FIRE FIGHTER ADVISORY COMMITTEE
AGENDA
June 11, 2020, 9:00 A.M.

Due to Governor Greg Abbott's March 13, 2020 proclamation of a state of disaster affecting all counties in Texas due to the Coronavirus (COVID-19) and the Governor's March 16, 2020 suspension of certain provisions of the Texas Open Meetings Act, the June 11, 2020 meeting of the Texas Commission on Fire Protection, Fire Fighter Advisory Committee will be held by video conference, as authorized under Texas Government Code section 551.125.

Members of the public will have access and a means to participate in this meeting, by video conference at https://zoom.us/webinar/register/WN_MRIaIEFwSj2e7MO3N2WnZA. An electronic copy of the agenda is available at www.tcfp.texas.gov, as well as a copy of the meeting materials. A recording of the meeting will be available after June 11, 2020 on the agency website at www.tcfp.texas.gov.

For public participants who would like to comment, when the board reaches the public comment item, you will be recognized by name and will be given the opportunity to speak. All public comments will be limited to 3 minutes.

1. **Roll call and excuse of committee member absences.**
2. **Election of officers.**
3. **Adoption of December 4, 2019 Fire Fighter Advisory Committee meeting minutes.**
4. **Report from the Curriculum and Testing Committee regarding possible changes to the Certification Curriculum Manual as follows:**
    a. **Basic Fire Suppression Curriculum**
    b. **Hazardous Materials Curriculum**
    c. **Fire Instructor Curriculum**
    d. **New Incident Commander Curriculum**
    e. **Incident Safety Officer (reference list)**
5. **Review of 2019 data collected on fire fighter injuries and development of recommendations to be submitted to the commission for approval and submission to the State Fire Marshal's Office.**
6. **Public comments.**
7. **Subjects for future agenda items.**
8. **Future meeting dates.**
9. **Adjourn meeting.**

1. **Roll call and excuse of committee member absences.**

2. Election of officers.

3. **Adoption of the December 4, 2019 Fire Fighter Advisory Committee meeting minutes.**

TEXAS COMMISSION ON FIRE PROTECTION

Presiding Officer Michael Wisko called the December 4, 2019 meeting of the Fire Fighter Advisory Committee to order at 9:00 a.m. at the William B. Travis Building, 1701 N. Congress Ave., Room 1-104, in Austin, Texas.

Member Attendance	Jim Reidy Jason Collier	Michael Wisko Daniel DeYear	Vince Abrigo Daniel Buford	Ken Swindle Daniel Anderson*	Keith Schmidt** *absent entire meeting **absent part of meeting

Staff Paul Maldonado Deborah Cowan Sylvia Miller

1.	Roll call	Presiding Officer, Michael Wisko called roll and a quorum was present.
2.	Adoption of Minutes	A motion was made by Jim Reidy and seconded by Daniel DeYear to approve the minutes of the September 19, 2019, fire fighter advisory committee meeting as discussed. The motion carried.
3.	Curriculum & Testing Committee Report	Nothing to report.
4.	37 TAC, Chapter 427 Training Facility Certification	A motion was made by Jason Collier and seconded by Jim Reidy to recommend to the commission to send the proposed amendments to 37 TAC, Chapter 427, §427.13, §427.203 and §427.305 to the Curriculum and Testing Committee for further review and possible solution. The motion carried.
5.	37 TAC, Chapter 437, Fees	After discussion no action taken.
6.	37 TAC, Chapter 445, Administrative Inspections and Penalties	After discussion no action taken.
7.	Future meeting dates/agenda items	Future meeting dates scheduled for 2020 were: March 19th, June 11th, September 17th, December 10th with all meetings beginning at 9:00 a.m. Future agenda items noted were: Update on 37 TAC, Chapter 445 (if needed); and report on number of violations found during compliance inspections
8.	Adjournment	A motion was made by Daniel DeYear and seconded by Jason Collier to adjourn. The motion carried.

Michael Wisko
Presiding Officer

4. Report from the Curriculum and Testing Committee regarding possible changes to the Certification Curriculum Manual as follows:

a. Basic Fire Suppression Curriculum

b. Hazardous Materials Curriculum

c. Fire Instructor Curriculum

d. New Incident Commander Curriculum

e. Incident Safety Officer (reference list)

4. Report from the Curriculum and Testing Committee regarding possible changes to the Certification Curriculum Manual as follows:

a. Basic Fire Suppression Curriculum

CERTIFICATION CURRICULUM MANUAL

CHAPTER ONE

BASIC FIRE SUPPRESSION

NFPA 1001 201913 edition

Effective January 1, 2021January 1, 2014

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

REFERENCE LIST FOR THE BASIC FIRE SUPPRESSION CURRICULUM

Certified Training Facilities approved to teach this curriculum must have the following reference materials:

Certification Curriculum Manual. Austin, TX: Texas Commission on Fire Protection. Current issue.

Essentials of Fire Fighting (**7** ~~6~~th ed.) (201**8**~~3~~). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association.

Evidence-Based Practices for Strategic and Tactical Firefighting (2016). Burlington, MA: Jones & Bartlett Learning.

Fundamentals of Fire Fighter Skills ***and Hazardous Materials Response*** (**4**th ~~3~~rd ed.) (201**9**4). **Burlington** ~~Sudbury~~, MA: Jones and Bartlett Publishers, Inc.

NFPA 1001: Standard for Fire Fighter Professional Qualifications (201**9**~~3~~ ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

Standards Manual for Fire Protection Personnel. Austin, TX: Texas Commission on Fire Protection. Current issue.

Note to training providers:
The reference lists for Hazardous Materials Awareness and Operations are located in Chapter 6 of the Certification Curriculum Manual.

CHAPTER ONE
BASIC FIRE SUPPRESSION
CURRICULUM OUTLINE

INTRODUCTION

The History of the Curriculum and Testing Committee

The Curriculum and Testing Committee was created and appointed by the commission to periodically review and recommend changes to the commission's testing and training programs. Testing committee members met for the first time on August 24, 1989 in response to the need for certification exams to be administered by the Commission. The intent of the exams is to verify competency for the performance of fire service duties within the State of Texas.

Upon a recommendation in December 1991, through action of the Fire Protection Personnel Advisory Committee and the Commission, approximately one-third of the original twenty-one members were asked to maintain an active role on the committee. In January 1994, there were two more members added to the testing committee. The current Curriculum and Testing Committee consists of eleven fire service professionals including fire officers, college instructors, and fire fighters from around the state.

Committee members are charged with development and review of curricula, test questions, and the testing process leading to certifications based on NFPA Professional Qualifications standards. Review and development of curricula, test questions and performance skill evaluations are integral to the accreditation process as required by the International Fire Service Accreditation Congress.

The amount of questioning and discussion incurred at the meetings, along with the mixture of diverse fire service professionals representing areas within the state, serve as a means for validating curriculum competencies and objectives. It is in the spirit of the fire service of Texas that these individuals contribute to the development of a meaningful testing process for fire service certifications in the state.

CHAPTER ONE
BASIC FIRE SUPPRESSION
CURRICULUM OUTLINES

BASIC FIRE SUPPRESSION		
SECTIONS	**SUBJECT**	**RECOMMENDED HOURS**
101-45.1; 102-56.1	General	
101-45.2; 102-56.2	Fire Department Communications	
101-45.3; 102-56.3	Fireground Operations	
102-56.4	Rescue Operations	
101-45.5	Preparedness and Maintenance	
102-56.5	Fire and Life Safety Initiatives, Preparedness and Maintenance	
601; 602; 603-6.2; 603-6.6	Hazardous Materials Awareness, Operations, Mission Specific as identified in Chapter Six	
	TOTAL RECOMMENDED HOURS	**468***

*TOTAL RECOMMENDED HOURS include Fire Fighter I, Fire Fighter II, Awareness and Operations

FIREFIGHTER I CURRICULUM OUTLINE		
SECTION	**SUBJECT**	**RECOMMENDED HOURS**
101-45.1	General	
101-45.2	Fire Department Communications	
101-45.3	Fireground Operations	
101-45.4	(Reserved for future use)	
101-45.5	Preparedness and Maintenance	
	TOTAL RECOMMENDED HOURS	**294**

FIREFIGHTER II CURRICULUM OUTLINE		
SECTION	**SUBJECT**	**RECOMMENDED HOURS**
102-56.1	General	
102-56.2	Fire Department Communications	
102-56.3	Fireground Operations	

102-~~5~~6.4	Rescue Operations	
102-~~5~~6.5	Fire and Life Safety Initiatives, Preparedness and Maintenance	
	TOTAL RECOMMENDED HOURS	**140**

CHAPTER SIX
HAZARDOUS MATERIALS AWARENESS AND OPERATIONS CURRICULUM OUTLINES

HAZARDOUS MATERIALS AWARENESS CURRICULUM OUTLINE		
SECTION	**SUBJECT**	**RECOMMENDED HOURS**
601-4.1	General	
601-4.2	**Recognition and Identification** ~~Analyzing the Incident~~	
601-4.3	**Initiate Protective Actions** ~~Planning the Response – Reserved – None required at this level~~	
601-4.4	**Notifications** ~~Implementing the Planned Response~~	
~~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**

Commented [MMA1]: All information taken from NFPA 1072-2017 and from new Hazmat Outlines, approved by LHavens, March 2020.

HAZARDOUS MATERIALS OPERATIONS CURRICULUM OUTLINE		
SECTION	**SUBJECT**	**RECOMMENDED HOURS**
602-5.1	General	
602-5.2	**Identify Potential Hazards** ~~Analyzing the Incident~~	
602-5.3	**Identify Action Options** ~~Planning the Response~~	
602-5.4	**Action Plan Implementation** ~~Implementing the Planned Response~~	
602-5.5	**Emergency Decontamination** ~~Evaluating Progress~~	

602-5.6	**Progress Evaluating and Reporting**~~Terminating the Incident~~ Reserved – None required at this level	
603-6.2; 603-6.6	Mission Specific – PPE and Product Control	
	TOTAL RECOMMENDED HOURS	**32**~~26*~~

Commented [MMA2]: All information taken from NFPA 1072-2017 and from new Hazmat Outlines, approved by LHavens, March, 2020.

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

*The reduction in Hazardous Materials recommended training hours from 48 hours (for stand-alone delivery as listed in the Hazardous Materials curriculum) to **32**~~26~~ hours is due to the duplication of certain training subjects in both the Hazardous Materials and Firefighter I training curricula (i.e. ICS, Foam, SCBA, Fire Chemistry/Science).

Course Instructor Information

Basic Fire Suppression

Overview

The Basic Fire Suppression curriculum is designed to provide clear guidance that ensures adequate presentation of the information required to meet the Job Performance Requirements (JPRs) of National Fire Protection Association (NFPA) 1001, *Standard for Fire Firefighter Professional Qualifications*, 2019~~3~~ edition.

The Basic Fire Suppression curriculum is found in chapter 1 of the Texas Commission on Fire Protection (TCFP) Curriculum Manual.

Certification Level	TCFP Section Number	NFPA 1001 Chapter
Fire Fighter I	101	4~~5~~
Fire Fighter II	102	5~~6~~

Layout

The NFPA numbering sequence is mirrored to allow easy correlation between this document and the NFPA Standard. For example, 101-4~~5~~.2.1 in the TCFP Fire Fighter I curriculum corresponds to NFPA 1001 - Fire Fighter I (i.e. chapter 4~~5~~), section 4~~5~~.2.1.

TCFP Standards Manual

It is critical that the course instructor review the chapters in the TCFP Standards Manual that apply to this curriculum. Of primary importance are the following chapters. Chapter 421, Standards for Certification; Chapter 437, Fees; Chapter 423~~31~~, Basic Fire Suppression Certification; Chapter 439, Examinations; Chapter 449, Certification as Head of a Prevention Only Department. These chapters do not address every issue that could impact this curriculum; therefore, the course instructor is encouraged to become familiar with the TCFP Standards Manual.

Supplemental Information

Instructors are expected to provide supplemental information if the text references used in the course do not provide adequate information to ensure successful completion of the JPRs as listed in the curriculum.

Components of the Curriculum

Each section of the curriculum identifies the NFPA JPR and subdivides the requisite knowledge requirements into learning components.

For example:

View within the Curriculum		Explanation
101-~~45~~.2.1	Initiate the response to a reported emergency, given the report of an emergency, fire department SOPs, and communications equipment, so that all necessary information is obtained, communications equipment is operated correctly, and the information is relayed promptly and accurately to the dispatch center.	**Section Number and NFPA JPR**
	Requisite Knowledge: Procedures for reporting an emergency; departmental SOPs for taking and receiving alarms, radio codes or procedures; and information needs of dispatch center.	**Requisite Knowledge Statement**
	a. Procedures for reporting an emergency ~~Procedures for reporting an emergency~~	**First part of Requisite Knowledge**
	1. Conventional phone **2. Cellular phone** **3. Call box** **4. Telecommunication Devices for the Deaf (TDD)** **5. Still Alarms** **6. Automatic alarms** ~~a. Conventional phone~~ ~~b. Cellular phone~~ ~~c. Call box~~ ~~d. Telecommunication Devices for the Deaf (TDD)~~ ~~e. Still alarms or walk-ins~~ ~~f. Automatic alarms~~	**Associated learning components**
	b. Departmental SOPs for taking and receiving alarms, radio codes or procedures ~~Departmental SOPs for taking and receiving alarms~~	**Second part of Requisite Knowledge**
	1. Nature of the emergency **2. Location of the emergency** **3. Caller information** **4. Responding units**	**Associated learning components**

5. Call back number 6. Clear speech-plain English 7. Emergency communications i. Emergency communications, per AHJ ii. Mayday iii. Evacuation order ~~g. Nature of emergency~~ ~~h. Location of emergency~~ ~~i. Caller information~~ ~~j. Responding units~~ ~~k. Call back number~~	
~~Radio codes or procedures~~	~~Third part of Requisite Knowledge~~
~~a. Clear speech – plain English~~ ~~b. Emergency communications~~	~~Associated learning components~~
c. Information needs of dispatch center ~~Information needs of dispatch center~~	Third ~~Fourth~~ part of Requisite Knowledge
~~l. Nature of emergency~~ ~~m. Location of emergency~~ ~~n. Caller information~~ ~~o. Responding units~~ ~~p. Call back number~~	~~Associated learning components~~
Requisite Skills: The ability to operate fire department communications equipment, relay information, and record information.	**Requisite Skills Statement**

Skills

NFPA Requisite Skill requirements are addressed in the corresponding skill sheets.

Instructional Skills – these training instruments are designed to be used during the instructional process to assist students in mastering requisite skills.

State Performance Evaluation Forms – these test instruments are designed to be used for Commission-designated performance skill evaluations. Refer to Texas Commission on Fire Protection Standards Manual Rule §439.11.

Descriptions of Certification Levels

Basic Structure Fire Protection Personnel are Fire Fighters who have met all the JPRs of Fire Fighter I and Fire Fighter II as defined in NFPA 1001 *Standard for Fire Fighter Professional Qualifications*. In order to satisfactorily meet these requirements, the Fire Fighter trainee must meet all the JPRs and demonstrate mastery of all the knowledge, skills, and ability requirements of the following components of the Texas Commission on Fire Protection Curriculum Manual:

- Chapter 1, Section 101 - 45 Basic Fire Suppression - Firefighter I
- Chapter 1, Section 102 - 56 Basic Fire Suppression - Firefighter II
- Chapter 6, Section 601 - 4 Hazardous Materials Awareness
- Chapter 6, Section 602 - 5 Hazardous Materials Operations
- Chapter 6, Section 603 - 6.2 Hazardous Materials Operations - Mission Specific Competencies - Using Personal Protective Equipment
- Chapter 6, Section 603 - 6.6 Hazardous Materials Operations - Mission Specific Competencies - Product Control

Training Recommendations

The Texas Commission on Fire Protection and other State and Federal agencies, require the adoption and use of an Incident Management/Command System. It is strongly recommended that students complete the following US Department of Homeland Security National Incident Management System training programs:

- IS-100 Introduction to Incident Command System (ICS)
- IS-200 ICS for Single Resources and Initial Action Incidents
- IS-700 National Incident Management System (NIMS), An Introduction
- IS-800 National Response Framework, An Introduction

Additional information can be found at **https://training.fema.gov/nims/** ~~http://training.fema.gov/IS/NIMS.asp~~

Promoting fire fighter safety is a fundamental component of any training program and one of the primary duties of the Texas Commission on Fire Protection. It is strongly recommended that all students attending a Basic Structure Fire Protection Personnel training program also complete the National Fallen Firefighters Foundation's ***Courage to Be Safe: So Everyone Goes Home*** program as a component of their Firefighter Safety training.

Additional information can be found at www.everyonegoeshome.com

CHAPTER ONE
FIRE SUPPRESSION
SUPPLEMENTAL OUTLINE

FIREFIGHTER I		
Section	Subject	Recommended Hours
101-~~45~~.1	**General**	36
~~45~~.1.1	General Knowledge • Organization • History • General safety • Fire behavior	
~~45~~.1.2	General Skill Requirements • PPC-donning and doffing (clothing) • Hoisting equipment using ropes • Locate information in departmental documents and standard or code materials	
101-~~45~~.2	**Fire Department Communications**	4
~~45~~.2.1	Initiate a response to a reported emergency	
~~45~~.2.2	Receive a telephone call	
~~45~~.2.3	Transmit and receive messages via the F.D. radio	
~~45~~.2.4	Activate an emergency call for assistance	
101-~~45~~.3	**Fireground Operations**	
~~45~~.3.1	SCBA use during emergency operations	32
~~45~~.3.2	Responding on apparatus to an emergency scene	2
~~45~~.3.3	Working at emergency scenes	4
~~45~~.3.4	Force entry into a structure	12
~~45~~.3.5	Exiting a hazardous area as a team	8
~~45~~.3.6	Ladders	32
~~45~~.3.7	Fire suppression - vehicle fires	8
~~45~~.3.8	Fire suppression - exterior Class A fires	8
~~45~~.3.9	Search and rescue in structures as a member of a team	16
~~45~~.3.10	Fire suppression - interior firefighting • Streams • Nozzles • Accident prevention • Two-in/two-out • Fire attack • Dangerous building conditions	32
~~45~~.3.11	Horizontal ventilation	10
~~45~~.3.12	Vertical ventilation	10
~~45~~.3.13	Overhaul a fire scene	8
~~45~~.3.14	Property conservation/loss control as a member of a team	8
~~45~~.3.15	Water supply- connect to a pumper	8
~~45~~.3.16	Portable fire extinguishers	8

45.3.17	Emergency scene lighting	4
45.3.18	Utility control	4
45.3.19	Fire suppression - wildland	8
45.3.20	Tie knots for hoisting tools	4
4.3.21	**Air monitoring**	
101-45.4	**Rescue Operations** This duty shall involve no requirements for Fire Fighter I.	**NONE**
101-45.5	**Preparedness and Maintenance**	
45.5.1	Equipment care and maintenance-ladders, ropes, SCBA, ventilation, salvage, and hand tools	4
45.5.2	Fire service hose • Rolls • Loads • Cleaning	24
	TOTAL RECOMMENDED HOURS	294
	FIREFIGHTER II	
Section	Subject	Recommended Hours
102-56.1	**General**	
56.1.1	General knowledge requirements • ICS/NIMS • Safety • Role of Firefighter II	8
56.1.2	General skills requirements • Utilizing ICS/NIMS • Determine need for command • Organize and coordinate in IMS until command is transferred • function within as assigned role in IMS	4
56.2	**Fire Department Communications**	
56.2.1	Incident reports – NFIRS/TXFIRS	4
56.2.2	Communicate the need for team assistance	4
56.3	**Fireground Operations**	
56.3.1	Fire suppression – Class B fires • Ignitable liquids • Firefighting foam	16
56.3.2	Fire suppression – interior fire attack • Hose • Nozzles and appliances • Building construction • Search and rescue • Ventilation • Forcible entry • Fire control	40
56.3.3	Fire suppression – Class B fires • Flammable gases	8

Commented [MMA1]: New section, added to NFPA 1001-2019

	• BLEVEs	
5~~6~~.3.4	Fire origin and cause determination • Types of evidence • Evidence protection	4
5~~6~~.4	**Rescue Operations**	
5~~6~~.4.1	Vehicle extrication	12
5~~6~~.4.2	Assisting special rescue operations team	12
5~~6~~.5	**Fire and Life Safety Initiatives, Preparedness and Maintenance**	0
5~~6~~.5.1	Fire safety surveys in occupied structures	4
5~~6~~.5.2	Public fire safety education	4
5~~6~~.5.3	Preincident planning	8
5~~6~~.5.4	Maintaining power equipment	4
5~~6~~.5.5	Hose testing	8
	TOTAL RECOMMENDED HOURS	140*
	GRAND TOTAL - FFI + FFII	**434***

TOTAL RECOMMENDED HOURS only include Fire Fighter I & Fire Fighter II without Awareness and Operations

*The recommended hours includes time for skills evaluation and is based on 12 students. Hours needed depends on the actual number of students.

Equipment List for the Basic Fire Suppression Curriculum

Appliances and Tools

- 1 ½ ” fog nozzle
- 2 ½ ” - 1 1/8” straight tip nozzle
- Other nozzle selection as determined by AHJ
- Cap
- Double female fittings
- Double male fittings
- Hose clamps
- Hose jacket
- Hose roller
- Hose strap, rope, or chain
- Hose test gate valve (1/4” hole drilled in the gate)
- Plug
- Reducer or increaser (fittings)
- Siamese
- Spanner wrenches
- Wye

Extinguishers and Supplies

- Dry chemical extinguisher (ordinary base or multi-purpose) 20 pounds
- CO_2 extinguisher
- Water extinguisher
- Class “A” fuel for live burns, such as hay
- Class “B” fuel for live burns, such as diesel fuel
- Metal pan – minimum 9 square feet

Extrication/Rescue Equipment/Materials

- Blanket
- Cribbing blocks
- Electrical connectors
- Electrical (extension) cords
- Electrical power supply (portable or mounted)
- Gas and water service cut-off
- Long spine board
- Stretcher
- Vehicle

Hose

- 1 ½" or 1 ¾" fire hose (300' minimum)
- 2 ½" or 3" fire hose (500' minimum)
- Large diameter hose (LDH) (300' minimum)
- Hard suction (intake) hose and strainer
- Hose and nozzles capable of flowing a minimum of 95 GPM
- Soft suction hose

Hand Tools

- Axe
- Bolt cutters
- Crowbar/pry bar
- Flat head axe
- Halligan tool
- Hand saw
- Hydrant wrench
- K-tool
- Pick-head axe
- Pike pole (8')
- Sledgehammer

Ladders

- 10' folding ladder
- 14' combination ladder
- 14' ladder with folding hooks
- 24' extension ladder
- 35' extension ladder
- Two straight ladders

Power Tools

- Chain saw
- Gasoline powered circular saw (K12)
- Hydraulic extrication ram
- Hydraulic extrication shears
- Hydraulic extrication spreaders

Protective Equipment/Clothing

- Full set of Protective Clothing for Structural Fire Fighting for each trainee, including:
    - Bunker pants, bunker coat, bunker boots, gloves, helmet, hood, and face piece
    - Self-Contained Breathing Apparatus with charged air cylinder
    - One extra fully charged air cylinder
    - Personal alert safety system (PASS)
- Manufacturer approved cleaning agent (for SCBA)
- Manufacturer approved cleaning equipment (for SCBA)
- Manufacturer approved sanitizing agent (for SCBA)

Rope

- ½" rope
- Safety line
- Various lengths and diameters of natural fiber rope
- Various lengths and diameters of synthetic rope
- Various lengths of 1-person or 2-person life safety rope

Salvage Equipment/Materials

- Brooms
- Buckets
- Tubs
- Mops
- Objects to cover, such as straight back chairs
- Salvage covers
- Squeegees
- Water vacuums

Simulation Equipment/Materials

- Burn building as recommended in NFPA 1403: Standard on Live Fire Training Evolutions
- Simulated wood roof with replaceable 4' x 8' wood panels over 2' x 8" roof joists on 24" centers
- Smoke house
- Training tower, minimum of 2 stories in height

Other Supplies/Equipment Needed

- Apparatus or hose testing device
- Equipment necessary for developing a foam stream
- Electric fan
- Fire hydrant
- Gasoline powered fan
- Pitot tube and gauge
- Portable radio
- Pumper
- Safety can with proper fuel mixture and funnel
- Scene tape
- Two apparatus equipped with pump and two separate water supplies
- Two portable tanks with water transfer equipment and appliances
- Water source

CERTIFICATION CURRICULUM MANUAL – CHAPTER ONE

FIRE FIGHTER I

SECTION 101

BASIC FIRE SUPPRESSION – FIREFIGHTER I

A Basic Structure Fire Protection Personnel is a fire fighter who has met all the job performance requirements (JPRs) of Fire Fighter I and Fire Fighter II as defined in NFPA 1001, *Standard for Fire Fighter Professional Qualifications*. In order to satisfactorily meet these requirements, the fire fighter trainee must meet all the JPRs and demonstrate mastery of all the knowledge, skills and ability requirements of the following components of the Texas Commission on Fire Protection Curriculum Manual:

- Chapter 1, Section 101 – ~~4~~ 5 Basic Fire Suppression – Firefighter I
- Chapter 1, Section 102 – ~~5~~ 6 Basic Fire Suppression – Firefighter II
- Chapter 6, Section 601 – 4 Hazardous Materials Awareness
- Chapter 6, Section 602 – 5 Hazardous Materials Operations
- Chapter 6, Section 603 – 6.1~~2~~ Hazardous Materials Operations – Mission Specific Competencies – Using Personal Protective Equipment
- Chapter 6, Section 603 – 6.6 Hazardous Materials Operations – Mission Specific Competencies – Product Control

101-~~4~~5.1 General

101-~~4~~5.1.1 General Knowledge Requirements

The organization of the fire department; the role of the Fire Fighter I in the organization; the mission of fire service; the fire department's standard operating procedures (SOPs) and rules and regulations as they apply to the Fire Fighter I; the value of life safety initiatives in support of the fire department mission and to reduce fire fighter line-of-duty injuries and fatalities; the role of other agencies as they relate to the fire department; **the signs and symptoms of behavioral and emotional distress;** aspects of the fire department's member assistance program; the importance of physical fitness and a healthy lifestyle to the performance of the duties of a fire fighter; the critical aspects of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

Commented [MMA1]: New wording, NFPA 1001-2019

101-A.4.1.1 A fire fighter should be able to identify the signs and symptoms associated with behavioral and emotional distress, as well as strategies and policies to address those stressors.

Commented [MMA2]: New annex material, NFPA 1001-2019

a. Organization of the fire department

1. History
2. Organizational structure

b. The role of the Fire Fighter I
c. Mission of the fire service
    1. Emergency activities
    2. Non-emergency activities
d. The value of life safety initiatives in support of the fire department mission and to reduce fire fighter line-of-duty injuries and fatalities
e. Role of other agencies as they relate to the fire department
f. Firefighter safety, health and wellness
g. Aspects of the fire department's member assistance program

h. Importance of physical fitness and a healthy lifestyle to the performance of duties of a fire fighter
i. The critical aspects of NFPA 1500, ***Standard on Fire Department Occupational Safety and Health Program***

~~1. Organization of the fire department~~
    ~~a. History~~
    ~~b. Organizational structure~~

~~2. The role of the Fire Fighter I~~

~~3. Mission of the fire service~~
    ~~a. Emergency activities~~
    ~~b. Non-emergency activities~~

~~4. The value of life safety initiatives in support of the fire department mission and to reduce fire fighter line-of-duty injuries and fatalities~~
    ~~a. Courage To Be Safe So Everyone Goes Home~~

~~5. Role of other agencies as they relate to the fire department~~
    ~~a. Private entities~~
    ~~b. Local~~
    ~~c. Regional~~
    ~~d. State~~
    ~~e. Federal~~

~~6. Aspects of the fire department's member assistance program~~

Commented [MMA3]: Subsections (a-e, old sheets) deleted, as per B. Ho-Gland.

Commented [MMA4]: New verbiage added, B. Ho-Gland.

Commented [MMA5]: Old sections 9-16 deleted, as per B. Ho-Gland.

a. Critical Incident Stress Management (CISM)
b. Member Assistance Programs (MAP)

7. Importance of physical fitness and a healthy lifestyle to the performance of duties of a fire fighter

8. The critical aspects of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*

9. The combustion process and key terms associated with fire science
    a. The four products of combustion commonly found in structural fires that create a life hazard
        i. Flame
        ii. Heat
        iii. Smoke
        iv. Gases and irritants
    b. Key terms
        i. Fire
        ii. Flash point
        iii. Ignition temperature
        iv. Fire point
        v. Flammable or explosive range
            a) LEL
            b) UEL
        vi. Boiling point
        vii. Oxidation
        viii. Pyrolysis
        ix. Reducing agent
        x. Vaporization
        xi. Combustion
        xii. Vapor density
        xiii. Specific gravity
        xiv. Thermal layering/heat stratification/thermal balance

10. Fire theory
    a. Key terms
        i. Fire triangle
        ii. Fire tetrahedron
    b. Describe the relationship of the concentration of oxygen to combustibility and firefighter safety

i. Ventilation-limited fire conditions
ii. Flow paths
iii. Door control

11. Identify and describe heat energy sources
    a. Chemical heat energy
    b. Electrical heat energy
    c. Mechanical heat energy
    d. Nuclear heat energy

12. The stages of a fire and describe the appropriate action to be taken for extinguishment
    a. Conditions and associated hazards and the appropriate actions to be taken for extinguishment
        i. Ignition
        ii. Growth
        iii. Decay - oxygen depleted
        iv. Flashover
        v. Fully developed/fully involved
        vi. Decay - fuel depleted
    b. Special conditions that occur during a fire's growth
        i. Flameover/rollover
        ii. Thermal layering
        iii. Ventilation-limited
        iv. Backdraft
    c. Methods of heat transfer
        i. Conduction
        ii. Convection
        iii. Radiation
        iv. Direct flame impingement

13. Physical states of matter in which fuels are commonly found
    a. Define and describe three types of fuel
        i. Solid fuel
        ii. Liquid fuel
        iii. Gaseous fuel
    b. Define and describe the chemical and physical properties of fuels
        i. Specific gravity
        ii. Vapor density

~~iii. The theory of surface to mass ratio as it relates to the combustion process~~

~~14. Identify and describe chemical by-products of combustion~~
~~a. Poisonous gases and irritants common in smoke~~
~~i. Carbon dioxide~~
~~ii. Carbon monoxide~~
~~iii. Hydrogen cyanide~~

~~15. Identify and describe the units of heat measurement~~
~~a. British thermal unit (BTU)~~
~~b. Fahrenheit (°F)~~
~~c. Celsius (°C)~~
~~d. Calorie (C)~~

~~16. Identify and describe the fire extinguishment theory~~
~~a. Describe the fire extinguishment theory~~
~~b. Identify and describe four methods of extinguishment~~
~~i. Temperature reduction~~
~~ii. Fuel removal~~
~~iii. Oxygen exclusion~~
~~iv. Inhibiting chemical reaction~~

~~17. Identify and describe the characteristics of water as it relates to its fire extinguishing potential~~
~~a. Identify and describe the physical characteristics of water~~
~~b. Identify and describe the Law of Specific Heat~~
~~c. Identify and describe the Law of Latent heat~~
~~d. Identify and describe the advantages and disadvantages of water as an extinguishing agent~~
~~e. Identify and describe the Law of Heat Flow~~

101-~~4~~5.1.2 General Skill Requirements

The ability to don personal protective clothing, doff personal protective clothing, **perform field reduction of contaminants** and prepare for reuse, hoist tools and equipment using ropes and the correct knot, and locate information in departmental documents and standard or code materials.

Commented [MMA6]: New wording, NFPA 1001-2019

a. Types of personal protective equipment (PPE) ensembles

1. Station/work uniforms
2. Structural firefighting
3. Wildland firefighting
4. Emergency medical service (EMS)
5. Specialized ensembles (i.e. ARFF, technical rescue)

b. Donning

c. Doffing/preparing for re-use

d. Care and maintenance
1. Basic inspection
2. Advanced inspection
3. Record keeping
4. Familiarization with NFPA 1851

e. Hoisting tools and equipment using ropes
1. Types of knots and hitches
i. Overhand safety
ii. Clove hitch
iii. Figure-eight
iv. Figure-eight on a bight
v. Figure-eight follow through
vi. Water knot
2. Department Standard Operating Procedures, AHJ

Commented [MMA7]: New section, added by B. Ho-Gland.

~~1. Types of personal protective equipment (PPE) ensembles~~
~~a. Station/work uniforms~~
~~b. Structural firefighting~~
~~c. Wildland firefighting~~
~~d. Emergency medical service (EMS)~~
~~e. Specialized ensembles (i.e. ARFF, technical rescue)~~

~~2. Donning~~

~~3. Doffing/preparing for re-use~~

~~4. Care and maintenance~~
~~a. Basic inspection~~

~~b. Advanced inspection~~
~~c. Record keeping~~
~~d. Familiarization with NFPA 1851~~

101-~~4~~5.2 ***Fire Department Communications***
This duty shall involve initiating responses, receiving telephone calls, and using fire department communications equipment to correctly relay verbal or written information, according to the JPRs in ~~4~~5.2.1 through ~~4~~5.2.4.

101-~~4~~5.2.1 Initiate the response to a reported emergency, given the report of an emergency, fire department SOPs, and communications equipment, so that all necessary information is obtained, communications equipment is operated correctly, and the information is relayed promptly and accurately to the dispatch center.

101-A.~~4~~5.2.1 The Fire Fighter I should be able to receive and accurately process information received at the station. Fire Fighters used as telecommunicators (dispatchers) should meet the requirements of NFPA 1061 for qualification standards and JPRs.

Requisite Knowledge~~:~~

a. Procedures for reporting an emergency~~:~~
1. Conventional phone
2. Cellular phone
3. Call box
4. Telecommunication Devices for the Deaf (TDD)
5. Still alarms or walk-ins
6. Automatic alarms

b. **D**~~d~~epartmental SOPs for taking and receiving alarms, radio codes, or procedures;
1. Nature of emergency
2. Location of emergency
3. Caller information
4. Responding units
5. Call back number
6. Clear speech – plain English
7. Emergency communications
i. Emergency communications per AHJ

ii. Mayday
iii. Evacuation order

c. ~~l~~and ~~i~~information needs of dispatch center~~.~~
1. Nature of emergency
2. Location of emergency
3. Caller information
4. Responding units
5. Call back number

~~**Requisite Knowledge**. Procedures for reporting an emergency; departmental SOPs for taking and receiving alarms, radio codes, or procedures; and information needs of dispatch center.~~

~~1. Procedures for reporting an emergency~~
~~a. Conventional phone~~
~~b. Cellular phone~~
~~c. Call box~~
~~d. Telecommunication Devices for the Deaf (TDD)~~
~~e. Still alarms or walk-ins~~
~~f. Automatic alarms~~

~~2. Departmental SOPs for taking and receiving alarms~~
~~a. Nature of emergency~~
~~b. Location of emergency~~
~~c. Caller information~~
~~d. Responding units~~
~~e. Call back number~~

~~3. Radio codes or procedures~~
~~1. Clear speech – plain English~~
~~2. Emergency communications~~
~~i. Emergency communications per AHJ~~
~~ii. Mayday~~
~~iii. Evacuation order~~

~~4. Information needs of dispatch center~~
~~a. Nature of emergency~~
~~b. Location of emergency~~
~~c. Caller information~~

Commented [MMA8]: Combined sections 2 and 3, old document

Commented [MMA9]: Formatting change requested by C & T committee. From here forward, each RKO outline begins with a letter rather than a number. Also: all material taken from RKO is ordered/presented according to the correlation sheet for NFPA 1001-2019.

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~~d. Responding units~~
~~e. Call back number~~

Requisite Skills. The ability to operate fire department communications equipment, relay information, and record information.

101-~~4~~5.2.2 Receive a telephone call, given a fire department phone, so that procedures for answering the phone are used and the caller's information is relayed.

Requisite Knowledge~~:~~.

a. **Fire department procedures for answering nonemergency telephone calls**~~.~~

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~~**Requisite Knowledge**. Fire department procedures for answering nonemergency telephone calls.~~

~~1. Departmental standard operating procedures (SOPs)~~

~~2. Phone etiquette~~

Requisite Skills. The ability to operate fire station telephone and intercom equipment.

101-~~4~~5.2.3 Transmit and receive messages via the fire department radio, given a fire department radio and operating procedures, so that the information is accurate, complete, clear, and relayed within the time established by the AHJ.

Requisite Knowledge~~:~~.

a. **Departmental radio procedures and etiquette routine traffic, emergency traffic, and emergency evacuation signals**~~.~~

Commented [MMA11]: Combined sections 1, 2 and 3, old document

~~**Requisite Knowledge**. Departmental radio procedures and etiquette for routine traffic, emergency traffic, and emergency evacuation signals.~~

~~1. Departmental radio procedures and etiquette for routine traffic~~

~~2. Departmental radio procedures and etiquette for emergency traffic~~

~~3. Departmental radio procedures and etiquette for emergency evacuation procedures~~

Requisite Skills. The ability to operate radio equipment and discriminate between routine and emergency traffic.

101-~~4~~5.2.4 Activate an emergency call for assistance, given vision-obscured conditions, PPE, and department SOPs, so that the fire fighter can be located and rescued.

101-A.~~4~~5.2.4 An emergency call for assistance can be initiated by the use of a radio, pass device, or other means to alert others to a fire fighter's need of emergency assistance. This should also include the term *mayday, fire fighter down*, or such other terminology as determined by the AHJ.

Requisite Knowledge~~:~~

a. Personnel accountability systems~~,~~
1. **Passport**
2. **Tag system**
3. **Electronic system**

b. E~~e~~mergency communication procedures~~,~~
1. **Radio**
2. **Face-to-face**
3. **Tagline**
4. **Evacuation signal**

c. E~~and e~~mergency evacuation methods~~.~~
1. **Roof escape**
2. **Balcony escape**
3. **Self rescue**
4. **Ladder escape**
5. **Room escape**

~~**Requisite Knowledge**. Personnel accountability systems, emergency communication procedures, and emergency evacuation methods.~~

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~~1. Personnel accountability systems~~
~~a. Passport~~
~~b. Tag system~~
~~c. Electronic system~~

~~2. Emergency communication procedures~~
~~a. Radio~~
~~b. Face-to-face~~
~~c. Tagline~~
~~d. Evacuation signal~~

~~3. Emergency evacuation methods~~
~~a. Roof escape~~
~~b. Balcony escape~~
~~c. Self rescue~~
~~d. Ladder escape~~
~~e. Room escape~~

Requisite Skills. The ability to initiate an emergency call for assistance in accordance with the AHJ's procedures, the ability to use other methods of emergency calls for assistance.

101-~~4~~5.3 ***Fireground Operations***
This duty shall involve performing activities necessary to ensure life safety, fire control, and property conservation, according to the JPRs in ~~4~~5.3.1 through ~~4~~5.3.2~~1~~19.

101-~~4~~5.3.1 Use self-contained breathing apparatus (SCBA) during emergency operations, given SCBA and other personal protective equipment, so that the SCBA is correctly donned, the SCBA is correctly worn, controlled breathing techniques are used, emergency procedures are enacted if the SCBA fails, all low-air warnings are recognized, respiratory protection is not intentionally compromised, and hazardous areas are exited prior to air depletion.

101-A.~~4~~5.3.1 The Fire Fighter I should already be wearing full protective clothing prior to the beginning of the SCBA-donning procedure. In addition to fully donning and activating the SCBA, the Fire Fighter I should also replace any personal protective clothing (i.e., gloves, protective hood, helmet, etc.)

displaced during the donning procedure and activate the personal alert safety system (PASS) device.

Requisite Knowledge: ~~,~~

a. Conditions that require respiratory protection~~,~~
   1. ~~-~~Oxygen deficiency
   2. Elevated temperatures
   3. Toxic environments
   4. Smoke (by-products of combustion)

b. U~~u~~ses and limitations of SCBA~~,~~
   1. Wearer
      i. Facial and long hair
      ii. Protective clothing
      iii. Donning
         a) Properly donned
         b) SCBA correctly worn
      iv. Eyeglasses or contact lenses
      v. Use in high or low temperatures
      vi. Communication
      vii. Personal alert safety system (PASS)
      viii. Physical conditioning
   2. Equipment
   3. Air supply
   4. Types of SCBA
      i. Open circuit
      ii. Closed circuit
      iii. Supplied air respirators (SARs)

c. C~~c~~omponents of SCBA~~,~~
   1. Backpack and harness assembly
   2. Air cylinder assembly
   3. Regulator assembly
   4. Face piece assembly
   5. PASS device
   6. Rapid Intervention Crew/Universal Air Connection (RIC/UAC)

d. D~~d~~onning procedures~~,~~

Commented [MMA12]: Deletions made as per Chris Watson, who researched section 101.4.3 to 101.4.3.5. New items (vi-viii) REPLACE old vi-viii section.

Commented [MMA13]: Combined item 3 from old sheet with item 2.

1. Over-the-head method
2. Coat method
3. Seat mounted
4. Compartment mounted

e. B~~b~~reathing techniques~~,~~
1. Controlled breathing
2. Skip breathing
3. Reilly Emergency Breathing Method

Commented [MMA14]: New item 3 to replace old one (""Buddy breathing") – as per C. Watson.

f. I~~i~~ndications for and emergency procedures used with SCBA~~,~~
1. Use of emergency by-pass or purge valve
2. Rapid Intervention Crew/Universal Air Connection (RIC/UAC)
3. Conservation of air

g. P~~and p~~hysical requirements of the SCBA wearer~~.~~
1. Cardiovascular conditioning
2. Respiratory conditioning
3. Psychological/emotional stability

h. Maintenance and inspections
1. Replacing a cylinder
2. Refilling a cylinder
3. Cleaning
4. Inspections
    i. Daily
    ii. Monthly
    ~~i.~~iii. Annually

~~**Requisite Knowledge**. Conditions that require respiratory protection, uses and limitations of SCBA, components of SCBA, donning procedures, breathing techniques, indications for and emergency procedures used with SCBA, and physical requirements of the SCBA wearer.~~

~~1. Conditions that require respiratory protection~~
~~1. Oxygen deficiency~~
~~2. Elevated temperatures~~
~~3. Toxic environments~~
~~4. Smoke (by-products of combustion)~~

2. Uses and limitations of SCBA
    1. Wearer
        i. Facial and long hair
        ii. Protective clothing
        iii. Donning
            a) Properly donned
            b) SCBA correctly worn
        iv. Eyeglasses or contact lenses
        v. Use in high or low temperatures
        vi. Accidental submersion
        vii. Communication
        viii. Working in teams
        ix. Personal alert safety system (PASS)
        x. Doffing
        xi. Physical conditioning
    2. Equipment
    3. Air supply

3. Types of SCBA
    a. Open circuit
    b. Closed circuit
    c. Supplied air respirators (SARs)

4. Components of SCBA
    a. Backpack and harness assembly
    b. Air cylinder assembly
    c. Regulator assembly
    d. Face piece assembly
    e. PASS device
    f. Rapid Intervention Crew/Universal Air Connection (RIC/UAC)

5. Donning and doffing procedures
    a. Over-the-head method
    b. Coat method
    c. Seat mounted
    d. Compartment mounted

6. Breathing techniques
    a. Controlled breathing

~~b. Buddy breathing~~

~~7. Indications for and emergency procedures used with SCBA~~
~~a. Use of emergency by-pass or purge valve~~
~~b. Rapid Intervention Crew/Universal Air Connection (RIC/UAC)~~
~~c. Conservation of air~~

~~8. Physical requirements of the SCBA wearer~~
~~a. Cardiovascular conditioning~~
~~b. Respiratory conditioning~~
~~c. Psychological/emotional stability~~

~~9. Maintenance and inspections~~
~~1. Replacing a cylinder~~
~~2. Refilling a cylinder~~
~~3. Cleaning~~
~~4. Inspections~~
~~ii. Daily~~
~~iii. Monthly~~
~~iv. Annually~~

Requisite Skills. The ability to control breathing, replace SCBA air cylinders, use SCBA to exit through restricted passages, initiate and complete emergency procedures in the event of SCBA failure or air depletion, and complete donning procedures.

101-4~~5~~.3.2 Respond on apparatus to an emergency scene, given personal protective clothing and other necessary personal protective equipment, so that the apparatus is correctly mounted and dismounted, seat belts are used while the vehicle is in motion, and other **PPE** ~~personal protective equipment~~ is correctly used.

101-A.4~~5~~.3.2 Other personal protective equipment might include hearing protection in cabs that have a noise level in excess of 90 dBa, eye protection for fire fighters riding in jump seats that are not fully enclosed, and SCBAs for those departments that require fire fighters to don SCBAs while en route to the emergency.

Requisite Knowledge: ~~.~~

a. Mounting and dismounting **procedures for riding fire apparatus**~~,~~
   1. **Hand grip**
   2. **Footing**
   3. **Seatbelt**

b. **H**~~h~~azards and ways to avoid hazards **associated with riding apparatus**~~,~~
   1. **Seated and utilizing safety restraints**
   2. **Secure loose objects in cab**
   3. **Close cab doors securely**

c. **P**~~p~~rohibited practices~~,~~
   1. **Seated and utilizing safety restraints**
   2. **Hearing protection, if required**
   3. **Secure loose objects in cab**

d. ~~and~~ **T**~~t~~ypes of department ~~**personal protective equipment (PPE)**~~ and the means for usage~~.~~
   1. **Hearing protection, if required**
   ~~1.~~2. **Safety bars/gates for unenclosed apparatus**

~~**Requisite Knowledge**. Mounting and dismounting procedures for riding fire apparatus, hazards and ways to avoid hazards associated with riding apparatus, prohibited practices, and types of department personal protective equipment and the means for usage.~~

~~1. Mounting procedures for riding fire apparatus~~
   ~~a. Hand grip~~
   ~~b. Footing~~
   ~~c. Seatbelt~~

~~2. Dismounting procedures for riding fire apparatus~~

~~3. Hazards associated with riding fire apparatus~~

~~4. Ways to avoid hazards associated with riding fire apparatus~~
   ~~a. Seated and utilizing safety restraints~~
   ~~b. Hearing protection, if required~~
   ~~c. Secure loose objects in cab~~

Commented [MMA15]: Combined sections 1 and 2, old document

Commented [MMA16]: Combined sections 3 and 4, old document. Deletions/additions recommended by Chris W (new "b" replaces old sheet "b"; "c" is new

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Commented [MMA17]: New wording added by Chris W.; old item "c" deleted.

~~5. Prohibited practices~~
~~a. Donning PPE while in motion~~
~~b. Riding on the tailboard/sideboards~~

~~6. Types of departmental personal protective equipment (PPE) and the means for usage~~
~~a. Safety bars/gates~~
~~b. Safety chains~~

Requisite Skills. The ability to use each piece of provided safety equipment.

101-~~4~~5.3.3 Establish and operate in work areas at emergency scenes, given protective equipment, traffic and scene control devices, structure fire and roadway emergency scenes, traffic hazards and downed electrical wires, **photovoltaic power systems, battery storage systems**, an assignment, and SOPs, so that procedures are followed, protective equipment is worn, protected work areas are established as directed using traffic and scene control devices, and the fire fighter performs assigned tasks only in established, protected work areas.

Commented [MMA18]: New addition, NFPA 1001-2019

101-A.~~4~~5.3.3 The safety of responders operating at an emergency scene is a key concern and one of the primary skills that the fire fighter must develop. Operations on roads and highways, on scenes where visibility is restricted, or where utilities can be unstable present a significant risk to the fire fighter as they dismount from apparatus and initiate emergency operations. Special protective equipment and constant attention to potential hazards is essential.

Fire fighters can be assigned to direct the movement of traffic at the scene or set up flare or cone lines either independently or in conjunction with law/traffic enforcement officers. A fire fighter assigned to this duty (either briefly or until the incident is under control) should understand the proper techniques to control traffic and the appropriate use of protective clothing and signaling equipment.

Federal law requires that fire department SOPs when operating on the roadway be in compliance with the US Department of Transportation publication *Manual on Uniform Traffic Control Devices.*

Requisite Knowledge: ~~:~~

a. Potential hazards involved in operating on emergency scenes including vehicle traffic, utilities, and environmental conditions~~;~~
   1. **Vehicle traffic**
   2. **Utilities**
   3. **Environmental conditions**

b. P~~p~~roper procedures for dismounting apparatus in traffic~~;~~
   1. **Look before you move**
   2. **Keep an eye on traffic**
   3. **Walk facing oncoming traffic**

c. P~~p~~rocedures for safe operation at emergency scenes~~;~~
   1. **Follow departmental SOPS**

d. ~~and the~~ **P**~~p~~rotective equipment available for members' safety on emergency scenes and work zone designations~~.~~

Commented [MMA19]: Verbiage added, C Watson.

Commented [MMA20]: New verbiage added, Chris W.

Commented [MMA21]: Combined sections 4 and 5, old document

~~**Requisite Knowledge**. Potential hazards involved in operating on emergency scenes including vehicle traffic, utilities, and environmental conditions; proper procedures for dismounting apparatus in traffic; procedures for safe operation at emergency scenes; and the protective equipment available for members' safety on emergency scenes and work zone designations.~~

~~1. Potential hazards involved in operating on emergency scenes~~
   ~~a. Vehicle traffic~~
   ~~b. Utilities~~
   ~~c. Environmental conditions~~

~~2. Proper procedures for dismounting apparatus in traffic~~

~~3. Procedures for safe operation at emergency scenes~~

~~4. Protective equipment available for members' safety on emergency scenes~~

~~5. Protective equipment available for members' safety on work zone designations~~

Requisite Skills. The ability to use personal protective clothing, deploy traffic and scene control devices, dismount apparatus, and operate in the protected work areas as directed.

101-~~4~~5.3.4 Force entry into a structure, given **PPE** ~~personal protective equipment~~ tools, and an assignment, so that the tools are used as designed, the barrier is removed, and the opening is in a safe condition and ready for entry.

101-A.~~4~~5.3.4 The Fire Fighter I should be able to force entry through wood, glass, and metal doors that open in and out, overhead doors, and windows common to the community or service area.

Requisite Knowledge~~:~~

a. Basic construction of typical doors, windows, and walls within the department's community or service area~~;~~

1. **Doors**
    - i. **Swinging doors**
        - a) **Inward opening**
        - b) **Outward opening**
        - c) **Double swing**
    - ii. **Wooden doors**
    - iii. **Metal doors**
    - iv. **Tempered plate glass doors**
    - v. **Revolving doors**
    - vi. **Sliding doors**
    - vii. **Overhead doors**
    - viii. **Fire doors**
2. **Windows**
    - i. **Single-Hung**
    - ii. **Double-Hung**
    - iii. **Casement windows (hinged)**
    - iv. **Projected windows (factory)**
    - v. **Awning and jalousie windows**
    - vi. **Plastic windows (high security)**
    - vii. **Screened or barred windows**
3. **Walls**
    - i. **Masonry and veneered walls**

Commented [MMA22]: Wording change (addition + deletion) recommended by Chris Watson

ii. Metal walls
iii. Wood frame walls
iv. Partition walls

b. Oeperation of doors, windows, and locks;

c. and the Ddangers associated with forcing entry through doors, windows, and walls.

d. Tools
1. Cutting tools
2. Prying tools
3. Pushing/pulling tools
4. Striking tools

e. Maintenance of tools
1. Axe heads and cutting edges
2. Wooden handles
3. Fiberglass handles
4. Unprotected metal surfaces
5. Power equipment

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Requisite Knowledge. Basic construction of typical doors, windows, and walls within the department's community or service area; operation of doors, windows, and locks; and the dangers associated with forcing entry through doors, windows, and walls.

1. Basic construction types within the department's community or service area
a. Doors
i. Swinging doors
a) Inward opening
b) Outward opening
c) Double swing
ii. Wooden doors
iii. Metal doors
iv. Tempered plate glass doors
v. Revolving doors
vi. Sliding doors

~~vii. Overhead doors~~
~~viii. Fire doors~~
~~2. Windows~~
~~i. Checkrail windows (double-hung)~~
~~i. Casement windows (hinged)~~
~~ii. Projected windows (factory)~~
~~iii. Awning and jalousie windows~~
~~iv. Plastic windows (high security)~~
~~v. Screened or barred windows~~
~~3. Walls~~
~~i. Masonry and veneered walls~~
~~ii. Metal walls~~
~~iii. Wood frame walls~~
~~iv. Partition walls~~

~~4. Dangers associated with forcing entry~~
~~a. Through doors~~
~~b. Through windows~~
~~c. Through walls~~

~~5. Tools~~
~~a. Cutting tools~~
~~b. Prying tools~~
~~c. Pushing/pulling tools~~
~~d. Striking tools~~

~~6. Maintenance of tools~~
~~a. Axe heads and cutting edges~~
~~b. Wooden handles~~
~~c. Fiberglass handles~~
~~d. Unprotected metal surfaces~~
~~e. Power equipment~~

Requisite Skills. The ability to transport and operate hand and power tools and to force entry through doors, windows, and walls using assorted methods and tools.

101-45.3.5 Exit a hazardous area as a team, given vision-obscured conditions, so that a safe haven is found before exhausting the air supply, others are not endangered, and the team integrity is maintained.

101-A.45.3.5 When training exercises are intended to simulate emergency conditions, smoke-generating devices that do not create a hazard are required. Several accidents have occurred when smoke bombs or other smoke-generating devices that produce a toxic atmosphere have been used for training exercises. All exercises should be conducted in accordance with the requirements of NFPA 1404.

Requisite Knowledge: ~~.~~

a. Personnel accountability systems~~,~~
- **1. Passport**
- **2. Tag system**
- **3. Electronic system**

b. C~~c~~ommunication procedures~~,~~
- **1. Radio**
- **2. Face-to-face**
- **3. Tagline**
- **4. Evacuation signal**

c. E~~e~~mergency evacuation methods~~,~~
- **1. Roof escape**
- **2. Balcony escape**
- **3. Self rescue**
- **4. Ladder escape**
- **5. Room escape**

d. W~~w~~hat constitutes a safe haven~~,~~
- **1. Absence of immediately dangerous to life and health (IDLH) hazard**
- **2. Area outside of collapse zone**

e. E~~e~~lements that create or indicate a hazard~~,~~

f. ~~and~~ **E**~~e~~mergency procedures for loss of air supply~~.~~
- **1. Stay calm/don't panic**

2. Activate PASS device
3. Declare Mayday

~~**Requisite Knowledge**. Personnel accountability systems, communication procedures, emergency evacuation methods, what constitutes a safe haven, elements that create or indicate a hazard, and emergency procedures for loss of air supply.~~

~~1. Personnel accountability systems~~
- ~~a. Passport~~
- ~~b. Tag system~~
- ~~c. Electronic system~~

~~2. Communication procedures~~
- ~~a. Radio~~
- ~~b. Face-to-face~~
- ~~c. Tagline~~
- ~~d. Evacuation signal~~

~~3. Emergency evacuation methods~~
- ~~a. Roof escape~~
- ~~b. Balcony escape~~
- ~~c. Self rescue~~
- ~~d. Ladder escape~~
- ~~e. Room escape~~

~~4. What constitutes a safe haven/refuge~~
- ~~a. Absence of immediately dangerous to life and health (IDLH) hazard~~
- ~~b. Area outside of collapse zone~~

~~5. Elements that indicate or create a hazard~~

~~6. Emergency procedures for loss of air supply~~
- ~~a. Stay calm/don't panic~~
- ~~b. Activate PASS device~~
- ~~c. Declare Mayday~~

Requisite Skills. The ability to operate as a team member in vision-obscured conditions, locate and follow a guideline, conserve air supply, and evaluate areas for hazards and identify a safe haven.

101-~~4~~5.3.6 Set up, **mount , ascend, dismount, and descend** ground ladders, given single and extension ladders, an assignment, and team members if needed, so that hazards are assessed, the ladder is stable, the angle is correct for climbing, extension ladders are extended to the necessary height with the fly locked, the top is placed against a reliable structural component, and the assignment is accomplished.

Commented [MMA23]: New wording, NFPA 1001-2019

101-A.~~4~~5.3.6 The fire fighter should be able to accomplish this task with each type and length of ground ladder carried by the department.

Requisite Knowledge~~:~~

a. Parts of a ladder~~,~~
1. **Beam**
2. **Bed section**
3. **Butt**
4. **Butt spur**
5. **Fly section**
6. **Guides**
7. **Halyard**
8. **Heat sensor label**
9. **Hooks**
10. **Pawls (dogs)**
11. **Protection plates**
12. **Pulley**
13. **Rail**
14. **Rung**
15. **Staypole**
16. **Stops**
17. **Tie rod**
18. **Tip**
19. **Truss blocks**

Commented [MMA24]: Added, CFrench

b. **H**~~h~~azards associated with setting up ladders~~,~~
1. **Overhead obstruction (energized power lines)**
2. **Lifting and moving**

3. Uneven terrain
4. Soft spots
5. High traffic areas (doorways)
6. Exposure to flame or heat

c. W~~w~~hat constitutes a stable foundation for ladder placement~~,~~
   1. Flat, stable surface
   2. Non-skid surface

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d. D~~d~~ifferent angles for various tasks~~,~~
   1. Roof
   2. Window
      i. Entry
      ii. Ventilation or working
      iii. Rescue set

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e. C~~c~~limbing techniques~~,~~

f. S~~s~~afety limits to the degree of angulation~~,~~

g. ~~and~~ W~~w~~hat constitutes a reliable structural component for top placement~~.~~

~~**Requisite Knowledge**. Parts of a ladder, hazards associated with setting up ladders, what constitutes a stable foundation for ladder placement, different angles for various tasks, safety limits to the degree of angulation, and what constitutes a reliable structural component for top placement.~~

~~1. Parts of a ladder~~
   ~~a. Beam~~
   ~~b. Bed section~~
   ~~c. Butt~~
   ~~d. Butt spur~~
   ~~e. Fly section~~
   ~~f. Guides~~
   ~~g. Halyard~~
   ~~h. Heat sensor label~~
   ~~i. Hooks~~

~~j. Pawls (dogs)~~
~~k. Protection plates~~
~~l. Pulley~~
~~m. Rail~~
~~n. Rung~~
~~o. Staypole~~
~~p. Stops~~
~~q. Tie rod~~
~~r. Tip~~

~~2. Hazards associated with setting up ladders~~
~~a. Overhead obstruction (energized power lines)~~
~~b. Lifting and moving~~
~~c. Uneven terrain~~
~~d. Soft spots~~
~~e. High traffic areas (doorways)~~
~~f. Exposure to flame or heat~~

~~3. What constitutes a stable foundation for ladder placement~~
~~a. Flat, stable surface~~
~~b. Non-skid surface~~

~~4. Different angles for various tasks~~
~~1. Roof~~
~~2. Window~~
~~i. Entry~~
~~ii. Ventilation or working~~
~~iii. Rescue set~~

~~5. Safety limits to the degree of angulation~~

~~6. What constitutes a reliable structural component for top placement~~

Requisite Skills. The ability to carry ladders, raise ladders, extend ladders and lock flies, determine that a wall and roof will support the ladder, judge extension ladder height requirements, and place the ladder to avoid obvious hazards**, mount, dismount, and descend the ladder**.

Commented [MMA25]: New wording, NFPA 1001-2019

101-**4**~~5~~.3.7 Attack a passenger vehicle fire operating as a member of a team, given **PPE** ~~personal protective equipment~~, attack line, and hand tools, so that

hazards are avoided, leaking flammable liquids are identified and controlled, protection from flash fires is maintained, all vehicle compartments are overhauled, and the fire is extinguished.

101-A.45.3.7 Passenger vehicles include automobiles, light trucks, and vans.

Requisite Knowledge: ~~.~~

a. Principles of fire streams as they relate to fighting automobile fires~~;~~
1. **Straight stream**
2. **Fog**

b. **P**~~p~~recautions to be followed when advancing hose lines toward an automobile~~;~~
1. **Uphill**
2. **Upwind**
3. **45-degree angle approach**

c. **O**~~o~~bservable results that a fire stream has been properly applied~~;~~

d. **I**~~i~~dentifying alternative fuels and the hazards associated with them~~;~~
1. **Compressed Natural Gas (CNG)**
2. **Liquified Petroleum Gas (CNG)**
3. **High voltage electrical power**
4. **Fuel cell**

e. **D**~~d~~angerous conditions created during an automobile fire~~;~~
1. **Energy absorbing bumpers**
2. **Hydraulic pistons (supports)**
   - i. **Trunks**
   - ii. **Tailgates**
   - iii. **Hoods**
3. **Shock absorbers/struts**
4. **Toxic by-products of combustion**
5. **Supplemental Restraint System (SRS)**
6. **Side Impact Protection System (SIPS)**
7. **Batteries**
8. **Combustible metals**

Commented [MMA26]: Verbiage deleted, CFrench

Commented [MMA27]: "Ethanol" (old sheet) deleted; "Fuel cell" added, CFrench

Commented [MMA28]: "Hatchbacks" eliminated, CFrench

f. C~~c~~ommon types of accidents or injuries related to fighting automobile fires and how to avoid them~~;~~

1. Traffic hazards
2. Injuries
3. Respiratory

g. H~~h~~ow to access locked passenger, trunk, and engine compartments~~;~~

h. ~~and~~ **M**~~m~~ethods for overhauling an automobile~~.~~

1. Chock wheels
2. Disable battery
3. Apply water thoroughly
~~1.~~**4. Confirm no leaking fluids or fuels**

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~~**Requisite Knowledge**. Principles of fire streams as they relate to fighting automobile fires; precautions to be followed when advancing hose lines toward an automobile; observable results that a fire stream has been properly applied; identifying alternative fuels and the hazards associated with them; dangerous conditions created during an automobile fire; common types of accidents or injuries related to fighting automobile fires and how to avoid them; how to access locked passenger, trunk, and engine compartments; and methods for overhauling an automobile.~~

~~1. Principles of fire streams as they relate to vehicle fires~~
~~a. Straight stream~~
~~b. Full fog~~
~~c. Power cone~~

~~2. Precautions to be followed when advancing hose lines toward a vehicle~~
~~a. Uphill~~
~~b. Upwind~~
~~c. 54 degree angle approach~~

~~3. Observable results that a fire stream has been properly applied~~

~~4. Identifying alternative fuels and the hazards associated with them~~
~~a. Compressed Natural Gas (CNG)~~
~~b. Liquefied Petroleum Gas (LPG)~~
~~c. Ethanol~~

~~d. High voltage electrical power~~

~~5. Dangerous conditions created during a vehicle fire~~
~~1. Energy absorbing bumpers~~
~~2. Hydraulic pistons (supports)~~
~~i. Hatchbacks~~
~~ii. Trunks~~
~~iii. Tailgates~~
~~iv. Hoods~~
~~3. Shock absorbers/struts~~
~~4. Toxic by-products of combustion~~
~~5. Supplemental Restraint System (SRS)~~
~~6. Side Impact Protection System (SIPS)~~
~~7. Batteries~~
~~8. Combustible metals~~

~~6. Common types of accidents or injuries related to fighting vehicle fires and how to avoid them~~
~~a. Traffic hazards~~
~~b. Injuries~~
~~c. Respiratory~~

~~7. Access compartments~~
~~a. Passenger~~
~~b. Trunk~~
~~c. Engine~~

~~8. Methods for overhauling a vehicle~~
~~a. Chock wheels~~
~~b. Disable battery~~
~~c. Apply water thoroughly~~
~~d. Confirm no leaking fluids or fuels~~

Requisite Skills. The ability to identify automobile fuel type; assess and control fuel leaks; open, close, and adjust the flow and pattern on nozzles; apply water for maximum effectiveness while maintaining flash fire protection; advance **1 ½ in. (38 mm)** ~~38 mm (1 ½ in.)~~ or larger diameter attack lines; and expose hidden fires by opening all automobile compartments.

101-45.3.8 Extinguish fires in exterior Class A materials, given fires in stacked or piled and small unattached structures or storage containers that can be fought from the exterior, attack lines, hand tools and master stream devices, and an assignment, so that exposures are protected, the spread of fire is stopped, collapse hazards are avoided, water application is effective, the fire is extinguished, and signs of the origin area(s) and arson are preserved.

101-A.45.3.8 The Fire Fighter I should be able to extinguish fires in stacked or piled materials such as hay bales, pallets, lumber, piles of mulch, sawdust, other bulk Class A materials, or small unattached structures that are attacked from the exterior. The tactics for extinguishing each of these types of fires are similar enough to be included in one JPR.

Live fire evolutions should be conducted in accordance with the requirements of NFPA 1403. It is further recommended that prior to involvement in live fire evolutions, the fire fighter demonstrate the use of SCBA in smoke and elevated temperature conditions.

In areas where environmental or other concerns restrict the use of Class A fuels for training evolutions, properly installed and monitored gas-fueled fire simulators might be substituted.

Requisite Knowledge:

a. Types of attack lines and water streams appropriate for attacking stacked, piled materials and outdoor fires:
   1. Types of attack lines
      i. ¾ or 1 inch (booster or reel line)
      ii. 1½ to 1¾ inches
      iii. 2 to 2½ inches
      iv. 3 inch or greater
   2. Water streams
      i. Low volume (less than 40 GPM)
      ii. Handline (40 to 350 GPM)
      iii. Master (350 GPM or greater)

b. Dangers — such as collapse — associated with stacked and piled materials:
   1. Collapse

Commented [ma29]: Next item after this one on old sheet – "b," "Energized sources"- deleted, C. French

~~Energized sources~~
2. Products of combustion
3. Increased weight (absorption of water)
4. Exposures

c. V~~v~~arious extinguishing agents and their effect on different material configurations~~;~~
   1. Water
      i. Cooling
      ii. Increased surface tension
   2. Foam
      i. Blanketing or smothering
      ii. Cooling
      iii. Decreased surface tension

d. T~~t~~ools and methods to use in breaking up various types of materials~~;~~
   1. Tools
      i. Pike pole
      ~~Rubbish hook~~
      ii. Rake
   2. Heavy equipment
      i. Tractor
      ii. Dozer

e. ~~the~~ D~~d~~ifficulties related to complete extinguishment of stacked and piled materials~~;~~
   1. Agent penetration
   2. Access
   3. Density of material
   4. Height and area of pile

f. W~~w~~ater application methods for exposure protection and fire extinguishment~~;~~
   1. Direct application
   2. Indirect application

g. D~~d~~angers such as exposure to toxic or hazardous materials associated with storage building and container fires~~;~~

Commented [ma30]: Item ii old sheet – "Rubbish hook" – and which came after this item deleted, as per C. French

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h. **O**~~o~~bvious signs of origin and cause; and techniques for the preservation of fire cause evidence~~.~~

1. **Burn pattern**
2. **Charring**
3. **Evidence of accelerants**
4. **Trailers**
5. **Protect evidence**
6. **Preserve area**
7. **Limit access**

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~~**Requisite Knowledge**. Types of attack lines and water streams appropriate for attacking stacked, piled materials and outdoor fires; dangers — such as collapse — associated with stacked and piled materials; various extinguishing agents and their effect on different material configurations; tools and methods to use in breaking up various types of materials; the difficulties related to complete extinguishment of stacked and piled materials; water application methods for exposure protection and fire extinguishment; dangers such as exposure to toxic or hazardous materials associated with storage building and container fires; obvious signs of origin and cause; and techniques for the preservation of fire cause evidence.~~

~~1. Types of attack lines and water streams appropriate for attacking stacked, piled materials and outdoor fires~~
   ~~a. Types of attack lines~~
      ~~i. ¾ or 1 inch (booster or reel line)~~
      ~~ii. 1½ to 1¾ inches~~
      ~~iii. 2 to 2½ inches~~
      ~~iv. 3 inch or greater~~
   ~~b. Water streams~~
      ~~i. Low volume (less than 40 GPM)~~
      ~~ii. Handline (40 to 350 GPM)~~
      ~~iii. Master (350 GPM or greater)~~

~~2. Dangers associated with stacked and piled materials~~
   ~~a. Collapse~~
   ~~b. Energized sources~~
   ~~c. Products of combustion~~
   ~~d. Increased weight (absorption of water)~~
   ~~e. Exposures~~

3. Various extinguishing agents and their effects on different material configurations
    a. Water
        i. Cooling
        ii. Increased surface tension
    b. Foam
        i. Blanketing or smothering
        ii. Cooling
        iii. Decreased surface tension

4. Tools and methods to use in breaking up various types of materials
    a. Tools
        i. Pike pole
        ii. Rubbish hook
        iii. Rake
    b. Heavy equipment
        i. Tractor
        ii. Dozer

5. Difficulties related to complete extinguishment of stacked and piled materials
    a. Agent penetration
    b. Access
    c. Density of material
    d. Height and area of pile

6. Water application methods for exposure protection and fire extinguishment
    a. Direct application
    b. Indirect application

7. Dangers such as exposure to toxic or hazardous materials associated with storage building and container fires

8. Obvious signs of origin and cause
    a. Burn pattern
    b. Charring
    c. Evidence of accelerants
    d. Trailers

~~9.~~1. Techniques for the preservation of fire cause evidence
   a. Protect evidence
   b. Preserve area
   c. Limit access

Requisite Skills. The ability to recognize inherent hazards related to the material's configuration, operate handlines or master streams, break up material using hand tools and water streams, evaluate for complete extinguishment, operate hose lines and other water application devices, evaluate and modify water application for maximum penetration, search for and expose hidden fires, assess patterns for origin determination, and evaluate for complete extinguishment.

101-~~4~~5.3.9 Conduct a search and rescue in a structure operating as a member of a team, given an assignment, obscured vision conditions, personal protective equipment, a flashlight, forcible entry tools, hose lines, and ladders when necessary, so that ladders are correctly placed when used, all assigned areas are searched, all victims are located and removed, team integrity is maintained, and team members' safety — including respiratory protection — is not compromised.

101-A.~~4~~5.3.9 Fire departments and training organizations must use reason and good judgment when training fire fighters to perform fire fighter rescue (rapid intervention) and self-survival evolutions. Training programs should put more emphasis on avoiding being trapped or disoriented in severe fire conditions than they should on getting out of them. While learning practical fire fighter rescue and self-survival skills is important, the particular skills that are taught should not require fire fighters to use tools beyond the limits of their intended use, should not place the fire fighters in an inordinate amount of danger during the training evolutions, and should be techniques that could realistically be required on the fireground. Fire departments and training organizations should balance the risk of injury or death to the fire fighter during training on these evolutions with the actual chance that they would ever need to apply them in real life. There are numerous accounts of fire fighters being injured or killed during rapid intervention and self-survival training of skills that will never, or should never, be performed on the fireground. One example of these questionable techniques is sliding down ground ladders. In the rare event that more than one fire fighter will need to exit the same window in an expedient manner, once the first fire fighter steps down two or three rungs,

they are not obstructing the next fire fighter from exiting the window. Yet, numerous fire fighters have been seriously injured or died attempting to perform this task in training.

From NFPA 1001 (2013 Edition) Annex, A.54.3.9(B):
"It is not the intent of the Technical Committee on Fire Fighter Professional Qualifications to prohibit a fire fighter from partially or completely removing the backpack assembly, as an emergency procedure only, to exit through a restricted passage, without removing the face piece or compromising the air supply in any manner."

Requisite Knowledge: ~~:~~

a. Use of forcible entry tools during rescue operations~~,~~
   1. Striking
   2. Prying
   3. Cutting
   4. Pushing/Pulling

Commented [MMA32]: "Pushing" added, CFrench

b. L~~l~~adder operations for rescue~~,~~
   1. Conscious victim
   2. Unconscious victim
   3. Fire fighter rescue

c. P~~p~~sychological effects of operating in obscured conditions and ways to manage them~~,~~

d. M~~m~~ethods to determine if an area is tenable~~,~~
   1. Level of heat
   2. Smoke
   3. Ventilation-limited fire conditions
   4. Creation of flow paths
   5. Structural stability
   6. Risk/benefit analysis

e. P~~p~~rimary and secondary search techniques~~,~~
   1. Define the following
      i. Primary search
      ii. Secondary search
   2. Search techniques

i. Right hand/left hand
ii. Large area/small area considerations
iii. Rope assisted, or hose line
iv. Tools (used to extend reach during search)
v. Vent-Enter-Isolate-Search (VEIS)

f. T~~t~~eam members' roles and goals~~,~~
1. Finding victims
2. Obtaining information on the extent of the fire
3. Search priorities
i. Closest to fire area
ii. Remainder of fire floor
iii. Floor above
iv. Floor below
4. Rescue vs. recovery

g. M~~m~~ethods to use and indicators of finding victims~~,~~
1. Probable victim locations
i. Behind doors
ii. Under windows
iii. On/under beds
iv. In closets
v. In bathtubs
2. Additional considerations
i. Type of occupancy
ii. Time of day
iii. Building size and arrangement
iv. Information from neighbors
v. Occupant indicators
a) Vehicles in driveway
b) Toys in yard

h. V~~v~~ictim removal methods ~~(including various carries),~~
1. Types of carries
i. Extremity carry
ii. Seat carry
iii. Chair carry
iv. Webbing drag
v. Blanket drag
vi. Ladder rescue

a) Conscious
b) Unconscious

2. Securing of a victim
   i. Basket
   ii. Stretcher
   iii. Long spine board
   iv. Other devices

i. ~~and~~ C~~c~~onsiderations related to respiratory protection~~.~~
   1. Personal use/work time
   2. Emergency procedures
   3. Rescue air/RIT pak
   4. Conditions for use
      i. Heat
      ii. Smoke
      iii. Oxygen deficiency
      iv. Toxic atmospheres

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~~**Requisite Knowledge**. Use of forcible entry tools during rescue operations, ladder operations for rescue, psychological effects of operating in obscured conditions and ways to manage them, methods to determine if an area is tenable, primary and secondary search techniques, team members' roles and goals, methods to use and indicators of finding victims, victim removal methods (including various carries), and considerations related to respiratory protection.~~

~~1. Use of forcible entry tools during rescue operations~~
   ~~a. Striking~~
   ~~b. Prying~~
   ~~c. Cutting~~
   ~~d. Pulling~~

~~2. Ladder operations for rescue~~
   ~~a. Conscious victim~~
   ~~b. Unconscious victim~~
   ~~c. Fire fighter rescue~~

~~3. Psychological effects of operating in obscured conditions and ways to manage them~~

4. Methods to determine if an area is tenable
    a. Level of heat
    b. Smoke
    c. Ventilation-limited fire conditions
    d. Creation of flow paths
    e. Structural stability
    f. Risk/benefit analysis

5. Primary and secondary search techniques
    1. Define the following
        i. Primary search
        ii. Secondary search
    2. Search techniques
        i. Right hand/left hand
        ii. Large area/small area considerations
        iii. Rope assisted, or hose line
        iv. Tools (used to extend reach during search)
        v. Vent-Enter-Isolate-Search (VEIS)

6. Team members' roles and goals
    1. Finding victims
    2. Obtaining information on the extent of the fire
    3. Search priorities
        i. Closest to fire area
        ii. Remainder of fire floor
        iii. Floor above
        iv. Floor below
    4. Rescue vs. recovery

7. Methods to use and indicators of finding victims
    1. Probable victim locations
        i. Behind doors
        ii. Under windows
        iii. On/under beds
        iv. In closets
        v. In bathtubs
    2. Additional considerations
        i. Type of occupancy
        ii. Time of day

~~iii. Building size and arrangement~~
~~iv. Information from neighbors~~
~~v. Occupant indicators~~
~~a) Vehicles in driveway~~
~~b) Toys in yard~~
~~3. Call out/listen~~
~~4. Victim sighting through opening (i.e. window/door)~~
~~5. Door control to prevent flow paths~~

~~8. Victim removal methods~~
~~1. Types of carries~~
~~i. Extremity carry~~
~~ii. Seat carry~~
~~iii. Chair carry~~
~~iv. Webbing drag~~
~~v. Blanket drag~~
~~vi. Ladder rescue~~
~~a) Conscious~~
~~b) Unconscious~~
~~2. Securing of a victim~~
~~i. Basket~~
~~ii. Stretcher~~
~~iii. Long spine board~~
~~iv. Other devices~~

~~9. Considerations related to respiratory protection~~
~~1. Personal use/work time~~
~~2. Emergency procedures~~
~~3. Rescue air/RIT pak~~
~~4. Conditions for use~~
~~i. Heat~~
~~ii. Smoke~~
~~iii. Oxygen deficiency~~
~~iv. Toxic atmospheres~~

Requisite Skills. The ability to use SCBA to exit through restricted passages, set up and use different types of ladders for various types of rescue operations, rescue a fire fighter with functioning respiratory protection, rescue a fire fighter whose respiratory protection is not

functioning, rescue a person who has no respiratory protection, and assess areas to determine tenability.

101-4~~5~~.3.10 Attack an interior structure fire operating as a member of a team, given an attack line, ladders when needed, personal protective equipment, tools, and an assignment, so that team integrity is maintained, the attack line is deployed for advancement, ladders are correctly placed when used, access is gained into the fire area, effective water application practices are used, the fire is approached correctly, attack techniques facilitate suppression given the level of the fire, hidden fires are located and controlled, the correct body posture is maintained, hazards are recognized and managed, and the fire is brought under control.

101-A.4~~5~~.3.10 The Fire Fighter I should be proficient in the various attack approaches for room and contents fires at three different levels (at grade, above grade, and below grade). Maintenance of body posture in the standard refers to staying low during initial attack, protecting oneself from falling objects, and otherwise using common sense given the state of the fire's growth or suppression. Live fire evolutions should be conducted in accordance with the requirements of NFPA 1403. It is further recommended that prior to involvement in live fire evolutions, the fire fighter demonstrates the use of SCBA in smoke and elevated temperature conditions. In areas where environmental or other concerns restrict the use of Class A fuels for training evolutions, properly installed and monitored gas-fueled fire simulators might be substituted.

Requisite Knowledge: ~~:~~

a. Principles of fire streams~~:~~
   1. Definitions
      i. Pressure
      ii. Friction loss
      iii. Elevation loss/gain
      iv. Fire stream
      v. Vaporization
      vi. Latent heat vaporization
      vii. British Thermal Unit (BTU)
      viii. Water hammer
   2. Fire streams
      i. Low-volume stream

ii. Handline stream
iii. Master stream
iv. Cooling/extinguishing properties

b. Types, design, operation, nozzle pressure effects, and flow capabilities of nozzles.
1. Solid stream
i. Types
ii. Advantages
iii. Disadvantages
iv. Flow rate
2. Fog stream
i. Types
ii. Advantages
iii. Disadvantages
iv. Flow rate
v. Water flow adjustment
a) Manually adjustable
b) Automatic (constant-pressure)
vi. Stream patterns
a) Straight stream
b) Narrow fog
c) Wide fog
vii. Broken stream
a) Types
b) Advantages
c) Flow rate
3. Specialty nozzles
i. Types
ii. Advantages
iii. Disadvantages
4. Solid stream nozzle
i. Components/parts
ii. Operating pressure
a) 50 psi hand line
b) 80 psi master stream
5. Fog stream nozzle
i. Components/parts
ii. Operating pressure
a) 100 psi hand line

Commented [MMA33]: Item iv (old sheet) eliminated as per Sam Baucom

b) 50-75 psi low pressure hand line
c) 100 psi master stream

6. Broken stream nozzle
   i. Components/parts
   ii. Operating pressure varies by design
7. Operating valves
   i. Ball valve
   ii. Slide valve
   iii. Rotary control valve
8. Flow selection
   i. Automatic
   ii. Adjustable
   iii. Fixed
9. Reach
   i. Solid stream
   ii. Fog stream
   iii. Broken stream
10. Nozzle reaction
   i. Solid stream
   ii. Fog stream
   iii. Broken stream
11. Water pattern
   i. Solid stream
   ii. Straight stream
   iii. Narrow fog
   iv. Wide fog
   v. Broken stream
12. Flow paths caused by air entrainment
   i. Solid or straight streams
   ii. Fog streams
13. Low volume nozzles – 40 GPM or less
14. Hand line nozzles – 40-350 GPM
15. Master stream nozzles – 350 GPM and above

Commented [MMA34]: Combined sections 3, 4, 5 and 6

c. P~~p~~recautions to be followed when advancing hose lines to a fire~~;~~
   1. Into a structure
   2. Up a stairway
   3. Down a stairway
   4. From a standpipe
   5. Up a ladder

d. Oobservable results that a fire stream has been properly applied;
   1. Direct attack
      i. Smoke
      ii. Heat
      iii. Flame
   2. Indirect attack
      i. Smoke
      ii. Heat
      iii. Flame
      iv. Patterns
         a) T pattern
         b) Z pattern
         c) O pattern
   3. Combination attack
      i. Smoke
      ii. Heat
      iii. Flame
      iv. Patterns
         a) T pattern
         b) Z pattern
         c) O pattern

e. Ddangerous building conditions created by fire;
   1. Flashover
   2. Rollover
   3. Ventilation-limited
   4. Backdraft
   5. Smoke explosion
   6. Imminent building collapse
   7. Fire behind, below, or above attack team
   8. Kinks or obstructions to the hose line
   9. Holes, weak stairs, or other fall hazards
   10. Suspended loads on fire-weakened supports
   11. Hazardous or highly flammable commodities likely to spill
   12. Electrical shock hazards

f. Pprinciples of exposure protection;
   1. Conduction
   2. Convection

3. Radiation

g. Ppotential long-term consequences of exposure to products of combustion;
   1. Respiratory diseases
   2. Cardiovascular diseases
   3. Stroke
   4. Cancer
   5. Death

h. Pphysical states of matter in which fuels are found;
   1. Solid
   2. Liquid
   3. Gaseous

i. Ccommon types of accidents or injuries and their causes;
   1. Common injuries
   2. Common activities
   3. Common causes
      i. Slips, trips, falls
      ii. Failure to wear proper PPE
      iii. Failure to follow safety procedures

j. Tthe application of each size and type of attack line, the role of the backup team in fire attack situations, attack and control techniques for grade level and above and below grade levels,
   1. 30-350 GPM
   2. 1½" to 3" hose lines
   3. AHJ
   4. "Two-in/two-out" rule
   5. Fire fighter rescue
   6. AHJ
   7. Grade level
      i. Single story structures
      ii. Large single story structures
   8. Above grade level
      i. Multi-story structures
      ii. Low-rise
      iii. Mid-rise
      iv. High-rise

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9. Below grade level
    i. Basements
    ii. Vaults
10. Coordinating fire attack with ventilation
11. Exterior offensive attack
    i. Blitz attack
    ii. Transitional attack
    iii. Softening the target

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k. ~~and~~ Eexposing hidden fires~~.~~
1. Overhaul techniques
    i. Opening walls
    ii. Opening floors
    iii. Opening ceilings
~~1.~~2. Other concealed spaces – special considerations

~~**Requisite Knowledge**. Principles of fire streams; types, design, operation, nozzle pressure effects, and flow capabilities of nozzles; precautions to be followed when advancing hose lines to a fire; observable results that a fire stream has been properly applied; dangerous building conditions created by fire; principles of exposure protection; potential long-term consequences of exposure to products of combustion; physical states of matter in which fuels are found; common types of accidents or injuries and their causes; and the application of each size and type of attack line, the role of the backup team in fire attack situations, attack and control techniques for grade level and above and below grade levels, and exposing hidden fires.~~

~~1. Principles of fire streams~~
~~a. Definitions~~
~~i. Pressure~~
~~ii. Friction loss~~
~~iii. Elevation loss/gain~~
~~iv. Fire stream~~
~~v. Vaporization~~
~~vi. Latent heat vaporization~~
~~vii. British Thermal Unit (BTU)~~
~~viii. Water hammer~~
~~b. Fire streams~~
~~i. Low-volume stream~~

ii. Handline stream
iii. Master stream
iv. Cooling/extinguishing properties

2. Types of nozzles
a. Solid stream
i. Types
ii. Advantages
iii. Disadvantages
iv. Flow rate
b. Fog stream
i. Types
ii. Advantages
iii. Disadvantages
iv. Flow rate
v. Water flow adjustment
a) Manually adjustable
b) Automatic (constant-pressure)
vi. Stream patterns
a) Straight stream
b) Narrow fog
c) Wide fog
vii. Broken stream
a) Types
b) Advantages
c) Disadvantages
d) Flow rate
c. Specialty nozzles
i. Types
ii. Advantages
iii. Disadvantages
iv. Flow rate

3. Design of nozzles
a. Solid stream nozzle
i. Components/parts
ii. Operating pressure
a) 50 psi hand line
b) 80 psi master stream
b. Fog stream nozzle

i. Components/parts
ii. Operating pressure
a) 100 psi hand line
b) 50-75 psi low pressure hand line
c) 100 psi master stream
c. Broken stream nozzle
i. Components/parts
ii. Operating pressure varies by design

4. Operation of nozzles
a. Operating valves
i. Ball valve
ii. Slide valve
iii. Rotary control valve
b. Flow selection
i. Automatic
ii. Adjustable
iii. Fixed

5. Nozzle pressure effects
a. Reach
i. Solid stream
ii. Fog stream
iii. Broken stream
b. Nozzle reaction
i. Solid stream
ii. Fog stream
iii. Broken stream
c. Water pattern
i. Solid stream
ii. Straight stream
iii. Narrow fog
iv. Wide fog
v. Broken stream
d. Flow paths caused by air entrainment
i. Solid or straight streams
ii. Fog streams

6. Flow capabilities of nozzles
a. Low volume nozzles – 40 GPM or less

b. Hand line nozzles – 40-350 GPM
c. Master stream nozzles – 350 GPM and above

7. Precautions to take when advancing hose lines to a fire
a. Into a structure
b. Up a stairway
c. Down a stairway
d. From a standpipe
e. Up a ladder

8. Observable results that a fire stream has been properly applied
a. Direct attack
i. Smoke
ii. Heat
iii. Flame
b. Indirect attack
i. Smoke
ii. Heat
iii. Flame
iv. Patterns
a) T pattern
b) Z pattern
c) O pattern
c. Combination attack
i. Smoke
ii. Heat
iii. Flame
iv. Patterns
a) T pattern
b) Z pattern
c) O pattern

9. Dangerous building conditions created by fire
a. Flashover
b. Rollover
c. Ventilation-limited
d. Backdraft
e. Smoke explosion
f. Imminent building collapse

g. Fire behind, below, or above attack team
h. Kinks or obstructions to the hose line
i. Holes, weak stairs, or other fall hazards
j. Suspended loads on fire-weakened supports
k. Hazardous or highly flammable commodities likely to spill
l. Electrical shock hazards

10. Principles of exposure protection
a. Conduction
b. Convection
c. Radiation
d. Direct flame impingement

11. Potential long-term consequences of exposure to products of combustion
a. Respiratory diseases
b. Cardiovascular diseases
c. Stroke
d. Cancer
e. Death

12. Physical states of matter in which fuels are found
a. Solid
b. Liquid
c. Gaseous

13. Common types of accidents or injuries and their causes
a. Common injuries
b. Common activities
c. Common causes
    i. Slips, trips, falls
    ii. Failure to wear proper PPE
    iii. Failure to follow safety procedures

14. Application of each size and type of attack line
a. 30-350 GPM
b. 1½" to 3" hose lines
c. AHJ

15. The role of the backup team in fire attack situations

~~a. "Two-in/two-out" rule~~
~~b. Fire fighter rescue~~
~~c. AHJ~~

~~16. Attack and control techniques for grade level, above grade level and below grade level~~
~~a. Grade level~~
~~i. Single story structures~~
~~ii. Large single story structures~~
~~b. Above grade level~~
~~i. Multi-story structures~~
~~ii. Low-rise~~
~~iii. Mid-rise~~
~~iv. High-rise~~
~~c. Below grade level~~
~~i. Basements~~
~~ii. Vaults~~
~~d. Coordinating fire attack with ventilation~~
~~e. Exterior offensive attack~~
~~i. Blitz attack~~
~~ii. Transitional attack~~
~~iii. Softening the target~~

~~17. Exposing hidden fires~~
~~a. Overhaul techniques~~
~~i. Opening walls~~
~~ii. Opening floors~~
~~iii. Opening ceilings~~
~~b. Other concealed spaces – special considerations~~
~~i. Utility chutes/shafts~~
~~ii. Cocklofts~~
~~iii. Attics~~
~~iv. Basements~~
~~v. Other~~

Requisite Skills. The ability to prevent water hammers when shutting down nozzles; open, close, and adjust nozzle flow and patterns; apply water using direct, indirect, and combination attacks; advance charged and uncharged **1 ½ in. (38 mm)** ~~38 mm (1 ½ in.)~~ diameter or larger hose lines up ladders and up and down interior and exterior stairways; extend

hose lines; replace burst hose sections; operate charged hose lines of **1 ½ in. (38 mm)** ~~38 mm (1 ½ in.)~~ diameter or larger while secured to a ground ladder; couple and uncouple various handline connections; carry hose; attack fires at grade level and above and below grade levels; and locate and suppress interior wall and subfloor fires.

101-~~4~~5.3.11 Perform horizontal ventilation on a structure operating as part of a team, given an assignment, **PPE** ~~personal protective equipment~~, ventilation tools, equipment, and ladders, so that the ventilation openings are free of obstructions, tools are used as designed, ladders are correctly placed, ventilation devices are correctly placed, and the structure is cleared of smoke.

Requisite Knowledge~~:~~

a. ~~The~~ **P**~~p~~rinciples, advantages, limitations, and effects of horizontal, mechanical, and hydraulic ventilation~~,~~

- **1. Purposes**
  - **i. Life safety**
  - **ii. Fire attack and extinguishment**
  - **iii. Fire spread control**
  - **iv. Reduce flashover potential**
  - **v. Reduce backdraft potential**
  - **vi. Property conservation**
- **2. Types of horizontal ventilation**
  - **i. Natural**
  - **ii. Mechanical**
    - **a) Positive pressure**
    - **b) Negative pressure**
    - **c) Hydraulic**
- **3. Advantages**
  - **i. Natural**
  - **ii. Mechanical**
    - **a) Positive pressure**
    - **b) Negative pressure**
    - **c) Hydraulic**
- **4. Limitations**
  - **i. Natural**
  - **ii. Mechanical**
    - **a) Positive pressure**

b) Negative pressure
c) Hydraulic

5. Effects
i. Natural
ii. Mechanical
a) Positive pressure
b) Negative pressure
c) Hydraulic

b. Ssafety considerations when venting a structure;
1. Life safety hazards
2. Determining the location and extent of the fire
3. Identifying building construction features
4. Flow paths
5. Predicting fire travel and growth

c. Ffire behavior in a structure;
1. Products of combustion
2. Behavior of heat, smoke and fire gases
3. Airflow characteristics

d. Tthe products of combustion found in a structure fire;
1. Heat
2. Smoke
3. Gases and irritants

e. Tthe signs, causes, effects, and prevention of backdrafts;
1. Signs
2. Causes
3. Effects
4. Prevention

f. Tthe relationship of oxygen concentration to life safety and fire growth.
1. Firefighter safety
1.2. Victim safety

Requisite Knowledge. The principles, advantages, limitations, and effects of horizontal, mechanical, and hydraulic ventilation; safety considerations when venting a structure; fire behavior in a structure; the products of combustion found in a structure fire; the signs, causes, effects,

and prevention of backdrafts; and the relationship of oxygen concentration to life safety and fire growth.

1. Principles, advantages, limitations and effects of horizontal, mechanical and hydraulic ventilation
    a. Purposes
        i. Life safety
        ii. Fire attack and extinguishment
        iii. Fire spread control
        iv. Reduce flashover potential
        v. Reduce backdraft potential
        vi. Property conservation
    b. Types of horizontal ventilation
        i. Natural
        ii. Mechanical
            a) Positive pressure
            b) Negative pressure
            c) Hydraulic
    c. Advantages
        i. Natural
        ii. Mechanical
            a) Positive pressure
            b) Negative pressure
            c) Hydraulic
    d. Limitations
        i. Natural
        ii. Mechanical
            a) Positive pressure
            b) Negative pressure
            c) Hydraulic
    e. Effects
        i. Natural
        ii. Mechanical
            a) Positive pressure
            b) Negative pressure
            c) Hydraulic

2. Safety considerations when venting a structure
    a. Life safety hazards
    b. Determining the location and extent of the fire

~~c. Identifying building construction features~~
~~d. Flow paths~~
~~e. Predicting fire travel and growth~~

~~3. Fire behavior in a structure~~
~~a. Products of combustion~~
~~b. Behavior of heat, smoke and fire gases~~
~~c. Airflow characteristics~~

~~4. Products of combustion found in a structure fire~~
~~a. Heat~~
~~b. Smoke~~
~~c. Gases and irritants~~

~~5. Backdrafts~~
~~a. Signs~~
~~b. Causes~~
~~c. Effects~~
~~d. Prevention~~

~~6. Relationship of oxygen concentration to life safety and fire growth~~
~~a. Firefighter safety~~
~~b. Victim safety~~

Requisite Skills. The ability to transport and operate ventilation tools and equipment and ladders, and to use safe procedures for breaking window and door glass and removing obstructions.

101-~~4~~5.3.12 Perform vertical ventilation on a structure as part of a team, given an assignment, **PPE** ~~personal protective equipment~~, ground and roof ladders, and tools, so that ladders are positioned for ventilation, a specified opening is created, all ventilation barriers are removed, structural integrity is not compromised, products of combustion are released from the structure, and the team retreats from the area when ventilation is accomplished.

Requisite Knowledge:~~.~~

a. The methods of heat transfer~~,~~
1. Conduction

2. Convection
3. Radiation

Commented [MMA38]: Item 1 d (old sheets) eliminated, as per Sam Baucom

b. The principles of thermal layering within a structure on fire;
   1. Definition of thermal layering (i.e. heat stratification, thermal balance)
   2. Thermal layering as it relates to ventilation
   3. Thermal layering in relation to life safety/rescue
   4. Roof styles
      i. Flat
      ii. Pitched
         1. Hip
         2. Gable
         3. Mansard
         4. Shed
         5. Gambrel

Commented [MMA39]: This section was stand-alone in old document as item 3. Added it to old section 2, new section b.

Commented [MMA40]: Preceding item (v on old sheets) eliminated, as per Sam Baucom

c. The techniques and safety precautions for venting flat roofs, pitched roofs, and basements;
   1. Weather conditions
   2. Determining need
   3. Exposures
   4. Obstructions/weight on roof
   5. Maintain structural support integrity during cut
   6. PPE
   7. Tools
   8. Ladder placement
   9. Sounding roof
   10. Slips, trips, and falls
   11. Reduced visibility
   12. Equipment safety
   13. Location of vent cut
   14. Secondary means of escape
   15. Personnel
   16. Types of cuts
   17. Angle of pitch
   18. Weather conditions
   19. Determining need
   20. Exposures
   21. Obstructions/weight on roof

Commented [MMA41]: Sam Baucom marked as a "?" item

22. Maintain structural support integrity during cut
23. PPE
24. Tools
25. Ladder placement
26. Sounding roof
27. Slips, trips, and falls
28. Reduced visibility
29. Equipment safety
30. Location of vent cut
31. Secondary means of escape
32. Personnel
33. Types of cuts
34. Determining need
35. Exposures
36. Obstructions/weight on floor above
37. Maintain structural support integrity during cut
38. PPE
39. Tools
40. Slips, trips, and falls
41. Reduced visibility
42. Equipment safety
43. Location of ventilation openings
44. Personnel

Commented [MMA42]: Sam Baucom marked as "?" item

Commented [MMA43]: Sam Baucom marked as a "?" item

Commented [MMA44]: Combined sections 4, 5 and 6, old documents

d. B~~b~~asic indicators of potential collapse or roof failure~~;~~
   1. Construction
      i. Solid beam
      ii. Light weight trusses
   2. Size up
      i. Sagging roof
      ii. Spongy roof
      iii. Melting tar
      iv. Smoke seepage
      v. Visible fire
   3. Elapsed time of fire

e. T~~t~~he effects of construction type and elapsed time under fire conditions on structural integrity~~;~~
   1. Fire spread

Commented [MMA45]: Combined sections 8 and 9, old document; kept item (Fire spread) since it was not mentioned in the reconstituted section header

~~a.~~f. ~~and~~ The advantages and disadvantages of vertical and trench/strip ventilation

Commented [MMA46]: Combined sections 10 and 11, old documents

~~**Requisite Knowledge**. The methods of heat transfer; the principles of thermal layering within a structure on fire; the techniques and safety precautions for venting flat roofs, pitched roofs, and basements; basic indicators of potential collapse or roof failure; the effects of construction type and elapsed time under fire conditions on structural integrity; and the advantages and disadvantages of vertical and trench/strip ventilation.~~

~~1. Methods of heat transfer~~
- ~~a. Conduction~~
- ~~b. Convection~~
- ~~c. Radiation~~
- ~~d. Direct flame impingement~~

~~2. Principles of thermal layering within a structure on fire~~
- ~~a. Definition of thermal layering (i.e. heat stratification, thermal balance)~~
- ~~b. Thermal layering as it relates to ventilation~~
- ~~c. Thermal layering in relation to life safety/rescue~~

~~3. Roof Styles~~
- ~~a. Flat~~
- ~~b. Pitched~~
  - ~~i. Hip~~
  - ~~ii. Gable~~
  - ~~iii. Mansard~~
  - ~~iv. Shed~~
  - ~~v. Butterfly~~
  - ~~vi. Gambrel~~

~~4. Techniques and safety precautions for venting flat roofs~~
- ~~a. Weather conditions~~
- ~~b. Determining need~~
- ~~c. Exposures~~
- ~~d. Obstructions/weight on roof~~
- ~~e. Maintain structural support integrity during cut~~
- ~~f. PPE~~
- ~~g. Tools~~

h. Ladder placement
i. Sounding roof
j. Slips, trips, and falls
k. Reduced visibility
l. Equipment safety
m. Location of vent cut
n. Secondary means of escape
o. Personnel
p. Types of cuts

5. Techniques and safety precautions for venting pitched roofs
   a. Angle of pitch
   b. Weather conditions
   c. Determining need
   d. Exposures
   e. Obstructions/weight on roof
   f. Maintain structural support integrity during cut
   g. PPE
   h. Tools
   i. Ladder placement
   j. Sounding roof
   k. Slips, trips, and falls
   l. Reduced visibility
   m. Equipment safety
   n. Location of vent cut
   o. Secondary means of escape
   p. Personnel
   q. Types of cuts

6. Techniques and safety precautions for venting basements
   a. Determining need
   b. Exposures
   c. Obstructions/weight on floor above
   d. Maintain structural support integrity during cut
   e. PPE
   f. Tools
   g. Slips, trips, and falls
   h. Reduced visibility
   i. Equipment safety
   j. Location of ventilation openings

~~k. Personnel~~

~~7. Basic indicators of potential collapse or roof failure~~
~~a. Construction~~
~~i. Solid beam~~
~~ii. Light weight trusses~~
~~b. Size up~~
~~i. Sagging roof~~
~~ii. Spongy roof~~
~~iii. Melting tar~~
~~iv. Smoke seepage~~
~~v. Visible fire~~
~~c. Elapsed time of fire~~

~~8. Effects of construction type~~
~~a. Structural integrity~~
~~b. Fire spread~~

~~9. Elapse time under fire conditions on structural integrity~~

~~10. Vertical ventilation~~
~~a. Advantages~~
~~b. Disadvantages~~

~~11. Trench/strip ventilation~~
~~a. Advantages~~
~~b. Disadvantages~~

Requisite Skills. The ability to transport and operate ventilation tools and equipment; hoist ventilation tools to a roof; cut roofing and flooring materials to vent flat roofs, pitched roofs, and basements; sound a roof for integrity; clear an opening with hand tools; select, carry, deploy, and secure ground ladders for ventilation activities; deploy roof ladders on pitched roofs while secured to a ground ladder; and carry ventilation-related tools and equipment while ascending and descending ladders.

101-**4**~~5~~.3.13 Overhaul a fire scene, given ~~personal protective equipment~~ **PPE, an** attack line, hand tools, a flashlight, and an assignment, so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.

Requisite Knowledge: ~~:~~

Commented [MMA47]: This section verified by Rich Bahena.

a. Types of fire attack lines and water application devices most effective for overhaul~~,~~
   1. Attack lines
   2. Fire extinguishers
   3. Buckets and basins
   4. SOPs per AHJ

b. W~~w~~ater application methods for extinguishment that limit water damage~~,~~
   1. Water conservation
   2. Soaking in buckets and basins

c. T~~t~~ypes of tools and methods and methods used to expose hidden fire~~,~~
   1. Prying and pulling tools
   2. Cutting tools
   3. Striking tools
   4. Power tools
   5. Thermal imaging camera
   6. Sight
   7. Touch
   8. Sound
   9. Electronic instruments

Commented [MMA48]: Combined sections 3 and 4, bold documents

d. D~~d~~angers associated with overhaul~~,~~
   1. Toxic atmospheric conditions
   2. Weakened floors and structural members
   3. Sharp objects and debris
   4. Utilities
   5. Slippery surfaces

e. O~~o~~bvious signs of area of origin or signs of arson~~,~~
   1. Burn patterns
   2. Smoke markings
   3. Physical evidence

f. ~~and~~ R~~r~~easons for protection of fire scene~~.~~
   1. Securing the scene

~~1.~~2. Preservation of evidence

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

~~1. Types of fire attack lines and water application devices most effective for overhaul~~
   ~~a. Attack lines~~
   ~~b. Fire extinguishers~~
   ~~c. Buckets and basins~~
   ~~d. SOPs per AHJ~~

~~2. Water application methods for extinguishment that limit water damage~~
   ~~a. Water conservation~~
   ~~b. Soaking in buckets and basins~~

~~3. Types of tools to expose hidden fire~~
   ~~a. Prying and pulling tools~~
   ~~b. Cutting tools~~
   ~~c. Striking tools~~
   ~~d. Power tools~~
   ~~e. Thermal imaging camera~~

~~4. Methods to expose hidden fires~~
   ~~a. Sight~~
   ~~b. Touch~~
   ~~c. Sound~~
   ~~d. Electronic instruments~~

~~5. Dangers associated with overhaul~~
   ~~a. Toxic atmospheric conditions~~
   ~~b. Weakened floors and structural members~~
   ~~c. Sharp objects and debris~~
   ~~d. Utilities~~
   ~~e. Slippery surfaces~~

~~6. Obvious signs of area of origin or signs of arson~~

~~a. Burn patterns~~
~~b. Smoke markings~~
~~c. Physical evidence~~

~~7. Reasons for protection of fire scene~~
~~a. Securing the scene~~
~~b. Preservation of evidence~~

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

101-~~4~~5.3.14 Conserve property as a member of a team, given salvage tools and equipment and an assignment, so that the building and its contents are protected from further damage.

Requisite Knowledge:~~.~~

Commented [MMA49]:

a. The purpose of property conservation and its value to the public~~.~~

b. M~~m~~ethods used to protect property~~.~~
1. Removal of property
2. Protection of property in place

c. T~~t~~ypes of and uses for salvage covers~~.~~
1. Types
2. Uses
i. Cover property
ii. Construct basins, chutes and catchalls
iii. Floor runners
iv. Debris removal

d. O~~o~~perations at properties protected with automatic sprinklers~~.~~

e. H~~h~~ow to stop the flow of water from an automatic sprinkler head~~.~~
1. Sprinkler stops and wedges
2. Operate main control valves

f. I~~i~~dentification of the main control valve on an automatic sprinkler system~~,~~

1. Sprinkler riser
2. Indication valves
i. Outside stem and yoke (OS&Y)
ii. Butterfly valve
iii. Wall post indicator valve (WPIV)
iv. Post indicator valve (PIV)
v. Post indicator valve assembly (PIVA)

g. ~~and~~ **F**~~f~~orcible entry issues related to salvage~~,~~

1. Utilize forcible entry when necessary
2. Try before you pry

h. ~~**and P**~~**procedures for protecting possible areas of origin and potential evidence**~~.~~

Commented [MMA50]: New wording, NFPA 1001-2019

~~**Requisite Knowledge**. The purpose of property conservation and its value to the public, methods used to protect property, types of and uses for salvage covers, operations at properties protected with automatic sprinklers, how to stop the flow of water from an automatic sprinkler head, identification of the main control valve on an automatic sprinkler system, and forcible entry issues related to salvage.~~

~~1. The purpose of property conservation and its value to the public~~

~~2. Methods used to protect property~~
~~a. Removal of property~~
~~b. Protection of property in place~~

~~3. Types and uses of salvage covers~~
~~a. Types~~
~~b. Uses~~
~~i. Cover property~~
~~ii. Construct basins, chutes and catchalls~~
~~iii. Floor runners~~
~~iv. Debris removal~~

~~4. Operations at properties protected with automatic sprinklers~~

~~5. How to stop the flow of water from an automatic sprinkler head~~
~~a. Sprinkler stops and wedges~~
~~b. Operate main control valves~~

~~6. Identification of the main control valve on an automatic sprinkler system~~
~~a. Sprinkler riser~~
~~b. Indicating valves~~
~~i. Outside stem and yoke (OS&Y)~~
~~ii. Butterfly valve~~
~~iii. Wall post indicator valve (WPIV)~~
~~iv. Post indicator valve (PIV)~~
~~v. Post indicator valve assembly (PIVA)~~

~~7. Forcible entry issues related to salvage~~
~~a. Utilize forcible entry only when necessary~~
~~b. Try before you pry~~

Requisite Skills. The ability to cluster furniture; deploy covering materials; roll and fold salvage covers for reuse; construct water chutes and catch-alls; remove water; cover building openings, including doors, windows, floor openings, and roof openings; separate, remove, and relocate charred material to a safe location while protecting the area of origin for cause determination; stop the flow of water from a sprinkler with sprinkler wedges or stoppers; and operate a main control valve on an automatic sprinkler system.

101-~~4~~5.3.15 Connect a fire department pumper to a water supply as a member of a team, given supply or intake hose, hose tools, and a fire hydrant or static water source, so that connections are tight and water flow is unobstructed.

101-A.~~4~~5.3.15 Static water sources can include portable water tanks, ponds, creeks, and so forth.

Requisite Knowledge:~~,~~

Commented [MMA51]: This section verified by Rich Bahena.

a. Loading and off-loading procedures for mobile water supply apparatus~~;~~
1. Portable water tanks

2. Drafting and siphoning appliances
3. Relay pumping apparatus
4. Fill apparatus and drafting appliances
5. Portable pumps
6. Fire hydrant appliances
7. Dry hydrants or suction supply points

b. Ffire hydrant operation~~;~~
   1. Types
      i. Dry barrel hydrant
      ii. Wet barrel hydrant
   2. Color coding
      i. Class AA light blue
      ii. Class A green
      iii. Class B orange
      iv. Class C red

c. ~~and S~~suitable static water supply sources, procedures, and protocol for connecting to various water sources~~.~~
   1. Lakes
   2. Rivers
   3. Streams
   4. Ponds
   5. Pools
   6. Hydrant to pumper connection
      i. Forward hose lay
      ii. Reverse hose lay
   ~~1.~~7. Drafting

Commented [MMA52]: Combined sections 3 & 4, old document

~~**Requisite Knowledge**. Loading and off-loading procedures for mobile water supply apparatus; fire hydrant operation; and suitable static water supply sources, procedures, and protocol for connecting to various water sources~~.

~~1. Loading and off-loading procedures for mobile water supply apparatus (AHJ)~~
   ~~a. Portable water tanks~~
   ~~b. Drafting and siphoning appliances~~
   ~~c. Relay pumping apparatus~~
   ~~d. Fill apparatus and drafting appliances~~

~~e. Portable pumps~~
~~f. Fire hydrant appliances~~
~~g. Dry hydrants or suction supply points~~

~~2. Fire hydrant operation~~
~~1. Types~~
~~i. Dry barrel hydrant~~
~~ii. Wet barrel hydrant~~
~~2. Color coding~~
~~i. Class AA light blue~~
~~ii. Class A green~~
~~iii. Class B orange~~
~~iv. Class C red~~

~~3. Suitable static water supply sources~~
~~a. Lakes~~
~~b. Rivers~~
~~c. Streams~~
~~d. Ponds~~
~~e. Pools~~

~~4. Procedures protocol for connecting to various water sources~~
~~1. Hydrant to pumper connection~~
~~i. Forward hose lay~~
~~ii. Reverse hose lay~~
~~2. Drafting~~

Requisite Skills. The ability to hand lay a supply hose, connect and place hard suction hose for drafting operations, deploy portable water tanks as well as the equipment necessary to transfer water between and draft from them, make hydrant-to-pumper hose connections for forward and reverse lays, connect supply hose to a hydrant, and fully open and close the hydrant.

101-4~~5~~.3.16 Extinguish incipient Class A, Class B, and Class C fires, given a selection of portable fire extinguishers, so that the correct extinguisher is chosen, the fire is completely extinguished, and correct extinguisher-handling techniques are followed.

101-A.4~~5~~.3.16 The Fire Fighter I should be able to extinguish incipient Class A fires such as wastebaskets, small piles of pallets, wood, or hay; Class B fires of approximately 9 ft^2 (0.84 m^2); and Class C fires where the electrical equipment is energized. If the Fire Department has Class D or K type extinguishers, the fire fighter should be knowledgeable on the devices and their use.

Requisite Knowledge: ~~:~~

Commented [MMA53]: This section verified by Rich Bahena

a. ~~The~~ Cclassifications of fire~~;~~
   1. Class A – ordinary combustible materials
   2. Class B – flammable and/or combustible liquids and gases
   3. Class C – energized electrical equipment
   4. Class D – combustible metals
   5. Class K – combustible cooking oils

b. ~~the~~ Ttypes of, rating systems for, and risks associated with each class of fire;
   1. Combustible materials
   2. Flammable liquids and gases
   3. Energized electrical equipment
   4. Combustible metals
   5. Combustible cooking oils
   6. Class A
      i. Wood panel
      ii. Wood crib
   7. Class B test
      i. Pan of flammable liquid
      ii. n-heptane used
   8. Class C test
      i. Applies to energized electrical fires only
      ii. De-energized is treated as a Class A, B or D fire
   9. Class D
      i. Metal fires only
      ii. Dry powder agent must be formulated to the specific metal
   10. Class K test
      i. Cooking oil fires
      ii. Uses a specialized extinguishing agent

Commented [MMA54]: Combined sections 2 & 3, old documents

c. ~~and the~~ **O**~~o~~perating methods of **portable extinguishers**
- **1. Acronym PASS**
  - **i. Pull**
  - **ii. Aim**
  - **iii. Squeeze**
  - **iv. Sweep**
- **2. Distance from the fire**

d. ~~and~~ **L**~~l~~imitations of portable extinguishers~~.~~
- **1. Type of agent for fire**
- ~~1.~~**2. Size of extinguisher for fire**

~~**Requisite Knowledge**. The classifications of fire; the types of, rating systems for, and risks associated with each class of fire; and the operating methods of and limitations of portable extinguishers.~~

~~1. Classifications of fire~~
- ~~a. Class A – ordinary combustible materials~~
- ~~b. Class B – flammable and/or combustible liquids and gases~~
- ~~c. Class C – energized electrical equipment~~
- ~~d. Class D – combustible metals~~
- ~~e. Class K – combustible cooking oils~~

~~2. Types of fire~~
- ~~a. Combustible materials~~
- ~~b. Flammable liquids and gases~~
- ~~c. Energized electrical equipment~~
- ~~d. Combustible metals~~
- ~~e. Combustible cooking oils~~

~~3. Rating systems for fire~~
- ~~1. Class A test~~
  - ~~i. Wood panel~~
  - ~~ii. Wood crib~~
- ~~2. Class B test~~
  - ~~i. Pan of flammable liquid~~
  - ~~ii. n-heptane used~~
- ~~3. Class C test~~
  - ~~i. Applies to energized electrical fires only~~

~~ii. De-energized equipment is treated as a class A, B or D fire~~
~~4. Class D test~~
~~i. Metal fires only~~
~~ii. Dry powder agent must be formulated to the specific metal~~
~~5. Class K test~~
~~i. Cooking oil fires~~
~~ii. Uses a specialized extinguishing agent~~

~~4. Operating methods of portable extinguishers~~
~~1. Acronym PASS~~
~~i. Pull~~
~~ii. Aim~~
~~iii. Squeeze~~
~~iv. Sweep~~
~~2. Distance from the fire~~

~~5. Limitations of portable extinguishers~~
~~a. Type of agent for fire~~
~~b. Size of extinguisher for fire~~

Requisite Skills. The ability to operate portable fire extinguishers, approach fire with portable fire extinguishers, select an appropriate extinguisher based on the size and type of fire, and safely carry portable fire extinguishers.

101-~~4~~5.3.17 **Operate emergency scene lighting** ~~Illuminate the emergency scene,~~ given fire service **lighting equipment, power supply** ~~electrical equipment~~, and an assignment so that **emergency scene lighting** ~~designated areas are illuminated and all~~ equipment is operated within the manufacturer's listed safety precautions.

Commented [MMA55]: Re-wording, NFPA 1001-2019

Requisite Knowledge~~:~~

Commented [MMA56]: This section verified by Rich Bahena.

a. Safety principles and practices~~,~~
1. Safely lifts equipment during set up
2. Locates the power plant in a remote and well-ventilated position
3. Arranges power cords neatly to minimize tripping hazards

4. **Ground Fault Interrupter (GFI) operations**

b. P~~p~~ower supply capacity and limitations~~,~~
1. **Power supply (portable or mounted)**
2. **Lights**
3. **Auxiliary equipment**
4. **Cords**
5. **Connectors**

c. ~~and~~ **L**~~l~~ight deployment methods~~.~~
1. **Safely lifts equipment during set up**
2. **Locates the power plant in a remote and well-ventilated position**
3. **Arranges power cords neatly to minimize tripping hazards**
~~1.~~4. **Ground Fault Interrupter (GFI) operations**

~~**Requisite Knowledge**. Safety principles and practices, power supply capacity and limitations, and light deployment methods~~.

~~1. Safety principles and practices~~
~~a. Safely lifts equipment during set up~~
~~b. Locates the power plant in a remote and well-ventilated position~~
~~c. Arranges power cords neatly to minimize tripping hazards~~
~~d. Ground Fault Interrupter (GFI) operations~~

~~2. Power supply capacity and limitations~~
~~a. Power supply (portable or mounted)~~
~~b. Lights~~
~~c. Auxiliary equipment~~
~~d. Cords~~
~~e. Connectors~~

~~3. Light deployment methods~~
~~a. Organizes lights to illuminate area sufficiently~~
~~b. Follow equipment operating guidelines~~

Requisite Skills. The ability to operate department power supply and lighting equipment, deploy cords and connectors, reset ground-fault interrupter (GFI) devices, and locate lights for best effect.

101-45.3.18 Turn off building utilities, given tools and an assignment, so that the assignment is safely completed.

Requisite Knowledge: ~~:~~

a. Properties, principles, and safety concerns for electricity, gas, and water systems~~;~~

b. **U**~~u~~tility disconnect methods and associated dangers;

1. Electrical

i. Electric meter

ii. Main breaker box

2. Natural gas meter

3. Water meter

4. Electrocution

5. Fire/explosion

~~a.~~**c.** ~~and~~ **U**~~u~~se of required safety equipment~~.~~

~~**Requisite Knowledge**. Properties, principles, and safety concerns for electricity, gas, and water systems; utility disconnect methods and associated dangers; and use of required safety equipment.~~

~~1. Electrical systems~~
~~a. Properties~~
~~b. Principles~~
~~c. Safety concerns~~

~~2. Gas systems~~
~~a. Properties~~
~~b. Principles~~
~~c. Safety concerns~~

~~3. Water systems~~
~~a. Properties~~
~~b. Principles~~
~~c. Safety concerns~~

~~4. Utility disconnect methods~~
~~1. Electrical~~

Commented [MMA57]: This section verified by Rich Bahena.

Commented [MMA58]: Combined sections 1, 2 and 3, old documents

Commented [MMA59]: Combined sections 4 and 5, old documents

~~i. Electric meter~~
~~ii. Main breaker box~~
~~2. Natural gas meter~~
~~3. Water meter~~

~~5. Dangers associated with utility disconnect methods~~
~~a. Electrocution~~
~~b. Fire/explosion~~

~~6. Use of required safety equipment (AHJ)~~

Requisite Skills. The ability to identify utility control devices, operate control valves or switches, and assess for related hazards.

101-~~4~~5.3.19 Combat a ground cover fire operating as a member of a team, given protective clothing, SCBA if needed, hose lines, extinguishers or hand tools, and an assignment, so that threats to property are reported, threats to personal safety are recognized, retreat is quickly accomplished when warranted, and the assignment is completed.

101-A.~~4~~5.3.19 Protective clothing is not personal protective clothing as used throughout the rest of this document. Some jurisdictions provide fire fighters with different clothing for ground cover fires than is worn for structural fires. This clothing can be substituted for structural protective clothing in order to meet the intent of this JPR.

Requisite Knowledge~~:~~

a. Types of ground cover fires~~,~~
1. Aerial fuel
2. Surface fuel
~~1.~~3. Subsurface fuel
b. P~~p~~arts of ground cover fires~~,~~
1. Head
2. Origin
3. Heel
4. Left and Right Flanks
5. Fingers
6. Spot fires
7. Island

Commented [MMA60]: Reworded, DMaretka

Commented [MMA61]: Verbiage deleted, DeMaretka

Commented [MMA62]: Verbiage added, DMaretka

8. Pocket
9. Green
10. Black

c. M~~m~~ethods to contain or suppress~~,~~
1. Direct attack
2. Indirect attack
3. Parallel attack

d. ~~and~~ S~~s~~afety principles and practices~~.~~
1. Proper use of PPE
2. Proper use of tools
3. Scene hazard awareness
4. Ten Standard Firefighting Orders
5. The Watch Out Situations

~~**Requisite Knowledge**. Types of ground cover fires, parts of ground cover fires, methods to contain or suppress, and safety principles and practices.~~

~~1. Types of ground cover fires~~
~~a. Crown fire – aerial fuel~~
~~b. Surface fire – surface fuel~~
~~c. Subsurface fire – subsurface fuel~~

~~2. Parts of ground cover fires~~
~~a. Head~~
~~b. Origin~~
~~c. Heel~~
~~d. Flanks~~
~~e. Fingers~~
~~f. Spot fires~~
~~g. Island~~
~~h. Perimeter~~
~~i. Green~~
~~j. Black~~

~~3. Methods to contain or suppress~~
~~a. Direct attack~~
~~b. Indirect attack~~

Commented [MMA63]: Reworded, DMaretka

Commented [MMA64]: Verbiage added, DMaretka

Commented [MMA65]: Added, DMaretka

Commented [MMA66]: Deleted section 5 – "Factors influencing the spread of ground fires": not present in the correlation sheets/NFPA standard

~~4. Safety principles and practices~~
~~a. Proper use of PPE~~
~~b. Proper use of tools~~
~~c. Scene hazard awareness~~

~~5. Factors influencing the spread of ground fires~~
~~a. Weather~~
~~b. Topography~~
~~c. Fuel~~

Requisite Skills. The ability to determine exposure threats based on fire spread potential, protect exposures, construct a fire line or extinguish with hand tools, maintain integrity of established fire lines, and suppress ground cover fires using water.

101-4~~5~~.3.20 Tie a knot appropriate for hoisting tool**s**, given ~~personal protective equipment~~ **PPE**, tools, ropes, and an assignment, so that the knots used are appropriate for hoisting tools securely and as directed.

Requisite Knowledge~~:~~**:**

a. Knot types and usage;
1. Safety knot or overhand knot
2. Half hitch
3. Clove hitch
4. Figure 8
5. Figure 8 on a bight
6. Figure 8 with a follow through
7. Bowline
8. Sheet bend or becket bend

b. T~~t~~he difference between life safety and utility rope~~;~~
1. Natural
2. Synthetic

c. R~~r~~easons for placing rope out of service~~;~~
1. Inspection
i. Routine
ii. After use

2. Storage
3. Maintenance

d. ~~the~~ Ttypes of knots to use for given tools, ropes, or situations~~;~~
1. Hoisting an axe
2. Pike pole
3. Hose
4. Ladder
5. Power tools or fans

e. H~~h~~oisting methods for tools and equipment~~;~~

f. ~~and~~ U~~u~~sing rope to support response activities~~.~~
1. Utility
~~1.~~2. Life safety/rescue

~~**Requisite Knowledge.** Knot types and usage; the difference between life safety and utility rope; reasons for placing rope out of service; the types of knots to use for given tools, ropes, or situations; hoisting methods for tools and equipment; and using rope to support response activities.~~

~~1. Knot types and use~~
~~a. Safety knot or overhand knot~~
~~b. Half hitch~~
~~c. Clove hitch~~
~~d. Figure 8~~
~~e. Figure 8 on a bight~~
~~f. Figure 8 with a follow through~~
~~g. Bowline~~
~~h. Sheet bend or becket bend~~

~~2. Differentiating between life safety and utility rope~~
~~a. Natural~~
~~b. Synthetic~~

~~3. Reasons for placing rope out of service~~
~~1. Inspection~~
~~i. Routine~~
~~ii. After use~~
~~2. Storage~~

~~3. Maintenance~~

~~4. Types of knots used for given tools, ropes or situations~~
~~a. Hoisting an axe~~
~~b. Pike pole~~
~~c. Hose~~
~~d. Ladder~~
~~e. Power tools or fans~~

~~5. Hoisting methods for tools and equipment~~

~~6. Using rope to support response activities~~
~~a. Utility~~
~~b. Life safety/rescue~~

Requisite Skills. The ability to hoist tools using specific knots based on the type of tool.

101-4.3.21 Air Monitoring
Operate air-monitoring instrument, given an air monitor and an assignment or task, so that the device is operated and the fire fighter recognizes the high- or low-level alarms of the air monitor and takes action to mitigate the hazard.

Requisite Knowledge:~~.~~

a. Knowledge of the various uses for an air monitor~~,~~

b. ~~the~~ ~~B~~basic operation of an air monitor~~,~~

~~a.~~c. ~~and~~ ~~R~~recognition and emergency actions to be taken upon the activation of the high- or low-level alarms of the air monitor~~.~~

Requisite Skills. The ability to operate the air monitor, recognize the alarms, and react to the alarms of the air monitor.

Commented [MMA67]: NEW SECTION: NFPA 1001-2019.

101-~~4~~5.4 Rescue Operations
This duty shall involve no requirements for Fire Fighter I.

101-~~4~~5.5 Preparedness and Maintenance

This duty shall involve performing activities that reduce the loss of life and property due to fire through response readiness, according to the JPRs in 45.5.1 and 45.5.2.

101-45.5.1 Clean and check ladders, ventilation equipment, SCBA, ropes, salvage equipment, and hand tools, given cleaning tools, cleaning supplies, and an assignment, so that equipment is clean and maintained according to manufacturer's or departmental guidelines, maintenance is recorded, and equipment is placed in a ready state or reported otherwise.

101-A.4.5.1 It is known that during an overhaul, many fire fighters remove their respiratory protective equipment and, as a result, expose themselves to probable contamination by carcinogens, toxic substances, and so forth. Respiratory protective equipment should be worn during overhaul, and all PPE should be washed down after any incident involving fire prior to leaving the scene.

Commented [MMA68]: All new annex material, NFPA 1001-2019

Requisite Knowledge:~~.~~

a. Types of cleaning methods for various tools and equipment~~,~~
1. **Ladders**
2. **Ventilation equipment**
3. **SCBA**
4. **Ropes**
5. **Salvage equipment**
6. **Hand tools**

b. C~~c~~orrect use of cleaning solvents~~,~~
1. **Mild diluted detergent**
2. **Safety solvent**
3. **Water**
4. **Manufacturer's recommendations**

Commented [MMA69]: Added, D. Maretka

c. ~~and~~ **M**~~m~~anufacturers or departmental guidelines for cleaning equipment and tools~~.~~

Commented [MMA70]: Added new item, as per the 2017 NFPA 1001 standard + correlation sheets

~~**Requisite Knowledge**. Types of cleaning methods for various tools and equipment, correct use of cleaning solvents, and manufacturer's or departmental guidelines for cleaning equipment and tools~~.

~~1. Types of cleaning methods for various tools and equipment~~
~~a. Ladders~~
~~b. Ventilation equipment~~
~~c. SCBA~~
~~d. Ropes~~
~~e. Salvage equipment~~
~~f. Hand tools~~

~~2. Correct use of cleaning solvents~~
~~a. Mild diluted detergent~~
~~b. Safety solvent~~
~~c. Water~~

Requisite Skills. The ability to select correct tools for various parts and pieces of equipment, follow guidelines, and complete recording and reporting procedures.

101-~~4~~5.5.1 Clean, inspect, and return fire hose to service, given washing equipment, water, detergent, tools, and replacement gaskets, so that damage is noted and corrected, the hose is clean, and the equipment is placed in a ready state for service.

Requisite Knowledge~~:~~.

a. Departmental procedures for noting a defective hose and removing it from service~~,~~

b. C~~c~~leaning methods~~,~~
1. Rinse
2. Gently scrub with mild detergent
3. Final rinse

c. ~~and~~ **H**~~h~~ose rolls and loads~~.~~
1. Straight roll
2. Donut roll
3. Twin donut roll
4. Self-locking twin donut roll
5. Forward lay
6. Reverse lay

7. Accordion load
8. Horseshoe load
9. Flat load
10. Triple layer load
11. Minuteman load

Commented [ma71]: Removed item "e" immediately after this one on old sheet "Reverse horseshoe load," as per Daryl Maretka.

Commented [ma72]: Removed item "I" immediately after this one on old sheet "Booster hose load reel," as per D. Maretka

Commented [ma73]: D. Maretka noted this is NOT in J & B but did not recommend removal.

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~~**Requisite Knowledge**. Departmental procedures for noting a defective hose and removing it from service, cleaning methods, and hose rolls and loads.~~

~~1. Departmental procedures for noting a defective hose and removing it from service (AHJ)~~

~~2. Cleaning methods~~
~~a. Rinse~~
~~b. Gently scrub with mild detergent~~
~~c. Final rinse~~

~~3. Hose rolls~~
~~a. Straight roll~~
~~b. Donut roll~~
~~c. Twin donut roll~~
~~d. Self-locking twin donut roll~~

~~4. Hose loads~~
~~a. Forward lay~~
~~b. Reverse lay~~
~~c. Accordion load~~
~~d. Horseshoe load~~
~~e. Reverse horseshoe load~~
~~f. Flat load~~
~~g. Triple layer load~~
~~h. Minuteman load~~
~~i. Booster hose load (reel)~~

Requisite Skills. The ability to clean different types of hose, operate hose washing and drying equipment, mark defective hose, and replace coupling gaskets, roll hose, and reload hose.

CERTIFICATION CURRICULUM MANUAL – CHAPTER ONE

FIRE FIGHTER II

SECTION 102
BASIC FIRE SUPPRESSION – FIREFIGHTER II

A Basic Structure Fire Protection Personnel is a Fire Fighter who has met all the job performance requirements of Fire Fighter I and Fire Fighter II as defined in NFPA 1001 *Standard for Fire Fighter Professional Qualifications*. In order to satisfactorily meet these requirements, the Fire Fighter trainee must meet all the job performance requirements (JPRs) and demonstrate mastery of all the knowledge, skills, and ability requirements of the following components of the Texas Commission on Fire Protection Certification Curriculum Manual:

- Chapter 1, Section 101 – 4~~5~~ Basic Fire Suppression – Firefighter I
- Chapter 1, Section 102 – 5~~6~~ Basic Fire Suppression – Firefighter II
- Chapter 6, Section 601 – 4 Hazardous Materials Awareness
- Chapter 6, Section 602 – 5 Hazardous Materials Operations
- Chapter 6, Section 603 – 6.1~~5.2~~ Hazardous Materials Operations – Mission Specific Competencies – Using Personal Protective Equipment
- Chapter 6, Section 603 – 6.6~~5.6~~ Hazardous Materials Operations – Mission Specific Competencies – Product Control

102-5~~6~~.1 General

102-5~~6~~.1.1 General Knowledge Requirements
Responsibilities of the Fire Fighter II in assuming and transferring command within an incident management system, performing assigned duties in conformance with applicable NFPA and other safety regulations and authority having jurisdiction AHJ procedures, and the role of a Fire Fighter II within the organization.

a. Identify and describe the purpose of an Incident Management System
1. **Common terminology**
2. **Modular organization**
3. **Integrated communications**
4. **Unified command structure**
5. **Incident Action Plan (IAP)**
6. **Manageable span of control**
7. **Predesignated incident facilities**
8. **Comprehensive resource management**
9. **Personnel Accountability**

b. Procedure for implementing the Incident Management System

Commented [MMA1]: All items from here forward have been renumbered according to system requested by Chris Watson.

Commented [MMA2]: New verbiage added by Pat McAuliff

Commented [MMA3]: New verbiage added by Pat McAuliff

Commented [MMA4]: Sections 2 and 3 of old document deleted, as per Pat McAuliff. This item is listed as number 4 on the old document.

1. Hazard and risk analysis
    i. What has occurred?
    ii. What is the current status of the emergency?
    iii. Is anyone trapped or injured?
    iv. Can the emergency be handled with the resources on scene or en route?
    v. Does the emergency fall within the scope of the individual's training?
2. Risk vs. benefit

c. Establishing command and the transfer of command
1. First on scene
    i. Investigation
    ii. Command
    iii. Pass command for fast attack/rescue
2. Considerations for transfer of command
    i. Arrival of senior staff
    ii. Specialized incident
    iii. Resource requirements
    iv. Time restraints
    v. Demobilization
3. Methods of transferring command
    i. Face-to-face
    ii. Via radio

d. Transferring command
1. Name of Incident
2. Incident Status
3. Safety Considerations
4. Goals and Objectives Listed in the IAP
5. Progress Toward Completion of Tactical Objectives
6. Deployment of Assigned Resources
~~1.~~7. Assessment of the Need for Additional Resources

Commented [MMA5]: Updated verbiage from Pat McAuliff

~~1. Identify and describe the purpose of an Incident Management System~~
~~i. Common terminology~~
~~ii. Modular organization~~
~~iii. Integrated communications~~
~~iv. Unified command structure~~
~~v. Consolidated action plans~~
~~vi. Manageable span of control~~
~~vii. Predesignated incident facilities~~
~~viii. Comprehensive resource management~~

2. Functions necessary to manage an incident effectively and the responsibilities within the Incident Management System
    i. Command
    ii. Safety
    iii. Liaison
    iv. Information
    v. Operations
    vi. Planning
    vii. Logistics
    viii. Finance/Administration

3. Components and functions of the operations section within the Incident Management System
    a. Incident Command
    b. Staging
    c. Branches
    d. Divisions and Groups
    e. Strike Teams and Task Forces
    f. Single Resources

4. Procedure for implementing the Incident Management System
    a. Hazard and risk analysis
        i. What has occurred?
        ii. What is the current status of the emergency?
        iii. Is anyone trapped or injured?
        iv. Can the emergency be handled with the resources on scene or en route?
        v. Does the emergency fall within the scope of the individual's training?
    b. Risk vs. benefit

5. Establishing command and the transfer of command
    1. First on scene
        i. Investigation
        ii. Command
        iii. Pass command for fast attack/rescue
    2. Considerations for transfer of command
        i. Arrival of senior staff
        ii. Specialized incident
        iii. Resource requirements
        iv. Time restraints
        v. Demobilization
    3. Methods of transferring command
        i. Face-to-face

~~ii. Via radio~~

~~6. Transferring command~~
~~a. Situation status report (sit stat)~~
~~b. Communicating transfer of command~~

102-~~5~~6.1.2 General Skill Requirements
The ability to determine the need for command, organize and coordinate an incident management system until command is transferred, and function within an assigned role in an incident management system.

102-~~5~~6.2 Fire Department Communications
This duty shall involve performing activities related to initiating and reporting responses, according to the JPRs in ~~6~~5.2.1 and ~~6~~5.2.2.

102-~~5~~6.2.1 Complete a basic incident report, given the report forms, guidelines, and information, so that all pertinent information is recorded, the information is accurate, and the report is complete.

Requisite Knowledge:~~.~~

a. Content requirements for basic incident reports~~,~~
1. National Fire Incident Reporting System (NFIRS)
2. Texas fire incident reporting system (TXFIRS)

b. T~~t~~he purpose and usefulness of accurate reports ~~and~~
1. A legal record of an incident ~~,~~
2. Provides information to officials for evaluation performance and making changes
3. Aids in determining departmental needs

c. C~~c~~onsequences of inaccurate reports~~,~~
1. Incorrect data
2. Litigation

d. R~~r~~equired coding procedures~~.~~
1. NFIRS
~~1.~~2. TXFIRS

~~**Requisite Knowledge.** Content requirements for basic incident reports, the purpose and usefulness of accurate reports, consequences of inaccurate reports, how to obtain necessary information, and required coding procedures.~~

Commented [MMA6]: Combined sections 2 and 3 from old curriculum sheets.

Commented [MMA7]: This item was formerly number 5 on the old sheets. Pat McAuliff requested that the item preceding it be STRIKEN (see strike-out section below).

Commented [MMA8]: From section 102 – 5.2.1 the end, each requisite knowledge item has been organized to align with the same items on the correlation sheets. Also: substituted letters for numbers (as per C & T) to identify each major point from the RK section.

~~1. Content requirements for basic incident reports~~
~~a. National Fire Incident Reporting System (NFIRS)~~
~~b. Texas fire incident reporting system (TXFIRS)~~

~~2. Purpose of accurate reports~~
~~a. A legal record of an incident~~
~~b. Consistent format for the collection of data usable at the state and national level~~

~~3. Usefulness of accurate reports~~
~~a. Provides information to officials for evaluation performance and making changes~~
~~b. Aids in determining departmental needs~~

~~4. Consequences of inaccurate reports~~
~~a. Incorrect data~~
~~b. Litigation~~

~~5. How to obtain necessary information~~
~~a. Person or entity involved~~
~~b. Owner~~
~~c. Bystanders or eye witnesses~~
~~d. Dispatch~~
~~e. Equipment involved in ignition~~
~~f. Fire fighters on scene~~

~~6. Required coding procedures~~
~~a. NFIRS~~
~~b. TXFIRS~~

Required Skills. The ability to determine necessary codes, proof reports, and operate fire department computers or other equipment necessary to complete reports.

102-5~~6~~.2.2 Communicate the need for team assistance, given fire department communications equipment, SOPs, and a team, so that the supervisor is consistently informed of team needs, departmental SOPs are followed, and the assignment is accomplished safely.

102-A.5~~6~~.2.2 The Fire Fighter II could be assigned to accomplish or coordinate tasks away from direct supervision. Many of these tasks could result in the need for additional or replacement personnel due to the ever-changing conditions on the scene of an emergency. The Fire Fighter II is expected to identify these needs and effectively communicate this information within

an incident management system. Use of radio communication equipment necessitates that these communications be accurate and efficient.

Requisite Knowledge:~~.~~

a. SOPs for alarm assignments

~~a.~~**b.** **F**~~f~~ire department radio communication procedures~~.~~

~~**Requisite Knowledge**. SOPs for alarm assignments and fire department radio communication procedures.~~

~~1. Alarm assignment SOP~~

~~2. Fire department radio communication procedures~~

Requisite Skills. The ability to operate fire department communications equipment.

102-5~~6~~.3 ***Fireground Operations***
This duty shall involve performing activities necessary to ensure life safety, fire control, and property conservation, according to the JPRs in ~~6~~**5**.3.1 through ~~6~~**5**.3.4.

102-**5**~~6~~.3.1 Extinguish an ignitable liquid fire, operating as a member of a team, given an assignment, an attack line, **PPE**~~personal protective equipment~~, a foam proportioning device, a nozzle, foam concentrates, and a water supply, so that the correct type of foam concentrate is selected for the given fuel and conditions, a properly proportioned foam stream is applied to the surface of the fuel to create and maintain a foam blanket, fire is extinguished, reignition is prevented, team protection is maintained with a foam stream, and the hazard is faced until retreat to safe haven is reached

102-A.**5**~~6~~.3.1 The Fire Fighter II should be able to accomplish this task with each type of foam concentrate used by the jurisdiction. This could include the use of both Class A and B foam concentrates on appropriate fires. When using Class B foams to attack flammable or combustible liquid fires, the Fire Fighter II should extinguish a fire of at least 100 ft^2 (9 m^2). The Fire Fighter II is not expected to calculate application rates and densities. The intent of this JPR can be met in training through the use of training foam concentrates or gas-fired training props.

Requisite Knowledge:~~.~~

a. Methods by which foam prevents or controls a hazard~~;~~
   1. Blanketing effect
   2. Vapor
   3. Separating
   4. Cooling
   5. Smothering
   6. Penetrating

b. P~~p~~rinciples by which foam is generated~~;~~
   1. Components of finished foam
      i. Foam solution
         a) Foam concentrate
         b) Water
      ii. Air (aeration/mechanical agitation at the nozzle)
   2. Water + concentrate = foam solution
   3. Foam solution + air = finished foam
   4. Methods by which foam is generated
      i. Foam Proportioning
         a) Eduction
         b) Injection
         c) Premixing
   5. Foam proportioners
      i. In Line Foam Eductors
      ii. Foam Nozzle Eductors
      iii. Apparatus Mounted Proportioners
      iv. Compressed Air Foam Systems (CAFS)
   6. Balanced pressure foam system
   7. Premix

c. C~~c~~auses for poor foam generation and corrective measures
   1. Foam concentrate/fuel type mismatch
   2. Fuel area and depth
   3. Wrong application rate
   4. Inadequate water supply, or pressure
   5. Foam educator type and setting
   6. Nozzle type and setting
   7. Back pressure~~;~~
   8. Identify fuel type
      i. Hydrocarbon
      ii. Polar solvent
   9. Determine fuel depth and surface area
   10. Determine application rate (GPM/ft^2)
   11. Acquire adequate supply of foam concentrate
   12. Establish water supply and correct pressure

Commented [MMA9]: New verbiage recommended by Pat McAuliff.

Commented [MMA10]: Combined sections 1 & 2 from old curriculum sheets

Commented [MMA11]: Combined sections 3 and 4, old sheets.

Commented [MMA12]: New verbiage recommended by Pat McAuliff

13. Verify proper educator operation
    i. Setting (i.e. 1%, 3%, 6%)
    ii. Concentrate pick-up tube
14. Nozzle flow matches educator capability (GPM) and provides aeration
15. Check for hose kinks and/or blockage
16. Assure nozzle is fully open

Commented [MMA13]: Combined sections 5 & 6, old sheets.

d. Dd~~i~~fference between hydrocarbon and polar solvent fuels and concentrates that work on each~~;~~
    1. Hydrocarbon fuels
        i. Examples
        ii. Concentrate types
        iii. Concentrate percentage and application rate
    2. Polar solvent fuels
        i. Examples
        ii. Concentrate types
        iii. Concentrate percentages and application rate

e. T~~t~~he characteristics, uses, and limitations of fire-fighting foams~~;~~
    1. Protein
        i. High water retention and heat resistance
        ii. Effective vapor suppression
        iii. Limited shelf life
        iv. Poor fuel resistance
        v. Slow knockdown
        vi. Poor compatibility with dry chemical agents
    2. Fluoroprotein
        i. Excellent fuel resistance
        ii. Compatible with specific dry chemical agents
        iii. High heat resistance
        iv. Requires use of foam nozzle
    3. Film Forming Fluoroprotein (FFFFP)
        i. Fast film-forming capability
        ii. High heat resistance
    4. Aqueous Film Forming Foam (AFFF)/Alcohol Type Concentrate (ATC)
        i. Fast film-forming capability
        ii. Applied with regular fob nozzles
        iii. Compatible with specific dry chemical agents
        iv. ATC suitable for polar solvent fuel fires
        v. Quick drain-down may require continued application
    5. High-expansion foam
        i. Reduces surface tension of water

ii. Excellent penetration into Class A materials
iii. Poor heat resistance
6. Class A foams
i. Reduces surface tension of water
ii. Foamy water solution clings to surfaces
iii. Fast extinguishment
iv. Requires a more accurate proportioning system
v. Impacts fire investigation laboratory tests
vi. Creates difficult salvage operations

f. The advantages and disadvantages of using fog nozzles versus foam nozzles for foam application~~;~~
1. Widely available
2. Variable flow and pattern
3. Faster occasion when hose is pre-connected
4. May not create same quality
5. Creates highest quality of foam
6. Useful in blanketing operations
7. Not as versatile as a fog nozzle
8. Stream reach less than a standard fog nozzle

g. Foam stream application techniques~~;~~
1. Roll-on technique
2. Bank-down technique
3. Rain-down technique

h. Hazards associated with foam usage~~; and~~
1. Mildly irritating
2. Mildly corrosive
3. Environmental impact
4. Limited foam stream reach

i. Methods to reduce or avoid hazards~~.~~
1. Flush affected areas with water
2. Control run-off
3. Additional exposure lines for personnel protection

~~**Requisite Knowledge**. Methods by which foam prevents or controls a hazard; principles by which foam is generated; causes for poor foam generation and corrective measures; difference between hydrocarbon and polar solvent fuels and the concentrates that work on each; the characteristics, uses, and limitations of fire-fighting foams; the advantages and disadvantages of using fog nozzles versus foam nozzles for foam~~

Commented [MMA14]: New verbiage recommended by Pat McAuliff

Commented [MMA15]: New verbiage recommended by Pat McAuliff

Commented [MMA16]: Combined sections 9 & 10, old sheets.

application; foam stream application techniques; hazards associated with foam usage; and methods to reduce or avoid hazards.

1. Methods by which foam prevents a hazard
    a. Blanketing effect
    b. Vapor suppression

2. Methods by which foam controls a hazard
    a. Heat resistance
    b. Fuel resistance
    c. Vapor suppression

3. Principles by which foam is generated
    a. Components of finished foam
        i. Foam solution
            a) Foam concentrate
            b) Water
        ii. Air (aeration/mechanical agitation at the nozzle)
    b. Water + concentrate = foam solution
    c. Foam solution + air = finished foam

4. Methods by which foam is generated
    a. Foam eductor
        i. Venture principle
        ii. In-line eductor
        iii. Bypass eductor
    b. Around the pump foam proportioner
    c. Balanced pressure foam system
    d. Premix

5. Cause for poor foam generation
    a. Foam concentrate/fuel type mismatch
    b. Fuel area and depth
    c. Wrong application rate
    d. Inadequate water supply, or pressure
    e. Foam eductor type and setting
    f. Nozzle type and setting
    g. Back pressure

6. Corrective measures for poor foam generation
    a. Identify fuel type
        i. Hydrocarbon
        ii. Polar solvent
    b. Determine fuel depth and surface area

c. Determine application rate (GPM/ft^2)
d. Acquire adequate supply of foam concentrate
e. Establish water supply and correct pressure
f. Verify proper eductor operation
    i. Setting (i.e. 1%, 3%, 6%)
    ii. Concentrate pick-up tube
g. Nozzle flow matches eductor capability (GPM) and provides aeration
h. Check for hose kinks and/or blockage
i. Assure nozzle is fully open

7. Differentiating between hydrocarbon and polar solvent fuels
    a. Hydrocarbon fuels
        i. Examples
        ii. Concentrate types
        iii. Concentrate percentage and application rate
    b. Polar solvent fuels
        i. Examples
        ii. Concentrate types
        iii. Concentrate percentage and application rate

8. Advantages, uses and limitations of fire-fighting foams
    a. Protein
        i. High water retention and heat resistance
        ii. Effective vapor suppression
        iii. Limited shelf life
        iv. Poor fuel resistance
        v. Slow knockdown
        vi. Poor compatibility with dry chemical agents
    b. Fluoroprotein
        i. Excellent fuel resistance
        ii. Compatible with specific dry chemical agents
        iii. High heat resistance
        iv. Requires use of foam nozzle
    c. Film Forming Fluoroprotein (FFFP)
        i. Fast film-forming capability
        ii. High heat resistance
    d. Aqueous Film Forming Foam (AFFF) / Alcohol Type Concentrate (ATC)
        i. Fast film-forming capability
        ii. Applied with regular fob nozzles
        iii. Compatible with specific dry chemical agents
        iv. ATC suitable for polar solvent fuel fires
        v. Quick drain-down may require continued application

e. High-expansion foam
    i. Reduces surface tension of water
    ii. Excellent penetration into Class A materials
    iii. Poor heat resistance
f. Class A foams
    i. Reduces surface tension of water
    ii. Foamy water solution clings to surfaces
    iii. Fast extinguishment
    iv. Requires a more accurate proportioning system
    v. Impacts fire investigation laboratory tests
    vi. Creates difficult salvage operations

9. Advantages and disadvantages of using fog nozzles
    a. Suitable for use with AFFF and Class A foams
    b. Not suitable for use with protein and fluoroprotein foams
    c. Use of expansion tubes
    d. Reduced reach when flowing foam

10. Advantages and disadvantages of using foam nozzles
    a. Creates highest quality of foam
    b. Must be used with protein and fluoroprotein foam
    c. Stream reach less than a standard fog nozzle

11. Foam stream application techniques
    a. Roll-on technique
    b. Bank-down technique
    c. Rain-down technique

12. Hazards associated with foam usage
    a. Mildly irritating
    b. Mildly corrosive
    c. Environmental impact
    d. Limited foam stream reach

13. Methods to reduce or avoid hazards
    a. Flush affected areas with water
    b. Control run-off
    c. Additional exposure lines for personnel protection

Requisite Skills. The ability to prepare a foam concentrate supply for use, assemble foam stream components, master various foam application techniques, and approach and retreat from spills as part of a coordinated team.

102-56.3.2 Coordinate an interior attack line for a team's accomplishment of an assignment in a structure fire, given attack lines, personnel, **PPE** ~~personal protective equipment~~, and tools, so that crew integrity is established; attack techniques are selected for the given level of the fire (e.g., attic, grade level, upper levels, or basement); attack techniques are communicated to the attack teams; constant team coordination is maintained; fire growth and development is continuously evaluated; search, rescue, and ventilation requirements are communicated or managed; hazards are reported to the attack teams; and incident command is apprised of changing conditions.

Commented [MMA17]: Sections 102-5.3.2 to 102-5.3.4 verified by Randy Pearson of C & T Committee.

102-A.56.3.2 The Fire Fighter II should be able to coordinate the actions of the interior attack line team at common residential fires and small business fires in the fire department's district. Complex or large interior fire management should be left to the officers; however, this JPR will facilitate the development of the Fire Fighter II toward effectively handling specific assignments within large fires.

Jurisdictions that use Fire Fighter IIs as acting company officers should comply with the requirements of NFPA 1021, *Standard for Fire Officer Professional Qualifications*.

Requisite Knowledge: ~~:~~

a. Selection of the nozzle and hose for fire attack, given different situations~~;~~
   1. Handlines
      i. Fog nozzles
      ii. Solid stream
      iii. Broken stream
   2. Master streams
      i. Fog nozzles
      ii. Solid stream
   3. Small diameter (¾", 1", 1½", 1¾", 2") handlines
   4. Medium diameter (2½", 3") handlines
   5. Medium or large diameter hose (3½", 4", 5", 6") for master stream support

Commented [MMA18]: Combined sections 1 & 2, old sheets.

b. S~~s~~election of adapters and appliances to be used for specific fireground situations~~;~~
   1. Wyes – gated and non-gated
   2. Siamese – clapper and non-clapper
   3. Water thief
   4. Large diameter hose appliance

Commented [MMA19]: Change as per Randy Pearson: replaces Manifold (portable hydrant).

5. Hydrant valve
6. Double male
7. Double female
8. Reducers
9. Adapters
    i. Adapts one thread type to another
    ii. Adapts threaded couplings to sexless couplings

c. D~~d~~angerous building conditions created by fire and fire suppression activities~~;~~
    1. Dangerous fire conditions in a building
        i. Ventilation-limited
        ii. Flashover
        iii. Backdraft
    2. Conditions that contribute to the spread and intensity of the fire
        i. Fire loading
        ii. Combustible furnishings and finishes
        iii. Roof coverings
        iv. Wooden floors and ceilings
        v. Large, open spaces
    3. Conditions that make the building susceptible to collapse
        i. Damage to structural system of the building from fire or firefighting activities
        ii. Age of the building
        iii. Lightweight or truss construction
        iv. Older buildings exposed to weather
        v. Firefighting operations
            a) Improper vertical ventilation
            b) Added weight of water used for fire extinguishment

d. I~~i~~ndicators of building collapse~~;~~
    1. Deterioration of mortar joints
    2. Overall age and condition of the building
    3. Cracks in walls, floors, ceilings, and roofs
    4. Signs of building repair (tie rods and stars)
    5. Large open spans
    6. Bulges, bowing and leaning of walls
    7. Sagging floors
    8. Abandoned buildings
    9. Large volume of fire
    10. Extended firefighting operations
    11. Smoke coming from cracks in walls

12. Dark smoke from truss roof or floor spaces
13. Multiple fires in same building or damage from previous fires

e. ~~the~~ Ee~~f~~fects of fire and fire suppression activities on wood, masonry (brick, block, stone), cast iron, steel, reinforced concrete, gypsum wallboard, glass, and plaster on lath~~;~~

f. S~~s~~earch and rescue and ventilation procedures~~;~~
   1. Define the following
      i. Primary search
      ii. Secondary search
   2. Search techniques
      i. Right hand/left hand
      ii. Large area/small area considerations
      iii. Rope assisted, or hose line
      iv. Use of tools
         a) To extend reach
         b) Door chocks doors/latch straps
         c) Thermal imaging cameras
      v. Vent-Enter-Isolate-Search (VEIS)
      vi. Communication during search
      vii. Search marking systems
   3. Door control
   4. Types
      i. Natural
      ii. Mechanical
         a) Positive pressure
         b) Negative pressure
         c) Hydraulic
   5. Techniques
      i. Horizontal
      ii. Vertical
   6. Coordinate with fire attack
   7. Special considerations
      i. Concrete roofs
      ii. Metal roofs
      iii. Ventilating basements
      iv. Ventilating high-rises
      v. Ventilating windowless buildings
      vi. Ventilating large buildings
   8. Flow paths
      i. Improving flow
      ii. Interrupting flow

Commented [MMA20]: Combined sections 7 & 8, old sheets.

Commented [MMA21]: Section added by Randy Pearson.

g. Iindicators of structural instability~~;~~
   1. Truss
   2. Lightweight construction
   3. Cracks or separations in walls, floors, ceilings and roof structures
   4. Presence of tie rods and stars
   5. Loose bricks, blocks, or stones falling from buildings
   6. Deteriorated mortar joints
   7. Walls that appear to be leaning
   8. Structural members that appear to be distorted

h. S~~s~~uppression approaches and practices for various types of structural fires~~;~~
   1. Offensive
   2. Exterior offensive attack
      i. Blitz attack
      ii. Transitional attack
      iii. Softening the target
   3. Defensive
   4. Occupancy
      i. Single-family dwellings
      ii. Multi-family dwellings
      iii. Commercial occupancies
      iv. High-rises
   5. Residential fires
      i. Attic
      ii. Grade-level
      iii. Upper-level
      iv. Basement
      v. Concealed spaces
   6. Small business fires
      i. Attic
      ii. Grade-level
      iii. Upper-level
      iv. Basement
      v. Concealed spaces

Commented [MMA22]: Combined sections 10 & 11, old sheets.

i. ~~and~~ T~~t~~he association between specific tools and special forcible entry needs~~.~~
   1. Hand tools
      i. Pry axe
      ii. Detroit door opener

2. Power tools
    i. Chain saw
    ii. Circular saw
    iii. Reciprocating saw
    iv. Drill
3. Lock tools
    i. A tool
    ii. K tool
    iii. J tool
    iv. Shove knife
    v. Duck bill lock breaker
    vi. Locking pliers and chain
    vii. Bam bam tool
    viii. Elevator keys
4. Hydraulic/pneumatic tools
    i. Rabbet tool
    ii. Hydraulic spreaders
    iii. Hydraulic rams
    iv. Hydraulic cutters
    v. Pneumatic spreaders
    vi. Pneumatic cutters
    ~~i.~~vii. Pneumatic drills and saws

~~**Requisite Knowledge**. Selection of the nozzle and hose for fire attack, given different fire situations; selection of adapters and appliances to be used for specific fireground situations; dangerous building conditions created by fire and fire suppression activities; indicators of building collapse; the effects of fire and fire suppression activities on wood, masonry (brick, block, stone), cast iron, steel, reinforced concrete, gypsum wallboard, glass, and plaster on lath; search and rescue and ventilation procedures; indicators of structural instability; suppression approaches and practices for various types of structural fires; and the association between specific tools and special forcible entry needs.~~

~~1. Selection of the nozzle for fire attack~~
~~a. Handlines~~
~~i. Fog nozzles~~
~~ii. Solid stream~~
~~iii. Broken stream~~
~~b. Master streams~~
~~i. Fog nozzles~~
~~ii. Solid stream~~

~~2. Selection of the hose for fire attack~~

a. Small diameter (¾", 1", 1½", 1¾", 2") handlines
b. Medium diameter (2½", 3") handlines
c. Medium (2½", 3") or large diameter hose (3½", 4", 5", 6") for master stream support

3. Selection of adapters and appliances to be used for specific fire ground situations
   a. Wyes – gated and non-gated
   b. Siamese – clapper and non-clapper
   c. Water thief
   d. Manifold (portable hydrant)
   e. Hydrant valve
   f. Double male
   g. Double female
   h. Reducers
   i. Adapters
      i. Adapts one thread type to another
      ii. Adapts threaded couplings to sexless couplings

4. Dangerous building conditions created by fire and fire suppression activities
   1. Dangerous fire conditions in a building
      i. Ventilation-limited
      ii. Flashover
      iii. Backdraft
   2. Conditions that contribute to the spread and intensity of the fire
      iv. Fire loading
      v. Combustible furnishings and finishes
      vi. Roof coverings
      vii. Wooden floors and ceilings
      viii. Large, open spaces
   3. Conditions that make the building susceptible to collapse
      i. Damage to structural system of the building from fire or firefighting activities
      ii. Age of the building
      iii. Lightweight or truss construction
      iv. Older buildings exposed to weather
      v. Firefighting operations
         a) Improper vertical ventilation
         b) Added weight of water used for fire extinguishment

5. Indicators of building collapse
   a. Deterioration of mortar joints
   b. Overall age and condition of the building

c. Cracks in walls, floors, ceilings, and roofs
d. Signs of building repair (tie rods and stars)
e. Large open spans
f. Bulges, bowing and leaning of walls
g. Sagging floors
h. Abandoned buildings
i. Large volume of fire
j. Extended firefighting operations
k. Smoke coming from cracks in walls
l. Dark smoke from truss roof or floor spaces
m. Multiple fires in same building or damage from previous fires

6. Effects of fire suppression activities on:
   a. Wood
   b. Masonry (brick, block, stone)
   c. Cast iron
   d. Steel
   e. Reinforced concrete
   f. Gypsum wallboard
   g. Glass
   h. Plaster on lath

7. Search and rescue procedures
   1. Define the following
      i. Primary search
      ii. Secondary search
   2. Search techniques
      i. Right hand/left hand
      ii. Large area/small area considerations
      iii. Rope assisted, or hose line
      iv. Use of tools
         a) To extend reach
         b) Door chocks or door/latch straps
         c) Thermal imaging cameras
      v. Vent-Enter-Isolate-Search (VEIS)
      vi. Communication during search
      vii. Search marking systems

8. Ventilation procedures
   1. Door control
   2. Types
      i. Natural
      ii. Mechanical
         a) Positive pressure

~~b) Negative pressure~~
~~c) Hydraulic~~
~~3. Techniques~~
~~i. Horizontal~~
~~ii. Vertical~~
~~4. Coordinate with fire attack~~
~~5. Special considerations~~
~~i. Concrete roofs~~
~~ii. Metal roofs~~
~~iii. Ventilating basements~~
~~iv. Ventilating high-rises~~
~~v. Ventilating windowless buildings~~
~~vi. Ventilating large buildings~~

~~9. Indicators of structural instability~~
~~1. Truss~~
~~2. Lightweight construction~~
~~3. Cracks or separations in walls, floors, ceilings and roof structures~~
~~4. Presence of tie rods and stars~~
~~5. Loose bricks, blocks, or stones falling from buildings~~
~~6. Deteriorated mortar joints~~
~~7. Walls that appear to be leaning~~
~~8. Structural members that appear to be distorted~~

~~10. Suppression approaches for various types of structural fires~~
~~1. Offensive~~
~~2. Exterior offensive attack~~
~~i. Blitz attack~~
~~ii. Transitional attack~~
~~iii. Softening the target~~
~~3. Defensive~~
~~4. Occupancy~~
~~i. Single-family dwellings~~
~~ii. Multi-family dwellings~~
~~iii. Commercial occupancies~~
~~iv. High-rises~~

~~11. Suppression practices for various types of structural fires~~
~~1. Residential fires~~
~~i. Attic~~
~~ii. Grade-level~~
~~iii. Upper-level~~
~~iv. Basement~~

~~v. Concealed spaces~~
~~2. Small business fires~~
~~i. Attic~~
~~ii. Grade-level~~
~~iii. Upper-level~~
~~iv. Basement~~
~~v. Concealed spaces~~

~~12. Association between specific tools and special forcible entry needs~~
~~1. Hand tools~~
~~i. Pry axe~~
~~ii. Detroit door opener~~
~~2. Power tools~~
~~i. Chain saw~~
~~ii. Circular saw~~
~~iii. Reciprocating saw~~
~~iv. Drill~~
~~3. Lock tools~~
~~i. A tool~~
~~ii. K tool~~
~~iii. J tool~~
~~iv. Shove knife~~
~~v. Duck bill lock breaker~~
~~vi. Locking pliers and chain~~
~~vii. Bam bam tool~~
~~viii. Elevator keys~~
~~4. Hydraulic/pneumatic tools~~
~~ii. Rabbet tool~~
~~iii. Hydraulic spreaders~~
~~iv. Hydraulic rams~~
~~v. Hydraulic cutters~~
~~vi. Pneumatic spreaders~~
~~vii. Pneumatic cutters~~
~~viii. Pneumatic drills and saws~~

Requisite Skills. The ability to assemble a team, choose attack techniques for various levels of a fire (e.g., attic, grade level, upper levels, or basement), evaluate and forecast a fire's growth and development, select tools for forcible entry, incorporate search and rescue procedures and ventilation procedures in the completion of the attack team efforts, and determine developing hazardous building or fire conditions.

102-5~~6~~.3.3 Control a flammable gas cylinder fire, operating as a member of a team, given an assignment, a cylinder outside of a structure, an attack line, **PPE**

~~personal protective eqipment~~, and tools, so that crew integrity is maintained, contents are identified, safe havens are identified prior to advancing, open valves are closed, flames are not extinguished unless the leaking gas is eliminated, the cylinder is cooled, cylinder integrity is evaluated, hazardous conditions are recognized and acted upon, and the cylinder is faced during approach and retreat.

102-A.5~~6~~.3.3 Controlling flammable gas cylinder fires can be a very dangerous operation. The Fire Fighter II should act as a team member, under the direct supervision of an officer, during these operations.

Requisite Knowledge:~~.~~

a. Characteristics of pressurized flammable gases~~,~~
1. **Pressure**
2. **Vapor pressure**
3. **Vapor density**
4. **Expansion ratio**

b. E~~e~~lements of a gas cylinder~~,~~
1. **Cylinder design**
2. **Cylinder valves**
3. **Pressure relief valves**

c. E~~e~~ffects of heat and pressure on closed cylinders~~,~~
1. **Expansion of cylinder**
2. **Pressure relief valves**
3. **Container failure**

d. B~~b~~oiling liquid expanding vapor explosion (BLEVE) signs and effects~~;~~
1. **Pinging sound of pressure-stretched metal**
2. **Discoloration of metal shell**
3. **Bulge or bubble in metal shell**
4. **Activation of pressure relief valve**
5. **Failure of pressure relief valve**
6. **Increase in intensity of pressure relief valve (torch)**
7. **Container failure**
8. **Violent explosion with fragmentation**
9. **Rapid expansion of gases**
10. **Huge fireball**
11. **Radiant heat**
12. **Flying container fragments**

e. M~~m~~ethods for identifying contents~~,~~

Commented [MMA23]: Item following, "Test limits," deleted as per Randy Pearson.

Commented [MMA24]: Combined sections 4 & 5, old sheets.

1. Placards
2. Labels
3. Shipping papers
4. Facility documents

f. H~~h~~ow to identify safe havens before approaching flammable gas cylinder fires~~,~~
   1. Perform scene size-up
      i. Note position and condition of container
      ii. Analyze terrain
      iii. Identify possible safe havens

Commented [MMA25]: Item following, "Do not approach…," deleted as per Randy Pearson.

g. W~~w~~ater stream usage and demands for pressurized cylinder fires
   1. Volume of water
      i. Vapor space
      ii. Point of impingement
      iii. 500 gpm minimum
   2. Placement of streamers
   3. Manned vs. unmanned fire streams
   4. Secured, uninterrupted source
   5. Adequate stream application

Commented [MMA26]: Combined sections 8 & 9, old sheets.

h. W~~w~~hat to do if the fire is prematurely extinguished~~,~~
   1. Vapor dispersion
   2. Vapor control (close valve)
   3. Secure or eliminate ignition sources

i. V~~v~~alve types and their operation~~,~~
   1. Shut-off valves
   2. Pressure relief valves

j. A~~a~~lternative actions related to various hazards~~,~~
   1. Evacuate
   2. Isolate
   3. Allow self extinguishment
   4. Retreat

k. ~~and~~ W~~w~~hen to retreat~~.~~
   1. Failure of relief valve
   2. Significant container damage
   ~~1.~~3. Loss of water

~~**Requisite Knowledge**. Characteristics of pressurized flammable gases, elements of a gas cylinder, effects of heat and pressure on closed~~

~~cylinders, boiling liquid expanding vapor explosion (BLEVE) signs and effects, methods for identifying contents, how to identify safe havens before approaching flammable gas cylinder fires, water stream usage and demands for pressurized cylinder fires, what to do if the fire is prematurely extinguished, valve types and their operation, alternative actions related to various hazards, and when to retreat.~~

~~1. Characteristics of pressurized flammable gases~~
- ~~a. Pressure~~
- ~~b. Vapor pressure~~
- ~~c. Vapor density~~
- ~~d. Expansion ratio~~

~~2. Elements of a gas cylinder~~
- ~~a. Cylinder design~~
- ~~b. Cylinder valves~~
- ~~c. Pressure relief valves~~
- ~~d. Test limits~~

~~3. Effects of heat on closed cylinders~~
- ~~a. Increase in pressure~~
- ~~b. Thermal damage~~
- ~~c. Container failure~~

~~4. Effects of pressure on closed cylinders~~
- ~~a. Expansion of cylinder~~
- ~~b. Pressure relief valves~~
- ~~c. Container failure~~

~~5. Boiling liquid expanding vapor explosion (BLEVE) signs~~
- ~~a. Pinging sound of pressure-stretched metal~~
- ~~b. Discoloration of metal shell~~
- ~~c. Bulge or bubble in metal shell~~
- ~~d. Activation of pressure relief valve~~
- ~~e. Failure of pressure relief valve~~
- ~~f. Increase in intensity of pressure relief valve (torch)~~

~~6. BLEVE effects~~
- ~~a. Container failure~~
- ~~b. Violent explosion with fragmentation~~
- ~~c. Rapid expansion of gases~~
- ~~d. Huge fireball~~
- ~~e. Radiant heat~~
- ~~f. Flying container fragments~~

7. Methods for identifying contents
    a. Placards
    b. Labels
    c. Shipping papers
    d. Facility documents

8. How to identify safe havens before approaching flammable gas cylinder fires
    a. Perform scene size-up
        i. Note position and condition of container
        ii. Analyze terrain
        iii. Identify possible safe havens
    b. Do not approach container from the ends

9. Water stream usage for pressurized cylinder fires
    a. Volume of water
        i. Vapor space
        ii. Point of impingement
        iii. 500 gpm minimum
    b. Placement of streams
    c. Manned vs. unmanned fire streams

10. Water stream demands for pressurized cylinder fires
    a. Secured, uninterrupted source
    b. Adequate stream application

11. What to do if the fire is prematurely extinguished
    a. Vapor dispersion
    b. Vapor control (close valve)
    c. Secure or eliminate ignition sources

12. Valve types and their operation
    a. Shut-off valves
    b. Pressure relief valves

13. Alternative actions related to various hazards
    a. Evacuate
    b. Isolate
    c. Allow self extinguishment
    d. Retreat

14. When to retreat
    a. Failure of relief valve

~~b. Significant container damage~~
~~c. Loss of water~~

Requisite Skills. The ability to execute effective advances and retreats, apply various techniques for water application, assess cylinder integrity and changing cylinder conditions, operate control valves, and choose effective procedures when conditions change.

102-~~5~~6.3.4 Protect evidence of fire cause and origin, given a flashlight and overhaul tools, so that the evidence is noted and protected from further disturbance until investigators can arrive on the scene.

102-A.~~5~~6.3.4 The Fire Fighter II should be able to recognize important evidence as to a fire's cause and maintain the evidence so that further testing can be done without contamination or chain-of-custody problems. Evidence should be left in place (when possible; otherwise, chain of custody must be established), not altered by improper handling, walking, and so forth, and not destroyed. Possible means to protect evidence is to avoid touching, protect with salvage covers during overhaul, or rope off the area where the evidence lies. The Fire Fighter II is not intended to be highly proficient at origin and cause determination.

Jurisdictions that use Fire Fighter IIs to determine origin and cause should comply with the requirements of NFPA 1021, *Standard for Fire Officer Professional Qualifications*.

Requisite Knowledge~~:~~.

a. Methods to assess origin and cause~~;~~

1. **Smoke conditions**
2. **Unusual odors**
3. **Abnormal behavior of fire when water is applied**
4. **Obstacles hindering fire fighting**
5. **Incendiary devices, trailers and accelerants**
6. **Effects of ventilation**
7. **Structural modifications**
8. **Charring and fire patterns**
9. **Fire behavior**
10. **Availability of documents**
11. **Fire detection and protection systems**
12. **Intrusion alarms**
13. **Description of fire**
14. **Contents**
15. **Business records**

Commented [MMA27]: Changed, Randy Pearson.

Commented [MMA28]: Verbiage added, Randy Perason

Commented [MMA29]: Changed, Randy Pearson

Commented [MMA30]: Changed, Randy Pearson

Commented [MMA31]: Verbiage added, Randy Pearson

Commented [MMA32]: Changed, Randy Pearson

Commented [MMA33]: Verbiage added, some items deleted, as per Randy Pearson

16. Time of day
17. Weather conditions
18. Vehicles and people on scene

b. Ttypes of evidence;
   1. Physical evidence
   2. Direct evidence
   3. Circumstantial evidence

c. Mmeans to protect various types of evidence;
   1. Securing the fire scene
   2. Chain of custody
   3. Do not gather or handle evidence
   4. Avoid trampling over evidence
   5. Avoid excess use of water
   6. Protect human footprints and tire marks
   7. Protect partially burned papers found in a furnace, stove or fireplace
   8. Leave charred documents found in containers

d. The role and relationship of Fire Fighter IIs, law enforcement authority ~~criminal investigators~~, and private investigation entities ~~insurance investigators~~ in fire investigations;
   1. The importance of writing a chronological account of important circumstances personally observed
   2. Identify the importance of reporting hearsay to the investigator
   3. Identify the importance of performing salvage and overhaul carefully
   4. Fire marshal
   5. Arson investigator
   6. Fire investigator
   7. Police
   8. Insurance investigator
   9. Private investigator

e. ~~and~~ The effects and problems associated with removing property or evidence from the scene.
   1. Exigent circumstances rule
   2. Chain of custody
   3. Spoliation
   4. Statements
   5. Miranda warning
   6. Search and seizure

Commented [MMA34]: Two sections deleted, as per Randy Pearson

Commented [MMA35]: Verbiage changed, Randy Pearson

Commented [MMA36]: Combined sections 4, 5 & 6, old shets..4.1

Commented [MMA37]: Verbiage changed, Randy Pearson

Commented [MMA38]: Verbiage delated, sections added, Randy Pearson

Requisite Knowledge. Methods to assess origin and cause; types of evidence; means to protect various types of evidence; the role and relationship of Fire Fighter IIs, criminal investigators, and insurance investigators in fire investigations; and the effects and problems associated with removing property or evidence from the scene.

1. Methods to assess origin and cause
    a. Legal considerations (Michigan v. Tyler court decision)
    b. Unusual odors
    c. Abnormal behavior of fire when water is applied
    d. Obstacles hindering fire fighting
    e. Incendiary devices
    f. Trailer
    g. Structural alterations
    h. Fire patterns
    i. Heat intensity
    j. Availability of documents
    k. Fire detection and protection systems
    l. Intrusion alarms
    m. Location of fire
    n. Personal possessions
    o. Household items
    p. Equipment or inventory
    q. Business records
    r. Time of day
    s. Weather conditions
    t. Vehicles and people on scene

2. Types of evidence
    a. Physical evidence
    b. Trace or transfer evidence
    c. Demonstrative evidence
    d. Direct evidence
    e. Circumstantial evidence

3. Means to protect various types of evidence
    a. Securing the fire scene
    b. Chain of custody
    c. Do not gather or handle evidence
    d. Avoid trampling over evidence
    e. Avoid excess use of water
    f. Protect human footprints and tire marks

~~g. Protect partially burned papers found in a furnace, stove or fireplace~~
~~h. Leave charred documents found in containers~~

~~4. Role and relationship of Fire Fighter II to the fire investigation~~
~~a. The importance of writing a chronological account of important circumstances personally observed~~
~~b. Identify the importance of reporting hearsay to the investigator~~
~~c. Identify the importance of performing salvage and overhaul carefully~~

~~5. Criminal investigators~~
~~a. Fire marshal~~
~~b. Arson investigator~~
~~c. Fire investigator~~
~~d. Police~~

~~6. Insurance investigators in fire investigations~~
~~a. Insurance investigator~~
~~b. Private investigator~~

~~7. Effects and problems associated with removing property or evidence from the scene~~
~~a. Legal considerations (Michigan v. Tyler court decision)~~
~~b. Chain of custody~~
~~c. Documentation/photographs~~

Requisite Skills. The ability to locate the fire's origin area, recognize possible causes, and protect the evidence.

102-5~~6~~.4 ***Rescue Operations***
This duty shall involve performing activities related to accessing and disentangling victims from motor vehicle accidents and helping special rescue teams, according to the JPRs in 5~~6~~.4.1 and 5~~6~~.4.2.

102-5~~6~~.4.1 Extricate a victim entrapped in a motor vehicle as part of a team, given stabilization and extrication tools, so that the vehicle is stabilized, the victim is disentangled without further injury, and hazards are managed.

102-A.5~~6~~.4.1 In the context of this standard, the term *extricate* refers to those activities required to allow emergency medical personnel access to the victim, stabilization of the vehicle, the displacement or removal of vehicle components obstructing victim removal, and the protection of the victim

and response personnel from hazards associated with motor vehicle accidents and the use of hand and power tools on a motor vehicle.

As persons performing extrication can be different from those performing medical functions, this standard does not address medical care of the victim. An awareness of the needs and responsibilities of emergency medical functions is recommended to allow for efficient coordination between the “extrication” team and the “medical” team.

Requisite Knowledge:

a. The fire department’s role at a vehicle accident
   1. Response
   2. Arrival and size-up
   3. Stabilization of the scene
   4. Gaining access and disentangling victims
   5. Removing and treating the victim

b. Points of strength and weakness in auto body construction
   1. Vehicle door and door posts
   2. Vehicle roof
   3. Steering wheel
   4. Vehicle floor
   5. Vehicle pedals
   6. Vehicle seats
   7. Reinforced dashboard
   8. Vehicle windshield and windows
   9. Dashboard

Commented [MMA39]: Combined sections 2 & 3, old sheets.

c. Dangers associated with vehicle components and systems
   1. Vehicle stabilization
   2. Airbag systems (SRS and SIPS)
   3. Roll over protection systems (ROPS)
   4. Hybrid electrical systems
   5. Fuels

d. The uses and limitations of hand and power extrication equipment
   1. Hydraulic devices
      i. Upright
      ii. Upside down
      iii. On its side
      iv. On an inclined surface
   2. Pneumatic devices
   3. Block and tackle

4. Cribbing and shoring materials
5. Ratchet device
6. Hydraulic extrication spreaders
7. Hydraulic extrication shears
8. Hydraulic extrication ram

Commented [MMA40]: Combined sections 5 & 6, old sheets.f

e. ~~and~~ Ssafety procedures when using various types of extrication equipment~~.~~
   1. PPE
   2. Flammable hazards
   3. Electrical hazards
   4. Pinch hazards
   5. Crush hazards
   6. Vehicle safety device deployment hazards
   ~~1.~~7. Proper tool use

~~**Requisite Knowledge**. The fire department's role at a vehicle accident, points of strength and weakness in auto body construction, dangers associated with vehicle components and systems, the uses and limitations of hand and power extrication equipment, and safety procedures when using various types of extrication equipment~~

~~1. The fire department's role at a vehicle accident~~
   ~~a. Response~~
   ~~b. Arrival and size-up~~
   ~~c. Stabilization of the scene~~
   ~~d. Gaining access and disentangling victims~~
   ~~e. Removing and treating the victim~~

~~2. Points of strength in auto body construction~~
   ~~a. Vehicle door and door posts~~
   ~~b. Vehicle roof~~
   ~~c. Steering wheel~~
   ~~d. Vehicle floor~~
   ~~e. Vehicle pedals~~
   ~~f. Vehicle seats~~
   ~~g. Reinforced dashboard~~

~~3. Points of weakness in auto body construction~~
   ~~a. Vehicle windshield and windows~~
   ~~b. Dashboard~~

~~4. Dangers associated with vehicle components and systems~~
   ~~a. Vehicle stabilization~~

~~b. Airbag systems (SRS and SIPS)~~
~~c. Roll-over protection systems (ROPS)~~
~~d. Hybrid electrical systems~~
~~e. Fuels~~

~~5. Uses and limitations of hand extrication equipment~~
~~a. Hydraulic devices~~
~~i. Upright~~
~~ii. Upside down~~
~~iii. On its side~~
~~iv. On an inclined surface~~
~~b. Pneumatic devices~~
~~c. Block and tackle~~
~~d. Cribbing and shoring materials~~
~~e. Ratchet device~~

~~6. Uses and limitations of power extrication equipment~~
~~a. Hydraulic extrication spreaders~~
~~b. Hydraulic extrication shears~~
~~c. Hydraulic extrication ram~~

~~7. Safety procedures when using various types of extrication equipment~~
~~a. PPE~~
~~b. Flammable hazards~~
~~c. Electrical hazards~~
~~d. Pinch hazards~~
~~e. Crush hazards~~
~~f. Vehicle safety device deployment hazards~~
~~g. Proper tool use~~

Requisite Skills. The ability to operate hand and power tools used for forcible entry and rescue as designed; use cribbing and shoring material; and choose and apply appropriate techniques for moving or removing vehicle roofs, doors, windshields, windows, steering wheels or columns, and the dashboard.

102-5~~6~~.4.2 Assist rescue operation teams, given standard operating procedures, necessary rescue equipment, and an assignment, so that procedures are followed, rescue items are recognized and retrieved in the time as prescribed by the AHJ, and the assignment is completed.

102-A.5~~6~~.4.2 The Fire Fighter II is not expected to be proficient in technical rescue skills. The Fire Fighter II should be able to help technical rescue teams in their efforts to safely manage structural collapses, trench collapses, cave

and tunnel emergencies, water and ice emergencies, elevator and escalator emergencies, energized electrical line emergencies, and industrial accidents.

Requisite Knowledge: ~~:~~

a. The fire fighter's role at a technical rescue operation~~,~~
   1. Safety
   2. Receive direction from technical rescue personnel
   3. Work as a team
   4. Basic components of rescue operations
      i. Preparation
      ii. Response
      iii. Arrival and size-up
      iv. Stabilization
      v. Access
      vi. Disentanglement
      vii. Removal
      viii. Transport
      ix. Security of the scene and preparation for next call
      x. Post incident analysis

b. T~~t~~he hazards associated with technical rescue operations~~,~~
   1. Machinery
   2. Confined space
   3. Rope rescue (vertical rescue)
   4. Trench
   5. Structural collapse
   6. Water and ice
   7. Energized electrical line
   8. Elevator and escalator emergencies
   9. Wilderness
   10. Mine, tunnel and cave
   11. Industrial/hazardous materials

c. T~~t~~ypes and uses for rescue tools~~,~~
   1. Machinery (e.g., hydraulic spreaders/cutters/rams)
   2. Confined space (e.g., taglines, harnesses, supplied air respirators, air monitoring devices, tripod, winch)
   3. Rope rescue (vertical rescue, e.g., rope, carabiners, anchor plates, pulleys)
   4. Trench (e.g., shoring, cribbing, stringers, rakers, air monitoring devices)
   5. Structural collapse (e.g., jacks, shoring, cribbing)

6. Water and ice (e.g., PFDs, throw bag of rope)
7. Elevator and escalator emergencies (e.g., elevator keys)
8. Wilderness (e.g., compass, GPS, stokes basket)
9. Mine, tunnel and cave (e.g., shoring, ropes, flashlights)

d. ~~and R~~rescue practices and goals~~.~~
1. Machinery
2. Confined space
3. Rope rescue (vertical rescue)
4. Trench
5. Structural collapse
6. Water and ice
7. Elevator and escalator emergencies
8. Wilderness
~~1.~~9. Mine, tunnel and cave

~~**Requisite Knowledge**. The fire fighter's role at a technical rescue operation, the hazards associated with technical rescue operations, types and uses for rescue tools, and rescue practices and goals.~~

~~1. The fire fighter's role at a technical rescue operation~~
~~a. Safety~~
~~b. Receive direction from technical rescue personnel~~
~~c. Work as a team~~
~~d. Basic components of rescue operations~~
~~i. Preparation~~
~~ii. Response~~
~~iii. Arrival and size-up~~
~~iv. Stabilization~~
~~v. Access~~
~~vi. Disentanglement~~
~~vii. Removal~~
~~viii. Transport~~
~~ix. Security of the scene and preparation for next call~~
~~x. Post incident analysis~~

~~2. The hazards associated with technical rescue operations~~
~~a. Machinery~~
~~b. Confined space~~
~~c. Rope rescue (vertical rescue)~~
~~d. Trench~~
~~e. Structural collapse~~
~~f. Water and ice~~
~~g. Energized electrical line~~

~~h. Elevator and escalator emergencies~~
~~i. Wilderness~~
~~j. Mine, tunnel and cave~~
~~k. Industrial/hazardous materials~~

~~3. Types and uses of rescue tools~~
~~a. Machinery (e.g., hydraulic spreaders/cutters/rams)~~
~~b. Confined space (e.g., taglines, harnesses, supplied air respirators, air monitoring devices, tripod, winch)~~
~~c. Rope rescue (vertical rescue, e.g., rope, carabiners, anchor plates, pulleys)~~
~~d. Trench (e.g., shoring, cribbing, stringers, rakers, air monitoring devices)~~
~~e. Structural collapse (e.g., jacks, shoring, cribbing)~~
~~f. Water and ice (e.g., PFDs, throw bag of rope)~~
~~g. Elevator and escalator emergencies (e.g., elevator keys)~~
~~h. Wilderness (e.g., compass, GPS, stokes basket)~~
~~i. Mine, tunnel and cave (e.g., shoring, ropes, flashlights)~~

~~4. Rescue practices and goals~~
~~a. Machinery~~
~~b. Confined space~~
~~c. Rope rescue (vertical rescue)~~
~~d. Trench~~
~~e. Structural collapse~~
~~f. Water and ice~~
~~g. Elevator and escalator emergencies~~
~~h. Wilderness~~
~~i. Mine, tunnel and cave~~

Requisite Skills. The ability to identify and retrieve various types of rescue tools, establish public barriers, and assist rescue teams as a member of the team when assigned.

102-5~~6~~.5 ***Fire and Life Safety Initiatives, Preparedness, and Maintenance***
This duty shall involve performing activities related to reducing the loss of life and property due to fire through hazard identification, inspection, and response readiness, according to the JPRs in 5~~6~~.5.1 through 5~~6~~.5.5.

102-5~~6~~.5.1 Perform a fire safety survey in an occupied structure, given survey forms and procedures, so that fire and life safety hazards are identified, recommendations for their correction are made to the occupant, and unresolved issues are referred to the proper authority.

102-A.5~~6~~.5.1 **A fire safety survey is intended to be a basic survey of the property to identify major hazards such as locked exits, nonoperational fire protection and detection systems, a lack of smoke alarms in residential occupancies, nonoperational water supplies, hazardous interior finishes, hazardous storage, and other items identified on the survey form. It is not intended to be a fire inspection conducted to the job performance requirements of a Fire Inspector as identified in NFPA 1031.** ~~It is the intent of the committee to recognize that there are response areas that do not have private dwellings. The term occupied structure allows for greater flexibility and for the AHJ to determine which structures could be used for performing a fire safety survey.~~

Requisite Knowledge:~~.~~

a. Organizational policy and procedures~~,~~
1. **Scheduling considerations**
2. **Approach and introduction**
3. **Conducting the survey**
4. **Formulate recommendations**

b. C~~c~~ommon causes of fire and their prevention~~,~~
1. **Housekeeping practices**
2. **Smoking**
3. **Open burning**
4. **Electrical sources of ignition**
5. **Common hazards by location**
   i. **Kitchen**
   ii. **Living area**
   iii. **Bedroom**
   iv. **Garage/storage**
   v. **Bathroom**
   vi. **Laundry**
   vii. **Attics and basements**
   viii. **Exterior**
6. **Special hazards**

c. T~~t~~he importance of a fire safety survey and public fire education programs to fire department public relations and the community~~,~~
1. **Enhances community life safety**
2. **Prevents loss**
3. **Promotes community support**

d. ~~and~~ **R**~~r~~eferral procedures

~~**Requisite Knowledge**. Organizational policy and procedures, common causes of fire and their prevention, the importance of a fire safety survey and public fire education programs to fire department public relations and the community, and referral procedures.~~

~~1. Organizational policy and procedures~~
- ~~a. Scheduling considerations~~
  - ~~i. FD personnel~~
  - ~~ii. Structure occupant~~
- ~~b. Approach and introduction~~
- ~~c. Conducting the survey~~
- ~~d. Formulate recommendations~~

~~2. Common causes of fire and their prevention~~
- ~~a. Housekeeping practices~~
- ~~b. Smoking~~
- ~~c. Open burning~~
- ~~d. Electrical sources of ignition~~
- ~~e. Common hazards by location~~
  - ~~i. Kitchen~~
  - ~~ii. Living area~~
  - ~~iii. Bedroom~~
  - ~~iv. Garage/storage~~
  - ~~v. Bathroom~~
  - ~~vi. Laundry~~
  - ~~vii. Attics and basements~~
  - ~~viii. Exterior~~
- ~~f. Special hazards~~

~~3. The importance of a fire safety survey and public fire education programs to fire department public relations and the community~~
- ~~a. Enhances community life safety~~
- ~~b. Prevents loss~~
- ~~c. Promotes community support~~

~~4. Referral procedures – AHJ~~

Requisite Skills. The ability to complete forms, recognize hazards, match findings to preapproved recommendations, and effectively communicate findings to occupants or referrals.

102-56.5.2 Present fire safety information to station visitors or small groups, given prepared materials, so that all information is presented, the information is accurate, and questions are answered or referred.

102-A.56.5.2 The Fire Fighter II should be able to present basic information on how to do the following:

(1) Stop, drop, and roll when one's clothes are on fire
(2) Crawl low under smoke
(3) Plan and practice a home escape plan with two ways out of each room (especially sleeping rooms), a meeting place, and how to call the fire department (from the neighbor's house)
(4) Alert others to an emergency
(5) Call the fire department
(6) Test and maintain residential smoke alarms according to manufacturer's instructions

The Fire Fighter II is not expected to be an accomplished speaker or instructor.

Requisite Knowledge:

a. Parts of informational materials and how to use them
   1. Learn Not to Burn
   2. EDITH (Exit Drill In The Home)
   3. Installation and maintenance of smoke alarms
   4. Change your clock – change your battery
   5. Stop, drop and roll
   6. Fire safety for babysitters
   7. Fire safety for seniors
   8. Fire safety for college students
   9. Wildland prevention program
   10. Pamphlets
   11. Coloring books
   12. Public service announcements (PSAs)
   13. Public presentations

Commented [MMA41]: Combined sections 1 & 2, old sheets.

b. Basic presentation skills
   1. Age and audience appropriateness
   2. Knowledge of subject – preparation
   3. Use of props
   4. Professional attire
   5. Positive attitude

~~a.~~c. ~~and~~ Dd~~e~~partmental standard operating procedures (SOPs) for giving fire station tours~~.~~

~~**Requisite Knowledge**. Parts of informational materials and how to use them, basic presentation skills, and departmental standard operating procedures for giving fire station tours.~~

~~1. Educational programs~~
~~a. Learn Not to Burn~~
~~b. EDITH (Exit Drill In The Home)~~
~~c. Installation and maintenance of smoke alarms~~
~~d. Change your clock—change your battery~~
~~e. Stop, drop and roll~~
~~f. Fire safety for babysitters~~
~~g. Fire safety for seniors~~
~~h. Fire safety for college students~~
~~i. Wildland prevention program~~

~~2. How to use informational materials~~
~~a. Pamphlets~~
~~b. Coloring books~~
~~c. Public service announcements (PSAs)~~
~~d. Public presentations~~

~~3. Basic presentation skills~~
~~a. Age and audience appropriateness~~
~~b. Knowledge of subject – preparation~~
~~c. Use of props~~
~~d. Professional attire~~
~~e. Positive attitude~~

~~4. Departmental standard operating procedures (SOPs) for giving fire station tours—AHJ~~

Requisite Skills. The ability to document presentations and to use prepared materials.

102-5~~6~~.5.3 Prepare a preincident survey, given forms, necessary tools, and an assignment, so that all required occupancy information is recorded, items of concern are noted, and accurate sketches or diagrams are prepared.

102-A.5~~6~~.5.3 The Fire Fighter II should be able to compile information related to potential emergency incidents within their community for use by officers in the development of preincident plans. Jurisdictions that use Fire Fighter IIs

to develop preincident plans should comply with the requirements of NFPA 1021, *Standard for Fire Officer Professional Qualifications*.

Requisite Knowledge:~~:~~

a. The sources of water supply for fire protection~~;~~
   1. Pressurized
   2. Static

b. T~~t~~he fundamentals of fire suppression and detection systems~~;~~
   1. Automatic sprinkler systems
      i. Types
         a) Wet pipe
         b) Dry pipe
         c) Pre-action
         d) Deluge
         e) Residential
      ii. Sprinkler heads
         a) Deflector style
            1) Upright
            2) Pendant
            3) Side wall
            4) Deluge
            5) Recessed
            6) In-rack
         b) Activating devices
            1) Fusible link
            2) Frangible bulb
            3) Chemical pellet
      iii. Control valves
         a) Outside stem and yoke (OS&Y)
         b) Butterfly valve
         c) Wall post indicator valve (WPIV)
         d) Post indicator valve (PIV)
         e) Post indicator valve assembly (PIVA)
      iv. Valves
         a) Check valve
         b) Main drain
         c) Alarm test
         d) Inspector test
      v. Fire department connection (FDC)
         a) Two 2½" inlets
         b) One large diameter hose (LDH)
   2. Standpipe systems

Commented [MMA42]: New verbiage recommended by Pat McAuliff

Commented [MMA43]: Word change by Pat McAuliff

i. Class I
    a) Fire department use only
    b) 2½" connection with a valve
ii. Class II
    a) Occupant use
    b) 1½" single jacket hose preconnected
iii. Class III
    a) Occupant or fire department use
    b) 2½" connection with 1½" reducer and hose preconnected

3. Specialized extinguishment systems
    i. Dry chemical systems
    ii. Wet chemical systems
    iii. Foam systems
    iv. Clean agent systems
    v. Carbon dioxide systems
4. Fire department notification systems
    i. Remote station systems
    ii. Proprietary systems
    iii. Central station systems
5. Fire alarm system components
    i. Initiating devices
        a) Heat detectors
            1) Fixed-temperature detectors
            2) Rate-of-rise detectors
            3) Combination rate-of-rise fixed temperature detectors
        b) Smoke detectors
            1) Ionization
            2) Photoelectric
        c) Flame detectors
            1) Ultraviolet (UV)
            2) Infrared (IR)
        d) Fire – gas detectors
        e) Manual pull station
    ii. Notification Appliances
        a) Audible
            1) Bells
            2) Horns
            3) Sirens
            4) Recorded announcement
        b) Visual
            1) Strobes
            2) Rotating beacons

Commented [MMA44]: Items i. and iii on old sheets deleted, as per Pat McAuliff

Commented [MMA45]: New verbiage, as per Pat McAuliff

c) Textual
d) Tactile
e) Fire alarm control panel (FACP)
1) Power supply

Commented [MMA46]: New verbiage added, as per Pat McAuliff

Commented [MMA47]: New verbiage, as per Pat McAuliff

c. C~~c~~ommon symbols used in diagramming construction features, utilities, hazards, and fire protection systems~~;~~

1. Construction features
   i. Fire escape
   ii. Skylight
   iii. Stairs
   iv. Elevator
   v. Fire wall
2. Utilities
   i. Gas
   ii. Electric
   iii. Water
3. Fire protection
   i. Hydrant
   ii. Sprinkler riser
   iii. Fire department connection
   iv. Automatic sprinklers
   v. Not sprinklered
   vi. Standpipe
   vii. Fire alarm
   viii. Fire pump
4. Hazards
   i. Gasoline tank
   ii. Steam boiler
      a) Vertical
      b) Horizontal

d. D~~d~~epartmental requirements for a preincident survey and form completion~~;~~

1. Tactical information – considerations/planning for:
   i. Water supply
   ii. Utilities
   iii. Search and rescue
   iv. Forcible entry
   v. Ladder placement
   vi. Ventilation
2. Occupancy type
   i. High rise
   ii. Assembly

iii. Health care facilities
iv. Detention and correctional facilities
v. Residential occupancies
3. Locations requiring special considerations
i. Gas or liquid fuel pipelines
ii. Electrical transmission lines
iii. Ships and waterways
iv. Subways
v. Railroads
vi. Airports
vii. Industrial facilities
viii. Hazardous materials bulk storage locations

Commented [MMA48]: Combined sections 4 & 5, old sheets.

e. ~~and~~ T~~t~~he importance of accurate diagrams~~.~~
1. Accurate diagrams promote better decision making
2. Enhances civilian and firefighter safety
3. Search and rescue operations are conducted efficiently

~~**Requisite Knowledge**. The sources of water supply for fire protection; the fundamentals of fire suppression and detection systems; common symbols used in diagramming construction features, utilities, hazards, and fire protection systems; departmental requirements for a preincident survey and form completion; and the importance of accurate diagrams.~~

~~1. The sources of water for fire protection~~
~~a. Pressurized~~
~~b. Static~~

~~2. The fundamentals of fire suppression and detection systems~~
~~1. Automatic sprinkler systems~~
~~i. Types~~
~~a) Wet pipe~~
~~b) Dry pipe~~
~~c) Pre-action~~
~~d) Deluge~~
~~e) Residential~~
~~ii. Sprinkler heads~~
~~a) Deflector style~~
~~1) Upright~~
~~2) Pendant~~
~~3) Side wall~~
~~4) Deluge~~
~~5) Special~~
~~b) Activating devices~~

1) Fusible link
2) Frangible bulb
3) Chemical pellet

iii. Control valves
a) Outside screw and yoke (OS&Y)
b) Butterfly valve
c) Wall post indicator valve (WPIV)
d) Post indicator valve (PIV)
e) Post indicator valve assembly (PIVA)

iv. Valves
a) Check valve
b) Main drain
c) Alarm test
d) Inspector test

v. Fire department connection (FDC)
a) Two 2½" inlets
b) One large diameter hose (LDH)

2. Standpipe systems
i. Class I
a) Fire department use only
b) 2½" connection with a valve

ii. Class II
a) Occupant use
b) 1½" single jacket hose preconnected

iii. Class III
a) Occupant or fire department use
b) 2½" connection with 1½" reducer and hose preconnected

3. Specialized extinguishment systems
i. Dry chemical systems
ii. Wet chemical systems
iii. Foam systems
iv. Clean agent systems
v. Carbon dioxide systems

4. Fire department notification systems
i. Local alarm systems
ii. Remote station systems
iii. Auxiliary systems
iv. Proprietary systems
v. Central station systems

5. Fire alarm system components
i. Initiating devices
a) Heat detectors
1) Fixed-temperature detectors

2) Rate-of-rise detectors
3) Combination rate-of-rise fixed temperature detectors
b) Smoke detectors
1) Ionization
2) Photoelectric
c) Flame detectors
1) Ultraviolet (UV)
2) Infrared (IR)
d) Fire - gas detectors
e) Manual pull station
ii. Indicating devices
a) Audible
1) Bells
2) Horns
3) Sirens
4) Recorded announcement
b) Visual
1) Strobes
2) Rotating beacons
c) Fire alarm control panel (FACP)

3. Common symbols used in diagramming construction features, utilities, hazards, and fire protection systems
1. Construction features
i. Fire escape
ii. Skylight
iii. Stairs
iv. Elevator
v. Fire wall
2. Utilities
i. Gas
ii. Electric
iii. Water
3. Fire protection
i. Hydrant
ii. Sprinkler riser
iii. Fire department connection
iv. Automatic sprinklers
v. Not sprinklered
vi. Standpipe
vii. Fire alarm
viii. Fire pump
4. Hazards

i. Gasoline tank
ii. Steam boiler
a) Vertical
b) Horizontal

4. Departmental requirements for a preincident survey
1. Tactical information – considerations/planning for:
i. Water supply
ii. Utilities
iii. Search and rescue
iv. Forcible entry
v. Ladder placement
vi. Ventilation
2. Occupancy type
i. High rise
ii. Assembly
iii. Health care facilities
iv. Detention and correctional facilities
v. Residential occupancies
3. Locations requiring special considerations
i. Gas or liquid fuel pipelines
ii. Electrical transmission lines
iii. Ships and waterways
iv. Subways
v. Railroads
vi. Airports
vii. Industrial facilities
viii. Hazardous materials bulk storage locations

5. Departmental requirements for form completion – AHJ

6. The importance of accurate diagrams
a. Accurate diagrams promote better decision making
b. Enhances civilian and firefighter safety
c. Search and rescue operations are conducted efficiently

Requisite Skills. The ability to identify the components of fire suppression and detection systems; sketch the site, buildings, and special features; detect hazards and special considerations to include in the preincident sketch; and complete all related departmental forms.

102-56.5.4 Maintain power plants, power tools, and lighting equipment, given tools and manufacturers' instructions, so that equipment is clean and maintained according to manufacturer and departmental guidelines,

maintenance is recorded, and equipment is placed in a ready state or reported otherwise.

Requisite Knowledge~~:~~

a. Types of cleaning methods~~,~~
- **1. Metal parts**
- **2. Wood parts**
- **3. Fiberglass/synthetic parts**
- **4. Cutting edges**
- **5. Power tools**
- **6. Electrical/electronic devices**

b. C~~c~~orrect use of cleaning solvents~~,~~
- **1. Associated hazards**
- **2. Application**
- **3. Safety considerations**

c. M~~m~~anufacturer and departmental guidelines for maintaining equipment and its documentation~~,~~
- **1. Per the manufacturer's recommendations**
- **2. Inspection frequency and procedures per AHJ**

d. ~~and~~ **P**~~p~~roblem-reporting practices~~.~~
- **1. Tag problem item**
- **2. Remove from service**
- ~~1.~~**3. Report problem per AHJ**

~~**Requisite Knowledge**. Types of cleaning methods, correct use of cleaning solvents, manufacturer and departmental guidelines for maintaining equipment and its documentation, and problem-reporting practices.~~

~~1. Types of cleaning methods~~
- ~~a. Metal parts~~
- ~~b. Wood parts~~
- ~~c. Fiberglass/synthetic parts~~
- ~~d. Cutting edges~~
- ~~e. Power tools~~
- ~~f. Electrical/electronic devices~~

~~2. Correct use of cleaning solvents~~
- ~~a. Associated hazards~~
- ~~b. Application~~

~~c. Safety considerations~~

~~3. Manufacturer and departmental guidelines for maintaining equipment and its documentation~~
~~a. Per the manufacturer's recommendations~~
~~b. Inspection frequency and procedures per AHJ~~

~~4. Problem-reporting practices~~
~~a. Tag problem item~~
~~b. Remove from service~~
~~c. Report problem per AHJ~~

Requisite Skills. The ability to select correct tools; follow guidelines; complete recording and reporting procedures; and operate power plants, power tools, and lighting equipment.

102-5~~6~~.5.5 Perform an annual service test on fire hose, given a pump, a marking device, pressure gauges, a timer, record sheets, and related equipment, so that procedures are followed, the condition of the hose is evaluated, any damaged hose is removed from service, and the results are recorded.

102-A.5~~6~~.5.5 **Procedures for conducting hose testing can be found in Chapter 4 of NFPA 1962.** ~~Procedures for conducting hose testing can be found in Chapter 5 of NFPA 1962, *Standard for the Inspection, Care, and Use of Fire Hose, Couplings and Nozzles and the Service Testing of Fire Hose.*~~

Requisite Knowledge:~~.~~

a. Procedures for safely conducting hose service testing~~,~~
1. Routine inspection
i. Lay clean hose out on flat surface
ii. Inspect hose for defects
iii. Mark defects as found
iv. Tag hose with description of defects found
2. Annual service test
i. Don protective gear – wear helmet and gloves at a minimum
ii. Connect up to 300 feet maximum of hose to a discharge outlet
iii. Attach a nozzle or valve to the end of the hose
iv. Fill hose to 50 psi, remove air, twists and kinks in hose
v. Mark hose at the base of the coupling
vi. Check couplings and hose for leaks

vii. If couplings leak at the gasket, replace the gasket
viii. After gaskets are replaced or if no leaks are present, increase pressure to manufacturer's recommended pressure per NFPA 1962 and maintain for 5 minutes
ix. Monitor hose and couplings for leaks or failure
x. Reduce pressure, depressurize hose, and drain
xi. Inspect marks at couplings for separation or slippage
xii. Tag failures or defects
xiii. Distinctly mark hose that passed
xiv. Log test results for departmental record

3. Safety notes:
i. Always wear a helmet and gloves while working around pressurized hose
ii. Never walk over, straddle, or stand over hose being pressure tested

b. I~~i~~ndicators that dictate any hose be removed from service~~,~~

1. Mechanical damage
i. Bent or damaged couplings
ii. Hose separating from couplings
iii. Cuts or holes
iv. Crushed suction hose
2. Chemical damage
i. Chemical degradation
ii. Contamination
3. Heat damage
i. Burn holes
ii. Delamination
4. Mildew/rot
5. Service test pressure failure (i.e. burst hose)

c. ~~and~~ R~~r~~ecording procedures for hose test results~~.~~

1. Hose records should contain:
i. Hose size/length, type, and diameter
ii. Date of manufacture
iii. Date of purchase
iv. Testing dates
v. Any repairs made
~~1.~~2. Other information per AHJ

~~**Requisite Knowledge**. Procedures for safely conducting hose service testing, indicators that dictate any hose be removed from service, and recording procedures for hose test results~~

1. Procedures for safety conducting hose service testing
    a. Routine inspection
        i. Lay clean hose out on flat surface
        ii. Inspect hose for defects
        iii. Mark defects as found
        iv. Tag hose with description of defects found
    b. Annual service test
        i. Don protective gear – wear helmet and gloves at a minimum
        ii. Connect up to 300 feet maximum of hose to a discharge outlet
        iii. Attach a nozzle or valve to the end of the hose
        iv. Fill hose to 50 psi, remove air, twists and kinks in hose
        v. Mark hose at the base of the coupling
        vi. Check couplings and hose for leaks
        vii. If couplings leak at the gasket, replace the gasket
        viii. After gaskets are replaced or if no leaks are present, increase pressure to manufacturer's recommended pressure per NFPA 1962 and maintain for 5 minutes
        ix. Monitor hose and couplings for leaks or failure
        x. Reduce pressure, depressurize hose, and drain
        xi. Inspect marks at couplings for separation or slippage
        xii. Tag failures or defects
        xiii. Distinctly mark hose that passed
        xiv. Log test results for departmental record
    c. Safety notes:
        i. Always wear a helmet and gloves while working around pressurized hose
        ii. Never walk over, straddle, or stand over hose being pressure tested

2. Indicators that dictate any hose be removed from service
    a. Mechanical damage
        i. Bent or damaged couplings
        ii. Hose separating from couplings
        iii. Cuts or holes
        iv. Crushed suction hose
    b. Chemical damage
        i. Chemical degradation
        ii. Contamination
    c. Heat damage
        i. Burn holes
        ii. Delamination
    d. Mildew/rot

~~e. Service test pressure failure (i.e. burst hose)~~

~~3. Recording procedures for hose test results~~
~~a. Hose records should contain:~~
~~i. Hose size/length, type, and diameter~~
~~ii. Date of manufacture~~
~~iii. Date of purchase~~
~~iv. Testing dates~~
~~v. Any repairs made~~
~~b. Other information per AHJ~~

Requisite Skills. The ability to operate hose testing equipment and nozzles and to record results.

4. Report from the Curriculum and Testing Committee regarding possible changes to the Certification Curriculum Manual as follows:

b. Hazardous Materials Curriculum

CERTIFICATION CURRICULUM MANUAL

CHAPTER SIX

HAZARDOUS MATERIALS

NFPA 1072~~472~~, 2017~~2013~~ Edition

Effective January 1, 2021~~June 1, 2015~~

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

HAZARDOUS MATERIALS AWARENESS

REFERENCE LIST FOR THE HAZARDOUS MATERIALS AWARENESS CURRICULUM

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

Required References

Texts

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

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

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

*Essentials of Fire Fighting ~~and Fire Department Operations~~, **7th** ~~6th~~ edition*. International Fire Service Training Association. (201**8**~~3~~). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

*Fundamentals of Fire Fighter Skills **and Hazardous Materials Response**, **4th** ~~3rd~~* edition. International Association of Fire Chiefs, & National Fire Protection Association. (201**9**~~4~~). **Burlington** ~~Sudbury~~, MA: Jones and Bartlett.

Hazardous Materials Awareness and Operations, 3rd *edition*. Schnepp, R. (2019). Sudbury, MA: Jones & Bartlett.

Hazardous Materials for First Responders, 5th edition. International Fire Service Training Association. (2017). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

Hazardous Materials/Weapons of Mass Destruction Response Handbook, ~~6th~~/201**8**~~3~~ edition. McGowan, T. (201**8**~~2~~). Quincy, MA: National Fire Protection Association.

*NFPA 472: Standard for ~~Professional~~ Competence of Responders to Hazardous Materials**/Weapons of Mass Destruction** Incidents. (*201**8**~~3~~ ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

NFPA 1072: Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications. (2017 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

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

Recommended References

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

Media

*DOT Chart **18**~~15~~: Hazardous Materials Marking, Labeling and Placarding Guide*. (or current edition) United States**.** Washington, DC: U.S. Dept. of Transportation, Pipeline and Hazardous Materials Safety Administration.

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

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

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

CHAPTER 6
SECTION 601
HAZARDOUS MATERIALS AWARENESS
CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
601-4.1	General - Introduction - Laws, Regulations, and National Consensus Standards	1
601-4.2	**Recognition and Identification** ~~Analyzing the Incident~~	5
601-4.3	**Initiate Protective Actions** ~~Planning the Response - Reserved - None Required at this Level~~	
601-4.4	**Notification** ~~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.

Commented [MMA1]: Not in NFPA 1072-2017.

Commented [MMA2]: Not in NFPA 1072-2017.

Commented [MMA3]: Not in NFPA 1072-2017.

Commented [MMA4]: New verbiage/strikeouts from NFPA 1072-2017.

Course Instructor Information

Hazardous Materials

Awareness

Overview
The Hazardous Materials curricula are designed to provide clear guidance that ensures adequate presentation of the information required to meet the Job Performance Requirements (JPRs) of National Fire Protection Association (NFPA) 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*, 2017 edition.

The Hazardous Materials curricula is found in Chapter 6 of the TCFP Curriculum Manual.

Certification Level	TCFP Section Number	NFPA 1072 Chapter
Awareness	601	4
Operations	602	5
Operations-Mission Specific Competencies (MSC)	603	6
*Technician	604	7
*Incident Commander	605	8

Layout
The NFPA numbering sequence is mirrored to allow easy correlation between this document and the NFPA Standard. For example, 601-4.1.2 identifies the section in Awareness that corresponds to NFPA section 4.1.2.

When a section references information from “Annex A Explanatory Material” in the NFPA Standard, it is identified by a boxed Instructor Note. For example, the boxed Instructor Note listed in 601-4.2.1 and that immediately follows the Requisite Knowledge section corresponds to the NFPA Annex A information for NFPA 1072 section 4.2.1.

* Asterisks by Technician and Incident Commander above indicate that both are voluntary (non-mandatory) certifications. Therefore, **a formal “curriculum outline” is not provided**. Please use chapters 7 and 8, respectively, of NFPA 1072 as a guide when creating your own course curricula or selecting a prepared instructional curriculum package from a publisher/vendor for Technician and Incident Commander.

TCFP Standards Manual
It is critical that you review the chapters in the TCFP Standards Manual that apply to this curriculum. Of primary importance are the following two chapters: Chapter 423, which defines the course of study, documentation and medical requirements necessary

for Awareness and Operations certification (required) and Chapter 453, which covers certification requirements for Technician and Incident Commander (voluntary). Additionally, instructors are expected to review the following chapters as they pertain to the instructional, examination, certification processes:

- Chapter 421,Standards for Certification
- Chapter 427, Training Facility Certification
- Chapter 435, Fire Fighter Safety
- Chapter 437, Fees
- Chapter 439, Examinations for Certification
- Chapter 441, Continuing Education

These chapters do not address every issue that could impact this curriculum; therefore, you are encouraged to become familiar with the TCFP Standards Manual.

Instructor Qualifications
Hazardous Materials courses must be taught by an instructor meeting the requirements described in Chapter 427.307 of the TCFP Standards Manual.

Supplemental Information
Instructors are expected to provide supplemental information if the main reference text does not provide adequate information to ensure successful completion of the Job Performance Requirements as listed in the curriculum.

Components of the Curricula
Each section of a curriculum identifies the NFPA Job Performance Requirement (JPR) and subdivides the requisite knowledge requirements into learning components. For example:

View within the Curriculum		Explanation
601-4.3.1	Isolate the hazard area and deny entry at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, policies and procedures, and approved reference sources, so that the hazard area is isolated and secured, personal safety procedures are followed, hazards are avoided or minimized, and additional people are not exposed to further harm.	**Section Number and NFPA JPR**
	Requisite Knowledge: Use of the ERG, SDS, shipping papers with emergency response information, and other approved reference sources to identify precautions to be taken to	**Requisite Knowledge Statement**

protect responders and the public; policies and procedures for isolating the hazard area and denying entry; and the purpose of and methods for isolating the hazard area and denying entry.	
(1) Use of the ERG, SDS, shipping papers with emergency response information, and other approved reference sources to identify precautions to be taken to protect responders and the public	**First part of Requisite Knowledge**
Identify precautions to be taken to protect responders/the public using ERG, SDS, shipping papers with emergency response information, other approved reference sources Identify the hazard a. Isolate the hazard area b. Deny entry c. Call for trained personnel d. Secure the scene	**Associated learning components**
(2) Policies and procedures for isolating the hazard area and denying entry	**Second part of Requisite Knowledge**
Policies and procedures, per AHJ/SOP a. Isolating the hazard area b. Denying entry	**Associated learning components**
(3) And the purpose of and methods for isolating the hazard area and denying entry	**Third part of Requisite Knowledge**
Purpose/methods a. Isolating the hazard area i. Establish perimeter ii. Erect barriers b. Denying entry i. Restrict hazard area access to	**Associated learning components**

appropriately trained personnel only ii. Maintain perimeter	
Requisite Skills: Use of the ERG, SDS, shipping papers with emergency response	**Requisite Skills Statement**
Instructor Note Recommended precautions found on numbered guides in the ERG include public safety issues; recommended protective clothing; evacuation; emergency response to fire, spill, and leak; and first aid sections. Examples of required knowledge include (1) precautions for providing emergency medical care to victims; typical ignition sources; ways hazardous materials/WMD are harmful to people, the environment, and property; general routes of entry for human exposure; emergency action (fire, spill, or leak; first aid); actions recommended not to be performed (e.g., closing of pipeline valves); protective actions (isolation of area and denial of entry, evacuation, shelter-in-place); size and shape of recommended initial isolation and protective action distances; difference between small and large spills; conditions that require the use of the ERG Table of Initial Isolation and Protective Action Distances and the isolation distances in the ERG numbered guide; techniques for isolating the hazard area and denying entry to unauthorized persons; how to recognize and protect evidence; and use of approved tools and equipment; (2) basic personal protective actions: staying clear of vapors, fumes, smoke, and spills; keeping vehicle at a safe distance from the scene; approaching from upwind, uphill, and upstream; and (3) types of protective actions and their purpose (e.g., isolate hazard area and deny entry, evacuation, and shelter-in-place); basic factors involved in the choice of protective actions (e.g., hazardous materials/WMD involved, population threatened,	**Appendix A: Explanatory Material for 4.3.1**

	and weather conditions).	

Unless otherwise specified, all curriculum references are to NFPA 1072. In some cases, (see, for example, 601-4.2.1), reference is also made under the section number and JPR to similar material in NFPA 472.

601-4.2.1	Recognize and identify the hazardous materials/WMD and hazards involved in a hazardous materials/WMD incident, given a hazardous materials/WMD incident, and approved reference sources, so that the presence of hazardous materials/WMD is recognized and the materials and their hazards are identified. Given a hazardous materials/WMD incident, and approved reference sources, awareness level personnel shall recognize those situations where hazardous materials/WMD are present. (472-4.2.1)	**Additional reference to NFPA 472**

Skills
NFPA Requisite Skill requirements are addressed in the corresponding Skill Sheets in Chapter 6 of the TCFP Curriculum Skills Manual.

Definitions of Certification Levels
Awareness Level Personnel: Personnel who, in the course of their normal duties, could encounter an emergency involving hazardous materials/weapons of mass destruction (WMD) and who are expected to recognize the presence of the hazardous materials/WMD, protect themselves, call for trained personnel, and secure the scene. These personnel have met all the performance requirements of Chapter 4 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*

Operations Level Personnel: Personnel 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. These personnel have met all the performance requirements of Chapter 5 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*

Operations-Mission Specific Competencies (MSC) Level Personnel: Responders assigned mission-specific responsibilities at hazardous materials/WMD incidents are

those operations level responders designated by the authority having jurisdiction (AHJ) to perform additional tasks to support the AHJ's response mission, expected tasks, equipment, and training in the following areas:

(1) Personal protection equipment (PPE)
(2) Mass decontamination
(3) Technical decontamination
(4) Evidence preservation and sampling
(5) Product control
(6) Detection, monitoring, and public safety sampling
(7) Victim rescue and recovery
(8) Illicit laboratories incidents

These personnel have met all the performance requirements of Chapter 5 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications* and have also met the performance requirements of the subchapter(s) of Chapter 6 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications,* to which they are trained and credentialed to perform.

Note: Basic TCFP Structural Fire Fighter certification requires that Structure Fire Fighter personnel meet all performance requirements for:

- *Hazardous Materials Awareness*
- *Hazardous Materials Operations*
- *Hazardous Materials Operations - MSC – 6.2 Personal Protective Equipment*
- *Hazardous Materials Operations - MSC – 6.6 Product Control*

Technician Level Personnel: Persons who respond to hazardous materials/weapons of mass destruction (WMD) incidents using a risk-based response process by which they analyze a problem involving hazardous materials/WMD, plan a response to the problem, evaluate progress of the planned response, and assist in terminating the incident. These personnel have met all the performance requirements of Chapter 7 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications.*

Incident Commander Level Personnel: That person, designated by the AHJ, responsible for all incident activities/operations, including the development of strategies and tactics and the ordering and release of resources. These personnel have met all the performance requirements of Chapter 8 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications.*

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

601-4.1.2 Awareness personnel shall meet the job performance requirements defined in Sections 601-4.2 through 601-4.4.

Instructor Note

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

Commented [MMA1]: Instructor Notes throughout this document equate to the annex section associated with the preceding section. Here, this note refers to A.4.1.2 of NFPA 1072-2017.

601-4.1.3 General Knowledge Requirements

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

1. Role of awareness personnel at a hazardous materials/WMD incident

2. AHJ emergency response plan
   a. Location
   b. Contents

3. Standard operating procedures for awareness personnel

601-4.1.4 General Skills Requirements (Reserved)

601-4.2 Recognition and Identification

Instructor Note

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

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

Commented [MMA2]: Instructor Note equates to annex section A.4.2 of NFPA 1072-2019.

Commented [MMA3]: Instructor Note equates to annex section A.4.2 of NFPA 1072-2019.

601-4.2.1 Recognize and identify the hazardous materials/WMD and hazards involved in a hazardous materials/WMD incident, given a hazardous

materials/WMD incident, and approved reference sources, so that the presence of hazardous materials/WMD is recognized and the materials and their hazards are identified.

Given a hazardous materials/WMD incident, and approved reference sources, awareness level personnel shall recognize those situations where hazardous materials/WMD are present. (472-4.2.1)

(A) Requisite Knowledge. What hazardous materials and WMD are; basic hazards associated with classes and divisions; indicators to the presence of hazardous materials including container shapes, NFPA 704 markings, globally harmonized system (GHS) markings, placards, labels, pipeline markings, other transportation markings, shipping papers with emergency response information, and other indicators; accessing information from the Emergency Response Guidebook (ERG) (current edition) using name of the material, UN/NA identification number, placard applied, or container identification charts; and types of hazard information available from the ERG, safety data sheets (SDS), shipping papers with emergency response information, and other approved reference sources.

1. Define hazardous materials and WMD
    a. Hazardous materials – matter (solid, liquid, or gas) or energy that when released is capable of creating harm to people, the environment, and property, including weapons of mass destruction (WMD).
    b. Dangerous goods (term used for hazardous materials in Canada)
    c. Weapon of mass destruction (WMD)
        i. CBRNE problems from a terrorist attack
            1. chemical
            2. biological
            3. radiological
            4. nuclear
            5. explosives (i.e, IED - improvised explosive device)
        ii. Radiological weapons of mass destruction
            1. Improvised nuclear device (IND)

2. Radiation dispersal device (RDD) (i.e., dirty bomb)
3. Radiation exposure device (RED) (i.e., radiation emitting device)

2. Basic hazards associated with classes and divisions
    a. Class 1 – Explosives
        i. Division 1.1 – Explosives which have a mass explosion hazard
        ii. Division 1.2 – Explosives which have a projection hazard but not a mass explosion hazard
        iii. Division 1.3 – Explosives which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard
        iv. Division 1.4 – Explosives which present no significant blast hazard
        v. Division 1.5 – Very insensitive explosives with a mass explosion hazard
        vi. Division 1.6 – Extremely insensitive articles which do not have a mass explosion hazard
    b. Class 2 – Gases
        i. Division 2.1 – Flammable gases
        ii. Division 2.2 – Non-flammable, non-toxic gases
        iii. Division 2.3 – Toxic gases
    c. Class 3 – Flammable liquids (and Combustible liquids [US])
    d. Class 4 – Flammable solids; Substances liable to spontaneous combustion; Substances which, on contact with water emit flammable gases
        i. Division 4.1 – Flammable solids, self-reactive substances and solid desensitized explosives
        ii. Division 4.2 – Substances liable to spontaneous combustion
        iii. Division 4.3 – Substances which in contact with water emit flammable gases
    e. Class 5 – Oxidizing substances and Organic peroxides
        i. Division 5.1 – Oxidizing substances
        ii. Division 5.2 – Organic peroxides
    f. Class 6 – Toxic substances and Infectious substances
        i. Division 6.1 – Toxic substances

ii. Division 6.2 – Infectious substances
g. Class 7 – Radioactive materials
h. Class 8 – Corrosive substances
i. Class 9 – Miscellaneous dangerous goods/hazardous materials and articles

3. Hazardous materials indicators
a. Container shapes
b. NFPA 704 markings
c. Globally harmonized system (GHS) markings
d. Placards
e. Labels
f. Pipeline markings
g. Other transportation markings
h. Shipping papers with emergency response information and other indicators
i. Military hazardous materials/WMD markings
ii. Special hazard communication markings for each hazard class (i.e., symbols)
iii. Container markings

4. Access information from the Emergency Response Guidebook (ERG) (current edition) using:
a. Name of material
b. UN/NA identification number
c. Placard applied – table of placards
d. Container identification charts
e. Other types of hazard information available from the ERG
i. Safety precautions
ii. Notification and request for technical information
iii. Hazard classification system information
iv. Railcar and road trailer identification charts
v. Globally harmonized system (GHS) of classification and labeling of chemicals information
vi. Hazard identification numbers
vii. Pipeline and pipeline marker information
viii. Response guide information
ix. Initial isolation and protective distances

x. Protective clothing information
xi. Fire and spill control information
xii. Boiling liquid expanding vapor explosion (BLEVE) safety precautions
xiii. Criminal/terrorist use of chemical/biological/radiological agents information
xiv. Improvised explosive device (IED) safe standoff distances
xv. Glossary of terms
xvi. Response center contact information

5. Safety data sheets (SDS), as provided by the manufacturer

6. Shipping papers
   a. Bill of Lading or Freight Bill – highway
   b. Dangerous Cargo Manifest – maritime
   c. Waybill and/or Consist/Train List – railroad
   d. Air Bill – aircraft
7. Other approved references – per AHJ, i.e., DOT chart, pre-incident response plans, WISER, pocket guides

Instructor Note

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

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

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

Indicators of the presence of hazardous materials include occupancy and locations, including facilities and transportation; container shape (general shape of the container); container owner/operator signage; placards and

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

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

The SDS requires more information than MSDS regulations and provides a standardized structure for presenting the required information.

Commented [MMA4]: Instructor Note equates to annex section A.4.2.1 (A) of NFPA 1072-2019.

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

1. Recognize hazardous materials/WMD indicators, which may include, but not be limited to:
   - **a. Odors**
   - **b. Gas leak**
   - **c. Fire**
   - **d. Vapor cloud or smoke**
   - **e. Corrosive actions**

f. Visible chemical reactions
g. Pooled liquids
h. Sound of a pressure release
i. Condensation or ice on a pressure tank
j. Injured persons/casualties, dead animals, dead/dying vegetation

2. Identify hazardous materials/WMD (by):
   a. Name
   b. UN/NA identification number
   c. Placard applied
   d. Container identification charts

3. Use ERG, SDS, shipping papers with emergency response information and other approved sources to identify:
   a. Hazardous materials/WMD
      i. Potential fire hazards
      ii. Potential explosion hazards
      iii. Potential health hazards

601-4.3 ***Initiate Protective Action***

Instructor Note

People not directly involved in emergency response operations should be kept away from the hazard area, and control should be established over the area of operations. Unprotected emergency responders should not be allowed to enter the isolation zone.

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

Commented [MMA5]: Instructor Note equates to section A.4.3 of NFPA 1072-2019.

601-4.3.1 **Isolate the hazard area and deny entry at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, policies and procedures, and approved reference sources, so that the hazard area is isolated and secured, personal safety procedures are followed, hazards are avoided or minimized, and additional people are not exposed to further harm.**

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

1. **Identify precautions to be taken to protect responders/the public using ERG, SDS, shipping papers with emergency response information, other approved reference sources**
    - a. **Identify the hazard**
    - b. **Isolate the hazard area**
    - c. **Deny entry**
    - d. **Call for trained personnel**
    - e. **Secure the scene**

2. **Policies and procedures, per AHJ/SOP**
    - a. **Isolating the hazard area**
    - b. **Denying entry**

3. **Purpose/methods**
    - a. **Isolating the hazard area**
        - i. **Establish perimeter**
        - ii. **Erect barriers**
    - b. **Denying entry**
        - i. **Restrict hazard area access to appropriately trained personnel only**
        - ii. **Maintain perimeter**

Instructor Note

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

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

Commented [MMA6]: Instructor Note equates to annex section A.4.3.1(A) of NFPA 1072-2019.

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

601-4.4 Notification

601-4.4.1 Initiate required notifications at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, policies and procedures, and approved communications equipment, so that the notification process is initiated and the necessary information is communicated.

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

1. Policies and procedures (NFPA 472, 4.4.2)
- **a. Notification, per AHJ**
- **b. Reporting, per AHJ**
- **c. Communications, per AHJ**

2. Types of approved communications equipment (NFPA 472, 4.4.2)
- **a. Radios**
- **b. Phone/cell phone**
  - **i. 9-1-1**
  - **ii. Reverse 9-1-1**
  - **iii. Notification/outreach software systems (i.e., Blackboard Connect, SwiftReach, Everbridge, etc.)**
- **c. Sirens, airhorns and public announcement (PA) systems**

3. The operation of communications equipment, per AHJ

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

~~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

601-4.1.2 Goal

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

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

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

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

601-4.2 Competencies — Analyzing the Incident

601-4.2.1 Detecting the Presence of Hazardous Materials/WMD
Given examples of various situations, awareness level personnel shall identify those situations where hazardous materials/WMD are present and shall meet the following requirements:

1. Identify the definitions of both *hazardous material* (or *dangerous goods*, in Canada) and *WMD*.
    a. Hazardous materials (or dangerous goods in Canada) – a substance (solid, liquid, gas or energy) that when released is capable of creating harm to people, the environment, and property, including weapons of mass destruction (WMD) as defined in 18 U.S. Code, Section 2332a, as well as any other criminal use of hazardous materials, such as illicit labs, environmental crimes, or industrial sabotage
    b. Weapons of Mass Destruction (WMD) - (1) Any destructive device, such as any explosive, incendiary, or poison gas bomb, grenade, rocket having a propellant charge of more than four ounces, missile having an explosive or incendiary charge of more than one quarter ounce (7 grams), mine, or device similar to the above; (2) any weapon involving toxic or poisonous chemicals; (3) any weapon involving a disease organism; or (4) any weapon that is designed to release radiation or radioactivity at a level dangerous to human life.

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

b. Class 2 - Gases
    i. Division 2.1 Flammable gases. Examples of Division 2.1 gases include inhibited butadienes, methyl chloride, and propane.
    ii. Division 2.2 Non-flammable, non-toxic gases. Examples of Division 2.2 gases include anhydrous ammonia, cryogenic argon, carbon dioxide, and compressed nitrogen.
    iii. Division 2.3 Toxic gases. Examples of Division 2.3 gases include anhydrous hydrogen fluoride, arsine, chlorine, and methyl bromide.
c. Class 3 - Flammable liquids (and Combustible liquids [U.S.]) Examples of Class 3 liquids include acetone, amyl acetate, gasoline, methyl alcohol, and toluene.
d. Class 4 - Flammable solids; Spontaneously combustible materials; and Dangerous when wet materials/Water-reactive substances
    i. Division 4.1 Flammable solids. Examples of Division 4.1 materials include magnesium (pellets, turnings, or ribbons) and nitrocellulose.
    ii. Division 4.2 Spontaneously combustible materials. Examples of Division 4.2 materials include aluminum alkyls, charcoal briquettes, magnesium alkyls, and phosphorus.
    iii. Division 4.3 Water-reactive substances/Dangerous when wet materials. Examples of Division 4.3 materials include calcium carbide, magnesium powder, potassium metal alloys, and sodium hydride.
e. Class 5 - Oxidizing substances and Organic peroxides
    i. Division 5.1 Oxidizing substances. Examples of Division 5.1 materials include ammonium nitrate, bromine trifluoride, and calcium hypochlorite.
    ii. Division 5.2 Organic peroxides. Examples of Division 5.2 materials include dibenzoyl peroxide, methyl ethyl ketone peroxide, and peroxyacetic acid.
f. Class 6 - Toxic substances and Infectious substances
    i. Division 6.1 Toxic substances. Examples of Division 6.1 materials include aniline, arsenic compounds, carbon tetrachloride, hydrocyanic acid, and tear gas.
    ii. Division 6.2 Infectious substances. Examples of Division 6.2 materials include anthrax, botulism, rabies, and tetanus.

g. Class 7 - Radioactive materials. Examples of Class 7 materials include cobalt, uranium hexafluoride, and "yellow cake."
h. Class 8 - Corrosive substances. Examples of Class 8 materials include nitric acid, phosphorus trichloride, sodium hydroxide, and sulfuric acid.
i. Class 9 - Miscellaneous hazardous materials/Products, Substances or Organisms. Examples of Class 9 materials include adipic acid, hazardous substances (e.g., PCBs), and molten sulfur.

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

comprises articles that contain only extremely insensitive detonating substances and that demonstrate a negligible probability of accidental initiation or propagation.

b. Class 2 — Gases

i. Division 2.1 (flammable gas) consists of materials that are a gas at 68°F (20°C) or less and 14.7 psi (101.3 kPa) of pressure, have a boiling point of 68°F (20°C) or less at 14.7 psi (101.3 kPa), and have the following properties:

a) Are ignitable at 14.7 psi (101.3 kPa) when in a mixture of 13 percent or less by volume with air

b) Have a flammable range at 14.7 psi (101.3 kPa) with air of at least 12 percent regardless of the lower limit

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

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

a) Are known to be so toxic to humans as to pose a hazard to health during transportation

b) In the absence of adequate data on human toxicity, are presumed to be toxic to humans because, when tested on laboratory animals, they have an LC_{50} value of not more than 5000 ppm.

c. Class 3 — Flammable and Combustible Liquids

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

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

d. Class 4 — Flammable Solids
   i. Division 4.1 (flammable solids) comprised of the following three types of materials:
      a) Desensitized explosives — explosives wetted with sufficient water, alcohol, or plasticizers to suppress explosive properties
      b) Self-reactive materials — materials that are thermally unstable and that can undergo a strongly exothermic decomposition even with participation of oxygen (air)
      c) Readily combustible solids — solids that can cause a fire through friction and any metal powders that can be ignited.
   ii. Division 4.2 (spontaneously combustible material) comprises the following materials:
      a) Pyrophoric materials — liquids or solids that, even in small quantities and without an external ignition source, can ignite within 5 minutes after coming in contact with air
      b) Self-heating materials — materials that, when in contact with air and without an energy supply, are liable to self-heat
   iii. Division 4.3 (dangerous-when-wet materials) is comprised of materials that, by contact with water, are liable to become spontaneously flammable or to give off flammable or toxic gas at a rate greater than 1 L/kg of the material per hour.

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

peroxide, where one or more of the hydrogen atoms have been replaced by organic radicals.

f. Class 6 — Poisonous Materials

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

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

g. Class 7 — Radioactive Materials

Radioactive material is any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed specified values.

h. Class 8 — Corrosive Materials

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

i. Class 9 — Miscellaneous Hazardous Materials

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

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

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

4. Identify the difference between hazardous materials/WMD incidents and other emergencies.

a. Size

b. Complexity
c. Intent
d. Crime scene management
e. Secondary devices/attacks and armed

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

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

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

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

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

10. Identify the following basic information on material safety data sheets (MSDS) or safety data sheets (SDS) and shipping papers for hazardous materials:
    a. Identify where to find MSDS/SDS.
    b. Identify major sections of an MSDS/SDS.
        a. Basic information that indicates hazardous materials
        b. Entries that indicate the presence of hazardous materials containers by their shape
    c. Identify the entries on shipping papers that indicate the presence of hazardous materials.
    d. Match the name of the shipping papers found in transportation (air, highway, rail, and water) with the mode of transportation.
        a. Air – air bill
        b. Highway – Bill of Lading or freight bill
        c. Water – dangerous cargo manifest
        d. Rail – waybill and/or consist
    e. Identify the person responsible for having the shipping papers in each mode of transportation.
    f. Identify where the shipping papers are found in each mode of transportation.
    g. Identify where the papers can be found in an emergency in each mode of transportation.

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

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

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

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

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

l. Unusual security, locks, bars on windows, covered windows, or barbed wire

16. Identify at least four indicators of possible criminal or terrorist activity involving biological agents.
    a. Unusual number of sick or dying people or animals (any number of symptoms; time before symptoms are observed dependent on the agent used but usually days to weeks)
    b. Healthcare facilities reporting multiple casualties with similar signs or symptoms
    c. Unscheduled or unusual spray being disseminated, especially if outdoors during period of darkness
    d. Abandoned spray devices (devices with no distinct odors)

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

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

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

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

601-4.2.2 Surveying Hazardous Materials/WMD Incidents

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

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

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

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

601-4.2.3 Collecting Hazard Information

Given the identity of various hazardous materials/WMD (name, UN/NA identification number, or type placard), awareness level personnel shall

identify the fire, explosion, and health hazard information for each material by using the current edition of the DOT *Emergency Response Guidebook* by completing the following requirements:

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

2. Identify the two general types of hazards found on each guidebook page.
    a. Fire/explosive
    b. Health

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

601-4.4 Competencies — Implementing the Planned Response

601-4.4.1 Initiating Protective Actions

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

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

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

3. Identify the following basic precautions to be taken to protect themselves and others in hazardous materials/WMD incidents:

a. Identify the precautions necessary when providing emergency medical care to victims of hazardous materials/WMD incidents.
    i. Responder safety/appropriate PPE
    ii. Isolate the victim
    iii. Identify the product (by appropriately trained personnel)
    iv. Decontaminate the patient (by appropriately trained personnel)
b. Identify typical ignition sources found at the scene of hazardous materials/WMD incidents.
c. Identify the ways hazardous materials/WMD are harmful to people, the environment, and property.
    i. **T**hermal
    ii. **R**adiation
    iii. **A**sphyxiation
    iv. **C**hemical (i.e., poisons, corrosives)
    v. **E**tiologic
    vi. **M**echanical
    vii. **P**sychological/psychogenic
d. Identify the general routes of entry for human exposure to hazardous materials/WMD.
    i. Contact
    ii. Absorption
    iii. Inhalation
    iv. Ingestion

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

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

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

c. Shelter-in-place

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

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

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

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

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

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

601-4.4.2 Initiating the Notification Process

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

601-4.5 Competencies — Evaluating Progress

~~No competencies required at this level.~~

~~*601-4.6 Competencies — Terminating the Incident*~~
~~No competencies required at this level.~~

Hazardous Materials Training
Equipment & Prop List

The following are minimal recommended supplies necessary for hazardous materials training at the below listed levels of certification. Variations may exist based on the needs of each AHJ and any mission-specific job tasks as assigned by an AHJ.

Hazardous Materials Awareness

Department of Transportation's *Emergency Response Guidebook* (ERG) (current ed.)
Material Safety Data Sheet (MSDS) or Safety Data Sheets (SDS) – Samples
Placards & Labels
Transportation/Shipping document – Sample
NFPA 704 sample
Safety Vests
Binoculars

Hazardous Materials Operations

All awareness equipment *plus…*
Structural Firefighter Protective Ensemble (bunker gear)

Reference Material:

- NIOSH *Pocket Guide to Chemical Hazards*
- NFPA *Hazardous Materials / Weapons of Mass Destruction Response Handbook* (current edition)
- Pesticide label example

Respiratory Protection to include:

- Air Purifying Respirator (APR-half mask)
- Air Purifying Respirator (APR-full face)
- SCBA

Chemical Protective Clothing to include:

- Vapor Protective CPC (Level A)
- Splash Protective Encapsulated CPC (Level B)
- Splash Protective Non-Encapsulated CPC (Level B, Level C)
- Chemical Boots (Rubber Boots for training only)
- Inner/Outer gloves - assorted types
- Chem Tape (duct tape for training only)

Fire Hose, Foam Nozzles and Eductors, Foam
Pictures/slides of various railcar, intermodal, and highway cargo trailers
Pictures/slides of bulk and non-bulk containers, and fixed facility containment systems

Defensive Spill Equipment:

- Absorbent/Adsorbent
- Broom/Shovel
- 5-gallon buckets
- Assortment of boom and pads

Decontamination Equipment:

- Poly sheeting or tarp
- Duct tape
- Traffic cone(s)
- Decon Pools
- Sprayer(s)
- Garden hose(s) and sprayer/nozzles
- 5-gallon bucket(s)
- Various Decon solution(s)
- Folding chairs
- Overpack drum

Various monitoring detection equipment as may be required. Examples *may* include:

- Combustible Gas Indicator
- Oxygen Meter
- Radiation Detector

Hazardous Materials Operations – Mission Specific Competencies

Equipment needed for training to Hazardous Materials Operations – Mission Specific Competencies will be based the competencies themselves and the authority having jurisdiction (AHJ). Equipment, at a minimum, will include that which is required to train to the Hazardous Materials Operations Level. Additional equipment or props may include part or all of the equipment listed below for Hazardous Materials Technician.

For example, if training to the Mission Specific Competencies: Air Monitoring and Sampling is to be performed, additional monitoring detection and sampling equipment will be required.

Hazardous Materials Technician

Awareness and Operations equipment *plus…*

Reference Material:

- CPC Permeation Guides/Tables
- BOE/AAR *Field Guide to Railcar Identification*
- NFPA *Fire Protection Guide to Hazardous Materials Detection*
- Other printed or electronic publications/databases as may be required by the AHJ

Various monitoring detection equipment and corresponding samples to include:

- Combustible Gas Indicator
- Oxygen Meter
- Carbon monoxide meter
- Gas specific meter
- Photoionization detector
- Radiation Detectors (alpha, beta, gamma)
- Colorimetric tubes, pump
- Classifier/detection strips and reagents
- pH paper or pH meter
- additional monitoring and detection equipment as may be required by AHJ
- Calibration kit(s) as required for above

Leak & Spill Equipment:

- Plugging/patching supplies
- Leaking drum(s): metal & poly
- Overpack drum(s)
- Leak pipe simulator
- 150 lbs. Chlorine cylinder leak prop
    - Chlorine emergency kit type “A”
- Chlorine 1-Ton cylinder leak prop
    - Chlorine emergency kit type “B”
- Pressure Railcar dome leak prop
    - Chlorine emergency kit type “C” or Midland kit
- Cargo Tank Leak Simulator (MC-306/DOT-406 Dome)
- Dome Cover Clamp
- Grounding & Bonding Kit
- Product Transfer Equipment
- Misc. Hand Tools (e.g., hand wrenches, bung wrench, spanner wrench, mallet, screwdrivers, etc.)

Command and Control Equipment/Forms (e.g., Incident Action Plan, Site Safety Plan, Medical Plan, Communication Plan - all NIMS/ICS compliant)

Hazardous Materials Incident Commander

Reference Material

- Department of Transportation’s *Emergency Response Guidebook* (ERG) (current ed.)
- Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) - Samples
- Transportation/Shipping document – Sample
- NIOSH *Pocket Guide to Chemical Hazards*

- NFPA *Hazardous Materials / Weapons of Mass Destruction Response Handbook* (current edition)
- CPC Permeation Guides/Tables
- BOE/AAR *Field Guide to Railcar Identification*
- NFPA *Fire Protection Guide to Hazardous Materials Detection*
- Other printed or electronic publications/databases as may be required by the AHJ

Command and Control Equipment/Forms

- Department of Homeland Security – National Incident Management System/Incident Command System standardized forms
    - ICS 201 Incident Briefing Form
    - ICS 202 Incident Objectives Worksheet
    - ICS 203 Organization Assignment List
    - ICS 204 Division Assignment List
    - ICS 205 Communications Plan
    - ICS 206 Medical Plan
    - ICS 208HM Site Safety and Control Plan
    - ICS 211 Incident Check-in List
    - ICS 213 General Message
    - ICS 214 Unit Log
    - ICS 215 Incident Planning Worksheet
    - ICS 215A Incident Action Plan Safety Analysis

HAZARDOUS MATERIALS OPERATIONS

REFERENCE LIST FOR THE HAZARDOUS MATERIALS OPERATIONS CURRICULUM

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

Required References

Texts

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

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

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

Essentials of Fire Fighting ~~and Fire Department Operations~~, 7th ~~6th~~ edition. International Fire Service Training Association. (2018~~3~~). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

*Fundamentals of Fire Fighter Skills **and Hazardous Materials Response**, 4th ~~3rd~~* edition. International Association of Fire Chiefs, & National Fire Protection Association. (2019~~4~~). **Burlington** ~~Sudbury~~, MA: Jones and Bartlett.

*Hazardous Materials Awareness and Operations, **3rd** ~~2nd~~ Edition*. Schnepp (2019~~4~~). Sudbury, MA: Jones & Bartlett.

Hazardous Materials for First Responders, 5~~4~~th edition. International Fire Service Training Association. (2017~~0~~). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

Hazardous Materials/Weapons of Mass Destruction Response Handbook~~, 6th~~/2018~~3~~ edition. McGowan, T. (2018~~2~~). Quincy, MA: National Fire Protection Association.

*NFPA 472: Standard for ~~Professional~~ Competence of Responders to Hazardous Materials/**Weapons of Mass Destruction** Incidents. (*2018~~3~~ ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

NFPA 1072: Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications. (2017 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

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

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

Recommended References

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

Media

DOT Chart 18~~5~~: Hazardous Materials Marking, Labeling and Placarding Guide. United States. (**or current edition** ~~2007~~). Washington, DC: U.S. Dept. of Transportation, Pipeline and Hazardous Materials Safety Administration.

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

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

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

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

CHAPTER 6
SECTION 602
HAZARDOUS MATERIALS OPERATIONS
CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
602-5.1	General - Introduction - Laws, Regulations, and National Consensus Standards	1
602-5.2	**Identify Potential Hazards** ~~Analyzing the Incident~~	14
602-5.3	**Identify Action Options** ~~Planning the Response~~	9
602-5.4	**Action Plan Implementation** ~~Implementing the Planned Response~~	6
602-5.5	**Emergency Decontamination** ~~Evaluating Progress~~	2
602-5.6	**Progress Evaluating and Reporting** ~~Terminating the Incident –~~ Reserved – None required at this level	
	TOTAL RECOMMENDED HOURS	**32**

Commented [MMA1]: New verbiage/strikeouts from NFPA 1072-2017.

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* 20**19**~~13~~ ed., the *TCFP Standards Manual*, and the *TCFP Certification Curriculum Manual.*

Course Instructor Information

Hazardous Materials

Operations

Overview
The Hazardous Materials curricula are designed to provide clear guidance that ensures adequate presentation of the information required to meet the Job Performance Requirements (JPRs) of National Fire Protection Association (NFPA) 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*, 2017 edition.

The Hazardous Materials curricula is found in Chapter 6 of the TCFP Curriculum Manual.

Certification Level	TCFP Section Number	NFPA 1072 Chapter
Awareness	601	4
Operations	602	5
Operations-Mission Specific Competencies (MSC)	603	6
*Technician	604	7
*Incident Commander	605	8

Layout
The NFPA numbering sequence is mirrored to allow easy correlation between this document and the NFPA Standard. For example, 601-4.1.2 identifies the section in Awareness that corresponds to NFPA section 4.1.2.

When a section references information from “Annex A Explanatory Material” in the NFPA Standard, it is identified by a boxed Instructor Note. For example, the boxed Instructor Note listed in 601-4.2.1 and that immediately follows the Requisite Knowledge section corresponds to the NFPA Annex A information for NFPA 1072 section 4.2.1.

* Asterisks by Technician and Incident Commander above indicate that both are voluntary (non-mandatory) certifications. Therefore, **a formal “curriculum outline” is not provided**. Please use chapters 7 and 8, respectively, of NFPA 1072 as a guide when creating your own course curricula or selecting a prepared instructional curriculum package from a publisher/vendor for Technician and Incident Commander.

TCFP Standards Manual
It is critical that you review the chapters in the TCFP Standards Manual that apply to this curriculum. Of primary importance are the following two chapters: Chapter 423, which defines the course of study, documentation and medical requirements necessary

for Awareness and Operations certification (required) and Chapter 453, which covers certification requirements for Technician and Incident Commander (voluntary). Additionally, instructors are expected to review the following chapters as they pertain to the instructional, examination, certification processes:

- Chapter 421,Standards for Certification
- Chapter 427, Training Facility Certification
- Chapter 435, Fire Fighter Safety
- Chapter 437, Fees
- Chapter 439, Examinations for Certification
- Chapter 441, Continuing Education

These chapters do not address every issue that could impact this curriculum; therefore, you are encouraged to become familiar with the TCFP Standards Manual.

Instructor Qualifications
Hazardous Materials courses must be taught by an instructor meeting the requirements described in Chapter 427.307 of the TCFP Standards Manual.

Supplemental Information
Instructors are expected to provide supplemental information if the main reference text does not provide adequate information to ensure successful completion of the Job Performance Requirements as listed in the curriculum.

Components of the Curricula
Each section of a curriculum identifies the NFPA Job Performance Requirement (JPR) and subdivides the requisite knowledge requirements into learning components. For example:

View within the Curriculum		Explanation
601-4.3.1	Isolate the hazard area and deny entry at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, policies and procedures, and approved reference sources, so that the hazard area is isolated and secured, personal safety procedures are followed, hazards are avoided or minimized, and additional people are not exposed to further harm.	**Section Number and NFPA JPR**
	Requisite Knowledge: Use of the ERG, SDS, shipping papers with emergency response information, and other approved reference sources to identify precautions to be taken to	**Requisite Knowledge Statement**

protect responders and the public; policies and procedures for isolating the hazard area and denying entry; and the purpose of and methods for isolating the hazard area and denying entry.	
(1) Use of the ERG, SDS, shipping papers with emergency response information, and other approved reference sources to identify precautions to be taken to protect responders and the public	**First part of Requisite Knowledge**
Identify precautions to be taken to protect responders/the public using ERG, SDS, shipping papers with emergency response information, other approved reference sources Identify the hazard a. Isolate the hazard area b. Deny entry c. Call for trained personnel d. Secure the scene	**Associated learning components**
(2) Policies and procedures for isolating the hazard area and denying entry	**Second part of Requisite Knowledge**
Policies and procedures, per AHJ/SOP a. Isolating the hazard area b. Denying entry	**Associated learning components**
(3) And the purpose of and methods for isolating the hazard area and denying entry	**Third part of Requisite Knowledge**
Purpose/methods a. Isolating the hazard area i. Establish perimeter ii. Erect barriers b. Denying entry i. Restrict hazard area access to	**Associated learning components**

appropriately trained personnel only ii. Maintain perimeter	
Requisite Skills: Use of the ERG, SDS, shipping papers with emergency response	**Requisite Skills Statement**
Instructor Note Recommended precautions found on numbered guides in the ERG include public safety issues; recommended protective clothing; evacuation; emergency response to fire, spill, and leak; and first aid sections. Examples of required knowledge include (1) precautions for providing emergency medical care to victims; typical ignition sources; ways hazardous materials/WMD are harmful to people, the environment, and property; general routes of entry for human exposure; emergency action (fire, spill, or leak; first aid); actions recommended not to be performed (e.g., closing of pipeline valves); protective actions (isolation of area and denial of entry, evacuation, shelter-in-place); size and shape of recommended initial isolation and protective action distances; difference between small and large spills; conditions that require the use of the ERG Table of Initial Isolation and Protective Action Distances and the isolation distances in the ERG numbered guide; techniques for isolating the hazard area and denying entry to unauthorized persons; how to recognize and protect evidence; and use of approved tools and equipment; (2) basic personal protective actions: staying clear of vapors, fumes, smoke, and spills; keeping vehicle at a safe distance from the scene; approaching from upwind, uphill, and upstream; and (3) types of protective actions and their purpose (e.g., isolate hazard area and deny entry, evacuation, and shelter-in-place); basic factors involved in the choice of protective actions (e.g., hazardous materials/WMD involved, population threatened,	**Appendix A: Explanatory Material for 4.3.1**

	and weather conditions).	

Unless otherwise specified, all curriculum references are to NFPA 1072. In some cases, (see, for example, 601-4.2.1), reference is also made under the section number and JPR to similar material in NFPA 472.

601-4.2.1	Recognize and identify the hazardous materials/WMD and hazards involved in a hazardous materials/WMD incident, given a hazardous materials/WMD incident, and approved reference sources, so that the presence of hazardous materials/WMD is recognized and the materials and their hazards are identified. Given a hazardous materials/WMD incident, and approved reference sources, awareness level personnel shall recognize those situations where hazardous materials/WMD are present. (472-4.2.1)	**Additional reference to NFPA 472**

Skills
NFPA Requisite Skill requirements are addressed in the corresponding Skill Sheets in Chapter 6 of the TCFP Curriculum Skills Manual.

Definitions of Certification Levels
Awareness Level Personnel: Personnel who, in the course of their normal duties, could encounter an emergency involving hazardous materials/weapons of mass destruction (WMD) and who are expected to recognize the presence of the hazardous materials/WMD, protect themselves, call for trained personnel, and secure the scene. These personnel have met all the performance requirements of Chapter 4 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*

Operations Level Personnel: Personnel 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. These personnel have met all the performance requirements of Chapter 5 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*

Operations-Mission Specific Competencies (MSC) Level Personnel: Responders assigned mission-specific responsibilities at hazardous materials/WMD incidents are

those operations level responders designated by the authority having jurisdiction (AHJ) to perform additional tasks to support the AHJ's response mission, expected tasks, equipment, and training in the following areas:

(1) Personal protection equipment (PPE)
(2) Mass decontamination
(3) Technical decontamination
(4) Evidence preservation and sampling
(5) Product control
(6) Detection, monitoring, and public safety sampling
(7) Victim rescue and recovery
(8) Illicit laboratories incidents

These personnel have met all the performance requirements of Chapter 5 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications* and have also met the performance requirements of the subchapter(s) of Chapter 6 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications,* to which they are trained and credentialed to perform.

Note: Basic TCFP Structural Fire Fighter certification requires that Structure Fire Fighter personnel meet all performance requirements for:

- *Hazardous Materials Awareness*
- *Hazardous Materials Operations*
- *Hazardous Materials Operations - MSC – 6.2 Personal Protective Equipment*
- *Hazardous Materials Operations - MSC – 6.6 Product Control*

Technician Level Personnel: Persons who respond to hazardous materials/weapons of mass destruction (WMD) incidents using a risk-based response process by which they analyze a problem involving hazardous materials/WMD, plan a response to the problem, evaluate progress of the planned response, and assist in terminating the incident. These personnel have met all the performance requirements of Chapter 7 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications.*

Incident Commander Level Personnel: That person, designated by the AHJ, responsible for all incident activities/operations, including the development of strategies and tactics and the ordering and release of resources. These personnel have met all the performance requirements of Chapter 8 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications.*

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* 2019~~2013~~ Ed., the *TCFP Standards Manual* and the *TCFP Curriculum Manual*.

602-5.1 General

602-5.1.1 Operations level responders are those persons who respond to hazardous materials/weapons of mass destruction (WMD) incidents for the purpose of implementing or supporting actions to protect nearby persons, the environment, or property from the effects of the release.

602-5.1.2 Operations level responders shall meet the job performance requirements defined in Sections 601-4.2 through 601-4.4 – Hazardous Materials Awareness-level competencies.

602-5.1.3 Operations level responders shall meet the job performance requirements defined in Sections 602-5.2 through 602-5.6 – Hazardous Materials Operations-level competencies.

602-5.1.4 Operations level responders shall have additional competencies that are specific to the response mission and expected tasks as determined by the AHJ.

Instructor Note

TCFP Basic Structural Firefighter certification requires the following Hazardous Materials Operations Mission-Specific competencies:

1. 603-6.2 Hazardous Materials Operations: Mission Specific Competencies – Personal Protective Equipment

2. 603-6.6 Hazardous Materials Operations: Mission Specific Competencies – Product Control

Commented [MMA1]: Added by committee.

602-5.1.5 General Knowledge Requirements

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

1. Role of operations level responders at a hazardous materials/WMD incident

2. AHJ emergency response plan
    a. Location

b. Contents

3. Standard operating procedures
   a. Response operations for hazardous materials/WMD incidents

602-5.1.6 General Skills Requirements (Reserved)

602-5.2 Identify Potential Hazards

Instructor Note

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

Commented [MMA2]: Instructor Notes from here forward equate to the annex section associated with the preceding section. Here, this note refers to A.5.2 of NFPA 1072-2017.

602-5.2.1 Identify the scope of the problem at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment, policies and procedures, and approved reference sources, so that container types, materials, location of any release, and surrounding conditions are identified, hazard information is collected, the potential behavior of a material and its container is identified, and the potential hazards, harm, and outcomes associated with that behavior are identified.

(A) Requisite Knowledge. Definitions of hazard classes and divisions; types of containers; container identification markings, including piping and pipeline markings and contacting information; types of information to be collected during the hazardous materials/WMD incident survey; availability of shipping papers in

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

1. Definitions of hazard classes and divisions
    a. Class 1 – Explosives
        i. Division 1.1 – Explosives which have a mass explosion hazard
        ii. Division 1.2 – Explosives which have a projection hazard but not a mass explosion hazard
        iii. Division 1.3 – Explosives which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard
        iv. Division 1.4 – Explosives which present no significant blast hazard
        v. Division 1.5 – Very insensitive explosives with a mass explosion hazard
        vi. Division 1.6 – Extremely insensitive articles which do not have a mass explosion hazard

b. Class 2 – Gases
    i. Division 2.1 – Flammable gases
    ii. Division 2.2 – Non-flammable, non-toxic gases
    iii. Division 2.3 – Toxic gases

c. Class 3 – Flammable liquids (and Combustible liquids [US])

d. Class 4 – Flammable solids; Substances liable to spontaneous combustion; Substances which, on contact with water emit flammable gases
    i. Division 4.1 – Flammable solids, self-reactive substances and solid desensitized explosives
    ii. Division 4.2 – Substances liable to spontaneous combustion
    iii. Division 4.3 – Substances which in contact with water emit flammable gases

e. Class 5 – Oxidizing substances and Organic peroxides
    i. Division 5.1 – Oxidizing substances
    ii. Division 5.2 – Organic peroxides

f. Class 6 – Toxic substances and Infectious substances
    i. Division 6.1 – Toxic substances
    ii. Division 6.2 – Infectious substances

g. Class 7 – Radioactive materials

h. Class 8 – Corrosive substances
i. Class 9 – Miscellaneous dangerous goods/hazardous materials and articles **(Copied from page 6, ERG Manual)

2. Types of containers
    a. Given examples of the following tank cars, the operations level responder shall identify each tank car by type, as follows:
        i. Cryogenic liquid tank cars
        ii. Nonpressure tank cars (general service or low-pressure cars)
        iii. Pressure tank cars

b. Given examples of the following intermodal tanks, the operations level responder shall identify each intermodal tank by type, as follows:
    i. Nonpressure intermodal tank
        1. IM-101 (IMO Type 1)
        2. IM-102 (IMO Type 2)
    ii. Pressure intermodal tanks (Spec 51/IMO Type 5)
    iii. Specialized intermodal tanks, including the following:
        1. Cryogenic intermodal tanks (IMO Type 7)
        2. Tube modules

c. Given examples of the following cargo tanks, the operations level responder shall identify each cargo tank by type, as follows:
    i. Compressed gas tube trailers
    ii. Corrosive liquid tanks
        1. DOT 412
        2. TC 412
        3. SCT 312
        4. MC 312
        5. TC 312
    iii. Cryogenic liquid tanks
        1. MC 338
        2. TC 338
        3. SCT 338
        4. TC 341
        5. CGA 341
    iv. Dry bulk cargo tanks
    v. High pressure tanks
        1. MC 331
        2. TC 331
        3. SCT 331
    vi. Low pressure chemical tanks
        1. DOT 407
        2. TC 407
        3. SCT 307

4. MC 307
5. TC 307

vii. Non-pressure liquid tanks
1. DOT 406
2. TC 406
3. SCT 306
4. MC 306
5. TC 306

Instructor Note

CGA=Compressed Gas Association, MC= Motor Carrier, TC=Transport Canada, DOT=Dept. of Transportation, SCT=Secretariat of Communications and Transportation [Mexico]

Commented [MMA3]: Note made as clarification by Hazmat committee.

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
   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

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)

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

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

2. Ton container
   a. Convex
   b. Concave

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

End of Container list.

3. Container identification markings
   a. DOT placarding/labeling/marking system
      i. Placards (bulk containers)
      ii. Labels (non-bulk containers)
      iii. Stenciling and markings

         1. Highway transportation vehicles, including cargo tanks
            a. Company names and logos
            b. Vehicle identification numbers
            c. Manufacturers' 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. Commodity stencils
            b. Capacity stencils
            c. Specification markings
            d. Standard transportation commodity code (STCC)
            e. Reporting marks

         4. Radioactive containers

a. Radioactive White-I Label
    i. Radioactive contents (isotope)
    ii. Activity
b. Radioactive Yellow-II Label
    i. Radioactive contents (isotope)
    ii. Activity
    iii. Transportation Index (TI)
c. Radioactive Yellow-III Label
    i. Radioactive contents (isotope)
    ii. Activity
    iii. Transportation Index (TI)
d. Fissile Label
e. UN numbers
f. NFPA 704 marking system (fixed facilities)
g. Hazardous Materials Identification System (HMIS)
h. Hazardous Identification Codes (Intermodal Containers)
i. Also known “Hazard Identification Numbers,” or
j. Kemler Code (ADR Code)
k. Global Harmonization System (GHS) Pictograms
l. Military Marking System
m. Piping markings
n. Facility markings
o. Color codes
p. Pipeline markings
    i. Emergency telephone number
    ii. Owner
    iii. Product

4. Contacting information
    a. SDS information
    b. Shipping papers
    c. Pipeline markers
    d. Pesticide labels
    e. Facility inventory logs

5. Types of information to be collected during the hazardous materials/WMD incident survey
    a. Surrounding conditions
        i. Topography
        ii. Land use
        iii. Accessibility
        iv. Weather conditions
        v. Bodies of water
        vi. Public exposure potential
        vii. Overhead and underground wires and pipelines
        viii. Storms and sewer drains
        ix. Possible ignition sources
        x. Adjacent land use
        xi. Nature and extent of injuries
        xii. Building information
        xiii. Ventilation ducts
        xiv. Air returns

    b. Container information
        i. Size
        ii. Shape
        iii. Condition
        iv. General Hazardous Materials Behavior Model (GEBMO)
            1. Stresses
            2. Breach
            3. Release
            4. Dispersion/engulf
            5. Exposure/contact
            6. Harm

    c. Product information
        i. What are the Hazardous Materials involved?
            1. Hazard class
            2. Quantity
            3. Concentrations
            4. Reactivity

        ii. Material behavior
            1. Solid
            2. Liquid

3. Gas
4. Is something burning?

6. Availability of shipping papers in transportation and of safety data sheets (SDS) at facilities
   a. Types of shipping papers
      i. Bill of Lading or Freight Bill - highway
      ii. Dangerous Cargo Manifest – maritime
      iii. Waybill and/or Consist/Train List - railroad
      iv. Air Bill – aircraft

   b. Safety Data Sheets (SDS) Information Sections
      i. Identification
      ii. Hazard(s) Identification
      iii. Composition/Information on Ingredients
      iv. First Aid Measures
      v. Fire Fighting Measures
      vi. Accidental Release Measures
      vii. Handling and Storage
      viii. Exposure and Controls/Personal Protection
      ix. Physical and Chemical ~~Properies~~Properties
      x. Stability and Reactivity
      xi. Toxicological Information
      xii. Ecological Information
      xiii. Disposal Considerations
      xiv. Transport Information
      xv. Regulatory Information
      xvi. Other Information

   c. Other transportation and facility information sources
      i. Chemical inventory list
      ii. Shipping and receiving documents
      iii. Inventory records
      iv. Risk management and hazardous communication plans
      v. Chemical inventory reports (Tier II reports)
      vi. Facility pre-plans

7. Types of hazard information available from/how to contact:

a. CHEMTREC – 1-800-424-9300
b. CANUTEC – Canadian Transport Emergency Centre (contact info in ERG)

c. SETIQ – Emergency Transportation System for the Chemical Industry, Mexico (contact info in ERG)

d. Governmental authorities
    i. Federal
        1. Environmental Protection Agency (EPA)
        2. Department of Transportation (DOT)
        3. Nuclear Regulatory Commission (NRC)
        4. Department of Energy (DOE)
        5. United States Coast Guard (USCG)
        6. Occupational Safety and Health Administration (OSHA)
        7. Federal Bureau of Investigation (FBI)
        8. Department of Homeland Security (DHS)
        9. Department of Defense (DoD)
    ii. State of Texas
        1. Texas Commission on Environmental Quality (TCEQ)
        2. General Land Office (GLO)
        3. Texas Railroad Commission (TRRC)
        4. Texas Department of Transportation (TXDOT)
        5. Department of State Health Services (DHS)
        6. Texas Division of Emergency Management (TDEM)
        7. Texas Department of Public Safety (DPS)
        8. National Guard Chemical Support Team (CST)
    iii. Local
        1. Department of Health
        2. Code Enforcement
        3. Local Emergency Planning Commission
        4. Fire Department
        5. Law Enforcement
        6. Emergency Management
        7. Emergency Medical Services

e. Manufacturers
    i. Safety Data Sheets
    ii. Other manufacturer information

f. Shippers
    i. Shipping Papers
    ii. Cargo manifest

g. Carriers
    i. Highway – Bill of lading
    ii. Rail – Waybill or consist
    iii. Water – Dangerous cargo manifest
    iv. Air – Air bill
    v. Pipeline – Pipeline marker

8. How to communicate with carrier representatives to reduce impact of a release
    a. Emergency contact information found in shipping papers and/or SDS
    b. Unified command

9. Basic physical and chemical properties
    a. Boiling point
    b. Chemical reactivity
    c. Corrosivity (pH)
    d. Flammable (explosive) range
        i. LFL
        ii. LEL
        iii. UFL
        iv. UEL
    e. Flash point
    f. Ignition (autoignition) temperature
    g. Particle size
    h. Persistence
    i. Physical state
        i. Solid
        ii. Liquid

iii. Gas
j. Radiation
i. Ionizing
ii. Nonionizing
k. Specific gravity
l. Toxic products of combustion
m. Vapor density
n. Vapor pressure
o. Water solubility
p. Viscosity
q. Polymerization
r. Expansion ratio
s. Biological agents and toxins
t. Sublimation

10. Identifying material and container behavior based on:
a. A material's properties
i. Physical
ii. Chemical

b. The hazards associated with an identified behavior
i. Thermal
ii. Radiation
iii. Asphyxiation
iv. Chemical (i.e. poison, corrosives)
v. Etiological
vi. Mechanical
vii. Psychological/psychogenic

11. Examples of potential criminal and terrorist targets
a. Public assembly areas
b. Public buildings
c. Mass transit systems
d. Places with high economic impact
e. Telecommunications facilities
f. Places with historical or symbolic significance
g. Military installations
h. Airports

i. Industrial facilities
j. Critical infrastructure
k. Educational sites
l. Medical and science facilities

12. Indicators of possible criminal or terrorist activity
    a. Chemical agents
        i. The presence of hazardous materials/WMD or laboratory equipment that is not relevant to the occupancy
        ii. Intentional release of hazardous materials/WMD

    b. Unexplained patterns of sudden onset of similar, nontraumatic illnesses or deaths (patterns that might be geographic, by employer, or associated with agent dissemination methods)
        i. The presence of hazardous materials/WMD or laboratory equipment that is not relevant to the occupancy
        ii. Intentional release of hazardous materials/WMD

    c. Unexplained odors or tastes that are out of character with the surroundings
        i. The presence of hazardous materials/WMD or laboratory equipment that is not relevant to the occupancy
        ii. Intentional release of hazardous materials/WMD

    d. Multiple individuals exhibiting unexplained signs of skin, eye, or airway irritation
        i. The presence of hazardous materials/WMD or laboratory equipment that is not relevant to the occupancy
        ii. Intentional release of hazardous materials/WMD

    e. explained bomb- or munitions-like material, especially if it contains a liquid

i. The presence of hazardous materials/WMD or laboratory equipment that is not relevant to the occupancy
ii. Intentional release of hazardous materials/WMD

f. Unexplained vapor clouds, mists, and plumes
i. The presence of hazardous materials/WMD or laboratory equipment that is not relevant to the occupancy
ii. Intentional release of hazardous materials/WMD

g. 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. The presence of hazardous materials/WMD or laboratory equipment that is not relevant to the occupancy
ii. Intentional release of hazardous materials/WMD

h. 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)
i. The presence of hazardous materials/WMD or laboratory equipment that is not relevant to the occupancy
ii. Intentional release of hazardous materials/WMD

i. Surfaces exhibiting oily droplets/films and unexplained oily film on water surfaces
i. The presence of hazardous materials/WMD or laboratory equipment that is not relevant to the occupancy
ii. Intentional release of hazardous materials/WMD

j. An abnormal number of sick or dead birds, animals, or fish

i. The presence of hazardous materials/WMD or laboratory equipment that is not relevant to the occupancy
ii. Intentional release of hazardous materials/WMD

k. Unusual security, locks, bars on windows, covered windows, or barbed wire
i. The presence of hazardous materials/WMD or laboratory equipment that is not relevant to the occupancy
ii. Intentional release of hazardous materials/WMD

l. Biological agents
i. 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)
ii. Healthcare facilities reporting multiple casualties with similar signs or symptoms
iii. Unscheduled or unusual spray being disseminated, especially if outdoors during period of darkness
iv. Abandoned spray devices (devices with no distinct odors)

m. Radiological agents
i. Radiation Symbols
ii. Unusual metal debris
iii. Heat-emitting material
iv. Glowing material
v. Sick people/animals

n. Illicit laboratories (i.e., clandestine laboratories, weapons labs, ricin labs)
i. Structures with unusual or multiple vents
ii. Buildings with heavy security
iii. Obscured windows
iv. Odd or unusual odors
v. May include mobile facilities, i.e. mobile meth labs

o. Explosives

i. Prior warning or threat of attack
ii. Unknown explosions
iii. Multiple fires or explosions
iv. Unattended packages, backpacks and other objects left in high traffic public areas
v. Fragmentation damage or injuries
vi. Craters
vii. Small metal objects, i.e. nuts, bolts, nails used as shrapnel

13. Additional hazards associated with terrorist or criminal activities
    a. Secondary devices **(roman numerals)
        i. Containers with unknown liquids or materials
        ii. Unusual devices or containers with electronic components such as wires, circuit boards, cellular phones, antennas and other items attached or exposed
        iii. Devices containing quantities of fuses, fireworks, match heads, black powder, incendiary materials or other unusual materials
        iv. Materials attached to or surrounding an item such as nails, bolts, drill bits that could be used for shrapnel
        v. Ordnance such as blasting caps, detcord, explosives, grenades, etc.

14. Determining harm/outcomes associated with
    a. Identified behavior
    b. Surrounding conditions

Instructor Note

At the operations level, responders should be able to recognize the following containers and identify them by name: rail tank cars (pressure, nonpressure, and cryogenic tank cars); highway cargo tanks (compressed gas tube trailers, corrosive liquid tanks, cryogenic tanks, dry bulk cargo tanks, high-pressure tanks, low-pressure chemical tanks, and nonpressure liquid tanks); UN portable tanks/intermodal tanks (nonpressure, pressure, cryogenic, and tube modules); storage tanks (nonpressure, pressure, and cryogenic

storage tanks); piping and pipelines; intermediate bulk containers (IBC) and ton containers; radioactive materials packages (excepted, industrial, Type A, and Type B packages); and nonbulk containers (bags, carboys, cylinders, drums, and Dewar flasks for cryogenic liquids).

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

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

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

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

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

(1) *Stress.* The three types of stress that could cause a container to release its contents are thermal stress, mechanical stress, and chemical stress.

(2) *Breach.* The five ways in which containers can breach are disintegration, runaway cracking, closures opening up, punctures, and splits or tears.

(3) *Release.* The four ways in which containment systems can release their contents are detonation, violent rupture, rapid relief, and spill or leak.

(4) *Dispersion.* Seven dispersion patterns can be created upon release of agents: hemisphere, cloud, plume, cone, stream, pool, and irregular.

(5) *Contact.* The three general time frames for predicting the length of time that an exposure can be in contact with hazardous materials/WMD in an endangered area are short term (minutes and hours), medium term (days, weeks, and months), and long term (years and generations).

(6) *Hazards.* The seven health and physical hazards that could cause harm in a hazardous materials/WMD incident are thermal, mechanical, poisonous, corrosive, asphyxiating, radiological, and etiologic.

***Identifying outcomes.* The process for identifying the potential harm and associated outcomes within an endangered area at a hazardous materials/WMD incident includes identifying the size and shape of the endangered area, the number of exposures (people, property, environment, and major systems) within the endangered area, and**

the physical, health, and safety hazards within the endangered area as determined from approved resources.

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

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

Commented [MMA4]: This note refers to A.5.1.2(A) of NFPA 1072-2017.

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

602-5.3 Identify Action Options

Instructor Note

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

Commented [MMA5]: This note refers to A.5.3 of NFPA 1072-2017.

602-5.3.1 Identify the action options for a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment, policies and procedures, approved reference sources, and the scope of the problem, so that response objectives, action options, safety precautions, suitability of approved personal protective equipment (PPE) available, and emergency decontamination needs are identified.

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

1. **Policies and procedures for hazardous materials/WMD incident operations**
    a. **29 CFR 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER)**
    b. **NFPA 475: Recommended Practices for Responding to Hazardous Materials Incidents/Weapons of Mass Destruction**
    c. **Local Emergency Response Plans**
    d. **AHJ Standard Operating Procedures**

2. Basic components of an incident action plan (IAP)
    a. Site restrictions
    b. Strategies/incident objectives
    c. Current and projected weather conditions
    d. Entry objectives
    e. Resource assignments and needs
    f. On-scene organization and control
    g. Risk assessment
    h. Hazard statement
    i. Selection of personal protective equipment
    j. Site safety plan (ICS 208HM)
    k. Medical plan
    l. Protective measures
    m. Communications procedures/plan
    n. Emergency procedures and personnel accountability
    o. Emergency medical care arrangements
    p. Rehabilitation plan
    q. Decontamination procedures
    r. On-scene work assignments (branches)
    s. Ensure debriefing and critiquing of the incident is conducted once the incident is terminated
        i. Accomplishments
        ii. Status of any injuries
    t. 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
            1. ICS 201 Incident Briefing Form
            2. ICS 202 Incident Objectives Worksheet
            3. ICS 203 Organization Assignment List
            4. ICS 204 Division Assignment List
            5. ICS 205 Communications Plan
            6. ICS 206 Medical Plan
            7. ICS 207 Incident Organization Chart
            8. ICS 208 HM Site Safety and Control Plan
            9. ICS 211 Incident Check-in List
            10. ICS 213 General Message

11. ICS 214 Unit Log
12. ICS 215 Incident Planning Worksheet
13. ICS 215A Incident Action Plan Safety Analysis

3. Modes of operation
    a. Offensive
    b. Defensive
    c. Nonintervention

4. Types of response objectives (strategies)
    a. SMART
        i. Specific
        ii. Measurable
        iii. Attainable
        iv. Realistic
        v. Timely
    b. LIPS
        i. Life safety
        ii. Incident stabilization
        iii. Property conservation
        iv. System restoration

5. Types of action options (tactics)
    a. Actions that enable responders to achieve response objectives
    b. Examples include but are not limited to:
        i. Scene size-up
        ii. Establish control zones
        iii. Non-intervention
            1. Protect exposures
            2. Implement public protective actions
        iv. Intervention
            1. Control product release
            2. Mitigate
            3. Neutralize

6. Types of response information available
    a. Emergency Response Guidebook (ERG)
    b. Safety Data Sheets (SDS)

c. Shipping papers with emergency response information
d. Other resources
    i. NIOSH Pocket Guide
    ii. NFPA Fire Protection Guide to Hazardous Materials
    iii. Jane's CBRN Response Handbook
    iv. Symbol Seeker: Hazard Identification Manual
    v. Electronic databases (i.e., CAMEO)
    vi. Mobile applications (i.e., WISER)*
        *NOTE: All mobile applications must be vetted for accuracy of information provided

7. Types of response information available from/how to contact:
    a. CHEMTREC – 1-800-424-9300
    b. CANUTEC – Canadian Transport Emergency Centre (contact info in ERG)
    c. SETIQ – Emergency Transportation System for the Chemical Industry, Mexico (contact info in ERG)
    d. Governmental authorities
        i. Federal
            1. Environmental Protection Agency (EPA)
            2. Department of Transportation (DOT)
            3. Nuclear Regulatory Commission (NRC)
            4. Department of Energy (DOE)
            5. United States Coast Guard (USCG)
            6. Occupational Safety and Health Administration (OSHA)
            7. Federal Bureau of Investigation (FBI)
            8. Department of Homeland Security (DHS)
            9. Department of Defense (DoD)
        ii. State of Texas
            1. Texas Commission on Environmental Quality (TCEQ)
            2. General Land Office (GLO)
            3. Texas Railroad Commission (TRRC)
            4. Texas Department of Transportation (TXDOT)
            5. Department of State Health Services (DHS)
            6. Texas Division of Emergency Management (TDEM)
            7. Texas Department of Public Safety (DPS)
            8. National Guard Chemical Support Team (CST)

iii. Local
1. Department of Health
2. Code Enforcement
3. Local Emergency Planning Commission
4. Fire Department
5. Law Enforcement
6. Emergency Management
7. Emergency Medical Services

e. Manufacturers
i. Safety Data Sheets
ii. Other manufacturer information

f. Shippers
i. Shipping Papers
ii. Cargo manifest

g. Carriers
i. Highway – Bill of lading
ii. Rail – Waybill or consist
iii. Water – Dangerous cargo manifest
iv. Air – Air bill
v. Pipeline – Pipeline marker

8. Safety procedures

9. Risk analysis concepts
a. Risk vs. reward
b. Cost benefit analysis

10. Uses of approved PPE to determine if PPE is suitable for the incident (See 602-5.4.1(8))
a. Purpose
b. Advantages
c. Limitations

11. Difference between exposure and contamination

12. Contamination types: sources and hazards
a. Carcinogens
b. Biological/etiological
c. Chemical

d. Radiological
e. Irritants
f. Sensitizers
g. Dust/particulates (i.e., silica and asbestos)

13. Routes of exposure
a. Absorption
b. Inhalation
c. Ingestion
d. Injection

14. Types of decontamination (See 602-5.5.1)
a. Emergency
b. Mass
c. Gross
d. Technical

15. Emergency decontamination
a. Purpose
b. Advantages
c. Limitations

16. Performing emergency decontamination
a. Procedures
b. Tools
c. Equipment

Instructor Note

Modes of operation are offensive, defensive, and nonintervention and include the following:

(1) Common response objectives, for example, product control; fire control; protection of people, the environment, and property; identification and isolation; evidence protection; rescue; recovery; and termination

(2) Common response options, for example, spill control, leak control, foam, control exposures, evacuation, isolation, shelter-in-place, and establishment of product control zones

(3) Contamination types: primary, secondary, and tertiary.

Commented [MMA6]: This note refers to A.5.3.1(A) of NFPA 1072-2017.

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

602-5.4 Action Plan Implementation

Instructor Note

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

Executive Summary – Field Decon

Over the past decade, research has been published linking higher rates of cancer in fire service personnel to repeated, chronic exposure to the by-products of smoke and particulates from structure fires. Various studies have proven that fire fighters are

experiencing higher rates of certain types of cancers and that they are more likely to have rare forms of cancers than the general population. See NIOSH Study of Cancer among U.S. Fire Fighters at https://www.cdc.gov/niosh/firefighters/ ~~www.cdc.gov/niosh/firefighters/ ffcancerstudy.html~~.

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

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

~~On January 19, 2016, the task group met via teleconference and determined that information about the previously referenced~~

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

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

Commented [MMA7]: This note refers to A.5.4 of NFPA 1072-2017. Committee used only a portion of this annex item for comment and struck out the rest.

602-5.4.1 Perform assigned tasks at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment with limited potential of contact with hazardous materials/WMD, policies and procedures, the scope of the problem, approved tools, equipment, and PPE, so that protective actions and scene control are established and maintained, on-scene incident command is described, evidence is preserved, approved PPE is selected and used in the proper manner; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; assignments are completed; and gross decontamination of personnel, tools, equipment, and PPE is conducted in the field.

(A) Requisite Knowledge. Scene control procedures; procedures for protective actions, including evacuation and sheltering-in-place;

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

1. Scene control procedures
- **a. Establish initial isolation perimeter**
- **b. Establish control zones (i.e., hot, warm, cold)**

2. Procedures for protective actions
- **a. Evacuation**
- **b. Sheltering-in-place**

3. Coordinated communications
- **a. Between responders**
- **b. To the public**

4. Evidence recognition and preservation procedures
- **a. Identification**
- **b. Secure and isolate the scene**
- **c. Coordinate with law enforcement**
- **d. AHJ - SOP**

5. Incident command organization (NFPA 472 5.4.3)

a. 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.
b. Identify the levels of hazardous materials/WMD incidents as defined in the emergency response plan.
c. Identify the purpose, need, benefits, and elements of the incident command system for hazardous materials/WMD incidents.
d. Identify the duties and responsibilities of the following functions within the incident management system:
    i. Incident Safety Officer
        1. Obtains briefing from:
            a. Incident Commander; or
            b. Incident Safety Officer; and
            c. Hazard Branch Director or Hazard Division/Group Supervisor
        2. Participates in:
            a. Preparation of incident safety plan
            b. Implementation of the incident safety plan
            c. Medical monitoring of entry team personnel before and after entry
        3. Advises Incident Commander or Hazard Branch Director or Hazard Division/Group Supervisor of:
            a. Deviations from the incident safety plan
            b. Dangerous or unsafe activities
        4. Alters, suspends, or terminates any operation that is considered unsafe
    ii. Hazardous materials branch or group
        1. Decon Team
        2. Site Access
            a. Safe Refuge Area
        3. Entry Team
        4. Technician
        5. Assistant Safety Officer Hazmat

e. Identify the considerations for determining the location of the incident command post for a hazardous materials/WMD incident.
f. Identify the procedures for requesting additional resources at a hazardous materials/WMD incident.
g. Describe the role and response objectives of other agencies that respond to hazardous materials/WMD incidents.

6. Incident command at hazardous materials/WMD incidents
    a. Purpose
    b. Importance
    c. Benefits
    d. Organization
        i. Incident Commander
        ii. Incident Safety Officer
        iii. Operation Section Chief
        iv. Hazmat Group Supervisor
            1. Decon Team Leader
            2. Site Access Specialist
                a. Safe Refuge Area Manager
            3. Entry Team Leader
            4. Technician Specialist
            5. Assistant Safety Officer Hazmat

7. Implementing incident command at hazardous materials/WMD incidents
    a. Policies
    b. Procedures
    c. Single Command vs. Unified Command
    d. AHJ/SOP

8. Capabilities, limitation, inspection, donning, working in, going through decontamination while wearing, and doffing approved PPE
    a. Structural Firefighting Protective Ensemble (NFPA 1971)
    b. High Temperature Protective Clothing
        i. Proximity Suits (ARFF) (NFPA 1971)

ii. Fire Entry Suits
c. Chemical Protective Clothing (CPC)
i. Vapor Protective Clothing (NFPA 1991)
ii. Splash Protective and Support Garments (NFPA 1992)
iii. CBRNE Garments (NFPA 1994)
d. Using Personal Protective Equipment (NFPA 472 5.4.4)
i. Given the personal protective equipment provided by the AHJ, the operations level responder shall describe considerations for the use of personal protective equipment provided by the AHJ, and shall meet the following requirements:
1. Identify the importance of the buddy system
2. Identify the importance of the backup personnel
3. Identify the safety precautions to be observed when approaching and working at hazardous materials/WMD incidents
4. Identify the signs and symptoms of heat and cold stress (thermal 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
e. Determining the suitability of Personal Protective Equipment (NFPA 472 5.3.3)
i. Identify the respiratory protection required for a given response option and the following:
1. Describe the advantages, limitations, uses, and operational components of the following types of respiratory protection at hazardous materials/WMD incidents:

a. Positive pressure self-contained breathing apparatus (SCBA)
b. Positive pressure air-line respirator with required escape unit
c. Closed-circuit SCBA
d. Powered air-purifying respirator (PAPR)
e. Air-purifying respirator (APR)
f. Particulate respirator

ii. Identify the required physical capabilities and limitations of personnel working in respiratory protection.

f. Identify the personal protective clothing required for a given option and the following:

i. Identify skin contact hazards encountered at hazardous materials/WMD incidents.

1. Burns
2. Rash
3. Absorption

ii. Identify the purpose, advantages, and limitations of the following types of protective clothing at hazardous materials/WMD incidents:

1. Chemical-protective clothing: liquid splash–protective clothing and vapor-protective clothing
2. High temperature–protective clothing: proximity suits and entry suits
3. Structural fire-fighting protective clothing

9. Safety precautions at hazardous materials/WMD incidents

a. Resist rushing in
b. Approach cautiously from upwind, uphill or upstream
c. Secure the scene
d. Identify the hazards
e. Assess the situation
f. Obtain help
g. Respond cautiously and appropriately
h. Do not assume that gases and vapors are harmless because they lack a smell

10. Gross decontamination
    a. Purpose
    b. Advantages
    c. Limitations

11. The need for gross decontamination in the field based on the task(s) performed/contamination received

12. Carcinogens at incident scenes
    a. Sources
    b. Hazards (of)

13. Gross decontamination procedures
    a. Personnel
    b. Tools
    c. Equipment
    d. PPE

14. Cleaning, disinfecting, and inspecting
    a. Tools
    b. Equipment
    c. PPE

Instructor Note

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

General procedures for preserving evidence include the following:

(1) Secure and isolate any incident area where evidence is located. This can include discarded personal protection equipment, specialized packaging (shipping or workplace labels and placards), biohazard containers, glass or metal fragments, containers (e.g., plastic, pipes, cylinders, bottles, fuel containers), and other materials that appear relevant to the occurrence, such as roadway flares, electrical components, fluids, and chemicals.

(2) Leave fatalities and body parts in place and secure the area in which they are located.

(3) Isolate any apparent source location of the event (e.g., blast area, spill release point).

(4) Leave in place any explosive components or housing materials.

(5) Place light-colored tarpaulins on the ground of access and exit corridors, decontamination zones, treatment areas, and rehabilitation sectors to allow possible evidence that might drop during decontamination and doffing of clothes to be spotted and collected.

(6) Secure and isolate all food vending locations in the immediate area. Contaminated food products will qualify as primary or secondary evidence in the event of a chemical or biological incident.

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

Safety precautions. Safety precautions should include buddy systems, backup systems, accountability systems, safety briefing, and evacuation/escape procedures. The following items should be

considered in a safety briefing prior to allowing personnel to work at hazardous materials/WMD incidents:

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

Commented [MMA8]: This note refers to A.5.4.1 (A) of NFPA 1072-2017.

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

Instructor Note

The operations level responder should implement the incident command system as required by the AHJ by completing the following requirements:

(1) Identify the role of the operations level responder during hazardous materials/WMD incidents as specified in the emergency response plan and/or standard operating procedures

(2) Identify the levels of hazardous materials/WMD incidents as defined in the emergency response plan

(3) Identify the purpose, need, benefits, and elements of the incident command system for hazardous materials/WMD incidents

(4) Identify the duties and responsibilities of the following functions within the incident management system:

(a) Incident safety officer
(b) Hazardous materials branch or group

(5) Identify the considerations for determining the location of the incident command post for a hazardous materials/WMD incident

(6) Identify the procedures for requesting additional resources at a hazardous materials/WMD incident

(7) Describe the role and response objectives of other agencies that respond to hazardous materials/WMD incidents.

Commented [MMA9]: This note refers to A.5.4.1 (B) of NFPA 1072-2017.

602-5.5 Emergency Decontamination

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

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

approved tools and equipment for emergency decontamination; and hazard avoidance for emergency decontamination.

1. Contamination, cross-contamination, and exposure
    a. Contamination
    b. Cross-contamination
    c. Exposure

2. Contamination types
    a. Primary
    b. Secondary
    c. Tertiary

3. Routes of exposure
    a. Absorption
    b. Inhalation
    c. Injection
    d. Ingestion

4. Types of decontamination
    a. Decon options
        i. Wet decon
        ii. Dry decon
        iii. Chemical decon options
        iv. Physical decon options
    b. Emergency
    c. Mass
    d. Technical
        i. Absorption
        ii. Adsorption
        iii. Vacuuming
        iv. Washing
        v. Chemical degradation
        vi. Dilution
        vii. Disinfection
        viii. Evaporation
        ix. Neutralization

x. Solidification
xi. Sterilization
xii. Isolation and disposal

5. Emergency decontamination
   a. Purpose
   b. Advantages
   c. Limitations

6. Performing emergency decontamination
   a. Policies
   b. Procedures

7. Approved tools and equipment

8. Hazard avoidance for emergency decon
   a. Establish control zones
   b. Establish entry and exit corridors
   c. Supervise the decon being performed (extra eyes)

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

602-5.6 Progress Evaluation and Reporting

Instructor Note

All responders should understand why their efforts must be evaluated. If they are not making progress, the plan must be re-evaluated to determine why. The evaluation should include what

changes have occurred with the circumstances of the incident (behavior of container or its contents).

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

Commented [MMA10]: This note refers to A.5.6 of NFPA 1072-2017.

602-5.6.1 Evaluate and report the progress of the assigned tasks for a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment, policies and procedures, status of assigned tasks, and approved communication tools and equipment, so that the effectiveness of the assigned tasks is evaluated and communicated to the supervisor, who can adjust the IAP as needed.

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

1. Components of progress reports

2. Evaluating/reporting progress
   a. Policies
   b. Procedures
   c. AHJ/SOP

3. Approved communication tools and equipment
    a. Hazardous area classifications
        i. National electric code (NEC)
        ii. Underwriters Laboratories (UL)
        iii. NFPA 70 – National Electrical Code
    b. Explosion-proof vs. intrinsically safe

4. Signs indicating improving, static, or deteriorating conditions based on the objectives of the action plan
    a. Hand and arm signals
    b. Air horn signals (i.e., emergency evacuation)
    c. E-notifications (i.e., TPASS)
    d. Radio emergency alert

5. When to withdraw from a hazardous material/WMD incident

Instructor Note

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

Commented [MMA11]: This note refers to A.5.6.1 (A) of NFPA 1072-2017.

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

Instructor Note

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

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

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

Commented [MMA12]: This note refers to A.5..6.1(B) of NFPA 1072-2017.

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

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

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

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

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

- ~~**Awareness Level Personnel,**~~

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

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

602.5.1 General

602.5.1.1 Introduction

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

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

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

602.5.1.2 Goal

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

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

1. Analyze a hazardous materials/WMD incident to determine the scope of the problem and potential outcomes by completing the following tasks:
   a. Survey a hazardous materials/WMD incident to identify the containers and materials involved, determine whether hazardous materials/WMD have been released, and evaluate the surrounding conditions.
   b. Collect hazard and response information from MSDS; CHEMTREC/CANUTEC/SETIQ; local, state, and federal authorities; and shipper/manufacturer contacts.

c. Predict the likely behavior of a hazardous material/WMD and its container.
d. Estimate the potential harm at a hazardous materials/WMD incident.
   i. Thermal
   ii. Radiation
   iii. Asphyxiant
   iv. Chemical
   v. Etiologic
   vi. Mechanical
   vii. Psychological/psychogenic

2. Plan an initial response to a hazardous materials/WMD incident within the capabilities and competencies of available personnel and personal protective equipment by completing the following tasks:
   a. Describe the response objectives for the hazardous materials/WMD incident.
      i. Evacuation
      ii. Search and Rescue
      iii. Exposure Protection/Isolate the Area
      iv. Defensive Control Techniques
      v. Crime scene management and evidence preservation
      vi. Recovery and termination
   b. Describe the response options available for each objective.
      i. Evacuation
         a) Public protection actions
            1) Full scale evacuation
            2) Shelter-in-place
            3) Combination
      ii. Search and Rescue
         a) Based on training and equipment
         b) Risk-benefit analysis (i.e., risk a lot/save a lot, risk a little/save a little)
      iii. Exposure Protection/Isolate the Area
         a) Establish initial isolation distance
         b) Establish protective action distance
         c) Establish control zones
      iv. Defensive Control Techniques
         a) Damming
            1) Overflow
            2) Underflow
         b) Diking
         c) Retention
         d) Dispersion
         e) Absorption
         f) Adsorption

g) Dilution
h) Dissolution
i) Diversion
j) Vapor dispersion
k) Vapor suppression
l) Ventilation
m) Remote valve shutoff

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

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

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

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

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

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

a. Evaluate the status of the actions taken in accomplishing the response objectives.
b. Communicate the status of the planned response.

602-5.2 Core Competencies — Analyzing the Incident

602-5.2.1 Surveying Hazardous Materials/WMD Incidents
Given scenarios involving hazardous materials/WMD incidents, the operations level responder shall collect information about the incident to identify the containers, the materials involved, the surrounding conditions, and whether hazardous materials/WMD have been released, by completing the requirements of 5.2.1.1 through 5.2.1.6.

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

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

1. Cryogenic liquid tank cars

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

3. Pressure tank cars

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

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

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

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

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

1. Compressed gas tube trailers

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

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

4. Dry bulk cargo tanks

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

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

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

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

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

2. Non-pressure tank (Atmospheric pressure=0-0.5 psi)
   a. Horizontal tank
   b. Cone roof tank
   c. Floating roof tank
   d. Covered floating roof tank
   e. Floating roof with geodesic dome
   f. Lifter roof tank
   g. Vapor dome roof tank
   h. Underground storage tanks

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

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

1. Bags
2. Carboys and Jerricans
3. Cylinders
4. Drums
    a. Types
        i. Open head
        ii. Closed head
    b. Construction Materials
        i. Metal
        ii. Plastic
        iii. Fiberboard
        iv. Other suitable materials
    c. Fittings
        i. Bungs
        ii. Chime ring
5. Dewar flask (cryogenic liquids)

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

1. Intermediate bulk container (IBC)
    a. Rigid intermediate bulk containers (RIBCs)
    b. Flexible intermediate bulk containers (FIBCs)
2. Ton container
    a. Convex
    b. Concave

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

1. Excepted
2. Industrial
3. Type A

4. Type B

5. Type C

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

1. DOT Placarding and Labeling System

2. UN Numbers

3. NFPA 704 Marking System

4. Hazardous Materials Identification System (HMIS)

5. Hazard Identification Codes (Intermodal Containers)
    a. Also known as "hazard identification numbers," or;
    b. Kemler code

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

1. Highway transport vehicles, including cargo tanks
    a. Company names and logos
    b. Vehicle identification numbers
    c. Manufacturer's specification plate

2. Intermodal equipment, including tank containers
    a. Reporting marks
    b. Tank number
    c. Specification markings

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

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

1. NFPA 704 Marking System

2. Hazardous Materials Identification System (HMIS)

3. Facility specification markings

4. Manufacturer's specification plate

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

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

1. Emergency telephone number

2. Owner

3. Product

602 5.2.1.3.12 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

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

1. Topography

2. Land use

3. Accessibility

4. Weather conditions

5. Bodies of water

6. Public exposure potential

7. Overhead and underground wires and pipelines

8. Storms and sewer drains

9. Possible ignition sources

10. Adjacent land use

11. Nature and extent of injuries

12. Building information

13. Ventilation ducts

14. Air returns

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

1. CHEMTREC

2. SDS/MSDS

3. Emergency Response Guides

4. Shipping Papers

5. Online, computer, and/or mobile-based applications (e.g., WISER)

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

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

602-5.2.2 Collecting Hazard and Response Information

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

1. Match the definitions associated with the UN/DOT hazard classes and divisions of hazardous materials/WMD, including refrigerated liquefied gases and cryogenic liquids, with the class or division.
2. Identify two ways to obtain an MSDS in an emergency.
    a. Shipper
    b. Manufacturer
    c. CHEMTREC
    d. Websites
3. Using an MSDS for a specified material, identify the following hazard and response information:
    a. Physical and chemical characteristics
    b. Physical hazards of the material
    c. Health hazards of the material
    d. Signs and symptoms of exposure
    e. Routes of entry
    f. Permissible exposure limits
    g. Responsible party contact
    h. Precautions for safe handling (including hygiene practices, protective measures, and procedures for cleanup of spills and leaks)

i. Applicable control measures, including personal protective equipment
j. Emergency and first-aid procedures

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

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

6. Identify the type of assistance provided by governmental authorities with respect to criminal or terrorist activities involving the release or potential release of hazardous materials/WMD.
   a. Federal
      i. DHS - Homeland Security Issues
      ii. FBI - Crisis Management
      iii. FEMA - Consequence Management
      iv. EPA - Environmental Management
      v. US Coast Guard - Navigable Waterway Management & Port Security
      vi. DOD - Explosives, Munitions, Military Shipments Technical Assistance/Response
      vii. ATF - Explosives Technical Assistance
   b. State
      i. DPS - District Disaster Chair (DDC)

ii. TDEM - Emergency Management
iii. TCEQ - Environmental Management
iv. TGLO - Water Quality
v. TRRC - Pipelines and Propane Storage

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

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

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

602.5.2.3 Predicting the Likely Behavior of a Material and Its Container

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

1. Use the hazard and response information obtained from the current edition of the DOT *Emergency Response Guidebook*, MSDS, CHEMTREC/CANUTEC/SETIQ, governmental authorities, and shipper and manufacturer contacts, as follows:
a. Match the following chemical and physical properties with their significance and impact on the behavior of the container and its contents:
i. Boiling point
ii. Chemical reactivity
iii. Corrosivity (pH)
iv. Flammable (explosive) range
a) Lower Explosive Limit (LEL)
b) Upper Explosive Limit (UEL)
v. Flash point
vi. Ignition (autoignition) temperature
vii. Particle size
viii. Persistence
ix. Physical state (solid, liquid, gas)
x. Radiation (ionizing and non-ionizing)
xi. Specific gravity

xii. Toxic products of combustion
xiii. Vapor density
xiv. Vapor pressure
xv. Water solubility

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

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

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

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

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

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

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

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

9. Given the following, identify the corresponding UN/DOT hazard class and division:
    a. Blood agents
    b. Biological agents and biological toxins
    c. Choking agents
    d. Irritants (riot control agents)
    e. Nerve agents
    f. Radiological materials
    g. Vesicants (blister agents)

602-5.2.4 Estimating Potential Harm

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

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

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

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

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

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

602-5.3 Core Competencies — Planning the Response

602-5.3.1 Describing Response Objectives

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

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

2. Given an analysis of a hazardous materials/WMD incident, describe the steps for determining response objectives.
    a. Analyze the incident
    b. Hazard analysis and risk assessment
    c. Identify incident priorities
        i. Life safety
        ii. Incident stabilization
        iii. Property preservation/environmental conservation
    d. Develop Incident Objectives (SMART)
        i. **S**pecific
        ii. **M**easureable
        iii. **A**ttainable
        iv. **R**ealistic
        v. **T**imely

e. Periodically reassess

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

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

602-5.3.2 Identifying Action Options

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

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

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

602-5.3.3 Determining Suitability of Personal Protective Equipment

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

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

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

602-5.3.4 Identifying Decontamination Issues

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

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

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

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

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

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

602-5.4 Core Competencies — Implementing the Planned Response

602-5.4.1 Establishing and Enforcing Scene Control Procedures

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

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

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

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

4. Demonstrate the ability to perform emergency decontamination

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

b. Hazardous materials/WMD incidents involving criminal activities

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

602-5.4.2 Preserving Evidence

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

602-5.4.3 Initiating the Incident Command System

Given scenarios involving hazardous materials/WMD incidents, the operations level responder shall implement the incident command system as required by the AHJ by completing the following requirements:

1. Identify the role of the operations level responder during hazardous materials/WMD incidents as specified in the emergency response plan and/or standard operating procedures.

2. Identify the levels of hazardous materials/WMD incidents as defined in the emergency response plan.

3. Identify the purpose, need, benefits, and elements of the incident command system for hazardous materials/WMD incidents.

4. Identify the duties and responsibilities of the following functions within the incident management system:
    a. Incident Safety Officer
        i. Obtains briefing from:
            a) Incident Commander; or
            b) Incident Safety Officer; and
            c) Hazard Branch Director or Hazard Division/Group Supervisor
        ii. Participates in:
            a) Preparation of incident safety plan
            b) Implementation of the incident safety plan; and
            c) Medical monitoring of entry team personnel before and after entry
        iii. Advises Incident Commander or Hazard Branch Director or Hazard Division/Group Supervisor of:
            a) Deviations from the incident safety plan
            b) Dangerous or unsafe activities
        iv. Alters, suspends, or terminates any operation that is considered unsafe

b. Hazardous materials branch or group

5. Identify the considerations for determining the location of the incident command post for a hazardous materials/WMD incident.

6. Identify the procedures for requesting additional resources at a hazardous materials/WMD incident.

7. Describe the role and response objectives of other agencies that respond to hazardous materials/WMD incidents.

602-5.4.4 Using Personal Protective Equipment

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

1. Identify the importance of the buddy system.

2. Identify the importance of the backup personnel.

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

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

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

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

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

602-5.5 Core Competencies — Evaluating Progress

602-5.5.1 Evaluating the Status of Planned Response

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

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

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

602-5.5.2 Communicating the Status of the Planned Response

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

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

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

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

Hazardous Materials Training
Equipment & Prop List

The following are minimal recommended supplies necessary for hazardous materials training at the below listed levels of certification. Variations may exist based on the needs of each AHJ and any mission-specific job tasks as assigned by an AHJ.

Hazardous Materials Awareness

Department of Transportation's *Emergency Response Guidebook* (ERG) (current ed.)
Material Safety Data Sheet (MSDS) or Safety Data Sheets (SDS) – Samples
Placards & Labels
Transportation/Shipping document – Sample
NFPA 704 sample
Safety Vests
Binoculars

Hazardous Materials Operations

All awareness equipment *plus…*
Structural Firefighter Protective Ensemble (bunker gear)

Reference Material:

- NIOSH *Pocket Guide to Chemical Hazards*
- NFPA *Hazardous Materials / Weapons of Mass Destruction Response Handbook* (current edition)
- Pesticide label example

Respiratory Protection to include:

- Air Purifying Respirator (APR-half mask)
- Air Purifying Respirator (APR-full face)
- SCBA

Chemical Protective Clothing to include:

- Vapor Protective CPC (Level A)
- Splash Protective Encapsulated CPC (Level B)
- Splash Protective Non-Encapsulated CPC (Level B, Level C)
- Chemical Boots (Rubber Boots for training only)
- Inner/Outer gloves - assorted types
- Chem Tape (duct tape for training only)

Fire Hose, Foam Nozzles and Eductors, Foam
Pictures/slides of various railcar, intermodal, and highway cargo trailers
Pictures/slides of bulk and non-bulk containers, and fixed facility containment systems

Defensive Spill Equipment:

- Absorbent/Adsorbent
- Broom/Shovel
- 5-gallon buckets
- Assortment of boom and pads

Decontamination Equipment:

- Poly sheeting or tarp
- Duct tape
- Traffic cone(s)
- Decon Pools
- Sprayer(s)
- Garden hose(s) and sprayer/nozzles
- 5-gallon bucket(s)
- Various Decon solution(s)
- Folding chairs
- Overpack drum

Various monitoring detection equipment as may be required. Examples *may* include:

- Combustible Gas Indicator
- Oxygen Meter
- Radiation Detector

Hazardous Materials Operations – Mission Specific Competencies

Equipment needed for training to Hazardous Materials Operations – Mission Specific Competencies will be based the competencies themselves and the authority having jurisdiction (AHJ). Equipment, at a minimum, will include that which is required to train to the Hazardous Materials Operations Level. Additional equipment or props may include part or all of the equipment listed below for Hazardous Materials Technician.

For example, if training to the Mission Specific Competencies: Air Monitoring and Sampling is to be performed, additional monitoring detection and sampling equipment will be required.

Hazardous Materials Technician

Awareness and Operations equipment *plus…*

Reference Material:

- CPC Permeation Guides/Tables
- BOE/AAR *Field Guide to Railcar Identification*
- NFPA *Fire Protection Guide to Hazardous Materials Detection*
- Other printed or electronic publications/databases as may be required by the AHJ

Various monitoring detection equipment and corresponding samples to include:

- Combustible Gas Indicator
- Oxygen Meter
- Carbon monoxide meter
- Gas specific meter
- Photoionization detector
- Radiation Detectors (alpha, beta, gamma)
- Colorimetric tubes, pump
- Classifier/detection strips and reagents
- pH paper or pH meter
- additional monitoring and detection equipment as may be required by AHJ
- Calibration kit(s) as required for above

Leak & Spill Equipment:

- Plugging/patching supplies
- Leaking drum(s): metal & poly
- Overpack drum(s)
- Leak pipe simulator
- 150 lbs. Chlorine cylinder leak prop
    - Chlorine emergency kit type “A”
- Chlorine 1-Ton cylinder leak prop
    - Chlorine emergency kit type “B”
- Pressure Railcar dome leak prop
    - Chlorine emergency kit type “C” or Midland kit
- Cargo Tank Leak Simulator (MC-306/DOT-406 Dome)
- Dome Cover Clamp
- Grounding & Bonding Kit
- Product Transfer Equipment
- Misc. Hand Tools (e.g., hand wrenches, bung wrench, spanner wrench, mallet, screwdrivers, etc.)

Command and Control Equipment/Forms (e.g., Incident Action Plan, Site Safety Plan, Medical Plan, Communication Plan - all NIMS/ICS compliant)

Hazardous Materials Incident Commander

Reference Material

- Department of Transportation’s *Emergency Response Guidebook* (ERG) (current ed.)
- Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) - Samples
- Transportation/Shipping document – Sample
- NIOSH *Pocket Guide to Chemical Hazards*

- NFPA *Hazardous Materials / Weapons of Mass Destruction Response Handbook* (current edition)
- CPC Permeation Guides/Tables
- BOE/AAR *Field Guide to Railcar Identification*
- NFPA *Fire Protection Guide to Hazardous Materials Detection*
- Other printed or electronic publications/databases as may be required by the AHJ

Command and Control Equipment/Forms

- Department of Homeland Security – National Incident Management System/Incident Command System standardized forms
    - ICS 201 Incident Briefing Form
    - ICS 202 Incident Objectives Worksheet
    - ICS 203 Organization Assignment List
    - ICS 204 Division Assignment List
    - ICS 205 Communications Plan
    - ICS 206 Medical Plan
    - ICS 208HM Site Safety and Control Plan
    - ICS 211 Incident Check-in List
    - ICS 213 General Message
    - ICS 214 Unit Log
    - ICS 215 Incident Planning Worksheet
    - ICS 215A Incident Action Plan Safety Analysis

HAZARDOUS MATERIALS OPERATIONS

(Mission Specific Competencies)

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

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

Required References

Texts

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

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

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

Essentials of Fire Fighting ~~and Fire Department Operations~~, 7th ~~6th~~ edition. International Fire Service Training Association. (2018~~3~~). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

Fundamentals of Fire Fighter Skills and Hazardous Materials Response, 4th ~~3rd~~ edition. International Association of Fire Chiefs, & National Fire Protection Association. (2019~~4~~). **Burlington ~~Sudbury~~**, MA: Jones and Bartlett.

Hazardous Materials Awareness and Operations, 3rd *Edition*. Schnepp (2019). Sudbury, MA: Jones & Bartlett.

Hazardous Materials for First Responders, 5th edition. International Fire Service Training Association. (2017). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

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

Hazardous Materials/Weapons of Mass Destruction Response Handbook, ~~6th~~/2018~~3~~ edition. McGowan, T. (2018~~2~~). Quincy, MA: National Fire Protection Association.

NFPA 472: Standard for ~~Professional~~ Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents. (2018~~3~~ ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

***NFPA 1072: Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications.* (2017 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.**

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

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

Recommended References

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

Texts

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

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

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

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

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

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

Media

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

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

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

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

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

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

CHAPTER 6

SECTION 603
HAZARDOUS MATERIALS OPERATIONS - MISSION SPECIFIC COMPETENCIES
CURRICULUM OUTLINES

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

SECTION	SUBJECT	RECOMMENDED HOURS
603-6.1	General - Introduction - Laws, Regulations, and National Consensus Standards	1
603-6.2	Mission Specific Competencies: Personal Protective Equipment*	8
603-6.3	Mission Specific Competencies: Mass Decontamination	Reserved~~8~~
603-6.4	Mission Specific Competencies: Technical Decontamination	Reserved8
603-6.5	Mission Specific Competencies: Evidence Preservation and **Public Safety** Sampling	Reserved8
603-6.6	Mission Specific Competencies: Product Control*	8
603-6.7	Mission Specific Competencies: **Detection, ~~Air~~** Monitoring and Sampling	Reserved8
603-6.8	Mission Specific Competencies: Victim Rescue and Recovery	Reserved8
603-6.9	Mission Specific Competencies: Response to Illicit Laboratories~~/ Incidents~~	Reserved16
~~603-6.10~~	~~Mission Specific Competencies: Disablement/Disruption of Improvised Explosives Devices (IEDs), Improvised WMD Dispersal Devices, and Operations at Improvised Explosives Laboratories~~	~~16~~

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

~~**Mission Specific - Mass Decontamination**~~		
~~**SECTION**~~	~~**SUBJECT**~~	~~**RECOMMENDED HOURS**~~

603-6.3	Mission Specific Competencies: Mass Decontamination	
603-6.3.1	General - Introduction - Laws, Regulations, and National Consensus Standards	1
603-6.3.2	Analyzing the Incident - Reserved - None Required at this Level	
603-6.3.3	Planning the Response	2
603-6.3.4	Implementing the Planned Response	3
603-6.3.5	Evaluating Progress	1
603-6.3.6	Terminating the Incident	1
	TOTAL RECOMMENDED HOURS	**8**

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

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

Mission Specific – Product Control*		
SECTION	**SUBJECT**	**RECOMMENDED**

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

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

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

~~Mission Specific – Response to Illicit Laboratory Incidents~~		
~~SECTION~~	~~SUBJECT~~	~~RECOMMENDED HOURS~~
~~603-6.9~~	~~Mission Specific Competencies: Response to Illicit Laboratory Incidents~~	

603-6.9.1	General - Introduction - Laws, Regulations, and National 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**

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

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

Commented [MMA1]: As per Butch Hayes, all l hours remain the same even though they refer to NFPA 472 (2018) and TCFP curriculum uses NFPA 1072 (2017). Kept footer reference to 472 and updated pub date, also as per Butch.

Course Instructor Information

Hazardous Materials

Operations-Mission Specific Competencies (MSC)

Overview
The Hazardous Materials curricula are designed to provide clear guidance that ensures adequate presentation of the information required to meet the Job Performance Requirements (JPRs) of National Fire Protection Association (NFPA) 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*, 2017 edition.

The Hazardous Materials curricula is found in Chapter 6 of the TCFP Curriculum Manual.

Certification Level	TCFP Section Number	NFPA 1072 Chapter
Awareness	601	4
Operations	602	5
Operations-Mission Specific Competencies (MSC)	603	6
*Technician	604	7
*Incident Commander	605	8

Layout
The NFPA numbering sequence is mirrored to allow easy correlation between this document and the NFPA Standard. For example, 601-4.1.2 identifies the section in Awareness that corresponds to NFPA section 4.1.2.

When a section references information from “Annex A Explanatory Material” in the NFPA Standard, it is identified by a boxed Instructor Note. For example, the boxed Instructor Note listed in 601-4.2.1 and that immediately follows the Requisite Knowledge section corresponds to the NFPA Annex A information for NFPA 1072 section 4.2.1.

* Asterisks by Technician and Incident Commander above indicate that both are voluntary (non-mandatory) certifications. Therefore, **a formal “curriculum outline” is not provided**. Please use chapters 7 and 8, respectively, of NFPA 1072 as a guide when creating your own course curricula or selecting a prepared instructional curriculum package from a publisher/vendor for Technician and Incident Commander.

TCFP Standards Manual
It is critical that you review the chapters in the TCFP Standards Manual that apply to this curriculum. Of primary importance are the following two chapters: Chapter 423, which defines the course of study, documentation and medical requirements necessary

for Awareness and Operations certification (required) and Chapter 453, which covers certification requirements for Technician and Incident Commander (voluntary). Additionally, instructors are expected to review the following chapters as they pertain to the instructional, examination, certification processes:

- Chapter 421,Standards for Certification
- Chapter 427, Training Facility Certification
- Chapter 435, Fire Fighter Safety
- Chapter 437, Fees
- Chapter 439, Examinations for Certification
- Chapter 441, Continuing Education

These chapters do not address every issue that could impact this curriculum; therefore, you are encouraged to become familiar with the TCFP Standards Manual.

Instructor Qualifications
Hazardous Materials courses must be taught by an instructor meeting the requirements described in Chapter 427.307 of the TCFP Standards Manual.

Supplemental Information
Instructors are expected to provide supplemental information if the main reference text does not provide adequate information to ensure successful completion of the Job Performance Requirements as listed in the curriculum.

Components of the Curricula
Each section of a curriculum identifies the NFPA Job Performance Requirement (JPR) and subdivides the requisite knowledge requirements into learning components. For example:

View within the Curriculum		Explanation
601-4.3.1	Isolate the hazard area and deny entry at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, policies and procedures, and approved reference sources, so that the hazard area is isolated and secured, personal safety procedures are followed, hazards are avoided or minimized, and additional people are not exposed to further harm.	**Section Number and NFPA JPR**
	Requisite Knowledge: Use of the ERG, SDS, shipping papers with emergency response information, and other approved reference sources to identify precautions to be taken to	**Requisite Knowledge Statement**

protect responders and the public; policies and procedures for isolating the hazard area and denying entry; and the purpose of and methods for isolating the hazard area and denying entry.	
(1) Use of the ERG, SDS, shipping papers with emergency response information, and other approved reference sources to identify precautions to be taken to protect responders and the public	**First part of Requisite Knowledge**
Identify precautions to be taken to protect responders/the public using ERG, SDS, shipping papers with emergency response information, other approved reference sources Identify the hazard a. Isolate the hazard area b. Deny entry c. Call for trained personnel d. Secure the scene	**Associated learning components**
(2) Policies and procedures for isolating the hazard area and denying entry	**Second part of Requisite Knowledge**
Policies and procedures, per AHJ/SOP a. Isolating the hazard area b. Denying entry	**Associated learning components**
(3) And the purpose of and methods for isolating the hazard area and denying entry	**Third part of Requisite Knowledge**
Purpose/methods a. Isolating the hazard area i. Establish perimeter ii. Erect barriers b. Denying entry i. Restrict hazard area access to	**Associated learning components**

appropriately trained personnel only ii. Maintain perimeter	
Requisite Skills: Use of the ERG, SDS, shipping papers with emergency response	**Requisite Skills Statement**
Instructor Note Recommended precautions found on numbered guides in the ERG include public safety issues; recommended protective clothing; evacuation; emergency response to fire, spill, and leak; and first aid sections. Examples of required knowledge include (1) precautions for providing emergency medical care to victims; typical ignition sources; ways hazardous materials/WMD are harmful to people, the environment, and property; general routes of entry for human exposure; emergency action (fire, spill, or leak; first aid); actions recommended not to be performed (e.g., closing of pipeline valves); protective actions (isolation of area and denial of entry, evacuation, shelter-in-place); size and shape of recommended initial isolation and protective action distances; difference between small and large spills; conditions that require the use of the ERG Table of Initial Isolation and Protective Action Distances and the isolation distances in the ERG numbered guide; techniques for isolating the hazard area and denying entry to unauthorized persons; how to recognize and protect evidence; and use of approved tools and equipment; (2) basic personal protective actions: staying clear of vapors, fumes, smoke, and spills; keeping vehicle at a safe distance from the scene; approaching from upwind, uphill, and upstream; and (3) types of protective actions and their purpose (e.g., isolate hazard area and deny entry, evacuation, and shelter-in-place); basic factors involved in the choice of protective actions (e.g., hazardous materials/WMD involved, population threatened,	**Appendix A: Explanatory Material for 4.3.1**

	and weather conditions).	

Unless otherwise specified, all curriculum references are to NFPA 1072. In some cases, (see, for example, 601-4.2.1), reference is also made under the section number and JPR to similar material in NFPA 472.

601-4.2.1	Recognize and identify the hazardous materials/WMD and hazards involved in a hazardous materials/WMD incident, given a hazardous materials/WMD incident, and approved reference sources, so that the presence of hazardous materials/WMD is recognized and the materials and their hazards are identified. Given a hazardous materials/WMD incident, and approved reference sources, awareness level personnel shall recognize those situations where hazardous materials/WMD are present. (472-4.2.1)	**Additional reference to NFPA 472**

Skills
NFPA Requisite Skill requirements are addressed in the corresponding Skill Sheets in Chapter 6 of the TCFP Curriculum Skills Manual.

Definitions of Certification Levels
Awareness Level Personnel: Personnel who, in the course of their normal duties, could encounter an emergency involving hazardous materials/weapons of mass destruction (WMD) and who are expected to recognize the presence of the hazardous materials/WMD, protect themselves, call for trained personnel, and secure the scene. These personnel have met all the performance requirements of Chapter 4 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*

Operations Level Personnel: Personnel 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. These personnel have met all the performance requirements of Chapter 5 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*

Operations-Mission Specific Competencies (MSC) Level Personnel: Responders assigned mission-specific responsibilities at hazardous materials/WMD incidents are

those operations level responders designated by the authority having jurisdiction (AHJ) to perform additional tasks to support the AHJ's response mission, expected tasks, equipment, and training in the following areas:

(1) Personal protection equipment (PPE)
(2) Mass decontamination
(3) Technical decontamination
(4) Evidence preservation and sampling
(5) Product control
(6) Detection, monitoring, and public safety sampling
(7) Victim rescue and recovery
(8) Illicit laboratories incidents

These personnel have met all the performance requirements of Chapter 5 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications* and have also met the performance requirements of the subchapter(s) of Chapter 6 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications,* to which they are trained and credentialed to perform.

Note: Basic TCFP Structural Fire Fighter certification requires that Structure Fire Fighter personnel meet all performance requirements for:

- *Hazardous Materials Awareness*
- *Hazardous Materials Operations*
- *Hazardous Materials Operations - MSC – 6.2 Personal Protective Equipment*
- *Hazardous Materials Operations - MSC – 6.6 Product Control*

Technician Level Personnel: Persons who respond to hazardous materials/weapons of mass destruction (WMD) incidents using a risk-based response process by which they analyze a problem involving hazardous materials/WMD, plan a response to the problem, evaluate progress of the planned response, and assist in terminating the incident. These personnel have met all the performance requirements of Chapter 7 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications.*

Incident Commander Level Personnel: That person, designated by the AHJ, responsible for all incident activities/operations, including the development of strategies and tactics and the ordering and release of resources. These personnel have met all the performance requirements of Chapter 8 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications.*

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 mass decontamination**
- **Perform technical decontamination**
- **Perform Evidence Preservation and Public Safety Sampling actions**
- **Perform product control**
- **Perform detection, monitoring, and sampling operations**
- **Reformed victim rescue and recovery operations**
- **Respond to illicit laboratory incidents**
- ~~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~~

Commented [MMA1]: As per LHavens.

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

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

- **Awareness Level Personnel**

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

This is in accordance with the competency requirements of *NFPA 1001: Standard for Fire Fighter Professional Qualifications* 2019~~2013~~ Ed., the *TCFP Standards Manual* and the *TCFP Curriculum Manual*.

603-6.1 General

603-6.1.1 Operations level responders assigned mission-specific responsibilities at hazardous materials/WMD incidents are those operations level responders designated by the AHJ to perform additional tasks to support the AHJ's response mission, expected tasks, equipment, and training in the following areas: (1) Personal protection equipment (PPE) (see Section 6.2) (2) Mass decontamination (see Section 6.3) (3) Technical decontamination (see Section 6.4) (4) Evidence preservation and sampling (see Section 6.5) (5) Product control (see Section 6.6) (6) Detection, monitoring, and public safety sampling (see Section 6.7) (7) Victim rescue and recovery (see Section 6.8) (8) Illicit laboratory incidents (see Section 6.9)

603-6.1.2 Operations level responders assigned mission-specific responsibilities at hazardous materials/weapons of mass destruction (WMD) incidents shall meet the job performance requirements defined in Sections 4.2 through 4.4.

603-6.1.3 Operations level responders assigned mission-specific responsibilities at hazardous materials/WMD incidents shall meet the job performance requirements defined in Sections 5.2 through 5.6.

603-6.1.4 Operations level responders assigned mission-specific responsibilities at hazardous materials/WMD incidents shall have additional competencies that are specific to their response mission, expected tasks, equipment, and training as determined by the AHJ.

603-6.1.5 Qualification for operations level responders assigned mission-specific responsibilities at hazardous materials/WMD incidents is specific to a mission area. For qualification, operations mission-specific responders shall perform all the job performance

requirements listed in at least one level of a specialty area (Sections 6.2 through 6.9). Operations mission specific responders will be identified by their specialty.

Instructor Note

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

Commented [MMA2]: This and all other Instructor Notes in this document are taken from the Annex material in NFPA 1072 – 2017, as per Hazmat Committee chair, Louie Havens. This particular note comes from section A.6.1.5.

603-6.1.6 Operations level responders assigned mission-specific responsibilities at hazardous materials/WMD incidents shall operate under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures.

Instructor Note

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

can be provided to ensure that operations mission-specific responders do not go beyond their level of training and equipment:

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

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

(1) Tasks expected of operations level responders

(2) Tasks beyond the capability of operations level responders

(3) Required PPE and equipment to perform the expected tasks

(4) Procedures for ensuring coordination within the AHJ ICS.

Commented [MMA3]: This Instructor Note comes from section A. 6. 1. 6 in NFPA 1072- 2017.

603-6.1.7 General Knowledge Requirements (Reserved)

603-6.1.8 General Skills Requirements (Reserved)

603-6.2 Personal Protective Equipment

Instructor Note

At this level, PPE refers to personal protective equipment that would be used in situations where contact with hazardous materials/WMD is possible or expected. Such equipment can include chemical-protective clothing, bomb suits, respirators, or other equipment that typically would not be worn by operations level responders. Specialized PPE also refers to operations level responders' PPE that requires changes to donning, doffing, and usage procedures — for example, taping gaps in fire-fighter protective clothing, doffing in a

decontamination corridor, or working in the hot zone as a member of a buddy system. Personnel should be able to describe the types of PPE available and the options for thermal hazards, radiological hazards, asphyxiation hazards, chemical hazards, etiological/biological hazards, and mechanical hazards. (See also A.6.1.6.)

Commented [MMA4]: This Instructor Note comes from section A.6.2 of NFPA 1072 – 2017.

603-6.2.1 Select, don, work in, and doff approved PPE at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; a mission-specific assignment in an IAP that requires use of PPE; the scope of the problem; response objectives and options for the incident; access to a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures; approved PPE; and policies and procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, approved PPE is selected, inspected, donned, worked in, decontaminated, and doffed; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; and all reports and documentation pertaining to PPE use are completed.

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

1. PPE selection and use
    a. Policies
    b. Procedures
    c. AHJ/SOP

2. Importance of selecting and using PPE under guidance

a. Hazardous materials technician
b. Allied hazardous material professional
c. Emergency response plan

3. Approved PPE
   a. Capabilities and limitations
   b. Specialized donning procedures
   c. Specialized doffing procedures
   d. Specialized usage procedures

4. Components of an incident action plan (IAP)

5. Procedures for approved PPE
   a. decontamination
   b. inspection
   c. maintenance
   d. storage of approved

6. Process for being decontaminated while wearing PPE

7. Use of PPE
   a. Procedures for reporting
   b. Procedures for documenting

Instructor Note

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

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

Commented [MMA5]: This note comes from section A 6.2.1 (A) of NFPA 1072 – 2017.

(B) Requisite Skills. Selecting PPE for the assignment; inspecting, maintaining, storing, donning, working in, and doffing PPE; going

through decontamination (emergency and technical) while wearing the PPE; and reporting and documenting the use of PPE.

603-6.3 Mass Decontamination

603-A.6.3 See A.6.1.5.

Commented [MMA6]: Notation taken from Annex.

603-6.3.1 Perform mass decontamination for ambulatory and nonambulatory victims at a hazardous materials/WMD incident, given a hazardous materials/WMD incident that requires mass decontamination; an assignment in an IAP; scope of the problem; policies and procedures; approved tools, equipment, and PPE; and access to a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, a mass decontamination process is selected, set up, implemented, evaluated, and terminated; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; personnel, tools, and equipment are decontaminated; and all reports and documentation of mass decontamination operations are completed.

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

1. Types of PPE and the hazards for which they are used

2. Operations and methods of mass decontamination
    a. Advantages
    b. Limitations

3. Performing mass decontamination
    a. Policies
    b. Procedures

c. Approved tools
d. Equipment
e. PPE

4. Crowd management techniques

5. AHJ'S mass decontamination team
   a. Positions
   b. Roles
   c. Responsibilities

6. Mass decontamination
   a. Requirements for reporting
   b. Requirements for documenting

Instructor Note

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

Commented [MMA7]: This note taken from section A 6.3.1(A) of NFPA 1072 – 2017.

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

and completing required reports and supporting documentation for mass decontamination operations.

Instructor Note

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

(1) Visual observation (stains, discolorations, corrosive effects, etc.)

(2) Monitoring devices [such as photoionization detectors (PIDs), detector tubes, radiation monitors, and pH paper strips/meters] that show whether contamination levels are at least below the device's detection limit]

(3) Wipe sampling, which provides after-the-fact information on the effectiveness of decontamination (Once a wipe swab is taken, it is analyzed by chemical means, usually in a laboratory. Protective clothing, equipment, and skin can be tested using wipe samples.)

Commented [MMA8]: This note taken from section A. 6. 3. 1(B) of NFPA 1072 – 2017.

603-6.4 Technical Decontamination

603-6.4.1 Perform technical decontamination in support of entry operations and for ambulatory and nonambulatory victims at a hazardous materials/WMD incident, given a hazardous materials/WMD incident that requires technical decontamination; an assignment in an IAP; scope of the problem; policies and procedures for technical decontamination; approved tools, equipment, and PPE; and access to a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, a technical decontamination method is selected, set up, implemented, evaluated, and terminated; approved PPE is selected and used; exposures and personnel are protected; safety procedures

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

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

1. Types of PPE and the hazards for which they are used

2. Importance of working under guidance (of):
    a. Hazardous Materials technician
    b. Allied professional
    c. Emergency response plan
    d. Standard operating procedures

3. Operations and methods of technical decontamination
    a. Advantages
    b. Limitations

4. Technical decontamination methods
    a. Advantages
    b. Limitations

5. Performing technical decontamination
    a. policies
    b. procedures
    c. approved tools
    d. equipment
    e. PPE

6. AHJ'S technical decontamination team
   a. Positions
   b. Roles
   c. Responsibilities

7. Technical decontamination
   a. Requirements for reporting
   b. Requirements for documenting

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

603-6.5 Evidence Preservation and Public Safety Sampling

603-6.5.1 Perform evidence preservation and public safety sampling at a hazardous materials/WMD incident, given a hazardous materials/WMD incident involving potential violations of criminal statutes or governmental regulations, including suspicious letters and packages, illicit laboratories, a release/attack with a WMD agent, and environmental crimes; an assignment in an IAP; scope of the problem; policies and procedures; approved tools, equipment, and PPE; and access to a hazardous materials technician, an allied professional, including law enforcement personnel or others with similar authority, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, hazardous materials/WMD incidents with a potential violation of criminal statutes or governmental regulations are identified; notify agency/agencies having investigative jurisdiction and hazardous explosive device responsibility for the type of incident are notified; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; evidence is identified and preserved; public safety samples are collected, and packaged, and the outside packaging is decontaminated; emergency responders, tools, and equipment are

decontaminated; and evidence preservation and public safety sampling operations are reported and documented.

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

1. Types of PPE and the hazards for which they are used

2. Importance of working under guidance (of):
    a. Hazardous materials technician
    b. Allied professional
        i. Law enforcement personnel
        ii. Others with similar authority
    c. Emergency response plan
    d. Standard operating procedures

3. Unique aspects

a. Suspicious letter
b. Suspicious package/device
c. Illicit laboratory
d. Release/attack with a WMD agent

4. Potential violations
   a. Criminal statutes
   b. Governmental regulations

5. Agencies having response authority to collect evidence and public safety samples

6. Agencies having investigative law enforcement authority to collect evidence or public safety samples

7. Notification procedures for agencies having investigative law enforcement authority and hazardous explosive device responsibility

8. Chain-of-custody procedures

9. Scene and potential forensic evidence
   a. Securing
   b. Characterization
   c. preservation

10. Approved documentation procedures

11. Types of evidence

12. Use and limitations of equipment to conduct field screening of samples for admission into the Laboratory Response Network to screen for:
    a. corrosivity
    b. flammability
    c. oxidizers
    d. radioactivity
    e. volatile organic compounds (VOC)
    f. fluorides

13. Use of collection kits

14. Collection and packaging of public safety samples

15. Decontamination of outside packaging

16. Prevention of secondary contamination

17. Protection and transportation requirements for sample packaging

18. Requirements for reporting and documenting
    a. evidence preservation
    b. public safety sampling operations

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

603-6.6 ***Product Control***

Instructor Note

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

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

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

Commented [MMA9]: This note taken from section A. 6. 6 of NFPA 1072 – 2017

603-6.6.1 **Perform product control techniques with a limited risk of personal exposure at a hazardous materials/WMD incident, given a hazardous materials/WMD incident with release of product; an assignment in an IAP; scope of the problem; policies and procedures; approved tools, equipment, control agents, and PPE; and access to a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; a product control technique is selected and implemented; the product is controlled; victims, personnel, tools, and equipment are decontaminated; and product control operations are reported and documented.**

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

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

1. Types of PPE and the hazards for which they are used

2. Importance of working under guidance (of):
    a. Hazardous materials technician
    b. Allied professional
    c. Emergency response plan
    d. Standard operating procedures

3. Definitions
    a. Control
    b. Confinement
    c. Containment
    d. Extinguishment

4. Policies and procedures

5. Product control methods for controlling a release with limited risk of personal exposure

6. Safety precautions associated with each product control method

7. Location and operation of remote/emergency shutoff devices in cargo tanks and intermodal tanks in transportation and containers at facilities, that contain
    a. Flammable liquids
    b. Flammable gases

8. Approved product control agents
    a. Characteristics
    b. Applicability

9. Use of approved tools and equipment

10. Product control operations
    a. Requirements for reporting
    b. Requirements for documenting

Instructor Note

Product control techniques that focus on confining/containing the release with limited risk of personal exposure include absorption, adsorption, damming, diking, dilution, diversion, remote valve shutoff, retention, vapor dispersion, and vapor suppression. Product control also includes techniques for controlling flammable liquid incidents and flammable gas incidents. Remote/emergency shutoff devices include those for MC-306/DOT-406, MC-407/DOT-407, MC-331 cargo tanks, and intermodal tanks.

Commented [MMA10]: This note taken from section A. 6. 6. 1 (A) of NFPA 1072 – 2017.

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

Instructor Note

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

Commented [MMA11]: This note taken from section A. 6. 6. 1 (B) of NFPA 1072 – 2017.

603-6.7 Detection, Monitoring, and Sampling

603-6.7.1 Perform detection, monitoring, and sampling at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment in an IAP; scope of the problem; policies and procedures; approved resources; detection, monitoring, and sampling equipment; PPE; and access to a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, detection, monitoring, and sampling methods are selected; approved equipment is selected for detection, monitoring, or sampling of solid, liquid, or gaseous hazardous materials/WMD; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; detection, monitoring, and sampling operations are implemented as needed; results of detection, monitoring, and sampling are read, interpreted, recorded, and communicated; personnel and their equipment are decontaminated; detection, monitoring, and sampling equipment is maintained; and detection, monitoring, and sampling operations are reported and documented.

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

for reporting and documenting detection, monitoring, and sampling operations.

1. Types of PPE and the hazards for which they are used

2. Approved PPE
    a. Capabilities
    b. Limitations

3. Importance of working under the guidance (of):
    a. A hazardous materials technician
    b. An allied professional
    c. An emergency response plan
    d. Standard operating procedures

4. Approved equipment
    a. Detection
    b. Monitoring
    c. Sampling
    d. Process of selection for an assigned task
    e. Operation (of)

5. Detection, monitoring, and sampling
    a. Policies
    b. Procedures

6. Local monitoring procedures, including action levels and field testing
    a. Capabilities
    b. Limitations

7. How to read and interpret results

8. Decontamination methods for detection, monitoring, and sampling equipment
    a. According to manufacturers' recommendations
    b. According to AHJ policies and procedures

9. Maintenance procedures for detection, monitoring, and sampling equipment

a. according to manufacturers' recommendations or
b. According to AHJ policies and procedures

10. Detection, monitoring, and sampling operations
    a. Reporting
    b. Documenting

Instructor Note

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

Commented [MMA12]: This note taken from section A. 6. 7. 1 (A) of NFPA 1072 – 2017.

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

603-6.8 Victim Rescue and Recovery

603-6.8.1 Perform rescue and recovery operations at a hazardous materials/WMD incident, given a hazardous materials/WMD incident involving exposed and/or contaminated victims; an assignment in an IAP; scope of the problem; policies and procedures; approved tools, equipment, including special rescue equipment, and PPE; and access to a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, the feasibility of conducting a rescue or a recovery operation is determined; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; rescue or recovery

options are selected within the capabilities of available personnel, approved tools, equipment, special rescue equipment, and PPE; victims are rescued or recovered; victims are prioritized and patients are triaged and transferred to the decontamination group, casualty collection point, area of safe refuge, or medical care in accordance with the IAP; personnel, victims, and equipment used are decontaminated; and victim rescue and recovery operations are reported and documented.

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

1. Types of PPE and the hazards for which they are used

2. Approved PPE
    a. Capabilities
    b. Limitations

3. Importance of working under guidance
    a. Hazardous materials technician
    b. Allied professional
    c. An emergency response plan
    d. standard operating procedures

4. The difference between victim rescue and victim recovery

5. Victim prioritization and patient triage methods

6. Considerations for determining the feasibility of rescue or recovery operations

7. Policies and procedures for implementing rescue and recovery

8. Safety issues

9. Approved PPE

10. Capabilities and limitations

11. Capabilities and limitations of approved PPE

12. Procedures, specialized rescue equipment required, and incident response considerations for rescue and recovery in 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

13. AHJ's rescue team
    a. Positions
    b. Roles
    c. Responsibilities

14. Procedures for reporting and documenting victim rescue and recovery operations

Instructor Note

Victim prioritization utilizes risk-based factors to establish an action plan for victim removal and eventual treatment. Patient triage is a

clinical prioritization employed to maximize survival and to prioritize application of therapeutic modalities.

Commented [MMA13]: This note taken from section A. 6. 8. 1 (A) of NFPA 1072 – 2017.

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

603-6.9 Response to Illicit Laboratories

603-6.9.1 Perform response operations at an illicit laboratory at a hazardous materials/WMD incident, given a hazardous materials/WMD incident involving an illicit laboratory; an assignment in an IAP; scope of the problem; policies and procedures; approved tools, equipment, and PPE; and access to a hazardous materials technician, an allied professional including law enforcement agencies or others having similar investigative authority, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional including law enforcement agencies or others having similar investigative authority, an emergency response plan, or standard operating procedures, the scene is secured; the type of laboratory is identified; potential hazards are identified; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; control procedures are implemented; evidence is identified and preserved; personnel, victims, tools, and equipment are decontaminated; and illicit laboratory operations are reported and documented.

(A) Requisite Knowledge. Types of PPE and the hazards for which they are used; importance of working under the guidance of a hazardous materials technician, an allied professional including law enforcement personnel or others with similar authority, an emergency response plan, or standard operating procedures; types of illicit laboratories and how to identify them; operational considerations at illicit laboratories; hazards and products at illicit

laboratories; booby traps often found at illicit laboratories; law enforcement agencies or others having similar investigative authority and responsibilities at illicit laboratories; crime scene coordination with law enforcement agencies or others having similar investigative authority; securing and preserving evidence; procedures for conducting a joint hazardous materials/hazardous devices assessment operation; procedures for determining atmospheric hazards through detection, monitoring, and sampling; procedures to mitigate immediate hazards; safety procedures and tactics; factors to be considered in the selection of decontamination, development of a remediation plan, and in decontaminating tactical law enforcement personnel, weapons, and law enforcement canines; procedures for decontaminating potential suspects; procedures for going through technical decontamination while wearing PPE; and procedures for reporting and documenting illicit laboratory response operations.

1. Types of PPE/hazards for which they are used

2. Importance of working under guidance
    a. Hazardous materials technician
    b. Allied professionals
        i. Law enforcement personnel
        ii. Others with similar authority
    c. Emergency response plan
    d. Standard operating procedures

3. Illicit laboratories
    a. Types
    b. How to identify
    c. Operational considerations
    d. Hazards and products

4. Booby traps

5. Law enforcement agencies

6. Crime scene coordination

    a. (With) law enforcement agencies

b. (With) others having similar investigative authority

7. Securing and preserving evidence

8. Conducting a joint hazardous materials/hazardous devices assessment operation

9. Determining atmospheric hazards through:
   a. Detection
   b. Monitoring
   c. Sampling

10. Procedures to mitigate immediate hazards

11. Safety procedures and tactics

12. Factors to be considered in:
   a. The selection of decontamination
   b. The development of a remediation plan
   c. Decontaminating
      i. Tactical law enforcement personnel
      ii. Weapons
      iii. Law enforcement canines

13. Decontaminating potential suspects

14. Technical decontamination while wearing PPE

15. Reporting and documenting illicit laboratory response operations

Instructor Note

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

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

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

Commented [MMA14]: This note taken from section A. 6. 9. 1 (A) of NFPA 1072 – 2017.

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

SECTION 603

HAZARDOUS MATERIALS OPERATIONS

MISSION SPECIFIC COMPETENCIES

~~***603-6.1 General***~~

~~***603-6.1.1 Introduction***~~

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

1. ~~Operations level responders assigned to use personal protective equipment~~
2. ~~Operations level responders assigned to perform mass decontamination~~
3. ~~Operations level responders assigned to perform technical decontamination~~
4. ~~Operations level responders assigned to perform evidence preservation and sampling~~
5. ~~Operations level responders assigned to perform product control~~
6. ~~Operations level responders assigned to perform air monitoring and sampling~~
7. ~~Operations level responders assigned to perform victim rescue/recovery~~

8. Operations level responders assigned to respond to illicit laboratory incidents

9. Operational level responders assigned to perform disablement/disruption of improvised explosives devices (IED), improvised WMD dispersal devices, and operations at improvised explosive laboratories.

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

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

603-6.1.1.4 The operations level responder who is assigned mission-specific responsibilities at hazardous materials/WMD incidents shall operate under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures.

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

603-6.1.2 Goal

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

603-6.1.3 Mandating of Competencies

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

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

603-6.1.3.2 If a response organization desires to train some or all of its operations level responders to perform mission-specific responsibilities at hazardous

materials/WMD incidents, the minimum required competencies shall be as set out in this chapter.

603-6.2 Mission-Specific Competencies: Personal Protective Equipment

603-6.2.1 General

603-6.2.1.1 Introduction

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

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

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

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

603-6.2.1.2 Goal

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

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

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

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

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

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

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

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

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

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

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

e. Identify the physiological and psychological stresses that can affect users of personal protective equipment.
f. Describe local procedures for going through the technical decontamination process.

603-6.2.4 Competencies — Implementing the Planned Response

603-6.2.4.1 Using Protective Clothing and Respiratory Protection

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

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

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

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

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

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

603-6.2.5 Competencies — Terminating the Incident

603-6.2.5.1 Reporting and Documenting the Incident

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

603-6.3 Mission-Specific Competencies: Mass Decontamination

603-6.3.1 General

603-6.3.1.1 Introduction

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

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

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

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

603-6.3.1.2 Goal

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

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

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

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

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

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

603-6.3.2 Competencies — Analyzing the Incident (Reserved)

603-6.3.3 Competencies — Planning the Response

603-6.3.3.1 Selecting Personal Protective Equipment

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

603-6.3.3.2 Selecting Decontamination Procedures

Given scenarios involving hazardous materials/WMD incidents, the operations level responder assigned to mass decontamination operations shall select a mass decontamination procedure that will minimize the hazard and spread of contamination, determine the equipment required to implement that procedure, and meet the following requirements:

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

ii. Describe the advantages and limitations of each of the following mass decontamination methods:
   1. Dilution
   2. Isolation
   3. Washing

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

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

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

603-6.3.4 Competencies — Implementing the Planned Response

603-6.3.4.1 Performing Incident Management Duties

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

603-6.3.4.2 Performing Decontamination Operations Identified in Incident Action Plan

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

603-6.3.5 Competencies — Evaluating Progress

603-6.3.5.1 Evaluating the Effectiveness of the Mass Decontamination Process

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

603-6.3.6 Competencies — Terminating the Incident

603-6.3.6.1 Reporting and Documenting the Incident

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

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

b. Describe the importance of personnel exposure records.

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

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

603-6.4 Mission-Specific Competencies: Technical Decontamination

603-6.4.1 General

603-6.4.1.1 Introduction

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

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

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

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

603-6.4.1.2 Goal

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

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

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

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

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

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

603-6.4.2 Competencies — Analyzing the Incident (Reserved)

603-6.4.3 Competencies — Planning the Response

603-6.4.3.1 Selecting Personal Protective Equipment

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

603-6.4.3.2 Selecting Decontamination Procedures

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

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

b. Describe the advantages and limitations of each of the following technical decontamination methods:
   1. Absorption
   2. Adsorption
   3. Chemical degradation
   4. Dilution
   5. Disinfection
   6. Evaporation
   7. Isolation and disposal
   8. Neutralization
   9. Solidification
   10. Sterilization
   11. Vacuuming
   12. Washing

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

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

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

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

603-6.4.4 Competencies — Implementing the Planned Response

603-6.4.4.1 Performing Incident Management Duties

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

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

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

603-6.4.4.2 Performing Decontamination Operations Identified in Incident Action Plan

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

1. Technical decontamination operations in support of entry operations

2. Technical decontamination operations for ambulatory and nonambulatory victims

603-6.4.5 Competencies — Evaluating Progress

603-6.4.5.1 Evaluating the Effectiveness of the Technical Decontamination Process

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

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

603-6.4.6 Competencies — Terminating the Incident

603-6.4.6.1 Reporting and Documenting the Incident

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

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

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

603-6.5.1 General

603-6.5.1.1 Introduction

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

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

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

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

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

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

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

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

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

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

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

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

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

~~3. Given examples of the following hazardous materials/WMD incidents, the operations level responder shall describe products that might be encountered in the incident associated with each situation:~~
~~a. Hazardous materials/WMD suspicious letter~~
~~b. Hazardous materials/WMD suspicious package~~
~~c. Hazardous materials/WMD illicit laboratory~~
~~d. Release/attack with a WMD agent~~
~~e. Environmental crimes~~

~~4. Given examples of the following hazardous materials/WMD incidents, the operations level responder shall identify the agency(cies) with investigative authority and the incident response considerations associated with each situation:~~
~~a. Hazardous materials/WMD suspicious letter~~
~~b. Hazardous materials/WMD suspicious package~~
~~c. Hazardous materials/WMD illicit laboratory~~
~~d. Release/attack with a WMD agent~~
~~e. Environmental crimes~~

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

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

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

~~1. Given an incident involving illicit laboratories, a hazardous materials/WMD incident, or an environmental crime, the operations level responder shall perform the following tasks:~~
~~a. Describe the procedure for securing the scene and characterizing and preserving evidence at the scene.~~
~~b. Describe the procedure to document personnel and scene activities associated with the incident.~~

c. Describe the procedure to determine whether the operations level responders are within their legal authority to perform evidence preservation and sampling tasks.
d. Describe the procedure to notify the agency with investigative authority.
e. Describe the procedure to notify the explosive ordnance disposal (EOD) personnel.
f. Identify potential sample/evidence.
g. Identify the applicable sampling equipment.
h. Describe the procedures to protect samples and evidence from secondary contamination.
i. Describe documentation procedures.
j. Describe evidentiary sampling techniques.
k. Describe field screening protocols for collected samples and evidence.
l. Describe evidence labeling and packaging procedures.
m. Describe evidence decontamination procedures.
n. Describe evidence packaging procedures for evidence transportation.
o. Describe chain-of-custody procedures.

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

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

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

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

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

7. Given examples of different types of potential criminal hazardous materials/WMD incidents, the operations level responder shall identify and describe the application, use, and limitations of the various types field screening tools that can be utilized for screening the following:

a. Corrosivity
b. Flammability
c. Oxidation
d. Radioactivity
e. Volatile organic compounds (VOC)

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

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

603-6.5.3.2 Selecting Personal Protective Equipment

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

603-6.5.4 Competencies — Implementing the Planned Response

603-6.5.4.1 Implementing the Planned Response

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

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

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

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

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

5. Notify the EOD personnel.

6. Identify potential samples and evidence to be collected.

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

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

9. Demonstrate documentation procedures.

10. Demonstrate sampling protocols.

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

12. Demonstrate evidence/sample labeling and packaging procedures.

13. Demonstrate evidence/sample decontamination procedures.

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

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

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

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

603-6.5.6 Competencies — Terminating the Incident (Reserved)

603-6.6 Mission-Specific Competencies: Product Control

603-6.6.1 General

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~~

~~603-6.6.3.1 Identifying Control Options~~

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

1. ~~Identify the options to accomplish a given response objective.~~
2. ~~Identify the purpose for and the procedures, equipment, and safety precautions associated with each of the following control techniques:~~

a. Absorption
b. Adsorption
c. Damming
d. Diking
e. Dilution
f. Diversion
g. Remote valve shutoff
h. Retention
i. Vapor dispersion
j. Vapor suppression

603-6.6.3.2 Selecting Personal Protective Equipment

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

603-6.6.4 Competencies — Implementing the Planned Response

603-6.6.4.1 Performing Control Options

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

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

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

1. 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

2. 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.

3. 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.

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.

a. 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

b. 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.

a. Monitoring and detection equipment may include:
    1. Carbon monoxide meter
    2. Colorimetric tubes
    3. Combustible gas indicator
    4. Oxygen meter
    5. Passive dosimeters
    6. pH indicators and/or pH meters
    7. Photoionization and/or flame ionization detectors
    8. Radiation detection instruments
    9. Reagents
    10. Test strips
    11. WMD detectors (chemical and/or biological)
    12. Other equipment provided by the AHJ

b. Evidence sampling and collection equipment is addressed in Section 603.6.5

c. Sampling equipment that may be used by operations trained responders may be required by the AHJ may include but is not limited to:
    1. Any tool designated to remove liquid or solid product from a container for the purpose of environmental sampling and testing
    2. Any container suitable for the collection of a liquid or solid sample based on the type and quantity

603.6.7.1.2 Goal

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

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

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

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

603-6.7.2 Competencies – Analyzing the Incident (Reserved)

603-6.7.3 Competencies – Planning the Response

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

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

603-6.7.3.3 Selecting Personal Protective Equipment (PPE)

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

603-6.7.3.4 Selecting Personal Protective Equipment

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

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

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

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

~~b. Hazards need to be identified based on:~~
~~1. Corrosivity~~
~~2. Flammability~~
~~3. Oxygen concentration~~
~~4. Radioactivity~~
~~5. Toxicity~~
~~6. Pathogenicity~~

~~c. Monitoring and detection equipment may include:~~
~~1. Carbon monoxide meter~~
~~2. Colorimetric tubes~~
~~3. Combustible gas indicator~~
~~4. Oxygen meter~~
~~5. Passive dosimeters~~
~~6. pH indicators and/or pH meters~~
~~7. Photoionization and/or flame ionization detectors~~
~~8. Radiation detection instruments~~
~~9. Reagents~~
~~10. Test strips~~
~~11. WMD detectors (chemical and/or biological)~~
~~12. 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

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.

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

b. 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:

a. 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.

b. 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:

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

ii. Describe the safety procedures, tactical guidelines, and incident response considerations to effect a rescue associated with each of the following situations:
1. Line-of-sight with ambulatory victims
2. Line-of-sight with nonambulatory victims
3. Non-line-of-sight with ambulatory victims
4. Non-line-of-sight with nonambulatory victims
5. Victim rescue operations versus victim recovery operations
a. Additional victim rescue hazard considerations include:
i. Hostile human threats
ii. Improvised explosive devices (IEDs)
iii. Agent type and possible harm
1. Operational considerations may include:
1. 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
2. Emergency responders will immediately exit any area where they encounter evidence of

chemical contamination and cannot identify any living victims
3. Emergency responders will avoid contact with any unidentified materials
4. Emergency responders and rescued victims will undergo an emergency decontamination immediately upon exit from the potentially hazardous area
5. Immediate medical assistance such as that provided by EMS providers is immediately available
6. 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
7. 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

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

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

603-6.8.3.2 Selecting Personal Protective Equipment (PPE)

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

603-6.8.4 Competencies – Implementing the Planned Response

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

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

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

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

d. Demonstrate the ability to triage victims.

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

603-6.8.5 Competencies – Evaluating Progress (Reserved)

603-6.8.6 Competencies – Terminating the Incident (Reserved)

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

603-6.9.1 General

603-6.9.1.1 Introduction

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

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

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

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

2. Written guidance: standard operating procedures or "rules of engagement" that emphasize:
    a. Task expected operations level responders
    b. Task beyond the capability of operations level responders

c. Required PPE and other equipment to perform the expected task
d. Procedures for ensuring coordination within the ICS

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

603-6.9.1.2 Goal

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

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

b. 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.

c. 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.

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

603-6.9.2 Competencies – Analyzing the Incident

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

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

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

- Illegal drugs (e.g., methamphetamines)
- Chemical modification (e.g., distilled pesticides)
- Biological toxins or pathogens (e.g., ricin, anthrax, toulceremia)
- Explosives (e.g., ANFO, pipe bombs)

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

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

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

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

603-6.9.3 Competencies – Planning the Response

603-6.9.3.1 Determining the Response Options

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

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

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

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

- Law enforcement securing and preserving the scene
  - Tasks include neutralization of tactical threat
  - Safe rendering of explosive devices or booby traps
  - Maintain accountability and identification of all personnel in the crime scene
  - Crime scene documentation
  - Safeguarding/protecting evidence

- Joint hazardous materials and EOD personnel site reconnaissance and hazard identification

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

- Mitigation of immediate hazards while preserving evidence

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

- Documenting personnel and scene activities associated with incident

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

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

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

2. Identify the role of law enforcement agencies at the following levels:
   1. Federal
   2. State
   3. 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
    1. Selection of PPE is based upon:
        a. Available intelligence
        b. Outward warning signs
        c.Detection clues
        d. Activity of animals
        e. Interviews with neighbors/witnesses
    b. Explosive ordnance disposal (EOD) operations will require an appropriate level of EOD protective gear to augment chemical protective clothing based on the hazard risk assessment

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

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

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

603-6.9.3.5 Selecting Personal Protective Equipment

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

603-6.9.4 Competencies – Implementing the Planned Response

603-6.9.4.1 Implementing the Planned Response

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

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

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

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

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.
    1. At a minimum, monitoring should include:
        a. Flammability – combustible gas indicator
        b. Oxygen level – oxygen meter
        c.Toxicity – photoionization detector
        d. Corrosivity – pH paper
        e. Radiological – radiological survey meter
    1. Other monitoring devices as determined by the AHJ

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

1. Potential manufacture of illicit drugs

2. Potential manufacture of illicit WMD materials

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

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

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

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

603-6.9.5 Competencies – Evaluating Progress (Reserved)

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

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

~~***603-6.10.1 General***~~

~~***603-6.10.1.1 Introduction***~~

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

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

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

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

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

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

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

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

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

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

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

4. Additional training per AHJ

603-6.10.1.2 Goal

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

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

a. Analyze a hazardous materials/WMD incident involving an improvised WMD dispersal device to determine the complexity of the problem and potential outcomes by completing the following tasks:

a. Determine if an IED or WMD dispersal device is potentially present
b. Categorize the device by its delivery method

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

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

603.6.10.1.2.3 When responding to hazardous materials/WMD incidents involving potential improvised explosives laboratories, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall be able to perform the following tasks:
a. Analyze a hazardous materials/WMD incident involving a potential improvised explosives laboratory to determine the complexity of the problem and potential outcomes and whether the incident is potentially an improvised explosives laboratory operation

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

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

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

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

~~a. Given examples of hazardous materials/WMD incidents involving an IED or improvised WMD dispersal device, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall identify and/or categorize the hazard by completing the following:~~

~~a. Letter/package-based improvised dispersal device~~
~~b. Briefcase backpack-based improvised dispersal device~~
~~c. Transportation-borne WMD dispersal device~~
~~d. Fixed location hazards where an IED has been placed to cause the deliberate release of a material~~

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

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

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

~~b. Given examples of improvised explosives laboratory operations, describe the potential booby traps that have been encountered by response personnel~~

~~a. Potential secondary devices~~
~~b. Explosives (including grenades and dynamite)~~
~~c. Wires attached to explosives or alerting devices~~
~~d. Weapons tied to doors~~
~~e. Bottles that will break thereby mixing chemicals to produce toxic fumes~~
~~f. On/off switches that have been reversed~~
~~g. Holes in floors (trap doors to snake pits)~~
~~h. Electrified door handles~~
~~i. Exposed wiring~~
~~j. Animals (such as dogs and poisonous snakes)~~
~~k. Spikes~~
~~l. Hooks~~
~~m. Acid~~

c. Given examples of improvised explosives laboratory operations, describe the agencies that have investigative authority and operational responsibility to support the response
   i. Department of Defense (DoD)
   ii. Department of Homeland Security (DHS)
   iii. Bureau of Alcohol, Tobacco and Firearms (ATF)
   iv. Federal Bureau of Investigation (FBI)
   v. Joint Terrorism Task Force (JTTF)
   vi. Drug Enforcement Administration (DEA)
   vii. Environmental Protection Agency (EPA)
   viii. Postal Inspection Service
   ix. National Park Service (NPS)
   x. Texas Department of Public Safety (DPS)
   xi. Local law enforcement (i.e. County Sheriff and/or local PD)
   xii. Public health agencies

603-6.10.3 Competencies – Planning the Response

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

When responding to hazardous materials/WMD incidents, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratory
incidents shall be capable of identifying the unique aspects associated with such incidents by completing the following requirements:

a. Given an incident involving a nonvehicle based WMD dispersal device, shall be able to perform the following tasks:
   a) Describe the hazards, safety procedures, and tactical guidelines for this type of incident
   b) Describe the factors to be evaluated in selecting the personal protective equipment
   c) Describe the procedure for identifying and obtaining the appropriate emergency response elements to support disablement/disruption activities

b. Given an incident involving a vehicle-borne WMD dispersal device, shall be able to perform the following tasks:
   ii. Describe the hazards, safety procedures, and tactical guidelines for this type of incident
   iii. Describe the factors to be evaluated in selecting the personal protective equipment
   iv. Describe the procedure for identifying and obtaining the appropriate emergency response elements to support disablement/disruption activities

c. Given examples of different types of incidents involving an improvised WMD dispersal device, shall identify and describe the application use and limitations of various types of field screening tools that can be utilized for determining the presence of the following materials:
   i. Gamma and neutron radiation
   ii. Explosive materials (commercial and home-made explosives (HME)]

603-6.10.3.2 *Identifying unique aspects of improvised explosives laboratory related hazardous materials/WMD incidents.*

When responding to conduct mitigation procedures on energetic materials at an improvised explosive laboratory, the operations level responder assigned to perform disablement/ disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives shall be capable of identifying the unique aspects associated with such incidents by completing the following requirements:

a. Given a scenario involving an improvised explosive laboratory and detection devices provided by the AHJ, complete the following:
   1. Describe the hazards, safety procedures, and tactical guidelines for this type of incident
   2. Describe the factors to be evaluated in selecting the personal protective equipment
   3. Describe the application, use, and limitations of various types of field screening tools that can be utilized for determining the presence of the following materials:
      1. Radioactive materials that emit alpha, beta, gamma, or neutron radiation, including radionuclide identification of gamma emitting radioactive materials
      2. Explosive materials (commercial and HME)
   1. Demonstrate the field test and operation of each detection device and interpret the readings based on local procedures
   2. Describe local procedures for decontamination of themselves and their detection devices upon completion of the material detection mission
   3. Describe the procedure for identifying and obtaining the appropriate emergency response elements to support disablement/disruption or mitigation activities

603-6.10.3.3 Identifying Potential Response Options

603-6.10.3.3.1 Given scenarios involving a potential IED or improvised WMD materials dispersal device, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories incident shall identify possible response options

a. Law enforcement securing and preserving the scene
    1. Tasks include neutralization of tactical threat
    2. Safe rendering of explosive devices or booby traps
    3. Maintain accountability and identification of all personnel in the crime scene
    4. Crime scene documentation
    5. Safeguarding/protecting evidence

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

c. Determining atmospheric hazards through air monitoring and detection
    1. At a minimum, monitoring should include:
        1. Flammability – combustible gas indicator
        2. Oxygen level – oxygen meter
        3. Toxicity – photoionization detector
        4. Corrosivity – pH paper
        5. Radiological – radiological survey meter
    6. Other monitoring devices as determined by the AHJ

d. Mitigation of immediate hazards while preserving evidence

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

f. Documenting personnel and scene activities associated with incident

603.6.10.3.3.2 Given scenarios involving a potential improvised explosives laboratories, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories incident shall identify possible response options

a. Offensive operations

b. Defensive operations

c. Non intervention

603.6.10.3.4 Selecting Personal Protective Equipment

Given the personal protective equipment provided by the AHJ, the operations level responder assigned to perform disablement/ disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories incident, shall select the personal protective equipment required to support such operations at hazardous materials/WMD incidents based on

the National Guidelines for Bomb Technicians adopted by the National Bomb Squad Commanders Advisory Board (NBSCAB) (see Section 6.2).

603-6.10.4 Competencies – Implementing the Planned Response

603-6.10.4.1 Given scenarios involving a potential IED or improvised WMD dispersal device, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratory incident shall be able to complete the following tasks:

a. Using detection and monitoring devices provided by the AHJ, demonstrate the field test and operation of each device and interpret the readings based on local or agency procedures

b. Perform diagnostics based on procedures instructed by a nationally accredited hazardous devices school or program

c. Perform disablement/disruption techniques in accordance with the FBI Hazardous Devices School "logic tree," the NBSCAB A Model for Bomb Squad Standard Operating Procedures, established protocol for military units, or established protocol of the AHJ

d. Assist in planning the air monitoring and sampling activities within the capabilities and competencies of available personnel, personal protective equipment, and control equipment; and in accordance with the AHJ, describe the air monitoring and sampling options available

e. Given the air monitoring and sampling equipment provided by the AHJ, shall complete the following:
   1. Select the detection or monitoring equipment suitable for detecting or monitoring of the IED or improvised WMD dispersal device
   2. Describe the operation, capabilities, limitations, local monitoring procedures, field testing, and maintenance procedures associated with each device provided by the AHJ
   3. Describe local procedures for decontamination of the detection and monitoring devices upon completion of the mission

603-6.10.4.2 Given a simulated improvised explosives laboratory incident, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratory incident shall be able to perform the following tasks:

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

1. Situation dependent
2. AHJ

b. Demonstrate methods to identify and avoid unique safety hazards at improvised explosives laboratories such as booby traps, releases of hazardous materials, and initiating components
   1. Anticipate the presence of hazards
   2. Visually search
   3. Limit access
   4. Avoiding touching or moving any hazards
   5. Scene control
   6. Evacuate victims and non-essential personnel
   7. Scene preservation

c. Using detection and monitoring devices provided by the AHJ, demonstrate the field test and operation of each device and interpret the readings based on local or agency procedures

d. Describe the methods that could be utilized to mitigate the hazards identified
   1. Per federal requirements
   2. Per state requirements
   3. Per local AHJ requirements

603-6.10.4.3 The operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall demonstrate the ability to wear an appropriate combination of chemical protective clothing, respiratory protection, and ballistic protection for the hazards identified in 6.10.2.1 and 6.10.2.2.

603-6.10.4.4 The operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall describe the local procedures for the technical decontamination process.

a. Per federal requirements

b. Per state requirements

c. Per local AHJ requirements

603-6.10.5 Competencies – Evaluating Progress (Reserved)

603-6.10.6 Competencies – Terminating the Incident (Reserved)

Hazardous Materials Training
Equipment & Prop List

The following are minimal recommended supplies necessary for hazardous materials training at the below listed levels of certification. Variations may exist based on the needs of each AHJ and any mission-specific job tasks as assigned by an AHJ.

Hazardous Materials Awareness

Department of Transportation's *Emergency Response Guidebook* (ERG) (current ed.)
Material Safety Data Sheet (MSDS) or Safety Data Sheets (SDS) – Samples
Placards & Labels
Transportation/Shipping document – Sample
NFPA 704 sample
Safety Vests
Binoculars

Hazardous Materials Operations

All awareness equipment *plus…*
Structural Firefighter Protective Ensemble (bunker gear)

Reference Material:

- NIOSH *Pocket Guide to Chemical Hazards*
- NFPA *Hazardous Materials / Weapons of Mass Destruction Response Handbook* (current edition)
- Pesticide label example

Respiratory Protection to include:

- Air Purifying Respirator (APR-half mask)
- Air Purifying Respirator (APR-full face)
- SCBA

Chemical Protective Clothing to include:

- Vapor Protective CPC (Level A)
- Splash Protective Encapsulated CPC (Level B)
- Splash Protective Non-Encapsulated CPC (Level B, Level C)
- Chemical Boots (Rubber Boots for training only)
- Inner/Outer gloves - assorted types
- Chem Tape (duct tape for training only)

Fire Hose, Foam Nozzles and Eductors, Foam
Pictures/slides of various railcar, intermodal, and highway cargo trailers
Pictures/slides of bulk and non-bulk containers, and fixed facility containment systems

Defensive Spill Equipment:

- Absorbent/Adsorbent
- Broom/Shovel
- 5-gallon buckets
- Assortment of boom and pads

Decontamination Equipment:

- Poly sheeting or tarp
- Duct tape
- Traffic cone(s)
- Decon Pools
- Sprayer(s)
- Garden hose(s) and sprayer/nozzles
- 5-gallon bucket(s)
- Various Decon solution(s)
- Folding chairs
- Overpack drum

Various monitoring detection equipment as may be required. Examples *may* include:

- Combustible Gas Indicator
- Oxygen Meter
- Radiation Detector

Hazardous Materials Operations – Mission Specific Competencies

Equipment needed for training to Hazardous Materials Operations – Mission Specific Competencies will be based the competencies themselves and the authority having jurisdiction (AHJ). Equipment, at a minimum, will include that which is required to train to the Hazardous Materials Operations Level. Additional equipment or props may include part or all of the equipment listed below for Hazardous Materials Technician.

For example, if training to the Mission Specific Competencies: Air Monitoring and Sampling is to be performed, additional monitoring detection and sampling equipment will be required.

Hazardous Materials Technician

Awareness and Operations equipment *plus…*

Reference Material:

- CPC Permeation Guides/Tables
- BOE/AAR *Field Guide to Railcar Identification*
- NFPA *Fire Protection Guide to Hazardous Materials Detection*
- Other printed or electronic publications/databases as may be required by the AHJ

Various monitoring detection equipment and corresponding samples to include:

- Combustible Gas Indicator
- Oxygen Meter
- Carbon monoxide meter
- Gas specific meter
- Photoionization detector
- Radiation Detectors (alpha, beta, gamma)
- Colorimetric tubes, pump
- Classifier/detection strips and reagents
- pH paper or pH meter
- additional monitoring and detection equipment as may be required by AHJ
- Calibration kit(s) as required for above

Leak & Spill Equipment:

- Plugging/patching supplies
- Leaking drum(s): metal & poly
- Overpack drum(s)
- Leak pipe simulator
- 150 lbs. Chlorine cylinder leak prop
    - Chlorine emergency kit type “A”
- Chlorine 1-Ton cylinder leak prop
    - Chlorine emergency kit type “B”
- Pressure Railcar dome leak prop
    - Chlorine emergency kit type “C” or Midland kit
- Cargo Tank Leak Simulator (MC-306/DOT-406 Dome)
- Dome Cover Clamp
- Grounding & Bonding Kit
- Product Transfer Equipment
- Misc. Hand Tools (e.g., hand wrenches, bung wrench, spanner wrench, mallet, screwdrivers, etc.)

Command and Control Equipment/Forms (e.g., Incident Action Plan, Site Safety Plan, Medical Plan, Communication Plan - all NIMS/ICS compliant)

Hazardous Materials Incident Commander

Reference Material

- Department of Transportation’s *Emergency Response Guidebook* (ERG) (current ed.)
- Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) - Samples
- Transportation/Shipping document – Sample
- NIOSH *Pocket Guide to Chemical Hazards*

- NFPA *Hazardous Materials / Weapons of Mass Destruction Response Handbook* (current edition)
- CPC Permeation Guides/Tables
- BOE/AAR *Field Guide to Railcar Identification*
- NFPA *Fire Protection Guide to Hazardous Materials Detection*
- Other printed or electronic publications/databases as may be required by the AHJ

Command and Control Equipment/Forms

- Department of Homeland Security – National Incident Management System/Incident Command System standardized forms
    - ICS 201 Incident Briefing Form
    - ICS 202 Incident Objectives Worksheet
    - ICS 203 Organization Assignment List
    - ICS 204 Division Assignment List
    - ICS 205 Communications Plan
    - ICS 206 Medical Plan
    - ICS 208HM Site Safety and Control Plan
    - ICS 211 Incident Check-in List
    - ICS 213 General Message
    - ICS 214 Unit Log
    - ICS 215 Incident Planning Worksheet
    - ICS 215A Incident Action Plan Safety Analysis

HAZARDOUS MATERIALS TECHNICIAN

REFERENCE LIST FOR THE HAZARDOUS MATERIALS TECHNICIAN CURRICULUM

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

Required References

Texts

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

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

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

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

Hazardous Materials Technician, **2nd** ~~1st~~ edition. (201**7**~~3~~) Stillwater, OK: International Fire Service Training Association.

Hazardous Materials/Weapons of Mass Destruction Response Handbook,~~6th~~/201**8**~~3~~ edition. McGowan, T. (201**8**~~2~~). Quincy, MA: National Fire Protection Association.

*NFPA 472: Standard for ~~Professional~~ Competence of Responders to Hazardous Materials**/Weapons of Mass Destruction** Incidents.* (201**8**~~3~~ ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

***NFPA 1072: Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications.* (2017 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.**

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

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

Recommended References

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

Texts

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

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

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

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

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

Hazardous Materials: Managing the Incident: Field Operations Guide. Bevelacqua, A. 2nd Edition (2013). MD: Jones and Bartlett Publishing

Hazardous Materials Technician. Weber, Chris (2013). Upper Saddle River, NJ: Pearson Education, Inc.

Media

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

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

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

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

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

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

Intermodal Containers. Noll, G. G., Hildebrand, M. S., & Donahue, M. L. (2002). [DVD] Edgartown, MA: Emergency Film Group.

Petroleum Storage Tanks. Hildebrand, M. S., & Noll, G. G. (2003). [DVD] Edgartown, MA: Emergency Film Group.

CHAPTER 6
SECTION 604
HAZARDOUS MATERIALS TECHNICIAN
CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
604-7.1	General - Introduction - Laws, Regulations, and National Consensus Standards	4
604-7.2	**Analyze** ~~Analyzing~~ the Incident	24
604-7.3	**Response Planning** ~~Planning the Response~~	24
604-7.4	**Action Plan Implementation** ~~Implementing the Planned Response~~	16
604-7.5	Evaluating **and Reporting** ~~Progress~~	6
604-7.6	Terminating the Incident	6
	TOTAL RECOMMENDED HOURS	**80**

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

Commented [MMA1]: New verbiage + strikeouts as per NFPA 1072-2017.

Course Instructor Information

Hazardous Materials

Technician

Overview
The Hazardous Materials curricula are designed to provide clear guidance that ensures adequate presentation of the information required to meet the Job Performance Requirements (JPRs) of National Fire Protection Association (NFPA) 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*, 2017 edition.

The Hazardous Materials curricula is found in Chapter 6 of the TCFP Curriculum Manual.

Certification Level	TCFP Section Number	NFPA 1072 Chapter
Awareness	601	4
Operations	602	5
Operations-Mission Specific Competencies (MSC)	603	6
*Technician	604	7
*Incident Commander	605	8

Layout
The NFPA numbering sequence is mirrored to allow easy correlation between this document and the NFPA Standard. For example, 601-4.1.2 identifies the section in Awareness that corresponds to NFPA section 4.1.2.

When a section references information from “Annex A Explanatory Material” in the NFPA Standard, it is identified by a boxed Instructor Note. For example, the boxed Instructor Note listed in 601-4.2.1 and that immediately follows the Requisite Knowledge section corresponds to the NFPA Annex A information for NFPA 1072 section 4.2.1.

* Asterisks by Technician and Incident Commander above indicate that both are voluntary (non-mandatory) certifications. Therefore, **a formal “curriculum outline” is not provided**. Please use chapters 7 and 8, respectively, of NFPA 1072 as a guide when creating your own course curricula or selecting a prepared instructional curriculum package from a publisher/vendor for Technician and Incident Commander.

TCFP Standards Manual
It is critical that you review the chapters in the TCFP Standards Manual that apply to this curriculum. Of primary importance are the following two chapters: Chapter 423, which defines the course of study, documentation and medical requirements necessary

for Awareness and Operations certification (required) and Chapter 453, which covers certification requirements for Technician and Incident Commander (voluntary). Additionally, instructors are expected to review the following chapters as they pertain to the instructional, examination, certification processes:

- Chapter 421,Standards for Certification
- Chapter 427, Training Facility Certification
- Chapter 435, Fire Fighter Safety
- Chapter 437, Fees
- Chapter 439, Examinations for Certification
- Chapter 441, Continuing Education

These chapters do not address every issue that could impact this curriculum; therefore, you are encouraged to become familiar with the TCFP Standards Manual.

Instructor Qualifications
Hazardous Materials courses must be taught by an instructor meeting the requirements described in Chapter 427.307 of the TCFP Standards Manual.

Supplemental Information
Instructors are expected to provide supplemental information if the main reference text does not provide adequate information to ensure successful completion of the Job Performance Requirements as listed in the curriculum.

Components of the Curricula
Each section of a curriculum identifies the NFPA Job Performance Requirement (JPR) and subdivides the requisite knowledge requirements into learning components. For example:

View within the Curriculum		Explanation
601-4.3.1	Isolate the hazard area and deny entry at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, policies and procedures, and approved reference sources, so that the hazard area is isolated and secured, personal safety procedures are followed, hazards are avoided or minimized, and additional people are not exposed to further harm.	**Section Number and NFPA JPR**
	Requisite Knowledge: Use of the ERG, SDS, shipping papers with emergency response information, and other approved reference sources to identify precautions to be taken to	**Requisite Knowledge Statement**

protect responders and the public; policies and procedures for isolating the hazard area and denying entry; and the purpose of and methods for isolating the hazard area and denying entry.	
(1) Use of the ERG, SDS, shipping papers with emergency response information, and other approved reference sources to identify precautions to be taken to protect responders and the public	**First part of Requisite Knowledge**
Identify precautions to be taken to protect responders/the public using ERG, SDS, shipping papers with emergency response information, other approved reference sources Identify the hazard a. Isolate the hazard area b. Deny entry c. Call for trained personnel d. Secure the scene	**Associated learning components**
(2) Policies and procedures for isolating the hazard area and denying entry	**Second part of Requisite Knowledge**
Policies and procedures, per AHJ/SOP a. Isolating the hazard area b. Denying entry	**Associated learning components**
(3) And the purpose of and methods for isolating the hazard area and denying entry	**Third part of Requisite Knowledge**
Purpose/methods a. Isolating the hazard area i. Establish perimeter ii. Erect barriers b. Denying entry i. Restrict hazard area access to	**Associated learning components**

appropriately trained personnel only ii. Maintain perimeter	
Requisite Skills: Use of the ERG, SDS, shipping papers with emergency response	**Requisite Skills Statement**
Instructor Note Recommended precautions found on numbered guides in the ERG include public safety issues; recommended protective clothing; evacuation; emergency response to fire, spill, and leak; and first aid sections. Examples of required knowledge include (1) precautions for providing emergency medical care to victims; typical ignition sources; ways hazardous materials/WMD are harmful to people, the environment, and property; general routes of entry for human exposure; emergency action (fire, spill, or leak; first aid); actions recommended not to be performed (e.g., closing of pipeline valves); protective actions (isolation of area and denial of entry, evacuation, shelter-in-place); size and shape of recommended initial isolation and protective action distances; difference between small and large spills; conditions that require the use of the ERG Table of Initial Isolation and Protective Action Distances and the isolation distances in the ERG numbered guide; techniques for isolating the hazard area and denying entry to unauthorized persons; how to recognize and protect evidence; and use of approved tools and equipment; (2) basic personal protective actions: staying clear of vapors, fumes, smoke, and spills; keeping vehicle at a safe distance from the scene; approaching from upwind, uphill, and upstream; and (3) types of protective actions and their purpose (e.g., isolate hazard area and deny entry, evacuation, and shelter-in-place); basic factors involved in the choice of protective actions (e.g., hazardous materials/WMD involved, population threatened,	**Appendix A: Explanatory Material for 4.3.1**

	and weather conditions).	

Unless otherwise specified, all curriculum references are to NFPA 1072. In some cases, (see, for example, 601-4.2.1), reference is also made under the section number and JPR to similar material in NFPA 472.

601-4.2.1	Recognize and identify the hazardous materials/WMD and hazards involved in a hazardous materials/WMD incident, given a hazardous materials/WMD incident, and approved reference sources, so that the presence of hazardous materials/WMD is recognized and the materials and their hazards are identified. Given a hazardous materials/WMD incident, and approved reference sources, awareness level personnel shall recognize those situations where hazardous materials/WMD are present. (472-4.2.1)	**Additional reference to NFPA 472**

Skills
NFPA Requisite Skill requirements are addressed in the corresponding Skill Sheets in Chapter 6 of the TCFP Curriculum Skills Manual.

Definitions of Certification Levels
Awareness Level Personnel: Personnel who, in the course of their normal duties, could encounter an emergency involving hazardous materials/weapons of mass destruction (WMD) and who are expected to recognize the presence of the hazardous materials/WMD, protect themselves, call for trained personnel, and secure the scene. These personnel have met all the performance requirements of Chapter 4 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*

Operations Level Personnel: Personnel 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. These personnel have met all the performance requirements of Chapter 5 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*

Operations-Mission Specific Competencies (MSC) Level Personnel: Responders assigned mission-specific responsibilities at hazardous materials/WMD incidents are

those operations level responders designated by the authority having jurisdiction (AHJ) to perform additional tasks to support the AHJ's response mission, expected tasks, equipment, and training in the following areas:

(1) Personal protection equipment (PPE)
(2) Mass decontamination
(3) Technical decontamination
(4) Evidence preservation and sampling
(5) Product control
(6) Detection, monitoring, and public safety sampling
(7) Victim rescue and recovery
(8) Illicit laboratories incidents

These personnel have met all the performance requirements of Chapter 5 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications* and have also met the performance requirements of the subchapter(s) of Chapter 6 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications,* to which they are trained and credentialed to perform.

Note: Basic TCFP Structural Fire Fighter certification requires that Structure Fire Fighter personnel meet all performance requirements for:

- *Hazardous Materials Awareness*
- *Hazardous Materials Operations*
- *Hazardous Materials Operations - MSC – 6.2 Personal Protective Equipment*
- *Hazardous Materials Operations - MSC – 6.6 Product Control*

Technician Level Personnel: Persons who respond to hazardous materials/weapons of mass destruction (WMD) incidents using a risk-based response process by which they analyze a problem involving hazardous materials/WMD, plan a response to the problem, evaluate progress of the planned response, and assist in terminating the incident. These personnel have met all the performance requirements of Chapter 7 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications.*

Incident Commander Level Personnel: That person, designated by the AHJ, responsible for all incident activities/operations, including the development of strategies and tactics and the ordering and release of resources. These personnel have met all the performance requirements of Chapter 8 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications.*

~~SECTION 604~~
~~HAZARDOUS MATERIAL TECHNICIAN~~

Commented [MMA1]: Because HMT is now a voluntary cert, this update contains no curriculum material.

~~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~~

~~***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

3. Implement the planned response to favorably change the outcomes consistent with the standard operating procedures and site safety and control plan by completing the following tasks:
   a. Perform the duties of an assigned hazardous materials branch or group position within the local Incident Command System (ICS)
   b. Don, work in, and doff personal protective clothing, including, but not limited to, both liquid splash - and vapor -protective clothing with correct respiratory protection
   c. Perform the control functions identified in the incident action plan
   d. Perform the decontamination functions identified in the incident action plan

4. Evaluate the progress of the planned response by completing the following tasks:
   a. Evaluate the effectiveness of the control functions
   b. Evaluate the effectiveness of the decontamination process

5. Terminate the incident by completing the following tasks:
   a. Assist in the incident debriefing
   b. Assist in the incident critique
   c. Provide reports and documentation of the incident

604-7.2 Competencies — Analyzing the Incident

604-7.2.1 Surveying Hazardous Materials/WMD Incidents

Given examples of hazardous materials/WMD incidents, the hazardous materials technician shall identify containers involved and, given the necessary equipment, identify or classify unknown materials involved, verify the identity of the hazardous materials/WMD involved, and determine the concentration of hazardous materials, by completing the requirements of 7.2.1.1 through 7.2.1.5

604-7.2.1.1 Given examples of various containers for hazardous materials/WMD, the hazardous materials technician shall identify each container by name and specification and identify the typical contents by name and hazard class

~~**604.7.2.1.1.1** Given examples of the following railroad cars, the hazardous materials technician shall identify the container by name and specification and identify the typical contents by name and hazard class:~~

~~1. Cryogenic liquid tank cars~~

~~2. Nonpressure tank cars~~

~~3. Pneumatically unloaded hopper cars~~

~~4. Pressure tank cars~~

~~**604.7.2.1.1.2** Given examples of the following intermodal tanks, the hazardous materials technician shall identify the container by name and specification and identify the typical contents by name and hazard class:~~

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

~~2. Pressure intermodal tank (DOT Specification 51; IMO Type 5 internationally)~~

~~3. Specialized intermodal tanks~~
~~a. Cryogenic intermodal tanks (IMO Type 7 internationally)~~
~~b. Tube modules~~

~~**604.7.2.1.1.3** Given examples of the following cargo tanks, the hazardous materials technician shall identify the container by name and specification and identify the typical contents by name and hazard class:~~

~~1. Compressed gas tube trailers~~

~~2. Corrosive liquid tanks~~

~~3. Cryogenic liquid tanks~~

~~4. Dry bulk cargo tanks~~

~~5. High-pressure tanks~~

~~6. Low-pressure chemical tanks~~

7. Nonpressure liquid tanks

604.7.2.1.1.4 Given examples of the following facility storage tanks, the hazardous materials technician shall identify the container by name and identify the typical contents by name and hazard class:

1. Cryogenic liquid tank

2. Nonpressure tank

3. Pressure tank

604.7.2.1.1.5 Given examples of the following nonbulk packaging, the hazardous materials technician shall identify the package by name and identify the typical contents by name and hazard class:

1. Bags

2. Carboys

3. Cylinders

4. Drums

604.7.2.1.1.6 Given examples of the following radioactive materials packages, the hazardous materials technician shall identify the container/package by name and identify the typical contents by name:

1. Excepted

2. Industrial

3. Type A

4. Type B

5. Type C

604.7.2.1.1.7 Given examples of the following packaging, the hazardous materials technician shall identify the package by name and identify the typical contents by name and hazard class:

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

b. Flexible intermediate bulk containers (FIBCs)

2. Ton container
   a. Convex
   b. Concave

604-7.2.1.2 Given examples of three facility and three transportation containers, the hazardous materials technician shall identify the approximate capacity of each container

604-7.2.1.2.1 Using the markings on the container, the hazardous materials technician shall identify the capacity (by weight or volume) of the following examples of transportation vehicles:

1. Cargo tanks

2. Tank cars

3. Tank containers

604-7.2.1.2.2 Using the markings on the container and other available resources, the hazardous materials technician shall identify the capacity (by weight or volume) of each of the following facility containers:

1. Cryogenic liquid tank

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

3. Pressure tank

604-7.2.1.3 Given at least three unknown hazardous materials/WMD, one of which is a solid, one a liquid, and one a gas, the hazardous materials technician shall identify or classify by hazard each unknown material

604-7.2.1.3.1 The hazardous materials technician shall identify the steps in an analysis process for identifying unknown solid and liquid materials

1. Approach from up wind

2. Wear appropriate level of Chemical Protective Clothing (CPC)

3. Work in pairs

4. Have backup team

5. Monitor in the following order:
    a. Radioactivity
    b. Oxygen availability
    c. pH (if a liquid or soluble solid)

604-7.2.1.3.2 The hazardous materials technician shall identify the steps in an analysis process for identifying an unknown atmosphere

1. Approach from up wind

2. Wear appropriate level of CPC

3. Work in pairs

4. Have backup team

5. Monitor in the following order:
    a. Radioactivity
    b. Combustibility
    c. Oxygen
        i. Deficiency
        ii. Enriched
    d. pH (if possible corrosive)
    e. Hydrogen sulfide
    f. Carbon monoxide
    g. Organic vapor

604-7.2.1.3.3 The hazardous materials technician shall identify the type(s) of monitoring technology used to determine the following hazards:

1. Corrosivity

2. Flammability

3. Oxidation potential

4. Oxygen deficiency

5. Pathogenicity

6. Radioactivity

7. Toxicity

604-7.2.1.3.4 The hazardous materials technician shall identify the capabilities and limiting factors associated with the selection and use of the following monitoring equipment, test strips, and reagents:

1. Biological immunoassay indicators
2. Chemical agent monitors (CAMs)
3. Colorimetric indicators [colorimetric detector tubes, indicating papers (pH paper and meters), reagents, test strips]
4. Combustible gas indicator
5. DNA fluoroscopy
6. Electrochemical cells (carbon monoxide meter, oxygen meter)
7. Flame ionization detector
8. Gas chromatograph/mass spectrometer (GC/MS)
9. Infrared spectroscopy
10. Ion mobility spectroscopy
11. Gamma spectrometer [radioisotope identification device (RIID)]
12. Metal oxide sensor
13. Photoionization detectors
14. Polymerase chain reaction (PCR)
15. Radiation detection and measurement instruments
16. Raman spectroscopy
17. Surface acoustical wave (SAW)
18. Wet chemistry

604-7.2.1.3.5 Given three hazardous materials/WMD, one of which is a solid, one a liquid, and one a gas, and using equipment, test strips, and reagents,

provided by the AHJ as applicable, the hazardous materials technician shall select from the following equipment and demonstrate the correct techniques to identify the hazards (corrosivity, flammability, oxidation potential, oxygen deficiency, radioactivity, toxicity, and pathogenicity):

1. Carbon monoxide meter

2. Colorimetric tubes

3. Combustible gas indicator

4. Oxygen meter

5. Passive dosimeters

6. pH indicators and/or pH meters

7. Photoionization and flame ionization detectors

8. Radiation detection instruments

9. Reagents

10. Test strips

11. WMD detectors (chemical and biological)

12. Other equipment provided by the AHJ

604.7.2.1.3.6 Given monitoring equipment, test strips, and reagents provided by the AHJ, the hazardous materials technician shall demonstrate the field maintenance and testing procedures for those items

604.7.2.1.4 Given a label for a radioactive material, the hazardous materials technician shall identify the type or category of label, contents, activity, transport index, and criticality safety index as applicable, then describe the radiation dose rates associated with each label

604.7.2.1.5 The hazardous materials technician shall demonstrate methods for collecting samples of the following:

1. Gas

2. Liquid

3. Solid

604-7.2.2 ***Collecting and Interpreting Hazard and Response Information***
Given access to printed and technical resources, computer databases, and monitoring equipment, the hazardous materials technician shall collect and interpret hazard and response information not available from the current edition of the DOT *Emergency Response Guidebook* or an MSDS and shall meet the requirements of 7.2.2.1 through 7.2.2.6

604-7.2.2.1 The hazardous materials technician shall identify and interpret the types of hazard and response information available from each of the following resources and explain the advantages and disadvantages of each resource:

1. Hazardous materials databases – examples include:
    a. CAMEO (Computer Assisted Management of Emergency Operations)
    b. MARPLOT (Mapping Applications for Response, Planning and Local Operational Tasks)
    c. ALOHA (Aerial Locations Of Hazardous Atmospheres)
    d. WISER (Wireless Informational Systems for Emergency Responders)
    e. OREIS (Operational Response Emergency Informational System)

2. Monitoring equipment – examples include:
    a. Combustible gas indicators
    b. Colorimetric tubes
    c. Photoionization detectors/flame ionization detectors
    d. Radiological survey equipment
    e. Oxygen meters
    f. Toxic Gas Sensors
    g. pH paper
    h. Chemical test strips

3. Reference manuals
    a. DOT Emergency Response Handbook
    b. ARR Hazardous Materials Emergency Action Guides
    c. Field Guide to Tank Guide Identification
    d. Bretherick's Handbook of Reactive Substances
    e. Emergency Care for Hazardous Materials Exposure
    f. Hawley's Condensed Chemical Dictionary
    g. NIOSH Pocket Guide

h. CHRIS Chemical Hazards Response Information System (USCG)
i. Dangerous Properties of Industrial Chemicals
j. NFPA Fire Protection Guide of Hazardous Materials

4. Technical information centers (i.e., CHEMTREC/CANUTEC/ SETIQ and local, state, and federal authorities) – examples include:
a. CHEMTREC
b. Chlorine Institute
c. US Coast Guard and DOT National Response Center
d. The Agency for Toxic Substance and Disease Registry (ATSDR)
e. National Animal Poison Control Center (NAPCC)
f. National Pesticide Informational Center (NPIC)
g. National Poison Control Center (Mr. Yuck)
h. US Army Operational Center
i. Defense Logistics Agency

5. Technical information specialists

6. Hazard Communication and Right To Know Reporting Requirements
a. OSHA Hazardous Communication Standard 29 CFR 1910.1200
b. Material Safety Data Sheets
c. Tier II Reports
d. EPA EPlan Database
e. Other federal, state and local reporting requirements

604.7.2.2.2 The hazardous materials technician shall describe the following terms and explain their significance in the analysis process:

1. Corrosive (acids and bases/alkaline)

2. Air reactivity

3. Autorefrigeration

4. Biological agents and biological toxins

5. Blood agents

6. Boiling point

~~7. Catalyst~~

~~8. Chemical change~~

~~9. Chemical interactions~~

~~10. Compound, mixture~~

~~11. Concentration~~

~~12. Critical temperature and pressure~~

~~13. Dissociation (acid/base)~~

~~14. Dose~~

~~15. Dose response~~

~~16. Expansion ratio~~

~~17. Fire point~~

~~18. Flammable (explosive) range (LEL and UEL)~~

~~19. Flash point~~

~~20. Half-life~~

~~21. Halogenated hydrocarbon~~

~~22. Ignition (autoignition) temperature~~

~~23. Inhibitor~~

~~24. Instability~~

~~25. Ionic and covalent compounds~~

~~26. Irritants (riot control agents)~~

~~27. Maximum safe storage temperature (MSST)~~

~~28. Melting point and freezing point~~

~~29. Miscibility~~

~~30. Nerve agents~~

~~31. Organic and inorganic~~

~~32. Oxidation potential~~

~~33. Persistence~~

~~34. pH~~

~~35. Physical change~~

~~36. Physical state (solid, liquid, gas)~~

~~37. Polymerization~~

~~38. Radioactivity~~

~~39. Reactivity~~

~~40. Riot control agents~~

~~41. Saturated, unsaturated (straight and branched), and aromatic hydrocarbons~~

~~42. Self-accelerating decomposition temperature (SADT)~~

~~43. Solubility~~

~~44. Solution and slurry~~

~~45. Specific gravity~~

~~46. Strength~~

~~47. Sublimation~~

~~48. Temperature of product~~

~~49. Toxic products of combustion~~

~~50. Vapor density~~

51. Vapor pressure

52. Vesicants (blister agents)

53. Viscosity

54. Volatility

604-7.2.2.3 The hazardous materials technician shall describe the heat transfer processes that occur as a result of a cryogenic liquid spill

604-7.2.2.4 Given five hazardous materials/WMD scenarios and the associated reference materials, the hazardous materials technician shall identify the signs and symptoms of exposure to each material and the target organ effects of exposure to that material

604-7.2.2.5 The hazardous materials technician shall identify two methods for determining the pressure in bulk packaging or facility containers

1. Fixed pressure gauge

2. Attach a pressure gauge

3. Determine temperature of the product and use a vapor pressure/temperature conversion chart

604-7.2.2.6 The hazardous materials technician shall identify one method for determining the amount of lading remaining in damaged bulk packaging or facility containers

1. Shipping papers and related documents

2. Fixed gauging devices

3. Weigh small nonbulk cylinders

4. Infrared cameras

5. Visible frost line on liquefied gas containers

604-7.2.3 Describing the Condition of the Container Involved in the Incident.

~~Given examples of container damage, the hazardous materials technician shall describe the damage by completing the related requirements of 7.2.3.1 through 7.2.3.5~~

~~**604-7.2.3.1** Given examples of containers, including the DOT specification markings for nonbulk and bulk packaging, and associated reference guides, the hazardous materials technician shall identify the basic design and construction features of each container~~

~~**604-7.2.3.1.1** The hazardous materials technician shall identify the basic design and construction features, including closures, of the following bulk containers: NOTE: CGA=Compressed Gas Association, MC= Motor Carrier, TC=Transport Canada, DOT=Dept. of Transportation, SCT=Secretariat of Communications and Transportation [Mexico])~~

~~1. Cargo tanks~~

~~a. Compressed gas tube trailers~~

~~b. Corrosive liquid tanks~~

- ~~DOT 412, TC 412, SCT 312, MC 312, TC 312~~

~~c. Cryogenic liquid tanks~~

- ~~MC 338, TC 338, SCT 338, TC 341, CGA 341~~

~~d. Dry bulk cargo tanks~~

~~e. High pressure tanks~~

- ~~MC 331, TC 331, SCT 331~~

~~f. Low pressure liquid tanks~~

- ~~DOT 407, TC 407, SCT 307, MC 307, TC 307~~

~~g. Non-pressure liquid tanks~~

- ~~DOT 406, TC 406, SCT 306, MC 306, TC 306~~

~~2. Fixed facility tanks~~

~~a. Cryogenic liquid tank~~

~~i. Refrigerated storage tanks−less than 15 psi~~

~~ii. High pressure cryogenic tanks−greater than 15psi~~

~~b. Non-pressure tank (Atmospheric pressure=0-0.5 psi)~~

~~i. Horizontal tank~~

~~ii. Cone roof tank~~

~~iii. Floating roof tank~~

iv. Covered floating roof tank
v. Floating roof with geodesic dome
vi. Lifter roof tank
vii. Vapor dome roof tank
viii. Underground storage tanks

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

3. Intermediate bulk containers (also known as tote tanks)

4. Intermodal tanks
a. Nonpressure intermodal tanks
i. IM-101 portable tank (IMO Type 1 internationally)
a) 25.4 – 100 psig
b) 5,000 – 6,340 gallon normal capacity
ii. IM-102 portable tank (IMO Type 2 internationally)
a) 14.5 – 24.4 psig
b) 5,000 – 6,340 gallon normal capacity
b. Pressure intermodal tanks (DOT Specification 51; IMO Type 5 internationally)
i. 100 – 500 psi
ii. 4,500 – 5,500 gallon normal capacity
c. Specialized intermodal tanks
i. Cryogenic intermodal tanks (IMO Type 7 internationally)
a) Insulated space is normally maintained under vacuum
b) 4,500 – 5,500 gallons normal capacity
ii. Tube modules
a) 2,400 – 5,000 psi
b) Cylinders range from 9 – 48 inches in diameter

5. One-ton containers (pressure drums)

6. Pipelines

7. Railroad cars

a. Cryogenic liquid tank cars
b. Nonpressure tank cars (general service or low pressure cars)
c. Pneumatically unloaded hopper cars
d. Pressure tank cars
e. Other specialized cars

604-7.2.3.1.2 The hazardous materials technician shall identify the basic design and construction features, including closures of the following nonbulk containers:

1. Bags

2. Carboys and Jerricans

3. Cylinders

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

5. Dewar flask (cryogenic liquids)

604-7.2.3.1.3 The hazardous materials technician shall identify the basic design features and testing requirements on the following radioactive materials packages:

1. Excepted

2. Industrial

3. Type A

4. Type B

5. Type C – used in air shipments

604.7.2.3.2 The hazardous materials technician shall describe how a liquid petroleum product pipeline can carry different products

1. Co-mingling of products

2. Batching

3. Separation with a pig

604.7.2.3.3 Given an example of a pipeline, the hazardous materials technician shall identify the following:

1. Ownership of the line

2. Procedures for checking for gas migration

3. Procedure for shutting down the line or controlling the leak

4. Type of product in the line

604.7.2.3.4 Given examples of container stress or damage, the hazardous materials technician shall identify the type of damage in each example and assess the level of risk associated with the damage

1. Cracks

2. Scores

3. Gouges

4. Dents

5. Wheel burn

6. Rail burn

7. Street burn

604.7.2.3.5 Given a scenario involving radioactive materials, the hazardous materials technician, using available survey and monitoring equipment, shall determine if the integrity of any container has been breached

604-7.2.4 ***Predicting Likely Behavior of Materials and Their Containers Where Multiple Materials Are Involved***

Given examples of hazardous materials/WMD incidents involving multiple hazardous materials or WMD, the hazardous materials technician shall predict the likely behavior of the material in each case and meet the requirements of 7.2.4.1 through 7.2.4.3

604-7.2.4.1 The hazardous materials technician shall identify at least three resources available that indicate the effects of mixing various hazardous materials

1. Richard J. Lewis, Jr., *Hazardous Chemicals Desk Reference*

2. NOAA (National Oceanic Atmospheric Administration) Chemical Reactivity Worksheet

3. Bretherick's *Handbook of Reactive Chemical Hazards*

4. NFPA *Fire Protection Guide on Hazardous Materials*

5. SDS/MSDS

604-7.2.4.2 The hazardous materials technician shall identify the impact of the following fire and safety features on the behavior of the products during an incident at a bulk liquid facility and explain their significance in the analysis process:

1. Fire protection systems

2. Monitoring and detection systems

3. Pressure relief and vacuum relief protection

4. Product spillage and control (impoundment and diking)

5. Tank spacing

6. Transfer operations

604-7.2.4.3 The hazardous materials technician shall identify the impact of the following fire and safety features on the behavior of the products during an incident at a bulk gas facility and explain their significance in the analysis process:

1. Fire protection systems

2. Monitoring and detection systems

3. Pressure relief protection

4. Transfer operations

604-7.2.5 ***Estimating the Likely Size of an Endangered Area***
Given examples of hazardous materials/WMD incidents, the hazardous materials technician shall estimate the likely size, shape, and concentrations associated with the release of materials involved in an incident by using computer modeling, monitoring equipment, or specialists in this field by completing the requirements of 7.2.5.1 through 7.2.5.4

604-7.2.5.1 Given the emergency response plan, the hazardous materials technician shall identify resources for dispersion pattern prediction and modeling, including computers, monitoring equipment, or specialists in the field

604-7.2.5.2 Given the quantity, concentration, and release rate of a material, the hazardous materials technician shall identify the steps for determining the likely extent of the physical, safety, and health hazards within the endangered area of a hazardous materials/WMD incident

604-7.2.5.2.1 The hazardous materials technician shall describe the following terms and exposure values and explain their significance in the analysis process:

1. Counts per minute (cpm) and kilocounts per minute (kcpm)

2. Immediately dangerous to life and health (IDLH) value

3. Incubation period

4. Infectious dose

5. Lethal concentrations (LC_{50})

6. Lethal dose (LD_{50})

7. Parts per billion (ppb)

8. Parts per million (ppm)

9. Permissible exposure limit (PEL)

10. Radiation absorbed dose (rad)

11. Roentgen equivalent man (rem), millirem (mrem), microrem (μrem)

12. Threshold limit value ceiling (TLV-C)

13. Threshold limit value short-term exposure limit (TLV-STEL)

14. Threshold limit value time-weighted average (TLV-TWA)

15. Health Hazard = Exposure + Toxicity

16. Dose = Concentration x Time

17. ALARA = As Low As Reasonably Achievable

604.7.2.5.2.2 The hazardous materials technician shall identify two methods for predicting the areas of potential harm within the endangered area of a hazardous materials/WMD incident

1. Determine the level of toxicity of the hazardous material that has been released in the endangered area

2. Determine the length of time that persons in the endangered area would be exposed to the hazard

3. Determine areas of potential harm using reference sources or direct monitoring instruments
    a. *Emergency Response Guidebook*
    b. Computer dispersion models
        i. CAMEO (Computer Assisted Management of Emergency Operations)
        ii. MARPLOT (Mapping Applications for Response, Planning and Local Operational Tasks)
        iii. ALOHA (Aerial Locations Of Hazardous Atmospheres)
        iv. WISER (Wireless Informational Systems for Emergency Responders)
    c. Portable and fixed air-monitoring systems

604-7.2.5.3 The hazardous materials technician shall identify the steps for estimating the outcomes within an endangered area of a hazardous materials/WMD incident

1. Determining the dimensions of the endangered area

2. Estimating the number of exposures within the endangered area

3. Measuring or predicting the concentrations of materials in the endangered area

4. Estimating the physical, health, and safety hazards within the endangered area

5. Identifying the area of potential harm within the endangered area

6. Estimating the potential outcomes within the endangered area

604-7.2.5.4 Given three examples involving a hazardous materials/WMD release and the corresponding instrument monitoring readings, the hazardous materials technician shall determine the applicable public protective response options and the areas to be protected

604-7.3 Competencies — Planning the Response

604-7.3.1 Identifying Response Objectives

604-7.3.1.1 Given scenarios involving hazardous materials/WMD incidents, the hazardous materials technician shall describe the response objectives for each problem

604-7.3.1.2 Given an analysis of a hazardous materials/WMD incident, the hazardous materials technician shall be able to describe the steps for determining response objectives (defensive, offensive, and nonintervention)

1. Estimate exposures that could be saved

2. Determine the response objectives

604-7.3.2 Identifying the Potential Response Options

604-7.3.2.1 Given scenarios involving hazardous materials/WMD incidents, the hazardous materials technician shall identify the possible response

options (defensive, offensive, and nonintervention) by response objective for each problem

1. Offensive
   a. Rescue
   b. Public Protective Actions
   c. Spill Control
   d. Leak Control
   e. Fire Control
   f. Clean up and recovery

2. Defensive
   a. Public Protective Actions
   b. Spill Control
   c. Fire Control
   d. Clean up and recovery

3. Non intervention - Public Protective Actions

604.7.3.2.2 The hazardous materials technician shall be able to identify the possible response options to accomplish a given response objective.

The hazardous materials technician shall be able to identify concerns associated with the following event stages of the General Hazardous Materials Behavior Model:

1. Stress event
   a. Thermal stress
   b. Mechanical stress
   c. Chemical stress

2. Breach event
   a. Disintegration
   b. Runaway Cracking
   c. Failure of Container Attachments
   d. Container Punctures
   e. Container Splits or Tears

3. Release event
   a. Detonation
   b. Violent Rupture
   c. Rapid Relief
   d. Spills or Leaks

4. Engulfing event
    a. Identify the hazardous material or the energy likely to engulf the area
    b. What form is the energy or matter in?
    c. What is making it move?
    d. What path will it follow?
    e. What type of dispersion pattern will it create?
        i. Cloud
        ii. Cone
        iii. Plume
        iv. Stream
        v. Irregular

5. Impingement event (typically categorized based on duration)
    a. Harmful characteristics of material
    b. Concentration of the hazardous material
    c. Duration of the impingement
    d. Characteristics of the exposure

6. Harm event
    a. Thermal
    b. Toxicity/poison
    c. Radiation
    d. Asphyxiation
    e. Corrosivity
    f. Etiological
    g. Mechanical

604-7.3.3 ***Selecting Personal Protective Equipment***

Given scenarios of hazardous materials/WMD incidents with known and unknown hazardous materials/WMD, the hazardous materials technician shall determine the personal protective equipment for the response options specified in the incident action plan in each situation by completing the requirements of 7.3.3.1 through 7.3.3.4.8

604-7.3.3.1 The hazardous materials technician shall describe types of personal protective equipment that are available for response based on NFPA standards and how these items relate to EPA levels of protection

1. Level A – Vapor Protective Chemical Protective Clothing (CPC)
    a. Encapsulated garment
    b. Requires SCBA (positive pressure self contained breathing apparatus) or SAR (supplied air respirator) use

2. Level B – Splash Protective CPC
   a. Encapsulated garment
   b. Non-encapsulated garment
   c. Requires SCBA or SAR use

3. Level C – Splash Protective CPC
   a. Non-encapsulated garment
   b. Utilizes APR (air purifying respirator) or PAPR (powered air purifying respirator)

4. Level D – Non-emergency/hazardous materials response work clothing

5. Chemical protective clothing for Level A, Level B or Level C ensembles should be selected based on one of the following applicable criteria:
   a. NFPA 1991 *Standard on Vapor Protective Ensembles for Hazardous Materials Emergencies*
   b. NFPA 1992 *Standard on Liquid Splash Protective Ensembles and Clothing for Hazardous Materials Emergencies*
   c. NFPA 1994 *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*

604.7.3.3.2 The hazardous materials technician shall identify and describe personal protective equipment options available for the following hazards:

1. Thermal

2. Radiological

3. Asphyxiating

4. Chemical (liquids and vapors)

5. Etiological (biological)

6. Mechanical (explosives)

604.7.3.3.3 The hazardous materials technician shall identify the process to be considered in selecting respiratory protection for a specified action option

1. IDLH environments
    a. Toxic environments
    b. Flammable/explosive environments
    c. Hazardous oxygen levels
    d. Radiation exposure

2. Non-IDLH Atmospheres
    a. Toxic environments
    b. Flammable/explosive environments
    c. Hazardous oxygen levels
    d. Radiation exposure

604-7.3.3.4 The hazardous materials technician shall identify the factors to be considered in selecting chemical-protective clothing for a specified action option

604-7.3.3.4.1 The hazardous materials technician shall describe the following terms and explain their impact and significance on the selection of chemical-protective clothing:

1. Degradation

2. Penetration

3. Permeation

604-7.3.3.4.2 The hazardous materials technician shall identify at least three indications of material degradation of chemical-protective clothing

1. Stiffness or excessive pliability

2. Tears, cuts or abrasions

3. Damage to zippers or other closures

604-7.3.3.4.3 The hazardous materials technician shall identify the different designs of vapor-protective and splash-protective clothing and describe the advantages and disadvantages of each type

1. Type I
    a. Fully encapsulating air tight vapor protective suit
    b. With SCBA

2. Type II

a. Non-encapsulating suit
b. With SCBA worn on outside

3. Type III
a. Fully encapsulating suit
b. With SAR

604-7.3.3.4.4 The hazardous materials technician shall identify the relative advantages and disadvantages of the following heat exchange units used for the cooling of personnel in personal protective equipment:

1. Air cooled

2. Ice cooled

3. Water cooled

4. Phase change cooling technology

604-7.3.3.4.5 The hazardous materials technician shall identify the process for selecting protective clothing at hazardous materials/WMD incidents

1. Perform site management control functions

2. Identify the problem

3. Perform hazard and risk analysis

4. Consult PPE compatibility charts and respiratory protection guidelines

5. Select appropriate PPE based on the above

604-7.3.3.4.6 Given three examples of various hazardous materials, the hazardous materials technician shall determine the protective clothing construction materials for a given action option using chemical compatibility charts

604-7.3.3.4.7 The hazardous materials technician shall identify the physiological and psychological stresses that can affect users of personal protective equipment

1. Physiological
a. Extreme heat or cold operating conditions

b. Noise
c. Reduced vision from fogging of CPC or SCBA face pieces
d. Operations in low-light or low-visibility environments
e. Reduced handling and dexterity due to the need to wear several layers of gloves
f. Adverse weather conditions
g. Physical hazards and the physical operating environment

2. Psychological
a. Lack of physical fitness and the physical ability to perform the required tasks
b. Response operations involving injuries, fatalities or high-risk operations
c. Operations within enclosed or confined space environments
d. Background and experience levels in both wearing CPC and operating in hostile environments
e. Fear of either suit or respiratory protection failure

604.7.3.3.4.8 Given the personal protective equipment provided by the AHJ, the hazardous materials technician shall identify the process for inspecting, testing, and maintenance of personal protective equipment.

1. Inspection – in accordance with manufacturers' recommendations and AHJ policies
a. Acceptance
b. Inspect before use
c. After each use
d. Periodic (i.e. monthly, quarterly or annually)
e. As needed
2. Testing - in accordance with manufacturers' recommendations and AHJ policies
a. Visual
b. Tactile
c. Pressure test - ASTM1052 Standard test method for pressure testing vapor ensembles
d. Soap bubble test
e. Light bar test
3. Maintenance and storage – in accordance with manufacturers' recommendations and AHJ policies
a. Protect from
i. Dust
ii. Moisture
iii. Sunlight
iv. Chemical exposures

v. Temperature extremes
vi. Impact

b. Documentation
i. Inspection
ii. Testing
iii. Maintenance

604-7.3.4 Selecting Decontamination Procedures

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall select a decontamination procedure that will minimize the hazard, shall determine the equipment required to implement that procedure, and shall complete the following tasks:

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

2. Identify three sources of information for determining the applicable decontamination procedure and identify how to access those resources in a hazardous materials/WMD incident
   a. CHEMTREC
   b. CHEM-TEL
   c. Manufacturer
   d. SDS/MSDS
   e. National Response Center (NRC)
   f. CANUTEC
   g. SETIQ
   h. Local or regional poison control centers

604-7.3.5 Developing a Plan of Action

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials technician shall develop a plan of action, including

site safety and a control plan, that is consistent with the emergency response plan and standard operating procedures and within the capability of available personnel, personal protective equipment, and control equipment for that incident, by completing the requirements of 7.3.5.1 through 7.3.5.5

A typical plan of action for a hazardous materials response would contain the following components:

1. Site description

2. Entry objective

3. On scene organization and coordination

4. On scene control

5. Hazard evaluation

6. Personal protective equipment

7. On scene work assignments

8. Communications procedures

9. Decontamination procedures

10. On scene safety and health considerations including designation of the safety officer, emergency medical care procedures, environmental monitoring, emergency procedures, and personnel monitoring

604 7.3.5.1 The hazardous materials technician shall describe the purpose of, procedures for, equipment required for, and safety precautions used with the following techniques for hazardous materials/WMD control:

1. Absorption

2. Adsorption

3. Blanketing

4. Covering

5. Damming

6. Diking

7. Dilution

8. Dispersion

9. Diversion

10. Fire suppression

11. Neutralization
    a. For corrosive releases
        i. Not for use on living tissue – use primarily on decon equipment or neutralize spills
        ii. Process generates heat
        iii. Final solution should be as close to pH 7 as possible
        iv. pH disposal guidelines dependent on AHJ
    b. For other chemical releases
        i. Consult technical reference
        ii. Process typically generates heat
        iii. pH disposal guidelines dependent on AHJ

12. Overpacking

13. Patching

14. Plugging

15. Pressure isolation and reduction (flaring; venting; vent and burn; isolation of valves, pumps, or energy sources)

16. Retention

17. Solidification

18. Transfer

19. Vapor control (dispersion, suppression)

604.7.3.5.2 Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall develop the site safety and control plan that must be included as part of the incident action plan

In accordance with 29 CFR 1910.120 site safety and control plans should address the following:

1. Analysis of hazards on the site and a risk analysis of those hazards

2. Site map or sketch

3. Site work (control) zones

4. Use of buddy system

5. Site communications

6. Command post

7. Standard operating procedures and safe work practices

8. Medical Assistance and triage area

9. Other relevant topics

604.7.3.5.2.1 The hazardous materials technician shall list and describe the safety considerations to be included

604.7.3.5.2.2 The hazardous materials technician shall identify the points that should be made in a safety briefing prior to working at the scene

604.7.3.5.3 The hazardous materials technician shall identify the atmospheric and physical safety hazards associated with hazardous materials/WMD incidents involving confined spaces

Hazards associated with confined spaces that should continually be monitored include but are not limited to:

1. Atmospheric hazards
    a. Oxygen deficient
    b. Oxygen enriched
    c. Flammable/explosive
    d. Toxic

2. Physical hazards
    a. Engulfment
    b. Slips/falls

c. Electrical
d. Structural
e. Mechanical

604-7.3.5.4 The hazardous materials technician shall identify the pre-entry activities to be performed.

1. Initial activities would include:
   a. Establish command
   b. Appoint a Safety Officer
   c. Establish hazard control zones
   d. Identify escape routes
   e. Designate a withdrawal signal
   f. Identify safe locations (uphill, upwind, up stream)

2. Develop Incident Action Plan

3. Identify hazards

4. Prior to entry into a hazard area the following tasks should be complete:
   a. Establish entry team(s) and back up team(s)
   b. Conduct site safety briefing
   c. Designate primary and emergency modes of communication
   d. Establish decon corridor
   e. Identification of task(s) to be performed
   f. Identification of personal protective equipment/respiratory protection
   g. Monitoring requirements

604-7.3.5.5 The hazardous materials technician shall identify the procedures, equipment, and safety precautions for preserving and collecting legal evidence at hazardous materials /WMD incidents

1. Evidence should be collected in accordance with AHJ.

2. All evidence collected must be appropriately documented and chain of custody maintained in accordance with AHJ.

3. Proper PPE must be utilized during collection process.

604-7.4 Competencies — Implementing the Planned Response

604-7.4.1 Performing Incident Command Duties

Given the emergency response plan or standard operating procedures and a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall demonstrate the duties of an assigned function in the hazardous materials branch or group within the incident command system and shall identify the role of the hazardous materials technician during hazardous materials/WMD incidents

604.7.4.1.1 Describe the duties of an assigned function in the hazardous materials branch or group within the incident command system

1. Primary hazardous materials group or branch functions include:
   a. Hazardous materials branch/group supervision (Hazardous Materials Branch Director/Group Supervisor)
   b. Safety (Assistant Safety Officer – Hazardous Materials)
   c. Site Access Control (Site Access Control Unit Leader)
      i. Establishes Hazard Control Zones
      ii. Manages Safe Refuge Area
   d. Entry Team Operations (Entry Team Leader)
      i. Recon team
      ii. Entry team(s)
      iii. Back-up team
   e. Decontamination (Decon Team Leader)
   f. Information/research coordination (Information/Research Team Leader)
      i. Technical/Product Specialist
      ii. Environmental/Remediation Contractors
      iii. Governmental or External Agency Liaisons

2. Secondary hazardous materials group or branch functions include:
   a. Resources/Logistics
   b. Medical (Medical Unit Leader)
   c. Incident rehabilitation (Rehabilitation Unit Leader)
   d. The above secondary functions are performed by the Hazardous Materials Branch/Group only if they are not being performed by the Logistics section, i.e., Logistics section has not been activated

604.7.4.1.2 Identify the role of the hazardous materials technician during hazardous materials/WMD incidents

1. Implement the employer's emergency response plan

2. Use field survey instruments to verify and/or determine the nature of the release

3. Function within the ICS

4. Select and use PPE

5. Understand hazard and risk assessment techniques

6. Perform advanced product control, containment, and/or confinement techniques

7. Understand and implement decontamination procedures

8. Understand termination procedures

9. Understand basic chemical and toxicological terminology and behavior

604.7.4.2 Using Protective Clothing and Respiratory Protection

The hazardous materials technician shall demonstrate the ability to don, work in, and doff liquid splash-protective, vapor-protective, and chemical-protective clothing and any other specialized personal protective equipment provided by the AHJ, including respiratory protection, and shall complete the following tasks:

1. Describe three safety procedures for personnel working in chemical-protective clothing

2. Describe three emergency procedures for personnel working in chemical-protective clothing
    a. Loss of air supply
    b. Loss of suit integrity
    c. Loss of verbal communications
    d. Victim/responder down in hazard area

3. Demonstrate the ability to don, work in, and doff self-contained breathing apparatus in addition to any other respiratory protection provided by the AHJ

4. Demonstrate the ability to don, work in, and doff liquid splash-protective, vapor-protective, and chemical-protective clothing in

addition to any other specialized protective equipment provided by the AHJ

604.7.4.3 Performing Control Functions Identified in Incident Action Plan. Given scenarios involving hazardous materials/WMD incidents, the hazardous materials technician shall select the tools, equipment, and materials for the control of hazardous materials/WMD incidents and identify the precautions for controlling releases from the packaging/containers and shall complete the following tasks:

1. Given a pressure vessel, select the material or equipment and demonstrate a method(s) to contain leaks from the following locations:
    a. Fusible plug
    b. Fusible plug threads
    c. Side wall of cylinder
    d. Valve blowout
    e. Valve gland
    f. Valve inlet threads
    g. Valve seat
    h. Valve stem assembly blowout

2. Given the fittings on a pressure container, demonstrate the ability to perform the following:
    a. Close valves that are open
    b. Replace missing plugs
    c. Tighten loose plugs

3. Given a 55 gal (208 L) drum and applicable tools and materials, demonstrate the ability to contain the following types of leaks:
    a. Bung leak
    b. Chime leak
    c. Forklift puncture
    d. Nail puncture

4. Given a 55 gal (208 L) drum and an overpack drum, demonstrate the ability to place the 55 gal (208 L) drum into the overpack drum using the following methods:
    a. Rolling slide-in
    b. Slide-in
    c. Slip-over

5. Identify the maintenance and inspection procedures for the tools and equipment provided for the control of hazardous materials

releases according to the manufacturer's specifications and recommendations

6. Identify three considerations for assessing a leak or spill inside a confined space without entering the area.

Use remote monitoring to evaluate for:
a. Oxygen levels
b. Flammable atmospheres
c. Toxic atmospheres

7. Identify three safety considerations for product transfer operations
a. Grounding
b. Bonding
c. Elimination of ignition sources and shock hazards

8. Given an MC-306/DOT-406 cargo tank and a dome cover clamp, demonstrate the ability to install the clamp on the dome

9. Identify the methods and precautions used to control a fire involving an MC-306/DOT-406 aluminum shell cargo tank

10. Describe at least one method for containing each of the following types of leaks in MC-306/DOT-406, MC-307/DOT-407, and MC-312/DOT-412 cargo tanks:
a. Dome cover leak
b. Irregular-shaped hole
c. Puncture
d. Split or tear

11. Describe three product removal and transfer considerations for overturned MC-306/DOT-406, MC-307/DOT-407, MC-312/DOT-412, MC-331, and MC-338 cargo tanks
a. Inherent risks associated with such operations
b. Procedures and safety precautions
c. Equipment required

604-7.4.4 Given MC-306/DOT-406, MC-307/DOT-407, MC-312/DOT-412, MC-331, and MC-338 cargo tanks, the hazardous materials technician shall identify the common methods for product transfer from each type of cargo tank.

604-7.4.5 ***Performing Decontamination Operations Identified in the Incident Action Plan.***

The hazardous materials technician shall demonstrate the ability to set up and implement the following types of decontamination operations:

1. Technical decontamination operations in support of entry operations

2. Technical decontamination operations involving ambulatory and non-ambulatory victims

3. Mass decontamination operations involving ambulatory and non-ambulatory victims

604-7.5 Competencies — Evaluating Progress

604-7.5.1 Evaluating the Effectiveness of the Control Functions

Given scenarios involving hazardous materials/WMD incidents and the incident action plan, the hazardous materials technician shall evaluate the effectiveness of any control functions identified in the incident action plan.

604-7.5.2 Evaluating the Effectiveness of the Decontamination Process

Given an incident action plan for a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall evaluate the effectiveness of any decontamination procedures identified in the incident action plan.

604-7.6 Competencies — Terminating the Incident

604-7.6.1 Assisting in the Debriefing

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall participate in the debriefing of the incident by completing the following requirements:

An effective debriefing should address the following informational issues regarding response activities:

- Positive aspects — Identify strengths or things that went well that need to be maintained or continued
- Negative aspects — Identify weaknesses that went poorly and need to be corrected
- Unique aspects — Unusual or unsuspected conditions that may need to be addressed or planned for

1. Describe (at least) three components of an effective debriefing

a. Inform responders of the potential signs and symptoms of any possible hazardous materials exposures
b. Identify:
    i. Damaged equipment
    ii. Expended supplies
    iii. Items that need to be disposed
    iv. Unsafe site conditions
c. Assign:
    i. information gathering responsibilities for a post-incident analysis and critique
    ii. Point of contact for any follow up on incident related issues
d. Assess the need for Critical Incident Stress Debriefing (CISD)

2. Describe the key topics of an effective debriefing
    a. Health information
    b. Equipment and apparatus exposure review
    c. A follow-up contact person
    d. Problems requiring immediate action
    e. Thank you!

3. Describe when a debriefing should take place
    a. As soon as the "emergency phase" of the incident is over
    b. Should be before any responders leave the scene

4. Describe who should be involved in a debriefing.
    a. Hazardous Materials Response Team
    b. Incident Commander
    c. Section Chiefs/Branch Directors/Division and Group Supervisors, etc.
    d. Information Officer
    e. Agency representatives or key players as determined by the Incident Commander (i.e. Safety Officer and Agency Liaisons)

604-7.6.2 ***Assisting in the Incident Critique***

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall provide operational observations of the activities that were performed in the hot and warm zones during the incident and shall complete the following tasks:

1. Describe three components of an effective critique
    a. Direction

b. Participation
c. Solutions

2. Describe who should be involved in a critique
   a. Hazardous Materials Response Team
   b. Incident Commander
   c. Section Chiefs/Branch Directors/Division and Group Supervisors, etc.
   d. Information Officer
   e. Agency representatives or key players as determined by the Incident Commander (i.e. Safety Officer and Agency Liaisons)

3. Describe why an effective critique is necessary after a hazardous materials/WMD incident
   a. Develop recommendations for improving the emergency response team
   b. Promotes systems-dependent operations rather than people-dependent organizations
   c. Promotes a willingness to cooperate through teamwork
   d. Promotes improvement of safe operating procedures
   e. Promotes sharing of information among emergency response organizations

4. Describe which written documents should be prepared as a result of the critique
   a. Post-Critique Report
   b. Formal-Critique Report

5. Describe recommended methods for critiquing large-scale emergency responses
   a. Participant-level critique
   b. Operations-level critique
   c. Group-level critique

604-7.6.3 Reporting and Documenting the Incident

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall complete the reporting and documentation as required by the AHJ by completing the following requirements:

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

2. Demonstrate completion of the reports and supporting documentation
    a. Incident action plan and all components
    b. Site safety plan and all components
    c. Other documentation required by AHJ

3. Describe the importance of personnel exposure records

4. Describe the importance of debriefing records

5. Describe the importance of critique records

6. Identify the steps in keeping an activity log and exposure records
    a. Activity log
        i. Record major event(s)
        ii. Record time major event(s) occurred
        iii. Briefly describe major event(s)
        iv. Additional information to include
            a) Information that may assist in the investigation or cost recovery process
            b) Task assignments
            c) Task completion
            d) Injuries and exposures
    b. Exposure records
        i. General information
            a) Name of exposed worker
            b) Personal ID number
            c) Assignment/station
            d) Incident date
            e) Incident number
            f) Incident location
        ii. Nature of incident
        iii. Level of personal protection
        iv. Emergency response activity
        v. Exposure data
            a) Method of exposure
            b) Duration of exposure
        vi. Medical treatment provided
            a) Signs and symptoms
            b) On-scene medical treatment
            c) Medical facility treatment
            d) Follow-up action required
        vii. Medical treatment provided
            a) Comment section

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.).

10.1. Identify the requirements for filing documents and maintaining records – AHJ

Hazardous Materials Training
Equipment & Prop List

The following are minimal recommended supplies necessary for hazardous materials training at the below listed levels of certification. Variations may exist based on the needs of each AHJ and any mission-specific job tasks as assigned by an AHJ.

Hazardous Materials Awareness

Department of Transportation's *Emergency Response Guidebook* (ERG) (current ed.)
Material Safety Data Sheet (MSDS) or Safety Data Sheets (SDS) – Samples
Placards & Labels
Transportation/Shipping document – Sample
NFPA 704 sample
Safety Vests
Binoculars

Hazardous Materials Operations

All awareness equipment *plus…*
Structural Firefighter Protective Ensemble (bunker gear)

Reference Material:

- NIOSH *Pocket Guide to Chemical Hazards*
- NFPA *Hazardous Materials / Weapons of Mass Destruction Response Handbook* (current edition)
- Pesticide label example

Respiratory Protection to include:

- Air Purifying Respirator (APR-half mask)
- Air Purifying Respirator (APR-full face)
- SCBA

Chemical Protective Clothing to include:

- Vapor Protective CPC (Level A)
- Splash Protective Encapsulated CPC (Level B)
- Splash Protective Non-Encapsulated CPC (Level B, Level C)
- Chemical Boots (Rubber Boots for training only)
- Inner/Outer gloves - assorted types
- Chem Tape (duct tape for training only)

Fire Hose, Foam Nozzles and Eductors, Foam
Pictures/slides of various railcar, intermodal, and highway cargo trailers
Pictures/slides of bulk and non-bulk containers, and fixed facility containment systems

Defensive Spill Equipment:

- Absorbent/Adsorbent
- Broom/Shovel
- 5-gallon buckets
- Assortment of boom and pads

Decontamination Equipment:

- Poly sheeting or tarp
- Duct tape
- Traffic cone(s)
- Decon Pools
- Sprayer(s)
- Garden hose(s) and sprayer/nozzles
- 5-gallon bucket(s)
- Various Decon solution(s)
- Folding chairs
- Overpack drum

Various monitoring detection equipment as may be required. Examples *may* include:

- Combustible Gas Indicator
- Oxygen Meter
- Radiation Detector

Hazardous Materials Operations – Mission Specific Competencies

Equipment needed for training to Hazardous Materials Operations – Mission Specific Competencies will be based the competencies themselves and the authority having jurisdiction (AHJ). Equipment, at a minimum, will include that which is required to train to the Hazardous Materials Operations Level. Additional equipment or props may include part or all of the equipment listed below for Hazardous Materials Technician.

For example, if training to the Mission Specific Competencies: Air Monitoring and Sampling is to be performed, additional monitoring detection and sampling equipment will be required.

Hazardous Materials Technician

Awareness and Operations equipment *plus…*

Reference Material:

- CPC Permeation Guides/Tables
- BOE/AAR *Field Guide to Railcar Identification*
- NFPA *Fire Protection Guide to Hazardous Materials Detection*
- Other printed or electronic publications/databases as may be required by the AHJ

Various monitoring detection equipment and corresponding samples to include:

- Combustible Gas Indicator
- Oxygen Meter
- Carbon monoxide meter
- Gas specific meter
- Photoionization detector
- Radiation Detectors (alpha, beta, gamma)
- Colorimetric tubes, pump
- Classifier/detection strips and reagents
- pH paper or pH meter
- additional monitoring and detection equipment as may be required by AHJ
- Calibration kit(s) as required for above

Leak & Spill Equipment:

- Plugging/patching supplies
- Leaking drum(s): metal & poly
- Overpack drum(s)
- Leak pipe simulator
- 150 lbs. Chlorine cylinder leak prop
    - Chlorine emergency kit type “A”
- Chlorine 1-Ton cylinder leak prop
    - Chlorine emergency kit type “B”
- Pressure Railcar dome leak prop
    - Chlorine emergency kit type “C” or Midland kit
- Cargo Tank Leak Simulator (MC-306/DOT-406 Dome)
- Dome Cover Clamp
- Grounding & Bonding Kit
- Product Transfer Equipment
- Misc. Hand Tools (e.g., hand wrenches, bung wrench, spanner wrench, mallet, screwdrivers, etc.)

Command and Control Equipment/Forms (e.g., Incident Action Plan, Site Safety Plan, Medical Plan, Communication Plan - all NIMS/ICS compliant)

Hazardous Materials Incident Commander

Reference Material

- Department of Transportation’s *Emergency Response Guidebook* (ERG) (current ed.)
- Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) - Samples
- Transportation/Shipping document – Sample
- NIOSH *Pocket Guide to Chemical Hazards*

- NFPA *Hazardous Materials / Weapons of Mass Destruction Response Handbook* (current edition)
- CPC Permeation Guides/Tables
- BOE/AAR *Field Guide to Railcar Identification*
- NFPA *Fire Protection Guide to Hazardous Materials Detection*
- Other printed or electronic publications/databases as may be required by the AHJ

Command and Control Equipment/Forms

- Department of Homeland Security – National Incident Management System/Incident Command System standardized forms
    - ICS 201 Incident Briefing Form
    - ICS 202 Incident Objectives Worksheet
    - ICS 203 Organization Assignment List
    - ICS 204 Division Assignment List
    - ICS 205 Communications Plan
    - ICS 206 Medical Plan
    - ICS 208HM Site Safety and Control Plan
    - ICS 211 Incident Check-in List
    - ICS 213 General Message
    - ICS 214 Unit Log
    - ICS 215 Incident Planning Worksheet
    - ICS 215A Incident Action Plan Safety Analysis

HAZARDOUS MATERIALS INCIDENT COMMANDER

REFERENCE LIST FOR THE HAZARDOUS MATERIALS INCIDENT COMMANDER CURRICULUM

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

Required References

Texts

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

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

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

Hazardous Materials Awareness and Operations, 3rd *Edition*. Schnepp (2019). Sudbury, MA: Jones & Bartlett.

Hazardous Materials for First Responders, 5th edition (2017). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

Hazardous Materials: Managing the Incident. Chester Noll, G. G., Hildebrand, M. S., ~~&~~ **Rudner, G., & Schnepp, R.** ~~Yvorra, J. G.~~ (20**14**~~05~~). **Burlington, MA: Jones & Bartlett** ~~MD: Red Hat Publishing Company, Inc~~.

Hazardous Materials/Weapons of Mass Destruction Response Handbook~~, 5th edition~~. **McGowan, T.** ~~Trebisacci, D. G.~~ (20**18**~~08~~). Quincy, MA: National Fire Protection Association.

NFPA 472: Standard for ~~*Professional*~~ *Competence of Responders to Hazardous Materials Incidents**/Weapons of Mass Destruction**. (*20**18**~~08~~ 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	**Analyze** ~~Analyzing~~ the Incident	4
605-8.3	**Plan** ~~Planning~~ the Response	9
605-8.4	Implement~~ing~~ the ~~Planned Response~~ **Incident Action Plan (IAP)**	4
605-8.5	**Evaluate** ~~Evaluating~~ Progress **and Adjust IAP**	2
605-8.6	**Termination** ~~Terminating the Incident~~	4
	TOTAL RECOMMENDED HOURS	**24**

Commented [MMA1]:

Commented [MMA2]: Verbiage reflects wording in NFPA 1072 (2017)

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

Course Instructor Information

Hazardous Materials

Incident Commander

Overview
The Hazardous Materials curricula are designed to provide clear guidance that ensures adequate presentation of the information required to meet the Job Performance Requirements (JPRs) of National Fire Protection Association (NFPA) 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*, 2017 edition.

The Hazardous Materials curricula is found in Chapter 6 of the TCFP Curriculum Manual.

Certification Level	TCFP Section Number	NFPA 1072 Chapter
Awareness	601	4
Operations	602	5
Operations-Mission Specific Competencies (MSC)	603	6
*Technician	604	7
*Incident Commander	605	8

Layout
The NFPA numbering sequence is mirrored to allow easy correlation between this document and the NFPA Standard. For example, 601-4.1.2 identifies the section in Awareness that corresponds to NFPA section 4.1.2.

When a section references information from “Annex A Explanatory Material” in the NFPA Standard, it is identified by a boxed Instructor Note. For example, the boxed Instructor Note listed in 601-4.2.1 and that immediately follows the Requisite Knowledge section corresponds to the NFPA Annex A information for NFPA 1072 section 4.2.1.

* Asterisks by Technician and Incident Commander above indicate that both are voluntary (non-mandatory) certifications. Therefore, **a formal “curriculum outline” is not provided**. Please use chapters 7 and 8, respectively, of NFPA 1072 as a guide when creating your own course curricula or selecting a prepared instructional curriculum package from a publisher/vendor for Technician and Incident Commander.

TCFP Standards Manual
It is critical that you review the chapters in the TCFP Standards Manual that apply to this curriculum. Of primary importance are the following two chapters: Chapter 423, which defines the course of study, documentation and medical requirements necessary

for Awareness and Operations certification (required) and Chapter 453, which covers certification requirements for Technician and Incident Commander (voluntary). Additionally, instructors are expected to review the following chapters as they pertain to the instructional, examination, certification processes:

- Chapter 421,Standards for Certification
- Chapter 427, Training Facility Certification
- Chapter 435, Fire Fighter Safety
- Chapter 437, Fees
- Chapter 439, Examinations for Certification
- Chapter 441, Continuing Education

These chapters do not address every issue that could impact this curriculum; therefore, you are encouraged to become familiar with the TCFP Standards Manual.

Instructor Qualifications
Hazardous Materials courses must be taught by an instructor meeting the requirements described in Chapter 427.307 of the TCFP Standards Manual.

Supplemental Information
Instructors are expected to provide supplemental information if the main reference text does not provide adequate information to ensure successful completion of the Job Performance Requirements as listed in the curriculum.

Components of the Curricula
Each section of a curriculum identifies the NFPA Job Performance Requirement (JPR) and subdivides the requisite knowledge requirements into learning components. For example:

View within the Curriculum		Explanation
601-4.3.1	Isolate the hazard area and deny entry at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, policies and procedures, and approved reference sources, so that the hazard area is isolated and secured, personal safety procedures are followed, hazards are avoided or minimized, and additional people are not exposed to further harm.	**Section Number and NFPA JPR**
	Requisite Knowledge: Use of the ERG, SDS, shipping papers with emergency response information, and other approved reference sources to identify precautions to be taken to	**Requisite Knowledge Statement**

protect responders and the public; policies and procedures for isolating the hazard area and denying entry; and the purpose of and methods for isolating the hazard area and denying entry.	
(1) Use of the ERG, SDS, shipping papers with emergency response information, and other approved reference sources to identify precautions to be taken to protect responders and the public	**First part of Requisite Knowledge**
Identify precautions to be taken to protect responders/the public using ERG, SDS, shipping papers with emergency response information, other approved reference sources Identify the hazard a. Isolate the hazard area b. Deny entry c. Call for trained personnel d. Secure the scene	**Associated learning components**
(2) Policies and procedures for isolating the hazard area and denying entry	**Second part of Requisite Knowledge**
Policies and procedures, per AHJ/SOP a. Isolating the hazard area b. Denying entry	**Associated learning components**
(3) And the purpose of and methods for isolating the hazard area and denying entry	**Third part of Requisite Knowledge**
Purpose/methods a. Isolating the hazard area i. Establish perimeter ii. Erect barriers b. Denying entry i. Restrict hazard area access to	**Associated learning components**

appropriately trained personnel only ii. Maintain perimeter	
Requisite Skills: Use of the ERG, SDS, shipping papers with emergency response	**Requisite Skills Statement**
Instructor Note Recommended precautions found on numbered guides in the ERG include public safety issues; recommended protective clothing; evacuation; emergency response to fire, spill, and leak; and first aid sections. Examples of required knowledge include (1) precautions for providing emergency medical care to victims; typical ignition sources; ways hazardous materials/WMD are harmful to people, the environment, and property; general routes of entry for human exposure; emergency action (fire, spill, or leak; first aid); actions recommended not to be performed (e.g., closing of pipeline valves); protective actions (isolation of area and denial of entry, evacuation, shelter-in-place); size and shape of recommended initial isolation and protective action distances; difference between small and large spills; conditions that require the use of the ERG Table of Initial Isolation and Protective Action Distances and the isolation distances in the ERG numbered guide; techniques for isolating the hazard area and denying entry to unauthorized persons; how to recognize and protect evidence; and use of approved tools and equipment; (2) basic personal protective actions: staying clear of vapors, fumes, smoke, and spills; keeping vehicle at a safe distance from the scene; approaching from upwind, uphill, and upstream; and (3) types of protective actions and their purpose (e.g., isolate hazard area and deny entry, evacuation, and shelter-in-place); basic factors involved in the choice of protective actions (e.g., hazardous materials/WMD involved, population threatened,	**Appendix A: Explanatory Material for 4.3.1**

	and weather conditions).	

Unless otherwise specified, all curriculum references are to NFPA 1072. In some cases, (see, for example, 601-4.2.1), reference is also made under the section number and JPR to similar material in NFPA 472.

601-4.2.1	Recognize and identify the hazardous materials/WMD and hazards involved in a hazardous materials/WMD incident, given a hazardous materials/WMD incident, and approved reference sources, so that the presence of hazardous materials/WMD is recognized and the materials and their hazards are identified. Given a hazardous materials/WMD incident, and approved reference sources, awareness level personnel shall recognize those situations where hazardous materials/WMD are present. (472-4.2.1)	**Additional reference to NFPA 472**

Skills
NFPA Requisite Skill requirements are addressed in the corresponding Skill Sheets in Chapter 6 of the TCFP Curriculum Skills Manual.

Definitions of Certification Levels
Awareness Level Personnel: Personnel who, in the course of their normal duties, could encounter an emergency involving hazardous materials/weapons of mass destruction (WMD) and who are expected to recognize the presence of the hazardous materials/WMD, protect themselves, call for trained personnel, and secure the scene. These personnel have met all the performance requirements of Chapter 4 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*

Operations Level Personnel: Personnel 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. These personnel have met all the performance requirements of Chapter 5 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*

Operations-Mission Specific Competencies (MSC) Level Personnel: Responders assigned mission-specific responsibilities at hazardous materials/WMD incidents are

those operations level responders designated by the authority having jurisdiction (AHJ) to perform additional tasks to support the AHJ's response mission, expected tasks, equipment, and training in the following areas:

(1) Personal protection equipment (PPE)
(2) Mass decontamination
(3) Technical decontamination
(4) Evidence preservation and sampling
(5) Product control
(6) Detection, monitoring, and public safety sampling
(7) Victim rescue and recovery
(8) Illicit laboratories incidents

These personnel have met all the performance requirements of Chapter 5 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications* and have also met the performance requirements of the subchapter(s) of Chapter 6 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications,* to which they are trained and credentialed to perform.

Note: Basic TCFP Structural Fire Fighter certification requires that Structure Fire Fighter personnel meet all performance requirements for:

- *Hazardous Materials Awareness*
- *Hazardous Materials Operations*
- *Hazardous Materials Operations - MSC – 6.2 Personal Protective Equipment*
- *Hazardous Materials Operations - MSC – 6.6 Product Control*

Technician Level Personnel: Persons who respond to hazardous materials/weapons of mass destruction (WMD) incidents using a risk-based response process by which they analyze a problem involving hazardous materials/WMD, plan a response to the problem, evaluate progress of the planned response, and assist in terminating the incident. These personnel have met all the performance requirements of Chapter 7 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications.*

Incident Commander Level Personnel: That person, designated by the AHJ, responsible for all incident activities/operations, including the development of strategies and tactics and the ordering and release of resources. These personnel have met all the performance requirements of Chapter 8 of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications.*

~~SECTION 605~~
~~HAZARDOUS MATERIALS INCIDENT COMMANDER~~

Commented [MMA1]: Because HMIC is now a voluntary cert, this update contains no curriculum material.

~~The Hazardous Materials Incident Commander is the person responsible for all hazardous materials/weapons of mass destruction (WMD) incident activities, including the development of strategies and tactics and the ordering and release of resources. The Hazardous Materials Incident Commander has overall authority and responsibility for conducting incident operations and is responsible for the management of all incident operations at the hazardous materials/weapons of mass destruction (WMD) incident site.~~

~~The Hazardous Materials Incident Commander must first master all the job performance requirements and knowledge, skills and abilities pertaining to:~~

- ~~Awareness Level Personnel,~~
- ~~Operations Level Responders and,~~
- ~~The competencies of this chapter~~

~~The Hazardous Materials Incident Commander performs the following functions and is primarily responsible for:~~

- ~~Having clear authority and knowledge of agency policy,~~
- ~~Ensuring incident safety,~~
- ~~Establishing the incident command post (ICP),~~
- ~~Setting priorities, determining incident objectives and strategies to be followed,~~
- ~~Establishing the incident command system (ICS) needed to manage the incident,~~
- ~~Approving the incident action plan (IAP),~~
- ~~Coordinating command and general staff functions,~~
- ~~Approving resource order requests and the use of volunteers and auxiliary personnel,~~
- ~~Ordering demobilization as needed,~~
- ~~Ensuring after action reports are completed.~~

~~605-8.1 General~~

~~605-8.1.1 Introduction~~

~~**605-8.1.1.1** The incident commander (IC) shall be that person responsible for all incident activities, including the development of strategies and tactics and the ordering and release of resources as designated by the authority having jurisdiction (AHJ).~~

~~**605-8.1.1.2** The incident commander shall be trained to meet all competencies at the awareness level (Section 601), all core competencies at the operations level (Section 602), and all competencies in this chapter.~~

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

605-8.1.1.4 The incident commander shall receive any additional training necessary to meet specific needs of the jurisdiction.

605-8.1.2 Goal

605-8.1.2.1 The goal of the competencies in this chapter shall be to provide the incident commander with the knowledge and skills to perform the tasks in 8.1.2.2 safely.

605-8.1.2.2 In addition to being competent at the awareness and all core competencies at the operations levels, the incident commander shall be able to perform the following tasks:

1. Analyze a hazardous materials/WMD incident to determine the complexity of the problem and potential outcomes by completing the following tasks:
    a. Collect and interpret hazard and response information from printed and technical resources, computer databases, and monitoring equipment
    b. Estimate the potential outcomes within the endangered area at a hazardous materials/WMD incident

2. Plan response operations within the capabilities and competencies of available personnel, personal protective equipment, and control equipment by completing the following tasks:
    a. Identify the response objectives for hazardous materials/WMD incidents
    b. Identify the potential response options (defensive, offensive, and nonintervention) available by response objective
    c. Approve the level of personal protective equipment required for a given action option
    d. Develop an incident action plan, including site safety and control plan, consistent with the emergency response plan or standard operating procedures and within the capability of available personnel, personal protective equipment, and control equipment

3. Implement a response to favorably change the outcome consistent with the emergency response plan or standard operating procedures by completing the following tasks:
    a. Implement an incident command system, including the specified procedures for notification and utilization of nonlocal resources (e.g., private, state, and federal government personnel)
    b. Direct resources (private, governmental, and others) with task assignments and on-scene activities and provide management overview, technical review, and logistical support to those resources

c. Provide a focal point for information transfer to media and local elected officials through the incident command system structure

4. Evaluate the progress of the planned response to ensure the response objectives are being met safely, effectively, and efficiently and adjust the incident action plan accordingly.

5. Terminate the emergency phase of the incident by completing the following tasks:
   a. Transfer command (control) when appropriate
   b. Conduct an incident debriefing
   c. Conduct a multiagency critique
   d. Report and document the hazardous materials/WMD incident and submit the report to the designated entity

605-8.2 Competencies — Analyzing the Incident

605-8.2.1 Collecting and Interpreting Hazard and Response Information

605-8.2.1.1 Given access to printed and technical resources, computer databases, and monitoring equipment, the incident commander shall ensure the collection and interpretation of hazard and response information not available from the current edition of the DOT *Emergency Response Guidebook* or an MSDS.

605-8.2.1.2 Given access to printed and technical resources, computer databases, and monitoring equipment, the incident commander shall be able to identify and interpret the types of hazard and response information available from each of the following resources and explain the advantages and disadvantages of each resource:

1. Hazardous materials databases — examples include:
   a. CAMEO (Computer Assisted Management of Emergency Operations)
   b. MARPLOT (Mapping Applications for Response, Planning and Local Operational Tasks)
   c. ALOHA (Aerial Locations Of Hazardous Atmospheres)
   d. WISER (Wireless Informational Systems for Emergency Responders)
   e. OREIS (Operational Response Emergency Informational System)

2. Monitoring equipment — examples include:
   a. Combustible gas indicators
   b. Colorimetric tubes
   c. Photoionization detectors/flame ionization detectors
   d. Radiological survey equipment
   e. Oxygen meters
   f. Toxic Gas Sensors
   g. pH paper

h. Chemical test strips

3. Reference materials
   a. DOT Emergency Response Handbook
   b. Field Guide to Tank Guide Identification
   c. Bretherick's Handbook of Reactive Substances
   d. Emergency Care for Hazardous Materials Exposure
   e. Hawley's Condensed Chemical Dictionary
   f. NIOSH Pocket Guide
   g. CHRIS Chemical Hazards Response Information System (USCG)
   h. Dangerous Properties of Industrial Chemicals
   i. NFPA Fire Protection Guide of Hazardous Materials

4. Technical information centers (i.e., CHEMTREC/CANUTEC/ SETIQ and local, state, and federal authorities) – examples include:
   a. CHEMTREC
   b. Chlorine Institute
   c. US Coast Guard and DOT National Response Center
   d. The Agency for Toxic Substance and Disease Registry (ATSDR)
   e. National Animal Poison Control Center (NAPCC)
   f. National Pesticide Informational Center (NPIC)
   g. National Poison Control Center (Mr. Yuck)
   h. US Army Operational Center
   i. Defense Logistics Agency

5. Technical information specialists

605-8.2.2 Estimating Potential Outcomes

Given scenarios involving hazardous materials/WMD incidents, the surrounding conditions, and the predicted behavior of the container and its contents, the incident commander shall estimate the potential outcomes within the endangered area and shall complete the following tasks:

1. Identify the steps for estimating the outcomes within an endangered area of a hazardous materials/WMD incident.
   a. Determining the dimensions of the endangered area
   b. Estimating the number of exposures within the endangered area
   c. Measuring or predicting the concentrations of materials in the endangered area
   d. Estimating the physical, health, and safety hazards within the endangered area
   e. Identifying the area of potential harm within the endangered area
   f. Estimating the potential outcomes within the endangered area

2. Describe the following toxicological terms and exposure values and explain their significance in the analysis process:
   a. Counts per minute (cpm) and kilocounts per minute (kcpm)
   b. Immediately dangerous to life and health (IDLH) value

c. Infectious dose
d. Lethal concentrations (LC_{50})
e. Lethal dose (LD_{50})
f. Parts per billion (ppb)
g. Parts per million (ppm)
h. Permissible exposure limit (PEL)
i. Radiation absorbed dose (rad)
j. Roentgen equivalent man (rem); millirem (mrem); microrem (μrem)
k. Threshold limit value ceiling (TLV-C)
l. Threshold limit value short-term exposure limit (TLV-STEL)
m. Threshold limit value time-weighted average (TLV-TWA)
n. Other toxicological terms or exposure values as determined by the AHJ

3. Identify two methods for predicting the areas of potential harm within the endangered area of a hazardous materials/WMD incident.
   a. Determine the level of toxicity of the hazardous material that has been released in the endangered area
   b. Determine the length of time that persons in the endangered area would be exposed to the hazard
   c. Determine areas of potential harm using reference sources or direct monitoring instruments
      i. *Emergency Response Guidebook*
      ii. Computer dispersion models
         a) CAMEO (Computer Assisted Management of Emergency Operations)
         b) MARPLOT (Mapping Applications for Response, Planning and Local Operational Tasks)
         c) ALOHA (Aerial Locations Of Hazardous Atmospheres)
         d) WISER (Wireless Informational Systems for Emergency Responders)
      iii. Portable and fixed air-monitoring systems

4. Identify the methods available to the organization for obtaining local weather conditions and predictions for short-term future weather changes.
   a. National Weather Service
   b. Local weather service
   c. Internet weather resources, i.e. Weather Bug station locations
   d. On-scene direct monitoring instrumentation, i.e. WeatherPak

5. Explain the basic toxicological principles relative to assessment and treatment of personnel exposed to hazardous materials, including the following:
   a. Acute and delayed toxicity (chronic)
   b. Dose response
   c. Local and systemic effects

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

6. Describe the health risks associated with the following:
    a. Biological agents and biological toxins
    b. Blood agents
    c. Choking agents
    d. Irritants (riot control agents)
    e. Nerve agents
    f. Radiological materials
    g. Vesicants (blister agents)

605-8.3 Competencies — Planning the Response

605-8.3.1 Identifying Response Objectives

Given an analysis of a hazardous materials/WMD incident, the incident commander shall be able to describe the steps for determining response objectives (defensive, offensive, and nonintervention).

605-8.3.2 Identifying the Potential Response Options

Given scenarios involving hazardous materials/WMD, the incident commander shall identify the possible response options (defensive, offensive, and nonintervention) by response objective for each problem and shall complete the following tasks:

1. Identify the possible response options to accomplish a given response objective.
    a. Offensive
        i. Rescue
        ii. Public Protective Actions
        iii. Spill Control
        iv. Leak Control
        v. Fire Control
        vi. Clean up and recovery
    b. Defensive
        i. Public Protective Actions
        ii. Spill Control
        iii. Fire Control
        iv. Clean up and recovery
    c. Non intervention - Public Protective Actions

2. Identify the purpose of each of the following techniques for hazardous materials control:
    a. Absorption

b. Adsorption
c. Blanketing
d. Covering
e. Contamination isolation
f. Damming
g. Diking
h. Dilution
i. Dispersion
j. Diversion
k. Fire suppression
l. Neutralization
    i. For corrosive releases
        a) Not for use on living tissue – use primarily on decon equipment or neutralize spills
        b) Process generates heat
        c) Final solution should be as close to pH 7 as possible
        d) pH disposal guidelines dependent on AHJ
    ii. For other chemical releases
        a) Consult technical reference
        b) Process typically generates heat
        c) pH disposal guidelines dependent on AHJ
m. Overpacking
n. Patching
o. Plugging
p. Pressure isolation and reduction (flaring; venting; vent and burn; isolation of valves, pumps, or energy sources)
q. Retention
r. Solidification
s. Transfer
t. Vapor control (dispersion, suppression)

605.8.3.3 Approving the Level of Personal Protective Equipment

Given scenarios involving hazardous materials/WMD with known and unknown hazardous materials/WMD, the incident commander shall approve the personal protective equipment for the response options specified in the incident action plan in each situation and shall complete the following tasks:

1. Identify the four levels of chemical protection (EPA/OSHA) and describe the equipment required for each level and the conditions under which each level is used.
    a. Level A – Vapor Protective Chemical Protective Clothing (CPC)
        i. Encapsulated garment
        ii. Requires SCBA (positive pressure self contained breathing apparatus) or SAR (supplied air respirator) use
    b. Level B – Splash Protective CPC
        i. Encapsulated garment
        ii. Non-encapsulated garment

iii. Requires SCBA or SAR use

c. Level C – Splash Protective CPC
   i. Non-encapsulated garment
   ii. Utilizes APR (air purifying respirator) or PAPR (powered air purifying respirator)

d. Level D – Non-emergency/hazardous materials response work clothing

e. Chemical protective clothing for Level A, Level B or Level C ensembles should be selected based on one of the following applicable criteria:
   i. NFPA 1991 *Standard on Vapor Protective Ensembles for Hazardous Materials Emergencies*
   ii. NFPA 1992 *Standard on Liquid Splash Protective Ensembles and Clothing for Hazardous Materials Emergencies*
   iii. NFPA 1994 *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*

2. Describe the following terms and explain their impact and significance on the selection of chemical-protective clothing:
   a. Degradation
   b. Penetration
   c. Permeation

3. Describe three safety considerations for personnel working in vapor-protective, liquid-splash–protective and high temperature–protective clothing.
   a. Loss of dexterity
   b. Limited vision
   c. Reduced communications capability
   d. Heat and/or cold stress
   e. Need for rehabilitation

4. Identify the physiological and psychological stresses that can affect users of personal protective equipment.
   a. Physiological
      i. Extreme heat or cold operating conditions
      ii. Noise
      iii. Reduced vision from fogging of CPC or SCBA face pieces
      iv. Operations in low-light or low-visibility environments
      v. Reduced handling and dexterity due to the need to wear several layers of gloves
      vi. Adverse weather conditions
      vii. Physical hazards and the physical operating environment
   b. Psychological
      i. Lack of physical fitness and the physical ability to perform the required tasks

ii. Response operations involving injuries, fatalities or high-risk operations
iii. Operations within enclosed or confined space environments
iv. Background and experience levels in both wearing CPC and operating in hostile environments
v. Fear of either suit or respiratory protection failure

605-8.3.4 Developing an Incident Action Plan

Given scenarios involving hazardous materials/WMD incidents, the incident commander shall develop an incident action plan, including site safety and control plan, consistent with the emergency response plan or standard operating procedures and within the capability of the available personnel, personal protective equipment, and control equipment, and shall complete the tasks in 8.3.4.1 through 8.3.4.5.5.

605-8.3.4.1 The incident commander shall identify the steps for developing an incident action plan.

1. Analyze - Analyze the incident

2. Plan - Develop the Incident Action Plan including the following:
   a. Site restrictions
   b. Entry objectives
   c. On-scene organization and control
   d. Selection of personal protective equipment
   e. Site safety plan (ICS 208HM)
   f. Communications procedures
   g. Emergency procedures and personnel accountability
   h. Emergency medical care arrangements
   i. Rehabilitation plan
   j. Decontamination procedures
   k. On-scene work assignments (branches)
   l. Ensure debriefing and critiquing of the incident is conducted once the incident is terminated
   m. Document the plan using:
      i. Appropriate regulatory agency methods as necessary
      ii. Department of Homeland Security – National Incident Management System/Incident Command System standardized forms
         a) ICS 201 Incident Briefing Form
         b) ICS 202 Incident Objectives Worksheet
         c) ICS 203 Organization Assignment List
         d) ICS 204 Division Assignment List
         e) ICS 205 Communications Plan
         f) ICS 206 Medical Plan
         g) ICS 208HM Site Safety and Control Plan
         h) ICS 211 Incident Check-in List

i) ICS 213 General Message
j) ICS 214 Unit Log
k) ICS 215 Incident Planning Worksheet
l) ICS 215A Incident Action Plan Safety Analysis

3. Implement - Implement the plan

4. Evaluate - Evaluate the plan's effectiveness and revise as necessary

605-8.3.4.2 The Incident Commander shall identify the factors to be evaluated in selecting public protective actions, including evacuation and sheltering in-place.

1. The Hazardous Material Involved
   a. Degree of health hazard
   b. Chemical and physical properties
   c. Amount involved
   d. Containment/control of release
   e. Rate of vapor movement

2. The Population Threatened
   a. Location
   b. Number of people
   c. Time available to evacuate or shelter in place
   d. Ability to control evacuation or shelter-in-place
   e. Building types and availability
   f. Special institutions or populations, e.g., nursing homes, hospitals, prisons

3. Weather Conditions
   a. Effect on vapor and cloud movement
   b. Potential for change
   c. Effect on evacuation or protection in-place

605-8.3.4.3 Given the emergency response plan or standard operating procedures, the incident commander shall identify which entity will perform the following:

1. Receive the initial notification

2. Provide secondary notification and activation of response agencies

3. Make ongoing assessments of the situation

4. Command on-scene personnel (incident management system)

5. Coordinate support and mutual aid

6. Provide law enforcement and on-scene security (crowd control)

7. Provide traffic control and rerouting

8. Provide resources for public safety protective action (evacuation or shelter in place)

9. Provide fire suppression services

10. Provide on-scene medical assistance (ambulance) and medical treatment (hospital)

11. Provide public notification (warning)

12. Provide public information (news media statements)

13. Provide on-scene communications support

14. Provide emergency on-scene decontamination

15. Provide operations-level hazard control services

16. Provide technician-level hazard mitigation services

17. Provide environmental remedial action (cleanup) services

18. Provide environmental monitoring

19. Implement on-site accountability

20. Provide on-site responder identification

21. Provide incident command post security

22. Provide incident or crime scene investigation

23. Provide evidence collection and sampling

605-8.3.4.4 The incident commander shall identify the process for determining the effectiveness of a response option based on the potential outcomes.

1. Evaluate the effectiveness of the response based on:
   a. Are the IAP objectives being met?
   b. What problems have arisen?

2. Revise or modify the incident action plan based on identified needs

3. Reevaluate the effectiveness of the revised IAP

4. Continually monitor the effectiveness of the IAP

605-8.3.4.5 The incident commander shall identify the safe operating practices and procedures that are required to be followed at a hazardous materials/WMD incident.

1. Approach cautiously from upwind, uphill and up stream

2. Secure the scene
   a. Establish command
   b. Implement ICS
   c. Implement isolation zones

3. Identify the hazards

4. Assess the situation - perform hazard and risk analysis

5. Obtain help as needed
   a. Ensure that all responders are only assigned to duties commensurate with their level of training
   b. Awareness level personnel cannot intervene directly with the material
   c. Operations level personnel can only perform defensive response tasks
   d. Operations personnel trained to a mission specific competency may perform that task under the direct supervision of Technician level personnel
   e. Technician level personnel may perform offensive response activities
   f. Specialist personnel may provide technical assistance, advice or response support depending on their degree of training
   g. Skilled support personnel may operate special equipment needed to support the response. They may not have any hazardous materials training and must be adequately briefed prior to being utilized.

6. Decide on site entry – if applicable

7. Respond
   a. Develop IAP
   b. Develop site safety plan
   c. Implement IAP

8. Above all, do not come into contact with the material
   a. Do not smell the material
   b. Do not touch the material
   c. Do not taste the material

605-8.3.4.5.1 The incident commander shall identify the importance of pre-incident planning relating to safety during responses to specific sites.

605-8.3.4.5.2 The incident commander shall identify the procedures for presenting a safety briefing prior to allowing personnel to work on a hazardous materials/WMD incident.

1. Orient personnel to the scene

2. Identify objectives

3. Identify scene safety and health considerations

4. Designate a safety officer

5. Identify emergency medical care procedures – ICS 206 Medical Plan

6. Establish environmental monitoring

7. Identify emergency procedures
    a. Communications plan
    b. Safe havens
    c. Back-up team
    d. Buddy system
    e. Establish decon plan – have technical decon and emergency decon procedures in place
    f. Identify SOPs and other safe work practices that apply

8. Conduct personnel monitoring
    a. Pre and post entry medical screening
    b. Personnel accountability

605-8.3.4.5.3 The incident commander shall identify at least three safety precautions associated with search and rescue missions at hazardous materials/WMD incidents.

1. Buddy system

2. Back-up team

3. PPE requirements - based on scene size-up and the hazard and risk analysis

605-8.3.4.5.4 The incident commander shall identify the advantages and limitations of the following and describe an example where each decontamination method would be used:

1. Absorption

2. Adsorption

3. Chemical degradation

4. Dilution

5. Disinfection

6. Evaporation

7. Isolation and disposal

8. Neutralization

9. Solidification

10. Sterilization

11. Vacuuming

12. Washing

605-8.3.4.5.5 The incident commander shall identify the atmospheric and physical safety hazards associated with hazardous materials/WMD incidents involving confined spaces.

1. Atmospheric hazards
    a. Oxygen-deficient atmosphere
    b. Oxygen-enriched atmosphere
    c. Flammable and explosive atmospheres
    d. Toxic atmosphere

2. Physical hazards
    a. Engulfment hazards
    b. Falls and slips
    c. Electrical hazards
    d. Structural hazards
        i. Limited egress
        ii. Extended travel distances
        iii. Darkness
    e. Mechanical hazards
    f. Poor communications

605-8.4 Competencies — Implementing the Planned Response

605-8.4.1 Implementing an Incident Command System

Given a copy of the emergency response plan and annexes related to hazardous materials/WMD, the incident commander shall identify the requirements of the plan, including the procedures for notification and utilization of nonlocal resources (private, state, and federal government personnel), by completing the following requirements:

1. Identify the role of the incident commander during a hazardous materials/WMD incident.
    a. The incident commander (IC) shall be that person responsible for all incident activities, including the development of strategies and tactics and the ordering and release of resources.
    b. The incident commander is the responder in charge of a single command ICS structure.

2. Describe the concept of unified command and its application and use at a hazardous materials/WMD incident.
    a. Unified command involves establishing a unified command team of command-level representatives from each of the primary responding agencies that develop strategies and tactics and authorize the ordering and release of resources.
    b. Unified command team shares command responsibilities but the responsible party plays the lead role.

3. Identify the duties and responsibilities of the following hazardous materials branch/group functions within the incident command system:
    a. Decontamination
    b. Entry (backup)
    c. Hazardous materials branch director or group supervisor
    d. Hazardous materials safety
    e. Information and research

4. Identify the steps for implementing the emergency response plans required under Title III Emergency Planning and Community Right-to-Know Act (EPCRA) of the Superfund Amendments and Reauthorization Act (SARA) Section 303, or other state and emergency response planning legislation.
    a. An event occurs
    b. The emergency management/response system is activated
    c. Responders respond to the scene
    d. The local, state, federal, or facility response plan is implemented per AHJ

5. Given the emergency response planning documents, identify the elements of each of the documents.
    a. Facility emergency response plans
    b. Pre-incident tactical plans
    c. Published emergency response references
    d. Shipping documents

6. Identify the elements of the incident management system/incident command system (IMS/ICS) necessary to coordinate response activities at hazardous materials/WMD incidents.
    a. Command staff
        i. Incident commander
        ii. Incident Safety Officer
        iii. Public Information Officer
        iv. Liaison Officer
    b. General Staff
        i. Operations Section Chief – Hazardous Materials Branch or Group
            a) Primary hazardous materials group or branch functions include:
                i) Hazardous materials branch/group supervision (Hazardous Materials Branch Director/Group Supervisor)
                ii) Safety (Assistant Safety Officer – Hazardous Materials)
                iii) Site Access Control (Site Access Control Unit Leader)
                    (a) Establishes Hazard Control Zones
                    (b) Manages Safe Refuge Area
                iv) Entry Team Operations (Entry Team Leader)
                    (a) Recon team
                    (b) Entry team(s)
                    (c) Back-up team
                v) Decontamination (Decon Team Leader)
                vi) Information/research coordination (Information/Research Team Leader)
                    (a) Technical/Product Specialist
                    (b) Environmental/Remediation Contractors
                    (c) Governmental or External Agency Liaisons
            b) Secondary hazardous materials group or branch functions include:
                i) Resources/logistics
                ii) Medical (Medical Unit Leader)
                iii) Incident rehabilitation (Rehabilitation Unit Leader)
                iv) The above secondary functions are performed by the Hazardous Materials Branch/Group only if they are not being performed by the logistics section, i.e., logistics section has not been activated.
        ii. Planning Section Chief – as applicable

iii. Logistics Section Chief – as applicable
iv. Finance/Admin. Section Chief – as applicable

7. Identify the primary government agencies and identify the scope of their regulatory authority (including the regulations) pertaining to the production, transportation, storage, and use of hazardous materials and the disposal of hazardous wastes.
   a. Federal
      i. DHS – Department of Homeland Security
      ii. DOT – Department of Transportation
      iii. EPA – Environmental Protection Agency
      iv. FAA – Federal Aviation Administration
      v. NRC – Nuclear Regulatory Commission
      vi. OSHA – Occupational Safety and Health Administration
      vii. USCG – United States Coast Guard
   b. State
      i. DPS – Department of Public Safety
      ii. Railroad Commission
      iii. TCEQ – Texas Commission on Environmental Quality
      iv. TDSHS – Texas Department of State Health Services
      v. TGLO – Texas General Land Office
      vi. TXDOT – Texas Department of Transportation
   c. Local
      i. Local emergency management
      ii. Local county/municipal agencies

8. Identify the governmental agencies and resources that can offer assistance during a hazardous materials/WMD incident and identify their role and the type of assistance or resources that might be available.
   a. Federal
      i. DHS - Homeland Security Issues
      ii. FBI - Crisis Management
      iii. FEMA - Consequence Management
      iv. EPA - Environmental Management
      v. US Coast Guard – Navigable Waterway Management & Port Security
      vi. DOD - Explosives, Munitions, Military Shipments Technical Assistance/Response
      vii. ATF - Explosives Technical Assistance
   b. State
      i. DPS - District Disaster Chair (DDC)
      ii. TDEM – Emergency Management
      iii. TCEQ - Environmental Management
      iv. TGLO - Water Quality
      v. TRRC - Pipelines and Propane Storage
   c. Local
      i. Local emergency management
      ii. Local fire department

iii. Local police department
iv. EMS providers

605-8.4.2 Directing Resources (Private and Governmental)

Given a scenario involving a hazardous materials/WMD incident and the necessary resources to implement the planned response, the incident commander shall demonstrate the ability to direct the resources in a safe and efficient manner consistent with the capabilities of those resources.

Criteria and factors should include the following:

1. Task assignment (based on strategic and tactical options)

2. Operational safety

3. Operational effectiveness

4. Planning support

5. Logistics support

6. Administrative support

605-8.4.3 Providing a Focal Point for Information Transfer to the Media and Elected Officials

Given a scenario involving a hazardous materials/WMD incident, the incident commander shall identify information to be provided to the media and local, state, and federal officials and shall complete the following tasks:

1. Identify the local policy for providing information to the media. (AHJ)

2. Identify the responsibilities of the public information officer and the liaison officer at a hazardous materials/WMD incident.

3. Describe the concept of a joint information center (JIC) and its application and use at a hazardous materials/WMD incident.

605-8.5 Competencies — Evaluating Progress

605-8.5.1 Evaluating Progress of the Incident Action Plan

Given scenarios involving hazardous materials/WMD incidents, the incident commander shall evaluate the progress of the incident action plan to determine whether the efforts are accomplishing the response objectives and shall complete the following tasks:

1. Identify the procedures for evaluating whether the response options are effective in accomplishing the objectives.
    a. Evaluate the effectiveness of the response based on:

i. Are the IAP objectives being met?
ii. What problems have arisen?

b. Revise or modify the incident action plan based on identified needs
c. Reevaluate the effectiveness of the revised IAP
d. Continually monitor the effectiveness of the IAP

2. Identify the steps for comparing actual behavior of the material and the container to that predicted in the analysis process.

Identifying and predicting material and container behavior can be done utilizing the General Hazardous Materials Behavior Model which includes identifying the following:

a. Stress event
i. Thermal stress
ii. Mechanical stress
iii. Chemical stress
b. Breach event
i. Disintegration
ii. Runaway Cracking
iii. Failure of Container Attachments
iv. Container Punctures
v. Container Splits or Tears
c. Release event
i. Detonation
ii. Violent Rupture
iii. Rapid Relief
iv. Spills or Leaks
d. Engulfing event
i. Identify the hazardous material or the energy likely to engulf the area
ii. What form is the energy or matter in?
iii. What is making it move?
iv. What path will it follow?
v. What type of dispersion pattern will it create?
a) Cloud
b) Cone
c) Plume
d) Stream
e) Irregular
e. Impingement event (typically categorized based on duration)
i. Harmful characteristics of material
ii. Concentration of the hazardous material
iii. Duration of the impingement
iv. Characteristics of the exposure
f. Harm event
i. Thermal
ii. Toxicity/poison

iii. Radiation
iv. Asphyxiation
v. Corrosivity
vi. Etiological
vii. Mechanical

3. Determine the effectiveness of the following:
   a. Control, containment, or confinement operations
   b. Decontamination process
   c. Established control zones
   d. Personnel being used
   e. Personal protective equipment

4. Make modifications to the incident action plan as necessary.

605.8.5.2 Transferring Command and Control Both During the Response Phase and the Post-Response Phase

Given a scenario involving a hazardous materials/WMD incident, the emergency response plan, and standard operating procedures, the incident commander shall be able to identify the steps to be taken to transfer command and control of the incident

1. Transfer of Command briefings should include the following information
   a. Nature of the emergency
   b. Actions taken to stabilize and resolve the emergency
   c. Resource(s) status
   d. Name and amount of hazardous material(s) involved
   e. Hazards and risks that were mitigated and those that still exist
   f. Safety procedures
   g. Relevant documentation and points of contact
   h. Parties responsible for the spill
   i. Law enforcement agencies responsible for traffic control
   j. State, municipal, or other regulatory authority having jurisdiction

605.8.6 Competencies – Terminating the Incident

605.8.6.1 Terminating Response Operations

Given a scenario involving a hazardous materials/WMD incident in which the incident action plan objectives have been achieved, the hazardous materials incident commander shall describe the steps taken to terminate the incident consistent with the emergency response plan and/or standard operating procedures and shall complete the following tasks:

1. Identify the steps required for terminating the hazardous materials/WMD incident
   a. Conduct debriefings
   b. After action review or critique
   c. Post incident analysis

d. Incident reporting/documentation

2. Identify the procedures for conducting incident debriefings at a hazardous materials/WMD incident
   a. Select a facilitator
   b. Inform responders of potential exposures
   c. Signs and symptoms of potential exposures
   d. Identify damaged equipment
   e. Identify expended supplies
   f. Identify equipment decontamination or disposal needs
   g. Identify unsafe site conditions
   h. Assign information gathering responsibilities
   i. Assess need for critical incident stress management (formerly CISD)
   j. Assign a point of contact

605-8.6.2 Conducting a Debriefing

Given scenarios involving a hazardous materials/WMD incident, the incident commander shall conduct a debriefing of the incident and shall complete the following tasks:

An effective debriefing should address the following informational issues regarding response activities:

- Positive aspects – Identify strengths or things that went well that need to be maintained or continued
- Negative aspects – Identify weaknesses that went poorly and need to be corrected
- Unique aspects – Unusual or unsuspected conditions that may need to be addressed or planned for

1. Describe three components of an effective debriefing.
   a. Inform responders of the potential signs and symptoms of any possible hazardous materials exposures
   b. Identify:
      i. Damaged equipment
      ii. Expended supplies
      iii. Items that need to be disposed
      iv. Unsafe site conditions
   c. Assign:
      i. information gathering responsibilities for a post-incident analysis and critique
      ii. Point of contact for any follow up on incident related issues
   d. Assess the need for Critical Incident Stress Management (formerly CISD)

2. Describe the key topics in an effective debriefing.
   a. Health information
   b. Equipment and apparatus exposure review

c. A follow-up contact person
d. Problems requiring immediate action
e. Thank you!

3. Describe when a debriefing should take place.
   a. As soon as the "emergency phase" of the incident is over
   b. Should be before any responders leave the scene

4. Describe who should be involved in a debriefing.
   a. Hazardous Materials Response Team
   b. Incident Commander
   c. Section Chiefs/Branch Directors/Division and Group Supervisors, etc.
   d. Information Officer
   e. Agency representatives or key players as determined by the Incident Commander (i.e. Safety Officer and Agency Liaisons)

5. Identify the procedures for conducting incident debriefings at a hazardous materials/WMD incident.

605.8.6.3 Conducting a Critique

Given details of a scenario involving a multiagency hazardous materials/WMD incident, the incident commander shall conduct a critique of the incident and shall complete the following tasks:

1. Describe three components of an effective critique.
   a. Direction
   b. Participation
   c. Solutions

2. Describe who should be involved in a critique.
   a. Hazardous Materials Response Team
   b. Incident Commander
   c. Section Chiefs/Branch Directors/Division and Group Supervisors, etc.
   d. Information Officer
   e. Agency representatives or key players as determined by the Incident Commander (i.e. Safety Officer and Agency Liaisons)

3. Describe why an effective critique is necessary after a hazardous materials/WMD incident.
   a. Develop recommendations for improving the emergency response team
   b. Promotes systems-dependent operations rather than people-dependent organizations
   c. Promotes a willingness to cooperate through teamwork
   d. Promotes improvement of safe operating procedures

e. Promotes sharing of information among emergency response organizations

4. Describe what written documents should be prepared as a result of the critique.
   a. Post-Critique Report
   b. Formal-Critique Report

5. Implement the procedure for conducting a critique of the incident.

605.8.6.4 Reporting and Documenting the Hazardous Materials/WMD Incident

Given a scenario involving a hazardous materials/WMD incident, the incident commander shall demonstrate the ability to report and document the incident consistent with local, state, and federal requirements and shall complete the following tasks:

1. Identify the reporting requirements of the federal, state, and local agencies.
   a. Incident action plan and all components
   b. Site safety plan and all components
   c. Other documentation required by AHJ

2. Identify the importance of the documentation for a hazardous materials/WMD incident, including training records, exposure records, incident reports, and critique reports.

3. Identify the steps in keeping an activity log and exposure records for hazardous materials/WMD incidents.
   a. Activity log
      i. Record major event(s)
      ii. Record time major event(s) occurred
      iii. Briefly describe major event(s)
      iv. Additional information to include
         a) Information that may assist in the investigation or cost recovery process
         b) Task assignments
         c) Task completion
         d) Injuries and exposures
   b. Exposure records
      i. General information
         a) Name of exposed worker
         b) Personal ID number
         c) Assignment/station
         d) Incident date
         e) Incident number
         f) Incident location
      ii. Nature of incident
      iii. Level of personal protection

iv. Emergency response activity
v. Exposure data
    a) Method of exposure
    b) Duration of exposure
vi. Medical treatment provided
    a) Signs and symptoms
    b) On-scene medical treatment
    c) Medical facility treatment
    d) Follow-up action required
vii. Medical treatment provided
    a) Comment section
    b) Individual's signature and date
    c) Officer's signature and date

4. Identify the requirements for compiling hazardous materials/WMD incident reports found in the emergency response plan or standard operating procedures.

5. Identify the requirements for filing documents and maintaining records found in the emergency response plan or standard operating procedures.

6. Identify the procedures required for legal documentation and chain of custody and continuity described in the standard operating procedures or the emergency response plan.

Hazardous Materials Training
Equipment & Prop List

The following are minimal recommended supplies necessary for hazardous materials training at the below listed levels of certification. Variations may exist based on the needs of each AHJ and any mission-specific job tasks as assigned by an AHJ.

Hazardous Materials Awareness

Department of Transportation's *Emergency Response Guidebook* (ERG) (current ed.)
Material Safety Data Sheet (MSDS) or Safety Data Sheets (SDS) – Samples
Placards & Labels
Transportation/Shipping document – Sample
NFPA 704 sample
Safety Vests
Binoculars

Hazardous Materials Operations

All awareness equipment *plus…*
Structural Firefighter Protective Ensemble (bunker gear)

Reference Material:

- NIOSH *Pocket Guide to Chemical Hazards*
- NFPA *Hazardous Materials / Weapons of Mass Destruction Response Handbook* (current edition)
- Pesticide label example

Respiratory Protection to include:

- Air Purifying Respirator (APR-half mask)
- Air Purifying Respirator (APR-full face)
- SCBA

Chemical Protective Clothing to include:

- Vapor Protective CPC (Level A)
- Splash Protective Encapsulated CPC (Level B)
- Splash Protective Non-Encapsulated CPC (Level B, Level C)
- Chemical Boots (Rubber Boots for training only)
- Inner/Outer gloves - assorted types
- Chem Tape (duct tape for training only)

Fire Hose, Foam Nozzles and Eductors, Foam
Pictures/slides of various railcar, intermodal, and highway cargo trailers
Pictures/slides of bulk and non-bulk containers, and fixed facility containment systems

Defensive Spill Equipment:

- Absorbent/Adsorbent
- Broom/Shovel
- 5-gallon buckets
- Assortment of boom and pads

Decontamination Equipment:

- Poly sheeting or tarp
- Duct tape
- Traffic cone(s)
- Decon Pools
- Sprayer(s)
- Garden hose(s) and sprayer/nozzles
- 5-gallon bucket(s)
- Various Decon solution(s)
- Folding chairs
- Overpack drum

Various monitoring detection equipment as may be required. Examples *may* include:

- Combustible Gas Indicator
- Oxygen Meter
- Radiation Detector

Hazardous Materials Operations – Mission Specific Competencies

Equipment needed for training to Hazardous Materials Operations – Mission Specific Competencies will be based the competencies themselves and the authority having jurisdiction (AHJ). Equipment, at a minimum, will include that which is required to train to the Hazardous Materials Operations Level. Additional equipment or props may include part or all of the equipment listed below for Hazardous Materials Technician.

For example, if training to the Mission Specific Competencies: Air Monitoring and Sampling is to be performed, additional monitoring detection and sampling equipment will be required.

Hazardous Materials Technician

Awareness and Operations equipment *plus…*

Reference Material:

- CPC Permeation Guides/Tables
- BOE/AAR *Field Guide to Railcar Identification*
- NFPA *Fire Protection Guide to Hazardous Materials Detection*
- Other printed or electronic publications/databases as may be required by the AHJ

Various monitoring detection equipment and corresponding samples to include:

- Combustible Gas Indicator
- Oxygen Meter
- Carbon monoxide meter
- Gas specific meter
- Photoionization detector
- Radiation Detectors (alpha, beta, gamma)
- Colorimetric tubes, pump
- Classifier/detection strips and reagents
- pH paper or pH meter
- additional monitoring and detection equipment as may be required by AHJ
- Calibration kit(s) as required for above

Leak & Spill Equipment:

- Plugging/patching supplies
- Leaking drum(s): metal & poly
- Overpack drum(s)
- Leak pipe simulator
- 150 lbs. Chlorine cylinder leak prop
    - Chlorine emergency kit type “A”
- Chlorine 1-Ton cylinder leak prop
    - Chlorine emergency kit type “B”
- Pressure Railcar dome leak prop
    - Chlorine emergency kit type “C” or Midland kit
- Cargo Tank Leak Simulator (MC-306/DOT-406 Dome)
- Dome Cover Clamp
- Grounding & Bonding Kit
- Product Transfer Equipment
- Misc. Hand Tools (e.g., hand wrenches, bung wrench, spanner wrench, mallet, screwdrivers, etc.)

Command and Control Equipment/Forms (e.g., Incident Action Plan, Site Safety Plan, Medical Plan, Communication Plan - all NIMS/ICS compliant)

Hazardous Materials Incident Commander

Reference Material

- Department of Transportation’s *Emergency Response Guidebook* (ERG) (current ed.)
- Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) - Samples
- Transportation/Shipping document – Sample
- NIOSH *Pocket Guide to Chemical Hazards*

- NFPA *Hazardous Materials / Weapons of Mass Destruction Response Handbook* (current edition)
- CPC Permeation Guides/Tables
- BOE/AAR *Field Guide to Railcar Identification*
- NFPA *Fire Protection Guide to Hazardous Materials Detection*
- Other printed or electronic publications/databases as may be required by the AHJ

Command and Control Equipment/Forms

- Department of Homeland Security – National Incident Management System/Incident Command System standardized forms
    - ICS 201 Incident Briefing Form
    - ICS 202 Incident Objectives Worksheet
    - ICS 203 Organization Assignment List
    - ICS 204 Division Assignment List
    - ICS 205 Communications Plan
    - ICS 206 Medical Plan
    - ICS 208HM Site Safety and Control Plan
    - ICS 211 Incident Check-in List
    - ICS 213 General Message
    - ICS 214 Unit Log
    - ICS 215 Incident Planning Worksheet
    - ICS 215A Incident Action Plan Safety Analysis

4. **Report from the Curriculum and Testing Committee regarding possible changes to the Certification Curriculum Manual as follows:**

   c. **Fire Instructor Curriculum**

CERTIFICATION CURRICULUM MANUAL

CHAPTER EIGHT

FIRE INSTRUCTOR

NFPA 1041, 2019~~2012~~ Edition

Effective January 1, 2021~~January 1, 2014~~

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

Course Instructor Information

Fire Instructor I, II and III

Overview
The Fire Instructor curricula are designed to provide clear guidance that ensures adequate presentation of the information required to meet the Job Performance Requirements (JPRs) of National Fire Protection Association (NFPA) 1041, *Standard for Fire Service Instructor Professional Qualifications*, **2019** edition.

Commented [WC1]: All wording changes are to match the changes in the NFPA standard unless another explanation is provided in a comment.

The Fire Instructor curricula make up Chapter 8 of the TCFP Curriculum Manual.

Certification Level	TCFP Section Number	NFPA 1041 Chapter
Fire Instructor I	801	4
Fire Instructor II	802	5
Fire Instructor III	803	6

Layout
The NFPA numbering sequence is mirrored to allow easy correlation between this document and the NFPA Standard. For example, 801-4.4.5 identifies the section in Instructor I that corresponds to NFPA section 4.4.5.

When a section references information from "Annex A Explanatory Material" in the NFPA Standard, it is identified by adding an "A" to the section number. For example, 802-A.5.4.3 identifies the section in Instructor II that corresponds to NFPA Annex A information for NFPA section 5.4.3.

TCFP Standards Manual
It is critical that you review the chapters in the TCFP Standards Manual that apply to this curriculum. Of primary importance are the following three chapters. Definitions of key terms are located in Chapter 439; Minimum standards for Fire Instructor certification are located in Chapter 425; Requirements for training facilities, including instructor requirements are located in Chapter 427. These chapters do not address every issue that could impact this curriculum; therefore, you are encouraged to become familiar with the TCFP Standards Manual.

Components of the Curricula
Each section of a curriculum identifies the NFPA Job Performance Requirement (JPR) and subdivides the requisite knowledge requirements into learning components. For example:

View within the Curriculum		Explanation
801-4.2.5	Complete training records and **reports**, given policies and procedures and forms, so that required reports are accurate and submitted in accordance with the procedures.	**Section Number and NFPA JPR**
	a. Types of records and reports required	**First part of Requisite Knowledge**
	b. Policies and procedures for processing records and reports	**Second part of Requisite Knowledge**

Commented [WC2]: New format for Requisite Knowledge:
•Expanded outline not needed, information covered well enough in the textbooks
•Knowledge items listed as a, b, c, etc. to match the numbering system used for instructors to see how their students scored on the knowledge items covered in the TCFP certification exam.

Skills
NFPA Requisite Skill requirements are addressed in the corresponding Skill Sheets.

NFPA Definitions of Certification Levels
Instructor I: A fire service instructor who has demonstrated the knowledge and ability to deliver instruction effectively from a prepared lesson plan, including instructional **technology tools** and evaluation instruments; adapt lesson plans to the unique requirements of the students and authority having jurisdiction; organize the learning environment so that learning and safety are maximized; and meet the record-keeping requirements of authority having jurisdiction.

Instructor II: A fire service instructor who, in addition to meeting Instructor I qualifications, has demonstrated the knowledge and ability to develop individual lesson plans for a specific topic including learning objectives, instructional **technology tools** , and evaluation instruments; schedule training sessions based on overall training plan of authority having jurisdiction; and supervise and coordinate the activities of other instructors.

Instructor III: A fire service instructor who, in addition to meeting Instructor II qualifications, has demonstrated the knowledge and ability to develop comprehensive training curriculum and programs for use by single or multiple organizations; conduct organization needs analysis; design **records management** and scheduling systems; and develop training goals and implementation strategies.

INSTRUCTOR I

CHAPTER EIGHT

FIRE INSTRUCTOR I

CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
801-4.1	General	1
801-4.2	Program Management	7
801-4.3	Instructional Development	16
801-4.4	Instructional Delivery	16
801-4.5	Evaluation and Testing	8
	TOTAL RECOMMENDED HOURS	**48**

Commented [WC3]: No changes to the Fire Instructor I hours.

REFERENCE LIST FOR THE FIRE INSTRUCTOR I CURRICULUM

Commented [WC4]: All changes just to reflect newest editions of reference materials.

Fire and Emergency Services Instructor (**9th** ed.). (**2019**). Stillwater, OK: International Fire Service Training Association, Oklahoma State University.

Fire and Emergency Services *Instructor: Principles and Practice* (**3rd** ed.). (**2020**). Burlington, MA: Jones and Bartlett Learning.

NFPA 1041: Standard for Fire Service Instructor Professional Qualifications (**2019** ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 1401: Recommended Practice for Fire Service Training Reports and Records (**2017** ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

NFPA 1403: Standard on Live Fire Training Evolutions (**2018** ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

Standards Manual for Fire Protection Personnel. Austin, TX: Texas Commission on Fire Protection.

SECTION 801

FIRE INSTRUCTOR I

Commented [WC5]: All wording changes to this Fire Instructor I curriculum are to match the changes in the NFPA standard unless another explanation is provided in a comment.

A Fire Instructor I is a fire service instructor who has demonstrated the knowledge and ability to:

- deliver instruction effectively from a prepared lesson plan, including instructional aids and evaluation instruments;
- adapt lesson plans to the unique requirements of the students and authority having jurisdiction (AHJ);
- organize the learning environment so that learning is maximized;
- meet the record-keeping requirements of the AHJ.

801-4.1 General

801-4.1.1 The Fire **and Emergency Services** Instructor I shall meet the JPRs defined in Sections 801-4.2 through 801-4.5 and meet any other certification requirements.

801-4.2 Program Management

801-4.2.1 **Definition of Duty.** The management of basic resources**,** records**,** and reports essential to the instructional process.

801-4.2.2 Assemble course materials, given a specific topic, so that the lesson plan and all materials, resources, and equipment needed o deliver the lesson are obtained.

Requisite Knowledge:

a. Components of a lesson plan

b. Policies and procedures for the procurement of material and equipment, and resource availability

Commented [WC6]: New format for Requisite Knowledge:
•Expanded outline not needed, information covered well enough in the textbooks
•Knowledge items listed as a, b, c, etc. to match the numbering system used for instructors to see how their students scored on the knowledge items covered in the TCFP certification exam.

Requisite Skills. None required.

801-4.2.3 Prepare requests for resources, given training goals and current resources, so that the resources required to meet training goals are identified and documented.

Requisite Knowledge:

a. Resource Management

b. Sources of instructional resources and equipment

Requisite Skills. Oral and written communication, forms completion.

801-4.2.4 Schedule single instructional sessions, given a training assignment, **AHJ** scheduling procedures, instructional resources, facilities and timeline for delivery, so that the specified sessions are delivered according to **AHJ** procedure.

801-A.4.2.4 There are times when a Fire and Emergency Services Instructor I may be required to schedule training sessions that are part of an overall training program, such as Fire Fighter I or to schedule individual training sessions as assigned. Coordination of the overall training calendar is the responsibility of the Fire and Emergency Services Instructor II.

Commented [WC7]: This is explanatory information from the Annex of the NFPA standard that was not previously included in the curriculum.

Requisite Knowledge:
a. AHJ scheduling procedures and resource management

Requisite Skills. Training schedule completion.

801-4.2.5 Complete training records and **reports**, given policies and procedures and forms, so that required reports are accurate and submitted in accordance with the procedures.

Requisite Knowledge:
a. Types of records and reports required

b. Policies and procedures for processing records and reports

Requisite Skills. Report writing and record completion.

801-4.3 Instructional Development

801-4.3.1 **Definition of Duty.** The review and adaptation of prepared instructional materials.

801-A.4.3.1 The Instructor I should **not** alter the content or the lesson objectives in this process.

801-4.3.2 Review instructional materials, given the materials for a specific topic, target audience, **learner characteristics,** and learning environment, so that elements of the lesson plan, learning environment, and resources that need adaptation are identified.

801-A.4.3.2 The **Fire and Emergency Services** Instructor I, prior to the start of the course, should be able to evaluate **the learning environment**, evaluate facilities for appropriateness, meet **AHJ** standard operating procedures (SOPs), and **recognize learner characteristics** of students.

Requisite Knowledge:

a. Recognition of student learner characteristics and diversity, methods of instruction, types of resource materials, organization of the learning environment, and policies and procedures

Requisite Skills. Analysis of resources, facilities, and materials.

801-4.3.3 Adapt a prepared lesson plan, given course materials and an assignment, so that the needs of the student and the objectives of the lesson plan are achieved.

801-A.4.3.3 The **Fire and Emergency Services** Instructor I should be able to modify the method of instruction and course materials to meet the needs of the student and accommodate the instructor's style. This includes **making** adaptations necessary due to the learning environment, **learner characteristics,** audience, capability of facilities, and types of equipment.

801-A.4.3.3(A) Presentation methods for the Instructor I include the following:

(1) Demonstration

(2) Illustration

(3) Lecture

(4) Individualized instruction

A lesson plan should include the following components:

(1) Job title topic

(2) Level of instruction

(3) Behavioral objectives performance objectives or learning outcomes

(4) Instructional materials needed

(5) References

(6) Preparation step (motivation)

(7) Presentation step

(8) Application step

(9) Lesson summary

(10) Evaluation step

(11) Assignment

The elements of the communication process include the following:

(1) Encoding

(2) Transmitting

(3) Receiving

(4) Decoding

Commented [WC8]: This is explanatory information from the Annex of the NFPA standard that was not previously included in the curriculum.

Requisite Knowledge:
a. Elements of a lesson plan

b. Selection of instructional aids and methods

c. Organization of the learning environment

Requisite Skills. Instructor preparation and **organization techniques**.

801-4.4 ***Instructional Delivery***

801-4.4.1 **Definition of Duty.** The delivery of instructional sessions utilizing prepared course materials.

801-4.4.2 Organize the classroom, laboratory, or outdoor learning environment, given a facility and an assignment, so that lighting, distractions, climate control or weather, noise control, seating, audiovisual equipment, teaching aids, and safety are **addressed**.

Requisite Knowledge:
a. Learning environment management and safety

b. Advantages and limitations of audiovisual equipment and teaching aids

c. Classroom arrangement

d. Methods and techniques of instruction

Requisite Skills. Use of instructional media and teaching aids.

801-4.4.3 Present **and adjust** prepared lessons, given a prepared lesson plan that specifies the presentation method(s), so that the method(s) indicated in the plan are used and the stated objectives or learning outcomes are achieved, applicable safety standards and practices are followed, and risks are addressed.

801-A4.4.3(A) Distance learning encompasses a variety of instructional strategies, including online learning, blended e-learning, web-based instruction, computer-based training, interactive television and podcasts.

Commented [WC9]: This is explanatory information from the Annex of the NFPA standard that was not previously included in the curriculum.

Requisite Knowledge:

a. **The laws and principles of learning methods and techniques of instruction, lesson plan components and elements of the communication process, and lesson plan terminology and definitions**

b. **Learner characteristics**

c. **Student-centered learning principles; instructional technology tools**

d. **The impact of cultural differences on instructional delivery**

e. **Safety rules, regulations and practices**

f. **Identification of training hazards**

g. **Elements and limitations of distance learning**

h. **Distance learning delivery methods**

i. **The instructor's role in distance learning**

Requisite Skills. Oral communication techniques, methods and techniques of instruction, **ability to adapt to changing circumstances,** and utilization of lesson plans in an instructional setting.

Commented [WC10]: This JPR was deleted from the NFPA standard. The "adjust presentation" was included in 4.4.3.

801-4.4.**4** Adjust to differences in **learner characteristics**, abilities, cultures and behaviors, given the instructional environment, so that lesson objectives are accomplished, disruptive behavior is addressed, and a safe **and positive** learning environment is maintained.

801-A.4.4.**4** Examples of disruptive behavior include, but are not limited to, harassment, abuse, discrimination, disruption of training, horseplay, and a lack of respect for others.

801-A.4.4.4(A) Factors that could influence the learning process include:

(1) Attitude

(2) Experience

(3) Knowledge

(4) Education

(5) Personality

(6) Physical condition (fatigue, illness, etc.)

(7) Unsafe behavior

(8) Motivation

(9) Competing demands for time

Commented [WC11]: This is explanatory information from the Annex of the NFPA standard that was not previously included in the curriculum.

Requisite Knowledge:
a. Motivation techniques

b. Learner characteristics

c. Types of learning disabilities and methods for dealing with them

d. Methods of dealing with disruptive and unsafe behavior.

Requisite Skills. Basic coaching and motivational techniques, correction of disruptive behaviors, and adaptation of lesson plans or materials to specific instructional situations.

801-4.4.**5** Operate **instructional technology tools** and demonstration devices, given a learning environment and equipment, so that the equipment functions**, the intended objectives are presented, and transitions between media and other parts of the presentation are accomplished**.

Requisite Knowledge:
a. Instructional technology tools, demonstration devices, selection criteria

Requisite Skills. Use of **instructional technology tools, demonstration devices, transition techniques**, cleaning, and field level maintenance.

Commented [WC12]: This JPR was deleted from the NFPA standard. The "transition between media" is included in 4.4.6.

801-4.5 Evaluation and Testing

801-4.5.1 **Definition of Duty.** The administration and grading of student evaluation instruments.

801-A.4.5.1 This duty primarily deals with student evaluation; however, the Instructor I could be required to conduct program evaluations according to policies and procedures.

801-4.5.2 Administer oral, written, and performance tests, given the lesson plan, evaluation instruments, and the evaluation procedures of the **AHJ** , so that

bias or discrimination is eliminated, the testing is conducted according to procedures and the security of the materials is maintained.

Requisite Knowledge:
a. Test administration

b. Laws and policies pertaining to discrimination during training and testing

c. Methods for eliminating testing bias

d. Laws affecting records and disclosure of training information

e. Purposes of evaluation and testing

f. Performance skills evaluation

Requisite Skills. Use of skills checklists and **assessment** techniques.

801-4.5.3 Grade student oral, written, or performance tests, given class answer sheets or skills checklists and appropriate answer keys, so the examinations are accurately graded and properly secured.

Requisite Knowledge:
a. Grading methods

b. Methods for eliminating bias during grading

c. Maintaining confidentiality of scores

Requisite Skills. None required.

801-4.5.4 Report test results, given a set of test answer sheets or skills checklists, a report form, and policies and procedures for reporting, so that the results are accurately recorded, the forms are forwarded according to procedure, and unusual circumstances are reported.

Requisite Knowledge:
a. Reporting procedures and the interpretation of test results

Requisite Skills. Communication skills and basic coaching.

801-4.5.5 Provide evaluation feedback to students, given evaluation data, so that the feedback is timely; specific enough for the student to make efforts to modify behavior; and objective, clear, and relevant; also include suggestions based on the data.

801-A.4.5.5 The **Fire and Emergency Services** Instructor I is expected to be able to assess student test results and identify areas requiring additional study and communicate this information to the student.

Requisite Knowledge:
a. Reporting procedures and the interpretation of test results

Requisite Skills. Communication skills and basic coaching.

INSTRUCTOR II

CHAPTER EIGHT

FIRE INSTRUCTOR II

CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
802-5.1	General	1
802-5.2	Program Management	16
802-5.3	Instructional Development	**10**
802-5.4	Instructional Delivery	**9**
802-5.5	Evaluation and Testing	12
	TOTAL RECOMMENDED HOURS	**48**

Commented [WC13]: Two hours removed from Instructional Delivery because NFPA deleted the JPR for modifying a lesson plan.

Commented [WC14]: Two hours added to Instructional Delivery because NFPA added new requisite knowledge items such as student-centered learning methods, problem-solving techniques, instructional technology tools, evaluation tools, etc.

Commented [WC15]: Total recommended hours remain the same at 48 hours.

REFERENCE LIST FOR THE FIRE INSTRUCTOR II CURRICULUM

Commented [WC16]: All changes just to reflect newest editions of reference materials.

Fire and Emergency Services Instructor (**9th** ed.). (**2019**). Stillwater, OK: International Fire Service Training Association, Oklahoma State University.

Fire and Emergency Services *Instructor: Principles and Practice* (**3rd** ed.). (**2020**). Burlington, MA: Jones and Bartlett Learning.

NFPA 1041: Standard for Fire Service Instructor Professional Qualifications (**2019** ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 1401: Recommended Practice for Fire Service Training Reports and Records (**2017** ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

NFPA 1403: Standard on Live Fire Training Evolutions (**2018** ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

Standards Manual for Fire Protection Personnel. Austin, TX: Texas Commission on Fire Protection.

SECTION 802

FIRE INSTRUCTOR II

Commented [WC17]: All wording changes to this Fire Instructor II curriculum are to match the changes in the NFPA standard unless another explanation is provided in a comment.

A Fire Instructor II is a fire service instructor who, in addition to meeting Instructor I qualifications, has demonstrated the knowledge and ability to:

- **Develop individual lesson plans** for a specific topic including learning objectives, instructional aids, and evaluation instruments
- **Schedule training sessions** based on overall training plan of the authority having jurisdiction (AHJ)
- **Supervise and coordinate the activities of other instructors**

802-5.1 General

The Fire and Emergency Services Instructor II shall meet the requirements **for Fire and Emergency Services Instructor I and the JPRs** defined in Sections 802-5.2 through 802-5.5 of this standard.

802-5.2 Program Management

802-5.2.1 **Definition of Duty.** The management of instructional resources, staff, facilities, and records and reports.

802-5.2.2 **Assign** instructional sessions, given **AHJ** scheduling policy, instructional resources, staff, facilities, and timeline for delivery, so that the specified sessions are delivered according to **AHJ** policy.

Requisite Knowledge:

c. AHJ policy

d. Scheduling processes

e. Supervision techniques

f. Resource management

Commented [WC18]: New format for Requisite Knowledge:
•Expanded outline not needed, information covered well enough in the textbooks
•Knowledge items listed as a, b, c, etc. to match the numbering system used for instructors to see how their students scored on the knowledge items covered in the TCFP certification exam.

Requisite Skills. Select resources, staff and facilities for specified instructional sessions.

802-5.2.3 **Recommend** budget needs, given training goals, **AHJ** budget policy, and current resources, so that the resources required to meet training goals are identified and documented.

Requisite Knowledge:

a. AHJ budget policy

b. Resources management

c. Needs analysis

d. Sources of instructional materials and equipment

Requisite Skills. Resource analysis and **preparation of supporting documentation**.

802-5.2.4 **Gather** training resources, given an identified need, so that the resources are obtained within established timelines, budget constraints, and according to **AHJ** policy.

Requisite Knowledge:
a. AHJ policies, purchasing procedures, and budget

Requisite Skills. Records completion.

802-5.2.5 **Manage** training record-keeping, given training **records**, **AHJ** policy, and training activity, so that all **AHJ** and legal requirements are met.

Requisite Knowledge:
a. Record-keeping processes

b. AHJ policies

c. Laws affecting records and disclosure of training information

d. Professional standards applicable to training records

e. Systems used for record-keeping

Requisite Skills. Records management.

802-5.2.6 Evaluate instructors, given an evaluation **tool** , **AHJ** policy, and **objectives**, so that the evaluation identifies areas of strengths and weaknesses, recommends changes in instructional style and communication methods, and provides opportunity for instructor feedback to the evaluator.

Requisite Knowledge:
a. Personnel evaluation methods

b. Supervision techniques

c. AHJ policy

d. Effective instructional methods and techniques

Requisite Skills. Coaching, observation techniques, and completion of evaluation **records**.

802-5.3 ***Instructional Development***

802-5.3.1 **Definition of Duty.** The development of instructional materials for specific topics.

802-5.3.2 Create a lesson plan, given a topic, **learner** characteristics, and a lesson plan format, so **that** learning objectives, a lesson outline, course materials, instructional **technology tools**, an evaluation plan**, and learning objectives for the topic are addressed**.

802-A.5.3.2 A lesson plan should include the following components:

(1) Job title or topic

(2) Level of instruction

(3) Behavioral objectives, performance objectives or learning outcomes

(4) Instructional materials needed

(5) References

(6) Preparation step (motivation)

(7) Presentation step

(8) Application step

(9) Lesson summary

(10) Evaluation step

(11) Assignment

Commented [WC19]: This is explanatory information from the Annex of the NFPA standard that was not previously included in the curriculum.

Requisite Knowledge:

a. Elements of a lesson plan

b. Components of learning objectives

c. Instructional methodology

d. Student-centered learning

e. Methods for eliminating bias

f. Types and application of instructional technology tools and techniques

g. Copyright law

h. References and materials

Requisite Skills. Conduct research, develop behavioral objectives, **assess** needs, **and develop instructional technology tools; lesson outline** techniques, evaluation techniques, and resource needs analysis.

802-5.4 ***Instructional Delivery***

802-5.4.1 **Definition of Duty.** Conducting classes using a lesson plan.

802-5.4.2 Conduct a class using a lesson plan that the instructor has prepared and that involves the utilization of multiple teaching methods and techniques, given a topic and a target audience, so that the lesson **is delivered in a safe and proficient manner and the** objectives are achieved.

Requisite Knowledge:
a. Student-centered learning methods, discussion methods, facilitation methods,

b. Problem-solving techniques

c. Methods for eliminating bias

d. Types and application of instructional technology tools

e. Evaluation tools and techniques

Requisite Skills. Facilitate instructional session, apply student-centered learning, evaluate instructional delivery; use and evaluate instructional technology tools, evaluation techniques, and resources.

802-A.5.4.2(B). The **Fire and Emergency Services** Instructor II should acquire skills to effectively utilize problem-solving techniques, to facilitate and lead conferences, and to use discussion methods of presentation. These techniques are frequently used to conduct small group sessions where participants have advanced knowledge and experience in the subject matter and the goal is to reach a group solution to a problem or issue.

802-5.4.3 Supervise other instructors and students during training, given a **specialized** training scenario, so that applicable safety standards and practices are followed, and instructional goals are met.

802-A.5.4.3 Examples of **specialized** training include live fire **evolutions**, hazardous materials, **abovegrade and belowgrade** rescue, and evolutions that involve the use of power tools.

Commented [WC20]: These are the words used in the NFPA standard.

Requisite Knowledge:
a. Safety rules, regulations and practices

b. The incident management system

c. Leadership techniques

Requisite Skills. Conduct a safety briefing, ability to communicate, and implement an incident management system.

802-5.5 ***Evaluation and Testing***

802-5.5.1 **Definition of Duty.** The development of student evaluation instruments to support instruction and the evaluation of test results.

802-5.5.2 Develop student evaluation instruments, given learning objectives, **learner** characteristics, and training goals, so that the evaluation instrument **measures whether** the student has achieved the learning objectives

.

Requisite Knowledge:
a. Evaluation methods

b. Evaluation instrument development

c. Assessment of validity and reliability

Requisite Skills. Evaluation item construction and assembly of evaluation instruments.

802-5.5.3 Develop a class evaluation instrument, given **AHJ** policy and evaluation goals, so that students have the ability to provide feedback to the instructor on instructional methods, communication techniques, learning environment, course content, and student materials.

802-A.5.5.3 It is understood that a program can consist of multiple courses, a course can consist of multiple classes, and a class can consist of a single teaching lesson.

Commented [WC21]: This is explanatory information from the Annex of the NFPA standard that was not previously included in the curriculum.

Requisite Knowledge:
a. Training evaluation methods

Requisite Skills. Development of **training** evaluation forms.
evaluation **instrument**.

INSTRUCTOR III

CHAPTER EIGHT

FIRE INSTRUCTOR III

CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
803-6.1	General	1
803-6.2	Program Management	17
803-6.3	Instructional Development	30
803-6.4	Instructional Delivery	0
803-6.5	Evaluation and Testing	16
	TOTAL RECOMMENDED HOURS	**64**

Commented [WC22]: Two hours added to Program Management because NFPA added a new JPR for formulating budget needs.

Commented [WC23]: Two hours removed from Instructional Development because NFPA deleted the JPR for modifying a curriculum.

Commented [WC24]: Total recommended hours remains the same at 48 hours.

REFERENCE LIST FOR THE FIRE INSTRUCTOR III CURRICULUM

Commented [WC25]: All changes just to reflect newest editions of reference materials.

Fire and Emergency Services Instructor (**9th** ed.). (**2019**). Stillwater, OK: International Fire Service Training Association, Oklahoma State University.

Fire and Emergency Services *Instructor: Principles and Practice* (**3rd** ed.). (**2020**). Burlington, MA: Jones and Bartlett Learning.

NFPA 1041: Standard for Fire Service Instructor Professional Qualifications (**2019** ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 1401: Recommended Practice for Fire Service Training Reports and Records (**2017** ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

NFPA 1403: Standard on Live Fire Training Evolutions (**2018** ed.). Quincy, MA: NFPA Publications. National Fire Protection Association.

Standards Manual for Fire Protection Personnel. Austin, TX: Texas Commission on Fire Protection.

SECTION 803

FIRE INSTRUCTOR III

A Fire Instructor III is a fire service instructor who, in addition to meeting Instructor II qualifications, has demonstrated the knowledge and ability to:

- **develop comprehensive training curriculum and programs** for use by single or multiple organizations
- **conduct organization needs analysis**
- **develop training goals and implementation strategies**

803-6.1 General

The Fire and Emergency Services Instructor III shall meet the requirements **for Fire and Emergency Services Instructor II and the JPRs** defined in Sections 803-6.2 through 803-6.5 of this standard.

803-6.2 Program Management

803-6.2.1 **Definition of Duty.** The administration of **AHJ** policies and procedures for the management of instructional resources, staff, facilities, records, and reports.

803-6.2.2 Administer a training record system, given **AHJ** policy and type of training activity to be documented, so that the information captured is concise, meets all **AHJ** and legal requirements, and can be readily accessed.

803-A.6.2.2 See NFPA 1401.

Requisite Knowledge:

g. AHJ policy

h. Record-keeping system

i. Professional standards addressing training records

j. Legal requirements affecting record-keeping

k. Disclosure of information

Requisite Skills. Development of **records** and report generation.

803-6.2.3 Develop recommendations for policies to support the training program, given **AHJ** policies and procedures and the training program goals, so that the training and agency goals are achieved.

Commented [WC26]: All wording changes to this Fire Instructor III curriculum are to match the changes in the NFPA standard unless another explanation is provided in a comment.

Commented [WC27]: New format for Requisite Knowledge:
•Expanded outline not needed, information covered well enough in the textbooks
•Knowledge items listed as a, b, c, etc. to match the numbering system used for instructors to see how their students scored on the knowledge items covered in the TCFP certification exam.

Requisite Knowledge:
a. AHJ procedures and training program goals

b. Format for AHJ policies

Requisite Skills. Technical writing **and decision making**.

803-6.2.4 Select instructional staff, given personnel qualifications, instructional requirements, and **AHJ** policies and procedures, so that staff selection meets **AHJ** policies and achievement of **AHJ** and instructional goals.

Requisite Knowledge:
a. AHJ regarding staff selection, instructional requirements, the capabilities of instructional staff, employment laws, and AHJ goals

Requisite Skills. Evaluation techniques **and interview methods**.

803-6.2.5 Construct a performance-based instructor evaluation plan, given **AHJ** policies and procedures and job requirements, so that instructors are evaluated at regular intervals, following **AHJ** policies.

Requisite Knowledge:
a. Evaluation methods

b. Employment laws

c. AHJ policies

d. Staff schedules

e. Job requirements

Requisite Skills. Evaluation techniques**, scheduling, technical writing**.

803-6.2.6 Formulate budget needs, given training goals, AHJ budget policy, and current resources, so that the resources required to meet training goals are identified and documented.

Requisite Knowledge:
a. AHJ budget policy

b. Resource management

c. Needs analysis

d. Sources of instructional materials

e. Equipment

Requisite Skills. Resource analysis and required documentation.

803-6.2.7 Write equipment purchasing specifications, given curriculum information, training goals, and **AHJ** guidelines, so that the equipment is appropriate and supports the curriculum.

Requisite Knowledge:
a. Equipment purchasing procedures

b. Available AHJ resources

c. Curriculum needs

Requisite Skills. Preparation of procurement documents, technical writing.

803-6.2.**8** Present evaluation findings, conclusions, and recommendations to **AHJ** administrator, given data summaries and target audience, so that recommendations are unbiased, supported, and reflect **AHJ** goals, policies, and procedures.

Requisite Knowledge:
a. Statistical analysis and AHJ goals

Requisite Skills. Presentation skills and report preparation following **AHJ** guidelines.

803-6.3 ***Instructional Development***

803-6.3.1 **Definition of Duty.** Plans, develops, and implements comprehensive programs and curricula.

803-6.3.2 Conduct an **AHJ** needs analysis, given **AHJ** goals, so that instructional needs are identified and solutions are recommended.

Requisite Knowledge:
a. Needs analysis

b. Gap analysis

c. Instructional design process

d. Instructional methodology

e. Learner characteristics

f. Instructional technologies

g. Curriculum development

h. Facilities

i. Development of evaluation instruments

Requisite Skills. Conducting research and needs and **gap** analysis, **forecasting**, **and** organizing information.

803-6.3.3 Design programs or curricula, given needs analysis and **AHJ** goals, so that the goals are supported, **learner characteristics are identified, audience-based instructional methodologies** are utilized, and the program meets time and budget constraints.

Requisite Knowledge:
a. Instructional design

b. Instructional methodologies

c. Learner characteristics

d. Principles of student-centered learning

e. Research methods

Requisite Skills. Technical writing and selecting course reference materials.

803-6.3.**4** Write program and course **outcomes**, given JPRs and needs analysis information, so that the **outcomes** are clear, concise, measurable, and correlate to **AHJ** goals.

Requisite Knowledge:
a. Components and characteristics of outcomes

b. Correlation of outcomes to AHJ goals

Requisite Skills. Technical writing.

803-6.3.**5** Write course objectives, given **course outcomes**, so that objectives are clear, concise, measurable, and reflect specific tasks.

Requisite Knowledge:
a. Component of objectives

b. Correlation between outcomes and objectives

Requisite Skills. Technical writing.

803-6.3.**6** Construct a course content outline, given course objectives, **and** reference sources, functional groupings and the agency structure, so that the content **outline** supports **course objectives**.

Requisite Knowledge:
a. Correlation between course objectives, instructor lesson plans, and instructional methodology

Requisite Skills. Technical writing.

803-6.4 ***Instructional Delivery***

No JPRs at the Instructor III Level.

803-6.5 ***Evaluation and Testing***

803-6.5.1 **Definition of Duty.** Develops an evaluation plan; collects, analyses, and reports data; and utilizes data for program validation and student feedback.

803-6.5.2 Develop a system for the acquisition, storage, and dissemination of evaluation results, given **AHJ** goals and policies, so that the goals are supported and so that those affected by the information receive feedback consistent with **AHJ** policies and federal, state, and local laws.

Requisite Knowledge:
a. Record-keeping systems

b. AHJ goals

c. Data acquisition techniques

d. Applicable laws

e. Methods of providing feedback

Requisite Skills. The evaluation, development, and use of information systems.

803-6.5.3 Develop **a** course evaluation plan, given course objectives and **AHJ** policies, so that objectives are measured and **AHJ** policies are followed.

803-A.6.5.3 It is viewed that the program can consist of multiple courses, a course can consist of multiple classes, and a class can consist of a single teaching session, such as a refresher update training.

Commented [WC28]: This is explanatory information from the Annex of the NFPA standard that was not previously included in the curriculum.

Requisite Knowledge:
a. Evaluation techniques

b. AHJ constraints

c. Resources

Requisite Skills. Decision making **and technical writing**.

803-6.5.4 **Develop** a program evaluation plan, given **AHJ** policies and procedures, so that instructors, course components, **program goals,** and facilities are evaluated**,** student input is obtained, **and needed improvements are identified**.

Requisite Knowledge:
a. Evaluation methods

b. AHJ goals

Requisite Skills. Construction of evaluation instruments**, technical writing**.

803-6.5.5 Analyze student evaluation instruments, given test data, objectives, and **AHJ** policies, so that validity **and reliability are** determined and necessary changes are made.

Requisite Knowledge:
a. AHJ policies and applicable laws

b. Test validity and reliability

c. Item analysis methods

Requisite Skills. Item analysis.

4. Report from the Curriculum and Testing Committee regarding possible changes to the Certification Curriculum Manual as follows:

d. New Incident Commander Curriculum

OVERVIEW
Incident Commander

The Incident Commander is required to meet the Job Performance Requirements (JPRs) of Chapter 4 of National Fire Protection Association (NFPA) 1026, *Standard for Incident Management Personnel Professional Qualifications,* 2018 edition.

The following items are included in the Incident Commander section of Chapter 14 of the curriculum manual:

- Course Instructor Information
- Reference List (textbooks and other recommended course materials)
- Course Outline (establishes the recommended hours for teaching this course)

This is a voluntary (non-mandatory) certification, therefore a formal "curriculum" is not provided. Please use Chapter 4 of NFPA 1026 as a guide when creating your own course curriculum.

Performance skills are available in Chapter 14 of the Skills Manual.

All documents in this curriculum manual, and in the skills manual, are available free of charge to download, copy and distribute as necessary. The TCFP does not provide printed copies.

Definition of an Incident Commander

An Incident Commander is an individual who has met the requirements of chapter 4 of NFPA 1026, *Standard for Incident Management Personnel Professional Qualifications* and has the knowledge, skills, and abilities to perform as an Incident Commander:

- The individual responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources.
- Has overall authority and responsibility for conducting incident operations and for managing all incident operations at the incident site.

COURSE INSTRUCTOR INFORMATION

Instructor Qualifications
Incident Commander courses must be taught by a person meeting the requirements described in Chapter §427.307 of the TCFP Standards Manual.

Supplemental Information
Instructors are expected to provide supplemental information if the main reference text does not cover all of the knowledge requirements set forth in the NFPA standard.

Certification Testing
Testing for certification in the state of Texas will be based on the knowledge and skills requirements of National Fire Protection Association (NFPA) 1026, *Standard for Incident Management Personnel Professional Qualifications,* 2018 edition, Chapter 4. All training programs must strictly adhere to the NFPA standard.

All test questions and performance skills evaluations will be based on the NFPA Job Performance Requirements (JPRs), requisite knowledge objectives, and requisite skills objectives found in the NFPA standard. Additionally, questions and performance skill evaluations may include information found in, or derived from, the NFPA standard annex, particularly Annex A, which includes explanatory material that may further clarify JPRs. The following is an example from NFPA 1026, section 4.4.1:

NFPA Standard/Curriculum	Explanation
4.4.1 Develop and manage an incident management organization capable of accomplishing strategic objectives, given an incident or planned event, incident status information, ICS forms and documentation, situational awareness, a communications system, incident resources and an IAP, so that an ICS organization is established and maintained; applicable span of control is maintained through the use of Division/Group Supervisors, Branch Directors, and the Operations Section Chief positions; resources and personnel cooperating in incident objectives are obtained and managed effectively; adjustments are made to the command structure when necessary; and the command structure remains in place until the incident or planned event is terminated.	NFPA JPR number 4.4.1
(A) Requisite Knowledge: NIMS, ICS, ICS forms and documentation; unity of command; procedures for ordering resources specific to the AHJ; Communications protocols; kinds and types of resources available to the AHJ; resource management techniques, roles, and responsibilities; and authority of responders and response agencies available to the AHJ.	Requisite knowledge objectives for 4.4.1 Written test questions and/or performance skills will be used to test these knowledge components on the state certification exam.

(B) Requisite Skills: Completing ICS forms and documentation, operating incident communications equipment, deploying applicable resources for incident-specific functions, and determining changing incident situations and matching the ICS structure and resources to meet them.	Requisite skills objectives for 4.4.1 Only performance skills will be used to test these objectives on the state certification exam.
A.4.4.1: The Incident Commander is responsible for maintaining a manageable span-of-control. This can be accomplished by implementing Operations Section Chiefs, Branch Directors, and Division/Group Supervisors. The generally accepted span-of-control is 3 to 7, with 5 being ideal.	Appendix A: Explanatory Material for 4.4.1

TCFP Standards Manual
It is critical that the Course Instructor review the chapters in the TCFP Standards Manual that apply to this curriculum. Of primary importance are the following chapters:

Chapter 421, *Standards for Certification*
Chapter 427, *Training Facility Certification*
Chapter 435, *Fire Fighter Safety*
Chapter 437, *Fees*
Chapter 461, *Minimum Standards for Incident Management Personnel Certification*

These chapters do not address every issue that could impact this curriculum; therefore, the Course Instructor is encouraged to become familiar with the TCFP Standards Manual.

Descriptions of Certification Levels
For additional information, see Chapter 421 of the Texas Commission on Fire Protection Standards Manual for Fire Protection Personnel.

CHAPTER FOURTEEN

INCIDENT COMMANDER

CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
1401-4.1	General	2
1401-4.2	Assume, Transfer and Receive Command	18
1401-4.3	Communications	8
1401-4.4	Management and Administration	20
	TOTAL RECOMMENDED HOURS*	**48**

*Actual hours required will depend on the number of students, the number of examiners, availability of equipment, and the student skill level.

REFERENCE LIST FOR THE
INCIDENT COMMANDER CURRICULUM

Certified Training Facilities approved to teach this curriculum, must have the following reference materials:

Command and Control: ICS, Strategy Development and Tactical Selections, Book 1 (2nd ed.) (2012). Stillwater, OK: Fire Protection Publications Oklahoma State University.

National Incident Management System: Principles and Practice (2nd ed.) (2012). Burlington, MA: Jones & Bartlett Learning

NFPA 1026: Standard for Incident Management Personnel Professional Qualifications (2018 ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 1561: Standard on Emergency Services Incident Management System and Command Safety, (2020 ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

Standards Manual for Fire Protection Personnel. Austin, TX: Texas Commission on Fire Protection.

4. Report from the Curriculum and Testing Committee regarding possible changes to the Certification Curriculum Manual as follows:

e. Incident Safety Officer (reference list)

REFERENCE LIST FOR THE
FIRE DEPARTMENT SAFETY OFFICER
INCIDENT SAFETY OFFICER CURRICULUM

Certified Training Facilities approved to teach this curriculum must have the following reference materials:

Required References

Fire Department Incident Safety Officer (3rd ed. Revised) (2020~~2016~~). Dodson, David W. Burlington, MA: Jones and Bartlett Learning.

NFPA 1500: Standard on Fire Department Occupational Safety and Health Program (2013 ed.). Quincy, MA: National Fire Protection Association NFPA Publications.

NFPA 1521: Standard for Fire Department Safety Officer Professional Qualifications (2020 ~~2015~~ ed). Quincy, MA: National Fire Protection Association NFPA Publications.

NFPA 1951 Standard on Protective Ensembles for Technical Rescue Incidents. (2013 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association NFPA Publications.

Certification Curriculum Manual for Fire Protection Personnel, Austin, TX: Texas Commission on Fire Protection

Standards Manual for Fire Protection Personnel, Austin, TX: Texas Commission on Fire Protection

Recommended References

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

Code of Federal Regulations, Title 29 Part 1910.146. United States. U.S. Department of Labor, Occupational Safety and Health Administration.

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

NFPA 1006 Standard for Technical Rescuer Professional Qualifications. (2013 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association NFPA Publications.

NFPA 1584 Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises. (2015 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association NFPA Publications.

NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments. (2016 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association NFPA Publications.

5. **Review of 2019 data collected on fire fighter injuries and development of recommendations to be submitted to the commission for approval and submission to the State Fire Marshal's Office.**

TEXAS COMMISSION ON FIRE PROTECTION INJURY REPORT

January 1, 2019 to December 31, 2019

TEXAS COMMISSION ON FIRE PROTECTION

Table of Contents

Mission

The commission shall gather and evaluate data on fire protection personnel injuries and develop recommendations for reducing injuries.

Why we are collecting injury data

Under Texas Government Code §419.048, the Texas Legislature charged the commission with gathering and evaluating data on injuries. The rules requiring regulated entities to report injuries to the commission are in Texas Administrative Code §435.23. The commission encourages volunteer entities to report injuries so that it can gain as accurate a picture as possible concerning injury trends in the Texas fire service. The injury reporting program began in March 2010.

Information the commission collects

- Minor, serious, and fatal injuries, as well as toxic exposures
- Activities where fire personnel are injured
- Types of injuries (burns, strain-sprains, wounds, etc.)
- Body parts being injured
- Tasks performed at the time of injury
- Missed time
- Work assignment after injury
- Malfunctions/failures of personal protective equipment (PPE), self-contained breathing apparatus (SCBA), personal alert safety systems (PASS devices) and standard operating procedures (SOPs)

How this will help the fire service

- Identify common injuries and exposures
- Identify trends in injuries and exposures
- Identify needed training
- Evaluate and find improvements in procedures
- Track lost time injuries (requested by user community)

Executive Summary

The information in this report is collected by the Texas Commission on Fire Protection (TCFP) via an on-line injury reporting application. The report is a comprehensive analysis of injuries and exposures to Texas fire fighters. These injuries and exposures were reported to the TCFP in 2019 by fire departments throughout the state, and this report contains charts and graphs depicting the results of the information that was collected. The report also compares Texas fire fighter injury statistics with national statistics that were gathered by the National Fire Protection Association (NFPA) in 2018.

Under Texas Government Code §419.048, the Texas Commission on Fire Protection is charged with developing and establishing criteria to receive and analyze injury information pertaining to Texas fire fighters. The commission reviews this information to develop recommendations to help reduce injuries to fire protection personnel. The commission provides this information to the State Fire Marshal's Office (SFMO) by September 1 of each year for inclusion in the SFMO's annual *Firefighter Fatality Investigations Report*. The commission has enacted rules about reporting injuries in the Texas Administrative Code (TAC) Title 37, Chapter 435, and has established the criteria and policies for reporting and analyzing the information.

The commission originally built the data systems necessary to gather this information in 2010. In 2017 the data systems were then migrated from a Microsoft Access database structure to a new system which was developed in-house and designed specifically to meet the information resource needs of the TCFP. Fine-tuning of this new system is ongoing as we receive feedback from stakeholders. The reporting process is accomplished online. Fire departments regulated by the commission have been notified of the requirement to report. Several volunteer departments, which are not regulated by the commission, are also participating voluntarily.

This report concludes with recommendations from the commission to help reduce the number of fire fighter injuries in Texas and to improve the injury reporting program.

Abstract

This report contains data submitted by regulated and non-regulated entities. The data collected in 2019 was the ninth full year of reporting.

Grand Totals – 2019
Total number of incidents (injury reports) submitted: 3,455
Total number of individuals who sustained an injury or exposure: 3,670*
Total number of injuries reported: 2,757
Total number of exposures reported: 943

**Note that an individual could have more than one injury or could have an injury and an exposure. This explains why the total number of individuals who sustained an injury is less than the total number of injuries + total number of exposures. (3,670 < 2,757 + 943)*

Because the injury reporting system was reconfigured in 2018, the information collected by the TCFP has evolved over the last couple of years. It's important to remember that one incident report can have multiple individuals involved, and **each** of those individuals can have **one or more** injuries. For example:

- Joe and Bob were burned in a fire while on duty. This resulted in:
  - One incident (one injury report), with
  - Two individuals who…
  - Sustained three injuries
    - Joe was burned on the hand and arm (two injuries)
    - Bob was burned on the leg (one injury)

Texas fire departments reported to the Texas Commission on Fire Protection a total of 3,670 individuals who were either injured or exposed in calendar year 2019. Of these, **746** individuals incurred their injuries/exposures during fire suppression activities, representing 20 percent of the total reported injuries (see Table 1).

Injuries and exposures from emergency medical services (EMS) activities surpassed those from fire suppression activities in 2019. EMS activities accounted for **893** of the 3,670 total individuals who were injured or exposed, or 24 percent.

After EMS and fire suppression, the next highest number reported in 2019 occurred in the performance of station duties, with **722**, or 20 percent, of the total reported injuries.

Skills training and wellness/fitness activities again rounded out the top five activities: **452** skills training injuries (12 percent of the total) and **391** wellness/fitness injuries (11 percent of the total).

We feel it's important to note that the total number of injured or exposed individuals reported in station duties, wellness/fitness activities, and skills training (which are all non-emergency activities) accounted for 43 percent of the total injuries reported in 2019.

State of Texas vs. NFPA

Comparison between the State of Texas (2019) and National Fire Protection Association (NFPA), U.S. Firefighter Injuries – 2018

For the purposes of comparison, the commission has mapped its categories to the NFPA categories as follows:

- "Fireground" includes the commission's Fire Suppression and Rescue – Fire Related categories.
- "Non-Fire" includes Rescue Non-Fire, EMS and Hazmat.
- "Other On-Duty" includes Fire Prevention, Station Duties and Wellness/Fitness.

The NFPA's "Responding and Returning" and "Training" categories appear to correspond closely to the commission's categories. (The NFPA numbers include Texas statistics, although the reporting populations may not be the same.)

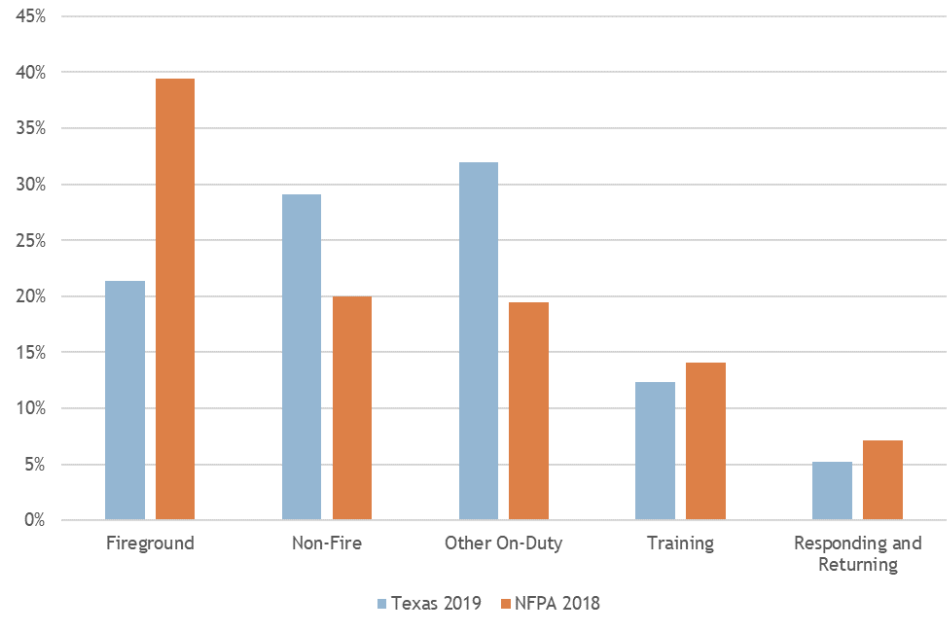
Comparing Texas 2019 and NFPA 2018

	Texas 2019		NFPA 2018	
Category	**Count**	**Percent**	**Count**	**Percent**
Fireground	785	21%	22,975	39%
Non-Fire	1,069	29%	11,625	20%
Other On-Duty	1,172	32%	11,325	19%
Training	452	12%	8,175	14%
Responding and Returning	192	5%	4,150	7%
Total	**3,670**	**100%**	**58,250**	**100%**

NFPA data is from the United States Firefighter Injuries in 2018 report, copyright ©2018 National Fire Protection Association, Quincy, MA.

While Texas seems to be doing similarly to the rest of the US in terms of training injuries and injuries resulting from responding and returning from incidents, we appear to have a much better track record on the fireground. Unfortunately, though, Texas appears to be doing significantly worse than the rest of the country when it comes to sustaining injuries in the "non-fire" and "other on-duty" categories.

Injuries by Activity, percentages
(Comparing Texas 2019 and NFPA 2018)

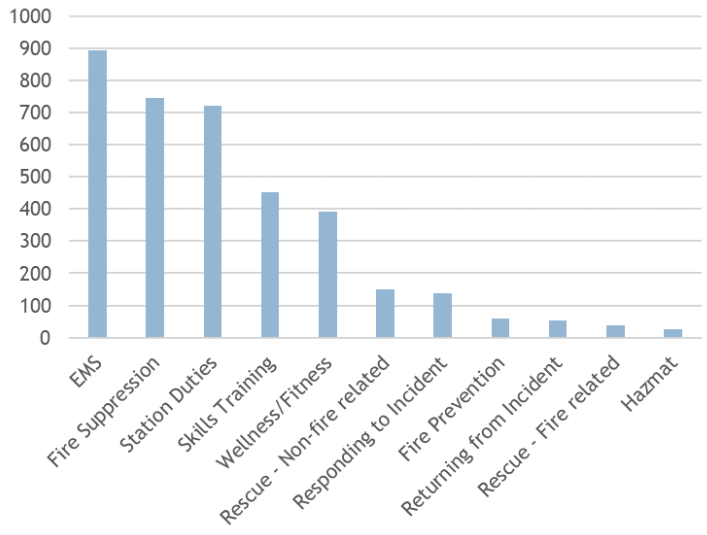


Fire Protection Personnel Injuries

Table 1: Total Injured or Exposed Individuals by Activity and Severity, 2019

Activity	Minor	Serious	Fatal	Total	2018	2017
EMS	753	140	0	893	1027	1079
Fire Suppression	604	140	2	746	799	827
Station Duties	578	143	1	722	639	668
Skills Training	315	137	0	452	400	412
Wellness/Fitness	282	109	0	391	417	384
Rescue - Non-fire related	136	14	0	150	183	233
Responding to Incident	112	26	1	139	163	209
Fire Prevention	45	14	0	59	90	66
Returning from Incident	38	15	0	53	91	70
Rescue - Fire related	35	4	0	39	44	120
Hazmat	24	2	0	26	28	22
Total	**2922**	**744**	**4**	**3670**	**3881**	**4090**

Figure 1: Total Injured or Exposed Individuals by Activity, 2019



Injuries by Activity

EMS activities resulted in the highest number of minor injuries for 2019 (see Table 2). The total number of serious fire suppression injuries is down significantly, compared with previous years. (See Table 3. The commission defines a serious injury as one which results in the employee missing one or more full duty shifts.)

Definitions
Minor = Injury that does not result in the employee missing a full duty period.
Serious = Injury that results in the employee missing one or more full duty periods.
Fatal = The injured individual did not survive.

Table 2: Minor Injury Activities, 2015 - 2019

	2015		2016		2017		2018		2019	
Activity	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
EMS	792	28.24%	882	27.89%	929	28.99%	843	29.09%	753	25.77%
Fire Suppression	618	22.03%	866	27.39%	662	20.66%	607	20.95%	604	20.67%
Station Duties	396	14.12%	434	13.73%	481	15.01%	437	15.08%	578	19.78%
Skills Training	288	10.27%	311	9.84%	291	9.08%	277	9.56%	315	10.78%
Wellness/Fitness	278	9.91%	252	7.97%	254	7.93%	286	9.87%	282	9.65%
Rescue - Non-Fire	204	7.27%	161	5.09%	206	6.43%	157	5.42%	136	4.65%
Responding to Incident	122	4.35%	117	3.70%	156	4.87%	99	3.42%	112	3.83%
Fire Prevention	41	1.46%	47	1.49%	50	1.56%	69	2.38%	45	1.54%
Returning from Incident	33	1.18%	37	1.17%	42	1.31%	57	1.97%	38	1.30%
Rescue - Fire Related	22	0.78%	20	0.63%	113	3.53%	39	1.35%	35	1.20%
Hazmat	11	0.39%	35	1.11%	21	0.66%	27	0.93%	24	0.82%
Total	**2805**	**100.00%**	**3162**	**100.00%**	**3205**	**100.00%**	**2898**	**100.00%**	**2922**	**100.00%**

Table 3: Serious Injury Activities, 2015 – 2019

Activity	2015		2016		2017		2018		2019	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Station Duties	174	19.31%	172	18.76%	185	21.29%	201	20.49%	143	19.22%
Fire Suppression	160	17.76%	179	19.52%	157	18.07%	191	19.47%	140	18.82%
EMS	185	20.53%	158	17.23%	147	16.92%	184	18.76%	140	18.82%
Skills Training	126	13.98%	141	15.38%	120	13.81%	123	12.54%	137	18.41%
Wellness/Fitness	125	13.87%	146	15.92%	129	14.84%	131	13.35%	109	14.65%
Responding to Incident	44	4.88%	36	3.93%	53	6.10%	64	6.52%	26	3.49%
Returning from Incident	13	1.44%	18	1.96%	28	3.22%	34	3.47%	15	2.02%
Rescue - Non-Fire	46	5.11%	52	5.67%	27	3.11%	26	2.65%	14	1.88%
Fire Prevention	12	1.33%	11	1.20%	15	1.73%	21	2.14%	14	1.88%
Rescue - Fire Related	12	1.33%	3	0.33%	7	0.81%	5	0.51%	4	0.54%
Hazmat	4	0.44%	1	0.11%	1	0.12%	1	0.10%	2	0.27%
Total	**901**	**100.00%**	**917**	**100.00%**	**869**	**100.00%**	**981**	**100.00%**	**744**	**100.00%**

Table 4: Number of Individuals Who Sustained Fatal Injuries, 2019

Activity	Count	Percent
Fire Suppression	2	50.00%
Station Duties	1	25.00%
Responding to Incident	1	25.00%
Total	**4**	**100.00%**

Emergency vs. Non-Emergency Injuries

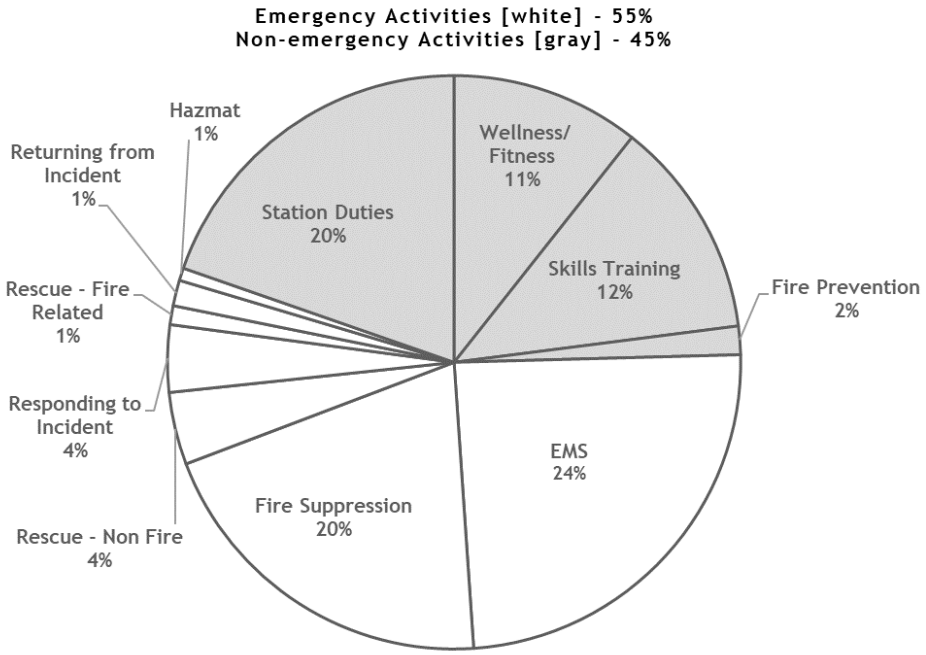
Table 5: Number of Injured Individuals by Emergency Activity and Severity, 2019

Activity	Minor	Serious	Fatal	Total
EMS	753	140	0	893
Fire Suppression	604	140	2	746
Rescue - Non-Fire	136	14	0	150
Responding to Incident	112	26	1	139
Rescue - Fire Related	35	4	0	39
Returning from Incident	38	15	0	53
Hazmat	24	2	0	26
Total	**1702**	**341**	**3**	**2046**

Table 6: Number of Injured Individuals by Non-Emergency Activity and Severity, 2019

Activity	Minor	Serious	Fatal	Total
Station Duties	578	143	1	722
Skills Training	315	137	0	452
Wellness/Fitness	282	109	0	391
Fire Prevention	45	14	0	59
Total	**1220**	**403**	**1**	**1624**

Figure 2: Percent of Injured Individuals in Emergency and Non-Emergency Activities, 2019

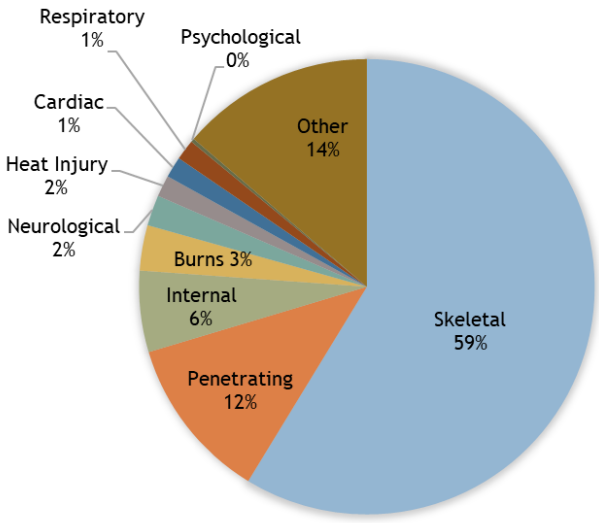


Types of Injuries

Table 7: Types of Injury, 2019

Type of Injury	2019	
	Count	Percent
Skeletal	1619	59%
Penetrating	321	12%
Internal	159	6%
Burns	89	3%
Neurological	60	2%
Heat Injury	42	2%
Cardiac	41	1%
Respiratory	40	1%
Psychological	7	0%
Other	379	14%
Total	**2757**	**100%**

Figure 3: Types of Injuries, 2019

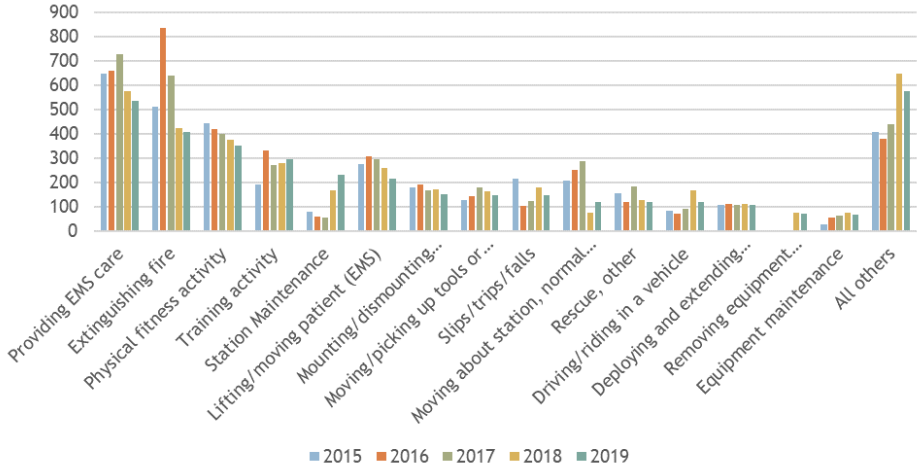


Task at Time of Injury

Table 8: Top 15 Tasks at Time of Injury, 2015-2019 (ordered by 2019, descending)

Task	2015	2016	2017	2018	2019
Providing EMS care	649	661	728	575	537
Extinguishing fire	513	837	638	423	409
Physical fitness activity	442	420	401	376	350
Training activity	193	331	273	281	296
Station Maintenance	81	59	55	166	232
Lifting/moving patient (EMS)	275	306	294	259	215
Mounting/dismounting apparatus	180	193	166	173	153
Moving/picking up tools or equipment	128	142	179	163	148
Slips/trips/falls	215	105	122	181	148
Moving about station, normal activity	206	252	289	77	121
Rescue, other	155	118	183	126	120
Driving/riding in a vehicle	82	70	92	166	118
Deploying and extending hoseline	108	111	106	113	108
Removing equipment from/returning equipment to storage	n/a	n/a	n/a	76	73
Equipment maintenance	29	57	65	77	67
All others	406	380	440	649	575
Total	**3721**	**4097**	**4090**	**3881**	**3670**

Figure 4: Top 15 Tasks at Time of Injury, 2015 - 2019



Injuries by Body Part

Table 9: Injuries by Body Part, 2015 - 2017 (ordered by 2017, descending)

Injured Body Part	2015	2016	2017
Multiple body parts, whole body	659	1007	1064
Hand and fingers	328	359	365
Knee	369	376	315
Hip, lower back, or buttocks	316	283	292
Back, except spine	207	244	248
Shoulder	241	238	221
Ankle	202	192	179
Multiple Parts	180	124	151
Face	140	116	127
Arm, lower, not including elbow or wrist	84	109	121
Leg, lower	117	132	113
Foot and toes	71	85	87
Head	69	82	78
Ear	60	74	76
Chest	40	82	76
Eye	75	70	73
Multiple body parts, upper body	52	61	73
Elbow	51	47	72
Wrist	48	74	56
Other body parts injured	500	342	303
Total	**3809**	**4097**	**4090**

Because TCFP migrated to a new data management system in 2017, the data collected in years 2018-2019 was categorized differently than it had been in the past. This is why Table 9 only goes through 2017, and we now have new tables (10 & 11) for 2018-2019 data.

Table 10: Injuries by Body Party Type, 2018 & 2019

Injured Body Part	2018	2019
Upper Extremities	864	765
Lower Extremities	810	663
Back	490	445
Multiple Parts	318	253
Head	300	319
Internal	105	122
Chest	104	105
Neck	64	55
Hip	23	30
Total	**3078**	**2757**

Table 11: Injuries by Body Part Sub-Type, 2018 & 2019

Body Part by Sub-Type	2018	2019
Back: Back	198	182
Back: Buttocks	1	3
Back: Lower Back	282	251
Back: Neck	4	3
Back: Spine	5	6
Chest: Abdomen	5	4
Chest: Abdominal Area	10	3
Chest: Chest	89	98
Head: Cheek	5	6
Head: Chin	7	1
Head: Ear	77	115
Head: Eye	64	58
Head: Face	111	109
Head: Jaw	1	6
Head: Mouth	15	16
Head: Nose	20	8
Hip: Groin	9	11
Hip: Hip	13	18
Hip: Pelvis	1	1

Internal: Genito-urinary	4	10
Internal: Heart	5	7
Internal: Internal	66	69
Internal: Intestinal tract	5	4
Internal: Lungs	9	11
Internal: Stomach	15	20
Internal: Trachea	1	1
Lower Extremities: Ankle	206	163
Lower Extremities: Foot	93	82
Lower Extremities: Knee	347	266
Lower Extremities: Lower leg	111	92
Lower Extremities: Toes	15	21
Lower Extremities: Upper Leg	38	39
Multiple Parts: Lower Body	26	19
Multiple Parts: Unknown	26	11
Multiple Parts: Upper Body	74	76
Multiple Parts: Whole Body	192	147
Neck: Neck	59	47
Neck: Throat	5	8
Upper Extremities: Elbow	68	44
Upper Extremities: Hands	361	313
Upper Extremities: Lower Arm	10	59
Upper Extremities: Shoulder	234	225
Upper Extremities: Upper Arm	112	68
Upper Extremities: Wrist	79	56
Total	**3078**	**2757**

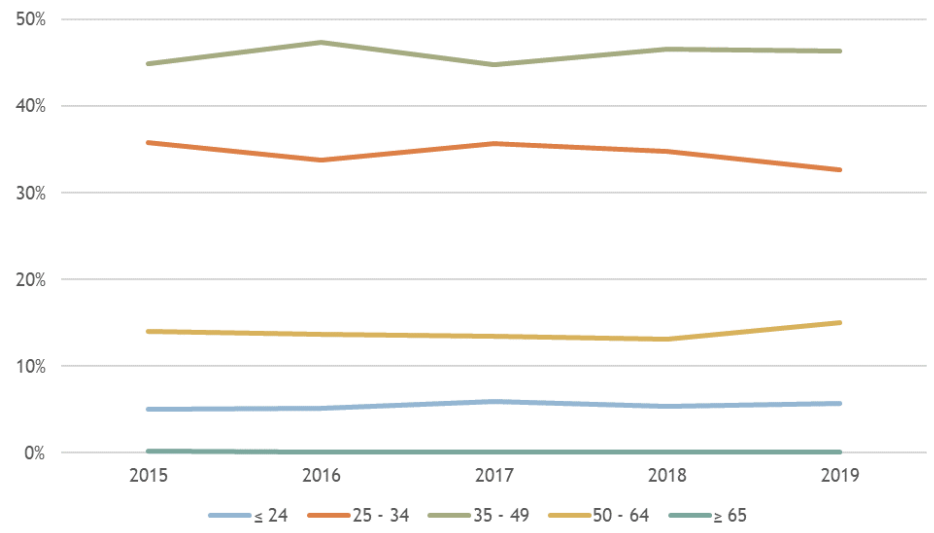
Individuals by Age Group

Table 12: Individuals by Age Group, 2015 - 2019*

Age Group	2015		2016		2017		2018		2019	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
≤ 24	187	5.03%	213	5.20%	242	5.92%	210	5.41%	206	5.71%
25 - 34	1334	35.85%	1382	33.73%	1460	35.70%	1348	34.73%	1179	32.70%
35 - 49	1669	44.85%	1939	47.33%	1832	44.79%	1806	46.53%	1672	46.37%
50 - 64	524	14.08%	559	13.64%	550	13.45%	511	13.17%	544	15.09%
≥ 65	7	0.19%	4	0.10%	6	0.15%	6	0.15%	5	0.14%
Totals	**3721**	**100.00%**	**4097**	**100.00%**	**4090**	**100.00%**	**3881**	**100.00%**	**3606**	**100.00%**

*Includes injured individuals and individuals with exposures.

Figure 5: Individuals by Age Group, percentages, 2014 - 2019



Injury Activities Resulting in Lost Time

Table 13: Activities Individuals Were Doing that Resulted in Lost Time, 2019, Totals

		Days Missed	
Activity	**Count**	**Average**	**Sum**
Fire Suppression	67	32	2178
Station Duties	65	17	1109
Skills Training	64	32	2059
EMS	62	30	1916
Wellness/Fitness	42	23	983
Returning from Incident	10	15	154
Responding to Incident	8	19	153
Rescue - Non-Fire	7	10	75
Fire Prevention	7	9	68
Rescue - Fire Related	2	12	25
Hazmat	1	10	10
Total	**139**	**16**	**3384**

Table 14: Activities Individuals Were Doing that Resulted in Lost Time, 2019, Between 1 and 30 days

		Days Missed	
Activity	**Count**	**Average**	**Sum**
Station Duties	53	11	590
Skills Training	45	11	523
Fire Suppression	43	9	428
EMS	37	10	378
Wellness/Fitness	34	10	362
Returning from Incident	9	13	122
Rescue - Non-Fire	7	10	75
Responding to Incident	6	9	54
Fire Prevention	6	4	28
Rescue - Fire Related	2	12	25
Hazmat	1	10	10
Total	**145**	**10**	**1482**

Table 15: Activities Individuals Were Doing that Resulted in Lost Time, 2019, between 31 and 90 days

		Days Missed	
Activity	**Count**	**Average**	**Sum**
EMS	21	50	1058
Skills Training	16	58	928
Fire Suppression	16	48	783
Station Duties	12	43	519
Wellness/Fitness	5	42	210
Responding to Incident	2	49	99
Fire Prevention	1	40	40
Returning from Incident	1	32	32
Total	**74**	**45**	**3669**

Table 16: Activities Individuals Were Doing that Resulted in Lost Time, 2019, 91+ days

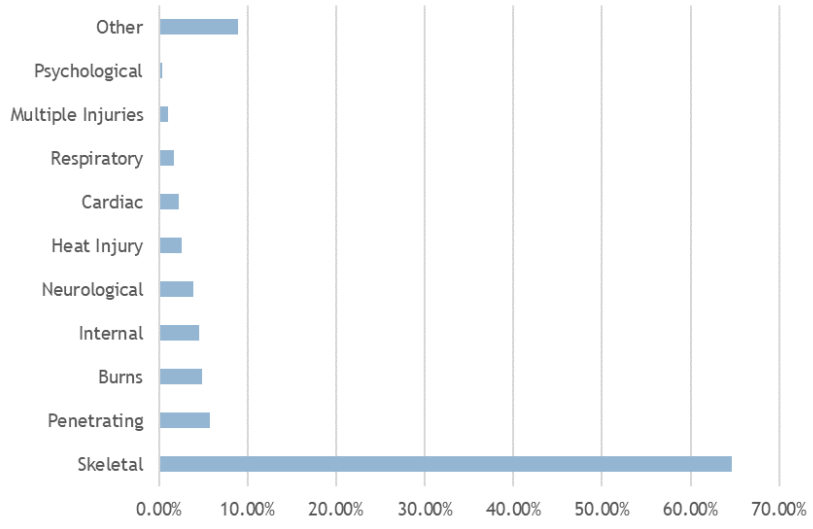
		Days Missed	
Activity	**Count**	**Average**	**Sum**
Fire Suppression	8	120	967
EMS	4	120	480
Skills Training	3	202	608
Wellness/Fitness	3	137	411
Total	**18**	**153**	**1499**

Types of Injuries with Lost Time

Table 17: Types of Injuries Resulting in Lost Time, 2019

Type of Injury	Count
Skeletal	203
Penetrating	18
Burns	15
Internal	14
Neurological	12
Heat Injury	8
Cardiac	7
Respiratory	5
Multiple Injuries	3
Psychological	1
Other	28
Totals	**314**

Figure 6: Types of Injuries Resulting in Lost Time, 2019



Burn Injuries

Table 18: All Burns, 2015 - 2019

All Burns - Types	2015	2016	2017	2018	2019
Thermal (Heat/Fire)	85	92	96	108	71
Scald or Steam	10	9	13	12	10
Chemical	0	3	4	6	6
Electrical	0	2	0	1	2
Totals	**95**	**106**	**113**	**127**	**89**

Table 19: Burns by Body Part Sub-Type, 2019

Body Part Sub-Type	Count
Back: Back	0
Back: Buttocks	0
Back: Lower Back	0
Back: Neck	0
Back: Spine	0
Chest: Abdomen	2
Chest: Abdominal Area	0
Chest: Chest	0
Head: Cheek	1
Head: Chin	1
Head: Ear	17
Head: Eye	5
Head: Face	7
Head: Jaw	0
Head: Mouth	1
Head: Nose	0
Hip: Groin	0
Hip: Hip	0
Hip: Pelvis	0
Internal: Genito-urinary	0
Internal: Heart	0

Internal: Internal	0
Internal: Intestinal tract	0
Internal: Lungs	0
Internal: Stomach	0
Internal: Trachea	0
Lower Extremities: Ankle	0
Lower Extremities: Foot	3
Lower Extremities: Knee	1
Lower Extremities: Lower leg	3
Lower Extremities: Toes	1
Lower Extremities: Upper Leg	0
Multiple Parts: Lower Body	0
Multiple Parts: Unknown	0
Multiple Parts: Upper Body	6
Multiple Parts: Whole Body	4
Neck: Neck	2
Neck: Throat	0
Upper Extremities: Elbow	0
Upper Extremities: Hands	16
Upper Extremities: Lower Back	5
Upper Extremities: Shoulder	1
Upper Extremities: Upper Arm	3
Upper Extremities: Wrist	10
Total	**89**

Table 20: Burns by Body Part, 2015 - 2017, Historical Data

Body Part	2015	2016	2017	2018*	2019*
Ear	22	14	16	17	17
Hand and fingers	14	27	22	30	16
Face	12	16	9	14	10
Wrist	4	9	7	8	10
Multiple body parts, upper body	5	8	4	10	6
Eye	0	0	0	4	5
Hip, lower back, or buttocks	0	1	0	0	5
Foot and toes	1	3	1	6	4
Multiple parts	8	4	12	5	4
Arm, upper, not including elbow or shoulder	2	1	2	11	3

Lower extremities	1	2	0	8	3
Chest	0	1	1	2	2
Neck	6	4	7	2	2
Knee	0	1	2	0	1
Shoulder	5	3	6	9	1
Back, except spine	0	0	2	1	0
Elbow	0	0	1	0	0
Pelvis or groin	0	0	2	0	0
Throat	0	0	0	0	0
Arm, lower, not including elbow or wrist	3	2	12	n/a	n/a
Head	4	2	1	n/a	n/a
Leg, lower	6	3	3	n/a	n/a
Upper extremities	2	2	0	n/a	n/a
Neck and shoulders	0	0	1	n/a	n/a
Undetermined	0	3	2	n/a	n/a
Total	**95**	**106**	**113**	**127**	**89**

*The 2018 & 2019 columns were pieced together from the data in Table 19: Burns by Body Part Sub-Type, from the 2018 and 2019 injury report data. This was done in order to view trends and patterns.

Exposures

Table 21: Exposure by Sub-Type, 2018 - 2019

Exposure + Sub-Type	2018	2019
Chemical: Ammonia	1	3
Chemical: Battery Acid*	n/a	4
Chemical: Benzene	2	15
Chemical: Bleach	1	11
Chemical: Not listed	151	160
Chemical: Unidentified	73	55
Physical: Animal venom	6	11
Physical: Meningitis	38	39
Physical: Not listed	138	201
Physical: Plant toxin	27	14
Physical: Radiation*	n/a	4
Physical: Unidentified	87	66
Physical: UV Light*	n/a	2
Respiratory: Blood	69	70
Respiratory: Influenza	4	19
Respiratory: Not listed	108	118
Respiratory: Saliva	24	21
Respiratory: Tuberculosis	98	75
Respiratory: Unidentified	50	37
Respiratory: Vomit	7	6
Other: Asbestos*	n/a	2
Other: Carbon Monoxide*	n/a	1
Other: Contaminated Water/Sewage*	n/a	4
Other: Smoke/Products of Combustion*	n/a	5
Total	**884**	**943**

Due to the change in our information management system, the exposure data collected in calendar years 2018 and 2019 is less specific than the exposure data collected in previous years. This is why we currently have "historical data" in separate charts and figures than that for 2018 and 2019.

*These exposure types were added to the injury reporting application in 2019, which is why they have n/a in the numbers column for 2018.

Table 22: Exposure by Route, 2019

Route	Count
Absorption	379
Ingestion	29
Inhalation	474
Injection/Puncture	61
Total	**943**

Figure 7: Exposure by Route, 2019, percentages

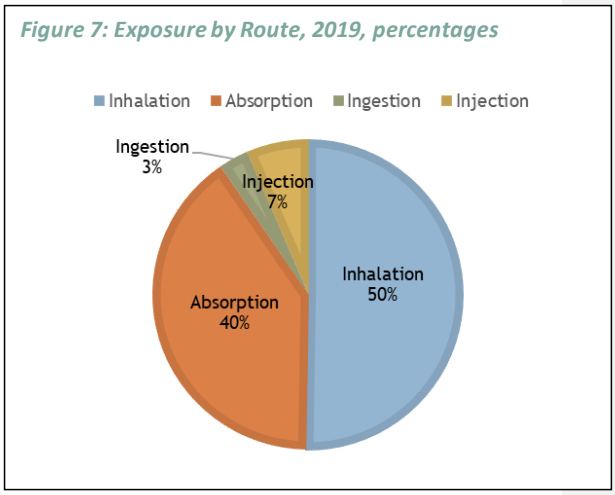


Table 23: Exposure by Substance, 2019

Substance	Count
Gas/vapor	410
Liquid	300
Solid	233
Total	**943**

Figure 8: Exposure by Substance, 2019, percentages

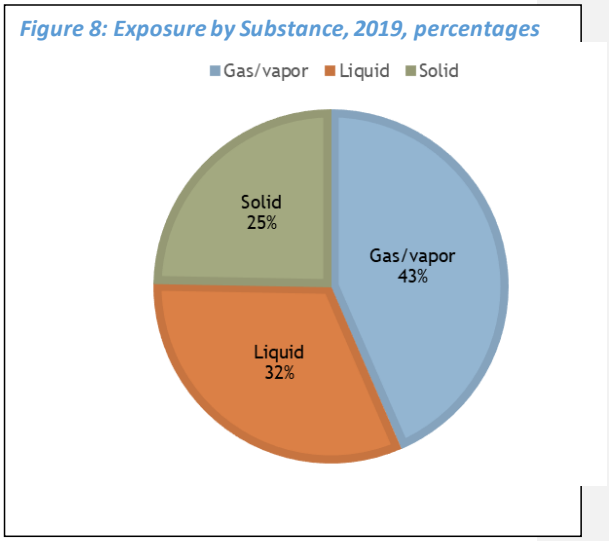


Table 24: Routes of Exposure, 2015 - 2017, Historical Data (ordered by 2017, descending)

Exposure Routes	2015	2016	2017
Airborne pathogens	141	290	354
Undetermined	287	273	325
Blood pathogens	181	194	174
Body Fluids	167	121	173
Chemical (household/industrial)	53	310	147
Plant Toxins	54	37	36
Chemical (carbon monoxide)	3	27	1
Total	**886**	**1252**	**1210**

Figure 9: Routes of Exposure, 2015 - 2017, Historical data

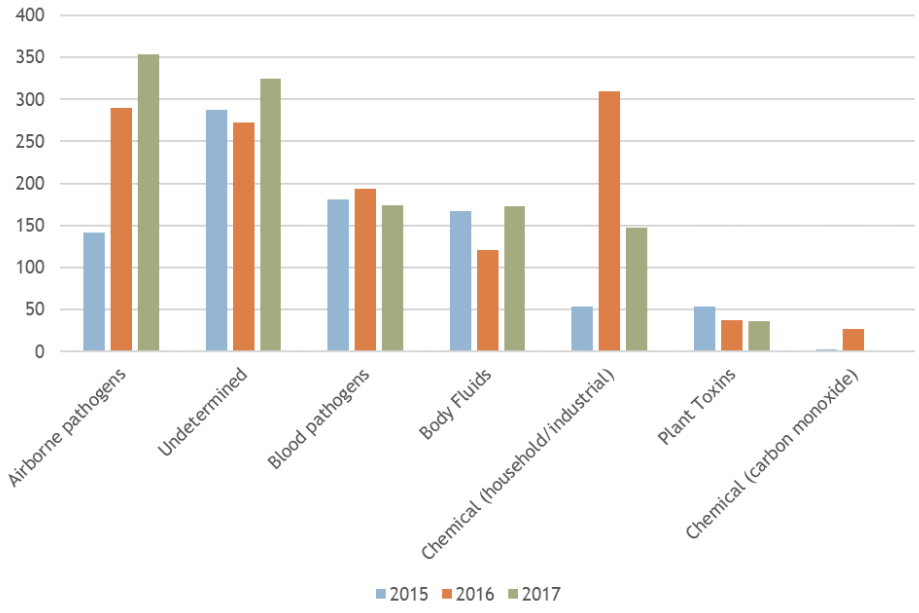


Table 25: Exposure description, 2015 - 2017, Historical Data (ordered by 2017, descending)

Exposure description	2015	2016	2017
Unknown	256	148	290
Blood	167	161	153
Chemicals/household/industrial	36	310	122
Asbestos	51	51	112
Tuberculosis	73	128	109
Body fluids	92	91	101
Meningitis	91	62	104
Animals or wildlife	75	90	58
Sickness, other	21	24	49
Poison plants	61	37	37
Vomit	19	14	17
Chlorine	4	1	14
Mold	4	26	10
Airborne, other	7	40	7
Staph	3	0	7
Carbon monoxide	8	26	5
HIV	11	4	4
Scabies	4	21	4
Hepatitis C	10	14	3
MRSA	0	14	3
Bacterial pneumonia	1	0	1
Explosive residue	0	0	0
Influenza	0	0	0
Lice	0	0	0
Strep	0	1	0
Total	**994**	**1263**	**1210**

Cancer

In June of 2019, the Governor of Texas signed Senate Bill 2551 (SB 2551) which expanded the scope of the law in which firefighters and EMTs who suffer from cancer are presumed to have developed the condition during the course and scope of their employment. The types of cancer this law addresses include:

- cancers that originate at the stomach, colon, rectum, skin, prostate, testis or brain
- non-Hodgkin's lymphoma
- multiple myeloma
- malignant melanoma
- renal cell carcinoma

The commission received **19** reports of cancer diagnoses from fire departments in 2019:

Skin/Melanoma/Basal Cell Carcinoma – 6
(Males, 36, 48, 51, 55, 56, 61)

Testicular – 1
(Males, 37)

Prostate – 3
(Males, 50, 57, 60)

Colorectal – 1
(Male, 33)

Colon – 2
(Female, 47; Male, 51)

Anal – 1
(Male, 55)

Kidney – 1
(Male, 54)

Throat – 1

A Reminder for Fire Departments

Any injuries to fire protection personnel that are reported to the Texas Worker's Compensation Commission must be reported to the Texas Commission on Fire Protection. This includes cancer diagnoses.

(Male, 54)

Unidentified – 3
(Female, 32; Males, 46, 53)

The commission strongly encourages fire departments to report cancer diagnoses; the commission recognizes that the number of job-related cancers reported during this time-period represents only a small fraction of the cases that Texas fire departments are currently managing. There is a growing awareness of the impact that cancer is having on fire protection personnel nationwide, and the commission urges departments to use this reporting tool to help contribute to the education and awareness of the issue in Texas.

SOP Issues

In 2019 there were 33 injuries attributed to failures of fire protection personnel to follow their departments' standard operating procedures (SOPs). All but a few were instances where the individuals were not wearing their provided PPE/SCBA gear in an environment or situation in which they should have been.

In its compliance inspections, the Texas Commission on Fire Protection verifies that fire departments have written SOPs that cover the appropriate subject matter.

Table 26: Injuries Attributed to SOP Issues, 2019

Activity	Minor	Serious	Total	2018	2017
Fire Suppression	6	5	11	19	9
EMS	10	0	10	9	7
Rescue - Non-fire	3	1	4	0	1
Rescue - Fire-related	2	0	2	0	0
Skills Training	0	1	1	2	2
Wellness/fitness	0	1	1	0	1
Station Duties	3	1	4	1	4
Responding to Incident	0	0	0	1	3
Fire Prevention	0	0	0	0	1
Totals	**24**	**9**	**33**	**32**	**28**

Table 27: Injuries Attributed to PPE & PASS Failures, 2019

Activity	Minor	Serious	Total	2018	2017*
Fire Suppression	2	0	2	8	n/a
Skills Training	1	1	2	2	n/a
Station Duties	1	0	1	0	n/a
Rescue - Non-fire	0	0	0	2	n/a
EMS	0	0	0	1	n/a
Rescue - Fire-related	0	0	0	1	n/a
Totals	**4**	**1**	**5**	**14**	**n/a**

*TCFP did not start collecting information on PPE & PASS failures until 2018.

Fatalities

The commission's 2019 injury report includes four fatalities. Fatalities listed in this report include only those reported to the Texas Commission on Fire Protection (TCFP) by the entities it regulates.

The State Fire Marshal's Office conducted three Texas fire fighter fatality incident investigations between September 1, 2018 and August 31, 2019. Comprehensive information about the investigations may be found on their website at the following web address: https://www.tdi.texas.gov/fire/fmloddannuals.html

Recommendations

The commission would like to thank Texas fire departments for their ongoing participation in reporting fire protection personnel injuries. This report would not be possible without their efforts.

Based on their review of the data contained within this report, the commission offers the following recommendations:

Recommendations for Program Improvement

1. Create more categories for the types of exposures that can be reported.
2. Notify all fire departments that reporting cancer diagnoses is now mandatory.

Recommendations for the Texas Fire Service

1. Focus on reducing strains and sprains:
    - Stretching
    - EMS equipment review/patient moving
    - Equipment deployment/apparatus design
2. Focus on reducing weight lifting injuries:
    - Clarify the purpose of weightlifting (functional fitness vs. body sculpting)
    - Review types of exercise routines
3. Increase cancer reporting and prevention activities:
    - Consider early detection testing
    - Review the Health and Wellness Committee's March 2019 presentation
    - Read *The Lavender Ribbon Report* (download a copy here)
    - Clean everything often
4. Reduce fire ground injuries through prevention:
    - Fire risk analysis
    - Familiarity walk through
    - Pre-planning with focus on firefighter safety and injury prevention

Commission-adopted standards

The commission has adopted several NFPA and other nationally recognized standards to help keep Texas fire protection personnel safe. This list summarizes the relationships between some of the Texas laws and national standards and is not intended to be all-inclusive:

Texas Government Code

- §419.040, Protective Clothing
- §419.041, Self-Contained Breathing Apparatus
- §419.042, Personal Alert Safety Systems
- §419.043, Applicable National Fire Protection Association Standard
- §419.044, Incident Management System
- §419.045, Personnel Accountability System
- §419.046, Fire Protection Personnel Operating at Emergency Incidents
- §419.047, Commission Enforcement

Texas Administrative Code

- CHAPTER 425 FIRE SERVICE INSTRUCTORS
- §443.9 National Fire Protection Association Standard
- CHAPTER 435 FIRE FIGHTER SAFETY
- §435.21 Fire Service Joint Labor Management Wellness-Fitness Initiative
- §435.23 Fire Fighter Injuries
- §435.25 Courage to be Safe So Everyone Goes Home Program
- §435.27 Live Fire Training Structure Evolutions
- CHAPTER 451 FIRE OFFICER
- CHAPTER 457 INCIDENT SAFETY OFFICER CERTIFICATION

See also the commission's web page: NFPA Standards adopted by the commission.

6. Public comments.

7. Subjects for future agenda items.

8. **Future meeting dates.**

9. Adjourn meeting.