Pennsylvania State Fire Academy

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Minimum Standard for Accreditation (MSA)

Date: September 2006
Last Revision:

Course Title: Hazardous Materials Operations Level 472

SFA Course Code: HMO

Course Length: 24 hours **Lecture/Lab Breakdown:** 12/12

Prerequisites: IST

Referenced Text(s): ***Hazardous materials Training: First Responder Operations*** Instructor Guide; OSHA 29 CFR 1910.120; DOT 49 CFR 171-173; NFPA 471; NFPA 472; DOT Emergency Response Guidebook 2004 Edition; ***NIOSH Pocket Guide to Chemical Hazards***, Third Printing, January 2003, DHHS (NIOSH) Publication No. 97-140, U.S. Department Health and Human Services, Public Health Service, Centers for Disease Control & Prevention; ***Fundamentals of Industrial Hygiene***, Third Edition, National Safety Council (Stock#151.33); ***Hazardous Materials, Managing the Incident***, Second Edition, Noll, Hildebrand & Yvorra, Fire Protection Publications, Oklahoma State University.

Course Goal: Students completing this course will be able to safely and effectively control, manage, and mitigate a hazardous materials release using first due resources until the arrival of additional specialized units. This program was designed to educate the student in hazardous materials responses and to prepare the student for professional certification testing in accordance with NFPA 472 Operations Level.

Course Description: The primary target audiences for this course are the First Responders charged with response actions associated with hazardous materials releases. Student will learn and adapt the knowledge and skill requirements for effective scene and response management. The goal of this program is to provide the First Responder with the training needed to comply with NFPA 472 Chapter 5 Competencies for the First Responder at the Operational Level, and 29 CFR 1910.120 OSHA's Hazardous Waste Operations and Emergency Response, (HAZWOPER), First Responder Operations Level. This program is designed to give the first responder the necessary skills to handle hazardous materials emergencies.

Description of Methodology: Lecture, discussion, demonstration, and supervised practice.

Student Equipment & Supplies: Pen/pencil & notebook, PPE, and SCBA, spare cylinder (optional).

Equipment/Audiovisual/Facility/Supply Requirements:

1. Classroom with usual amenities; computer and computer projection equipment with screen; AV CD for the course; below-listed equipment list:
2. One copy of Instructor Guide and PowerPoint Presentation CD
3. One copy of Student Manual for each student (manual will remain in student's possession at course conclusion)
4. Course Resource/Equipment Needs:
    a. Lessons 1 – 3
        i. 2004 ERG books 24 for each kit
        ii. Worksheets for students for practical skills
    b. Lesson 4
        i. Turnout gear for each student
        ii. SCBA, with spare cylinders
        iii. (optional) If local hazmat team truck is available, the following is recommended:
            1. APRs (samples)
            2. Tyvek or sarnx suits (12 suit various sizes)
            3. CPC boots and gloves (12 sets)
            4. Medical gloves
            5. Level "A" training suit (for teaching dress out assistance only)
            6. Area for dressing out students in different types of CPC
    c. Lesson 5
        i. Standard classroom needs
    d. Lesson 6
        i. Standard classroom needs
    e. Lesson 7
        i. Several large booms, socks, pads
        ii. Training foam, at least 4 pails per class
        iii. 1 Foam eductor
        iv. 1 Foam expansion adapter
        v. Several tarps
        vi. Shovels, flat head and spade
        vii. Street brooms
        viii. Hay bales
        ix. 1 extension ladder
        x. Sand/soil pile (road silt may be used) (6 tons)
        xi. (optional) Props (if available) Empty cylinders, drums, and other containers
        xii. An area for practical skills to perform vapor suppression with foam, damming, diking & diverting, and vapor dispersion, the area should include (if possible) a waterway, roadway with storm rains, and impervious and non-impervious surface.
    f. Lesson 8
        i. Standard classroom needs

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g. Lesson 9
    i. Decon equipment, (it would be best to use local hazmat teams if possible)
    ii. Multi-station: Showers, tarps or plastic, pools, garden hose, brushes, 5 gallon pails, fold-up chairs
    iii. Emergency decon: tarps, 25' pony line 3" to 5" or 2 roof ladders and pike poles
    iv. Mass Decon: water supply, 2 engines and ladder truck
    v. An area large enough to set up for at the very least emergency decon
h. Lesson 10
    i. Gas detectors single or multi-gas (should be fire company or hazmat team owned)
    ii. Thermal imaging camera (if available)
        1. Not needed but should be reviewed if available
            a. Photo Ionization Detectors
            b. pH paper
            c. Radiation Monitors
            d. Colorimetric Tubes
        2. If possible, samples of products to be detected
i. Lesson 11
    i. Command worksheets
    ii. Resource information from lesson 1-3
    iii. Portable radios
    iv. If possible information on the location where class is held, this should include fixed facilities, area waterways and maps of local roads
    v. Written examination

5. Practical skills and or certification
    a. All of the above, also an area where the training can take place
6. Certification Testing Needs:
    a. Various absorbent pads or socks for spill drill
    b. 1 – Engine with attack hose, supply hose, and nozzles with operator
    c. Test-site suitable for practical exercise drills
    d. 1 – classroom to seat student number comfortably; must have chairs and tables for note taking and written test
    e. 1 – gated wye appliance
    f. 1 – foam eductor with matching gpm nozzle
    g. Training foam concentrate or liquid soap for foam application exercise; 2 pails for testing and two pails for class.
    h. PPE and SCBA for students, units may be shared if there is not enough foe each student

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i. 1 – ventilation fan (smoke ejector) or PPV blower
j. 1 – multi-gas meter
k. 2 – salvage covers or 1 – 100’ x 50’ roll of plastic (4mm)
l. 4 - NIOSH Pocket Guides
m. Assorted pads (50) and socks (8) for spill control exercise
n. 6 ton of sand or stone dust for spill control exercise and testing
o. 4 – shovels (flat preferred but not essential)
p. 1 – wheelbarrow
q. Assorted indicator paper (ie. pH, Spill Fighter)
r. 4 sections of PVC pipe: 1 – 4’ x 2”, 1 – 6’ x 2”, 1 – 4’ x 3”, 1 – 6’ x 3”
s. 1 plastic bottle of baby powder
t. 1 – “A” frame ladder
u. 1 - roll duct tape
v. 1 - 6’ pike pole
w. Adequate water supply 2,500 gpm (tanker) or hydrant
x. Projection screen, 6’ preferred; LCD projector optional
y. 6 - 36” traffic cones
z. 1 - 30 - 55 gallon empty drum for training prop

Special Notes & Conditions: Maximum enrollment is 30 students. A second instructor will be required for the lab sections of the course (12hrs.). All course material is the property of the Pennsylvania State Fire Academy; Course materials may be duplicated. Minimum age is 18 due to the Child Labor Law restrictions on minors working at hazmat incidents with a potential exposure to IDLH atmospheres and chemical releases.

Course Outline

Elapsed Time		Topic
0.75	……..……	Introduction
1.00	……..……	Unit 1: Identification
0.75	……..……	Unit 2: Health & Safety
0.50	……..……	Unit 3: Hazmat Chemical Terms
1.00	……..……	Skill: ERG & MSDS Exercise
1.00	……..……	Unit 4: Personal Protective Equipment
1.00	……..……	Unit 5: Hazardous Material Containers
0.50	……..……	Unit 6: Why Containers Fail
1.50	……..……	Skill: Donning & Doffing PPE
1.00	……..……	Unit 7: Mitigation
1.00	……..……	Unit 8: WMD & The First Responder
1.00	……..……	Unit 9: Decon
1.00	……..……	Unit 10: Detection Devices

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2.00	……...……	Skill: Emergency Decon Evolutions
2.00	……...……	Skill: Building Containment Systems
2.00	……...……	Unit 11: Incident Scene Management
5.00	……...……	Skill: Practical Skills Evolutions
1.00	……...……	Written Examination
24 Hours	**Total**	

Competency Evaluation Mechanism: Student performance on practical skills evolutions and written examination grade (minimum passing grade of 70% required for successful completion of the course).

Learning Outcomes (Behavioral Objectives): Upon completion of this course, the student shall:

1. The student will identify hazardous materials by occupancy and location, placards and labels
2. The student will utilize the 2004 ERG in researching hazardous materials
3. The student will utilize facility documents in researching hazardous materials
4. The student will identify common facility markings and the NFPA 704 diamond
5. The student will identify the common health hazards and their effects associated with hazardous materials
6. The student will identify the routes of entry of hazardous materials in the human body and their health effects
7. The student will describe the differences between exposure and contamination
8. The student will identify expose terms and their meaning
9. The student will recognize the terms that are applied to the properties of hazardous materials
10. The student will describe the four levels of protection
11. The student will identify various PPE and how they protect the wearer
12. The student will identify various respiratory protection devices and how they protect the wearer
13. The student will identify the various sizes and types of pressurized vessels
14. The student will identify the various sizes and types of non-pressurized vessels
15. The student will describe the effects of stress on containers and their potential outcomes
16. The student will recognize the four common dispersion patterns from container failure
17. The student will describe the dispersion pattern of spilled hazardous material
18. The student will describe methods of mitigation for spill of a liquid hazardous material
19. The student will apply class B foam on a spill of a simulated liquid hazardous material
20. The student will apply a water vapor spray in a simulated hazardous material gas leak to disperse the vapors
21. The student will describe situations when no action would be taken at a hazardous materials incident
22. The student will identify common targets of terrorists
23. The student will describe the effects of a terrorist event
24. The student will describe the effects of various agents used in terrorist events

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25. The student will recognize the differences between a criminal and terrorist event
26. The student will identify three different types of decontamination and the appropriate situation for each type
27. The student will build an emergency decontamination system
28. The student will identify methods of decontamination
29. The student will identify devices used for detecting hazardous materials
30. The student will operate detecting devices in a simulated hazardous materials incident
31. The student will identify the five components of an incident command system
32. The student will describe the levels of response for hazardous materials incidents
33. The student will demonstrate skill sets during integrated exercises

Questions/Comments: Curriculum Specialist: Extension 106