

147044

# BASIC COURSE INSTRUCTOR UNIT GUIDE

41

HAZARDOUS MATERIALS

January 1994

147044

U.S. Department of Justice  
National Institute of Justice

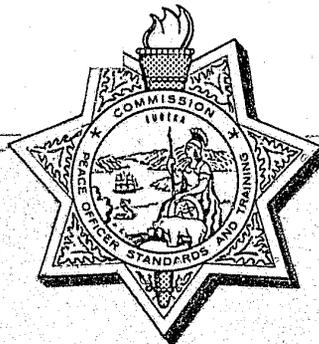
This document has been reproduced exactly as received from the person or organization originating it. Points of view or opinions stated in this document are those of the authors and do not necessarily represent the official position or policies of the National Institute of Justice.

Permission to reproduce this copyrighted material has been granted by

California Commission on Peace  
Officer Standards and Training

to the National Criminal Justice Reference Service (NCJRS).

Further reproduction outside of the NCJRS system requires permission of the copyright owner.



THE COMMISSION  
ON PEACE OFFICER STANDARDS AND TRAINING

STATE OF CALIFORNIA

The curricula contained in this document is designed as a *guideline* for the delivery of performance-based law enforcement training. It is part of the POST Basic Course guidelines system developed by California law enforcement trainers and criminal justice educators in cooperation with the California Commission on Peace Officer Standards and Training.

# UNIT GUIDE 41

## TABLE OF CONTENTS

### Learning Domain 41 Hazardous Materials

	Page
<b>Knowledge Test (POSTRAC)</b>	
8.51.1 Indicators of Hazardous Materials Situations .....	1
8.51.2 Precautions in Presence of Hazardous Materials .....	5
8.51.3 Hazardous Materials Substances .....	11
<b>Exercises</b>	
8.51.4 Handling Hazardous Materials Incidents .....	15
<b>Supporting Materials and References</b>	

## INDICATORS OF HAZARDOUS MATERIALS SITUATIONS

Given a word picture depicting the presence of an unknown substance, a spill, fire, or explosion or a container, vehicle, or building marked by a placard, the student will identify if the situation should be treated as a hazardous materials incident. In making this identification, the student will use the following indicators:

- A. People evacuating an area or building
- B. People unconscious or showing signs of dizziness, nausea, or breathing difficulty
- C. A spill or leak involving an unknown or dangerous substance
- D. Fire, smoke, fumes or vapors
- E. Hissing, knocking or pinging sounds coming from an enclosed container
- F. Type of business (e.g., fertilizer plants, laboratories, gas stations, etc.)
- G. Container sizes or shapes used in storing or transporting hazardous materials
- H. Markings, colors, placards, or labels indicating the presence of hazardous materials
- I. Shipping papers, Material Safety Data Sheets (MSDS), or National Fire Protection Association (NFPA) 704 system

Performance Objective 8.51.1

## CURRICULUM

### A. Recognition

#### 1. Types of incidents

##### a. Low chemical risk

(1) Working definition - Any substance reasonably believed not to pose a significant risk to health, safety, and environment.

(2) Substances

(a) Materials used for human consumption (i.e., food stuff)

(b) Materials and products intended for domestic or law enforcement use:

Paint  
Household bleach  
Cleaning products  
Gasoline, diesel oil  
Cigarette smoke, Fireplace  
smoke  
Propane  
Lead (Firearms Range)  
Drinking Alcohol

Photographic chemicals  
Ninhydrin powder  
(Fingerprinting substances)

(3) Exceptions

- (a) Large quantities
- (b) When sensory indicators produce a bad human reaction.
- (c) Mixture of low risk chemicals can equal a high risk situation, (e.g., dry swimming pool chlorine plus certain soft drink beverages such as Coca Cola).

b. High chemical risk

- (1) Working definition: Any substance capable of posing an unnecessary risk to health, safety, or property.
- (2) If an incident is not readily identified as "low risk" and chemical substances are observed and unknown, a high-risk scenario must be assumed for personal protection (i.e., the known chemicals could be deadly, explosive, carcinogenic).

(3) Substances

Explosives  
Compressed gases  
Flammable liquids  
Flammable solids  
Oxidizers and organic peroxides  
Poisons and etiologic agents  
Radioactive materials  
Corrosives

2. Locations

- a. Streets and highways
- b. Industrial sites
- c. Rural
- d. Other

3. Scope

- a. Amount transported in California

- b. Clandestine Labs
  - c. Types of incidents reported in California
4. First responders are limited in their response to hazardous material incidents by the availability or lack of their personal protective equipment and by the level of their training. Many times the only reasonable response to an event is to call for trained hazardous material personnel.
5. Container shapes
- a. Container packaging
  - b. EPA assistance on labels
  - c. Names on packages and tanks
  - d. Types of tank truck construction
  - e. Rail car and tank car construction
  - f. Railroad tank car numbers
  - g. National Fire Protection Association  
(Identification System - NFPA 704M)
6. Sensory cues
- a. Sight
  - b. Smell (may be hazardous)
  - c. Color
  - d. Sound
  - e. Environmental



## PRECAUTIONS IN PRESENCE OF HAZARDOUS MATERIALS

Given a direct question, the student will identify the following precautions which should be taken in the presence of hazardous materials.

- A. Stay upwind, uphill and upstream of the material in a well-ventilated location
- B. Do not smoke, eat, or drink
- C. Do not attempt to touch, taste or sniff any substance
- D. Eliminate all sources of ignition (e.g., do not use flares, do not turn on light switches, do not strike matches, etc.)
- E. Park emergency vehicles facing away from the incident

Performance Objective 8.51.2

## CURRICULUM

- A. Toxicological risk - If hazardous materials are present, information about the nature of the risk to the first responder, victims and others must be determined as soon as possible by trained hazardous materials personnel. Many hazardous materials can cause irritation, sickness or death depending on the materials and the area of the release. Some of the forms of damage that may occur to the first responder include asphyxiation, skin irritation, internal organ damage or cancer.
  - 1. Routes of exposure
    - a. Inhalation: The most common form of exposure resulting in greater than 90% of all occupational poisoning. After inhalation, not all materials are absorbed into the blood stream, but can be either immediately exhaled or otherwise excreted. Thus, some exposures can be accurately determined by medical testing.
    - b. Skin Absorption: Second most important with respect to occupational exposures. Some liquids and solids can be absorbed by direct contact with broken or unbroken skin but more importantly some vapors and gases can be absorbed through unbroken skin as readily as by inhalation via the lungs.
    - c. Ingestion: Most common in nonindustrial accidents, such as children ingesting toxic compounds or improper storage; e.g., draining antifreeze into an empty wine bottle. Occupational exposures can occur by eating, drinking, or smoking with contamination present, either in the environment, on clothing or on hands.
  - 2. Effects of exposure

- a. Acute Exposure: Toxic exposure with symptoms resulting usually within 24 hours occurs after one dose.
- b. Chronic Exposure: Toxicity results after repeated exposure concentrations over time, at least 30 days, but could mean years.

B. High-risk situations

1. Initial Action. If placards, shipping papers, container shapes or sensory cues indicate hazardous substances are present, the site should be evacuated and secured for a detailed site evaluation by trained hazardous materials personnel.
  - a. Isolate area and deny entry
    - (1) Techniques
    - (2) Authority
  - b. Position for safety and control
    - (1) Personnel
    - (2) Equipment
    - (3) General public
  - c. Traffic control
    - (1) Re-routing
    - (2) Equipment
    - (3) Manpower resources
    - (4) Notifications

NOTE: Authority - Streets and Highways Code Section 126  
Vehicle Code Section 2800, Penal Code Section 409.5

2. Techniques of isolation
  - a. Consider factors which affect wind direction/weather conditions/topography
  - b. Preliminary containment techniques within safety parameters.
    - (1) Safety concerns
    - (2) Environmental

- (3) Techniques
- c. Control of Contaminated Individuals
  - (1) Isolate contaminated persons
  - (2) Notification responsibility
  - (3) Symptoms of contamination
  - (4) Documentation of exposure
- 3. Notification
  - a. Required Notifications
    - (1) Local (As required by your Agency Plan)
      - (a) Police
      - (b) Fire
      - (c) Public Works
      - (d) County Agriculture (Pesticide Incidents)
      - (e) County Water and Air
      - (f) County Health
      - (g) Emergency Medical Services Agency
      - (h) Private clean-up contractor
    - (2) State
      - (a) Office of Emergency Services
      - (b) California Highway Patrol (Highways)
      - (c) California Department of Transportation (State Highways)
  - (b) Request For assistance
    - (1) What is needed
      - (a) Based upon observations
      - (b) Considerations
        - 1) Equipment

- 2) Manpower
    - 3) Access routes
  - (c) Command system per local plan
- (2) Notification information
  - (a) Provide accurate, clear and complete information
  - (b) Weather, wind, product mobility, victim, etc.
- c. Media
  - (1) Legal access to scene and limitations
    - (a) Command post
    - (b) Safety considerations
    - (c) Military incidents
    - (d) Air space
  - (2) Release of information
- 4. Basic first responder limitations
  - a. Definitions
    - (1) First responder (awareness)
    - (2) First responder (operation)
    - (3) Hazardous materials technician
    - (4) Hazardous materials specialist
    - (5) On-scene incident commander
  - b. Training
  - c. Knowledge
  - d. Equipment
- C. Hazardous materials response
  - 1. Detailed site analysis for hazardous incidents
    - a. Substance evaluation for a scientific risk assessment.

- b. Use of appropriate equipment to identify problem.
  - (1) Varies depending upon duties, levels of training, and equipment available.
  - (2) Binoculars, protective clothing, special protective equipment (breathing), etc.
  - (3) Limitations
- c. Rescue considerations
  - (1) Rescue or not
  - (2) Personal limitations



## HAZARDOUS MATERIALS SUBSTANCES

Given an Emergency Response Guidebook (ERG) and information contained on a shipping paper or placard for a hazardous material, the student will use the ERG to identify the material by its name or identification number as listed in the ERG; the potential hazards of the material; and the actions to be taken.

Performance Objective 8.51.3

### CURRICULUM

- A. Methods of identification
  - 1. Placards and labels/hazard classes
    - a. Recognition
    - b. Location
    - c. Hazard classes  
(Risks and consequences)
    - d. Use of Emergency Response Guidebook, DOT
  - 2. Driver and/or witness information
  - 3. Shipping papers
    - a. Best source to identify substances
    - b. Types and locations
      - (1) Rail
      - (2) Highway
      - (3) Water
      - (4) Air



**EXERCISES**



### HANDLING HAZARDOUS MATERIALS INCIDENTS

Given a table-top exercise simulating a hazardous materials incident, the student will do the following:

- A. Describe the nature of the hazardous incident
- B. Select the appropriate safety precautions to take
- C. Explain how to isolate the scene
- D. Name the agency or person that should be contacted

Performance Objective 8.51.4

### CURRICULUM

- A. Given a table-top exercise simulating a hazardous materials incident, the student will do the following:
  - 1. Describe the nature of the hazardous incident
  - 2. Select the appropriate safety precautions to take
  - 3. Explain how to isolate the scene
  - 4. Name the agency or person that should be contacted

**SUPPORTING MATERIAL**

**AND**

**REFERENCES**

This section is set up as reference information for use by training institutions. These materials can be used for instruction, remediation, additional reading, viewing, or for planning local blocks of instruction. This list is not an endorsement of any author, publisher, producer, or presentation. Each training institution should establish its own list of reference materials.



**TOPICAL LIST OF SUPPORTING MATERIALS AND  
REFERENCES INCLUDED IN THIS SECTION**

None included.

## ADDITIONAL REFERENCES

Emergency Response Guidebook, U.S. Department of Transportation.

Transportation of Hazardous Materials in California by Highway and Rail, Report to the Legislature, California Department of Transportation.

Hazardous Materials Training, Module I and II, California Highway Patrol.

Dot Chart 9 (Hazardous Materials Marking, Labeling and Placarding Guide, U.S. Department of Transportation, Research and Special Programs Administration.