



**Hazardous Materials Technician A  
Objectives  
5/6/98**

- \_\_\_\_\_ 24-1.1      The student will understand the laws regulating training requirements for the hazardous materials technician as set forth by Occupational Safety and Health Administration (OSHA), the Illinois Department of Labor (IDOL), the United States Environmental Protection Agency (USEPA), and the National Fire Protection Administration (NFPA). (NFPA 472: 4-1.1)
- \_\_\_\_\_ 24-2.1      The student shall understand how to analyze a hazardous materials incident to determine the magnitude of the problem in terms of outcomes by completing the following tasks. (NFPA 472: 4-1.3)
- \_\_\_\_\_ a.      Survey the 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 resources, technical resources, computer databases, and monitoring equipment.
- \_\_\_\_\_ c.      Determine the extent of damage to containers.
- \_\_\_\_\_ d.      Predict the likely behavior of materials when released.
- \_\_\_\_\_ e.      Estimate the size of an endangered area using monitoring equipment or specialists in this area.
- \_\_\_\_\_ 24-2.2      Identify the steps in an analysis process for identifying unknown materials. (NFPA 472: 4-2.1.3.1)
- \_\_\_\_\_ 24-2.3      The student shall, given simulated facility and transportation problems, describe the response objectives for each problem. (NFPA 472: 4-3.1)
- \_\_\_\_\_ 24-2.4      Describe the steps for determining responsive objectives (defensive, offensive, non-intervention) given an analysis of a hazardous materials incident. (NFPA 472: 4-3.1.1)

- \_\_\_\_\_ 24-3.1 The technician shall identify special containers involved and, given the appropriate equipment, identify or classify unknown materials, verify the identify of hazardous material, and determine the concentration of hazardous materials. (NFPA 472: 4-2.1)
- \_\_\_\_\_ 24-3.2 Identify the six recognition clues as presented in class.
- \_\_\_\_\_ 24-3.3 Identify how occupancy and location can assist in determining the presence of hazardous materials.
- \_\_\_\_\_ 24-3.4 Identify the following hazardous materials and response information as found on an MSDS.
- \_\_\_\_\_ 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
  - \_\_\_\_\_ d. Signs and symptoms of exposure
  - \_\_\_\_\_ e. Routes of entry
  - \_\_\_\_\_ f. PELs
  - \_\_\_\_\_ g. Responsible party contact
  - \_\_\_\_\_ h. Precautions for handling
  - \_\_\_\_\_ i. Applicable control measures
  - \_\_\_\_\_ j. Emergency and first aid procedures
  - \_\_\_\_\_ k. Manufacturer's emergency phone number
- \_\_\_\_\_ 24-4.1 The technician shall, given situations with known and unknown hazardous materials, determine the appropriate personal protective equipment for the action options specified in the plan of action in each situation. (NFPA 472: 4-3.3)
- \_\_\_\_\_ 24-4.2 The student will identify the four levels of chemical protection (EPA) and understand the equipment and conditions for use of each level. (NFPA 472: 4-3.3.1)
- \_\_\_\_\_ 24-4.3 Identify the factors to be considered in selecting the proper respiratory protection for a specified action options. (NFPA 472: 4-3.3.2)
- \_\_\_\_\_ 24-4.4 Understand the following terms with their definitions and explain their impact and significance on the selection of chemical-protective clothing. (NFPA 472: 4-3.3.3.1)
- \_\_\_\_\_ a. Degradation

- \_\_\_\_\_ b. Penetration
- \_\_\_\_\_ c. Permeation
  
- \_\_\_\_\_ 24-4.5 Identify indications of material degradation of chemical protective clothing. (NFPA 472: 4-3.3.3.2)
  
- \_\_\_\_\_ 24-4.6 Identify the three types of vapor-protective and splash-protective clothing and describe the advantages and disadvantages of each type. (NFPA 472: 4-3.3.3.3.)
  
- \_\_\_\_\_ 24-4.7 Identify the process for selecting the proper personal protective clothing at hazardous materials incidents. (NFPA 472: 4-3.3.3.5.)
  
- \_\_\_\_\_ 24-4.8 Given examples of various hazardous materials, determine the appropriate protective clothing construction materials for a given action option using chemical compatibility charts. (NFPA 472: 4-3.3.3.6)
  
- \_\_\_\_\_ 24-4.9 Identify the physical and psychological stresses that can affect users of personal protective clothing. (NFPA 472: 4-3.3.3.7)
  
- \_\_\_\_\_ 24-4.10 The student shall demonstrate the ability to don, work in, and doff both liquid splash and vapor protective clothing and other specialized personal protective equipment. (NFPA 472: 4-4.2 and NFPA 472: 4-4.2.3)
  
- \_\_\_\_\_ 24-4.11 Identify the safety and emergency procedures for personnel wearing vapor protective clothing. (NFPA 472: 4-4.2.1)
  
- \_\_\_\_\_ 24-4.12 Describe the maintenance, testing, inspection, and storage procedures for personal protective equipment provided by the authority having jurisdiction according to the manufacturer's specifications and recommendations. (NFPA 472: 4-4.2.5)
  
- \_\_\_\_\_ 24-5.1 Identify the steps for determining the extent of physical, health, and safety hazards within the endangered area of a hazardous materials incident given the concentrations of the released material. (NFPA 472: 4-2.5.2)
  
- \_\_\_\_\_ 24-5.2 Match the following toxicological terms and exposure values with their significance in predicting the extent of health hazards in a hazardous materials incident. (NFPA 472: 4-2.5.2.1)
  
- \_\_\_\_\_ a. Immediately dangerous to life and health value (IDLH)
- \_\_\_\_\_ b. Lethal concentrations (LC<sub>50</sub>)

- \_\_\_\_\_ c. Lethal dose (LD<sub>50</sub>)
- \_\_\_\_\_ d. Permissible exposure limit (PEL)
- \_\_\_\_\_ e. Threshold limit value ceiling (TLV-C)
- \_\_\_\_\_ f. Threshold limit value short-term exposure limit (TLV-STEL)
- \_\_\_\_\_ g. Threshold limit value time-weighted average (TLV-TWA)
- \_\_\_\_\_ h. Parts per million (ppm)
  
- \_\_\_\_\_ 24-5.3 Given various hazardous materials and appropriate reference materials, identify the signs and symptoms of exposure to each material and the target organ effects of exposure to that material. (NFPA 472: 4-2.2.4)
  
- \_\_\_\_\_ 24-6.1 Identify steps in an analysis process for identifying unknown materials. (NFPA 472: 4-2.1.3.1)
  
- \_\_\_\_\_ 24-6.2 Identify the types of monitoring equipment used to determine the following hazards. (NFPA 472: 4-2.1.3.2)
  - \_\_\_\_\_ a. Corrosivity (pH)
  - \_\_\_\_\_ b. Flammability
  - \_\_\_\_\_ c. Oxidizing potential
  - \_\_\_\_\_ d. Oxygen deficiency
  - \_\_\_\_\_ e. Radioactivity
  - \_\_\_\_\_ f. Toxic exposures
  
- \_\_\_\_\_ 24-6.3 Given examples of various hazardous materials and the following monitoring equipment, select the appropriate monitoring equipment to identify and quantify the materials. (NFPA 472: 4-2.1.3.4)
  - \_\_\_\_\_ a. Carbon monoxide meter
  - \_\_\_\_\_ b. Colorimetric tubes
  - \_\_\_\_\_ c. Combustible gas meter
  - \_\_\_\_\_ d. Oxygen meter
  - \_\_\_\_\_ e. pH papers, meters, and strips
  - \_\_\_\_\_ f. Radiation detection instruments
  
- \_\_\_\_\_ 24-6.4 Demonstrate the field maintenance and testing procedures for monitoring equipment. (NFPA 472: 4-2.1.3.5)
  
- \_\_\_\_\_ 24-6.5 Identify the steps for determining the extent of physical, health, and safety hazards within the endangered area of a hazardous materials incident given the concentrations of the released material. (NFPA 472: 4-2.5.2)

- \_\_\_\_\_ 24-6.6 Identify the following terms and their importance in monitor performance.
- \_\_\_\_\_ a. Sensitivity  
\_\_\_\_\_ b. Selectivity  
\_\_\_\_\_ c. Response time  
\_\_\_\_\_ d. Calibration  
\_\_\_\_\_ e. Relative response
- \_\_\_\_\_ 24-6.7 Identify the limiting factors associated with the selection and use of the following monitoring equipment. (NFPA 4-2.1.3.3)
- \_\_\_\_\_ a. Carbon monoxide meter  
\_\_\_\_\_ b. Colorimetric tubes  
\_\_\_\_\_ c. Combustible gas meter  
\_\_\_\_\_ d. Oxygen meter  
\_\_\_\_\_ e. Passive dosimeter  
\_\_\_\_\_ f. pH papers, pH meters, and strips  
\_\_\_\_\_ g. Radiation detection instruments
- \_\_\_\_\_ 24-6.8 Describe the following chemical and physical properties and their significance in a hazardous materials release: (NFPA 4-2.2.2)
- \_\_\_\_\_ a. Boiling point  
\_\_\_\_\_ b. Concentration  
\_\_\_\_\_ c. Corrosivity (pH)  
\_\_\_\_\_ d. Expansion ratio  
\_\_\_\_\_ e. Flammable (explosive) range  
\_\_\_\_\_ f. Flash point  
\_\_\_\_\_ g. Form (solid, liquid, gas)  
\_\_\_\_\_ h. Ignition (autoignition) temperature  
\_\_\_\_\_ i. Melting point  
\_\_\_\_\_ j. Reactivity  
\_\_\_\_\_ k. Specific gravity  
\_\_\_\_\_ l. Temperature of product  
\_\_\_\_\_ m. Toxic products of combustion  
\_\_\_\_\_ n. Vapor density  
\_\_\_\_\_ o. Vapor pressure  
\_\_\_\_\_ p. Water solubility
- \_\_\_\_\_ 24-6.9 Match the following chemical and physical terms with their significance and impact on the behavior of the container and/or its contents:

- \_\_\_\_\_ a. Acid, caustic
- \_\_\_\_\_ b. Air reactivity
- \_\_\_\_\_ c. Catalyst
- \_\_\_\_\_ d. Chemical interactions
- \_\_\_\_\_ e. Compound, mixture
- \_\_\_\_\_ f. Critical temperatures and pressure
- \_\_\_\_\_ g. Halogenated hydrocarbon
- \_\_\_\_\_ h. Inhibitor
- \_\_\_\_\_ i. Instability
- \_\_\_\_\_ j. Organic and inorganic
- \_\_\_\_\_ k. Oxidation ability
- \_\_\_\_\_ l. pH
- \_\_\_\_\_ m. Polymerization
- \_\_\_\_\_ n. Radioactivity
- \_\_\_\_\_ o. Salt, nonsalt
- \_\_\_\_\_ p. Saturated, unsaturated, and aromatic hydrocarbons
- \_\_\_\_\_ q. Solution, slurry
- \_\_\_\_\_ r. Strength
- \_\_\_\_\_ s. Sublimation
- \_\_\_\_\_ t. Viscosity
- \_\_\_\_\_ u. Volatility
- \_\_\_\_\_ v. Water miscible, immiscible
- \_\_\_\_\_ w. Water reactivity

- \_\_\_\_\_ 24-7.1 Given a simulated hazardous materials incident, the student shall develop a site safety plan. (NFPA 472: 4-3.5.2 and NFPA 472: 4-3.5.2.2)
- \_\_\_\_\_ 24-7.2 Describe the components of a site safety plan for a hazardous materials incident. (NFPA 472: 4-3.4.2.1)
- \_\_\_\_\_ 24-7.3 Identify the role, specified in the local emergency response plan and the organization's standard operating guidelines, of the hazardous materials technician during an incident involving hazardous materials. (NFPA 472: 4-4.1.1)
- \_\_\_\_\_ 24-8.1 The technician shall, given access to printed resources, technical resources, computer databases, and monitoring equipment, collect and interpret hazard and response information. (NFPA 472: 4-2.2)
- \_\_\_\_\_ 24-8.2 Identify the types of hazard and response information available from each of the following resources and explain the advantages and disadvantages of each resource. (NFPA 472: 4-2.2.1)

- \_\_\_\_\_ a. Reference manuals
  - \_\_\_\_\_ b. Hazardous materials databases
  - \_\_\_\_\_ c. Technical information centers (CHEMTREC/CANUTEC, NRC)
  - \_\_\_\_\_ d. Technical information specialists
  - \_\_\_\_\_ e. Monitoring equipment
- \_\_\_\_\_ 24-8.3 Identify the sources of technical information for selecting appropriate decontamination procedures and identify how to contact those sources in an emergency. (NFPA 472: 4-3.4.2)
- \_\_\_\_\_ 24-9.1 Survey the 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. (NFPA 472: 4-1.3)
- \_\_\_\_\_ 24-9.2 Determine the extent of damage to containers. (NFPA 472: 4-1.3)
- \_\_\_\_\_ 24-9.3 Predict the likely behavior of materials when released. (NFPA 472: 4-1.3)
- \_\_\_\_\_ 24-9.4 Given various hazardous materials and appropriate reference materials, identify the signs and symptoms of exposure to each material and the target organ effects of exposure to that material. (NFPA 472: 4-2.2.4)
- \_\_\_\_\_ 24-10.1 The student shall demonstrate how to perform the functions and responsibilities of each role within the incident management system for hazardous materials incidents. (NFPA 472: 4-4.1)
- \_\_\_\_\_ 24-10.2 Identify the duties and responsibilities of the following hazard sector functions within the incident management system. (NFPA 472: 4-4.1.2)
- |   |   |
|---|---|
| _____ a. Safety<br>_____ b. Entry/reconnaissance<br>_____ c. Information/research | _____ d. Resources<br>_____ e. Decontamination<br>_____ f. Operations |
|---|---|
- \_\_\_\_\_ 24-10.3 Given the local emergency response plan or organization's standard operating procedures, identify the duties and responsibilities of the hazard sector officer and describe how to coordinate all activities of that sector. (NFPA 472: 4-4.1.3)

\_\_\_\_\_ 24-11.1 The technician shall, given a simulated hazardous materials incident, select an appropriate decontamination procedure and determine the equipment required to implement that procedure. (NFPA 472: 4-3.4)

\_\_\_\_\_ 24-11.2 Identify the advantages and limitations and describe an example where each of the following decontamination methods would be used. (NFPA 472: 4-3.4.1)

- \_\_\_\_\_ a. Absorption
- \_\_\_\_\_ b. Adsorption
- \_\_\_\_\_ c. Chemical and physical degradation
- \_\_\_\_\_ d. Dilution
- \_\_\_\_\_ e. Disposal
- \_\_\_\_\_ f. Neutralization
- \_\_\_\_\_ g. Solidification
- \_\_\_\_\_ h. Evaporation
- \_\_\_\_\_ i. Washing
- \_\_\_\_\_ j. Vacuuming

\_\_\_\_\_ 24-11.3 Identify the sources of technical information for selecting appropriate decontamination procedures and identify how to contact those sources in an emergency. (NFPA 472: 4-3.4.2)

\_\_\_\_\_ 24-11.4 Given a simulated hazardous materials incident, demonstrate setup of the contamination reduction corridor as specified in the planned response. (NFPA 472: 4-4.1.4)

\_\_\_\_\_ 24-11.5 Given a simulated hazardous materials incident, demonstrate how to perform the decontamination process specified in the planned response. (NFPA 472: 4-4.1.5)