



Standard Guide for Developing a Hazardous Materials Training Curriculum for Initial Response Personnel¹

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1. Scope

1.1 This guide covers a format for a hazardous materials spill initial response team training curriculum. This guide is designed to assist trainers of initial response personnel in assessing the content of training curriculum by providing guidelines for subject content against which these curricula may be evaluated. The guide should be tailored by the trainer to fit specific circumstances that are present in the community or industry where a spill may occur.

1.2 Sections 56789 of this guide identify those training areas that should be considered in a curriculum. The area of preplanning is listed and this topic should be seriously considered by the user. Training is only a small part of an overall spill response contingency plan. A properly equipped and trained spill response team cannot operate without a previously agreed plan of attack.

1.3 Currently the Code of Federal Regulation 40 CFR 112, 40 CFR 265, and 49 CFR 173 specify that producers, handlers, and shippers of hazardous materials shall plan and train for hazardous spill response. The broad interpretation of these regulations could include the requirement to train state and local response organizations who may be required to handle hazardous materials in an emergency spill situation. Regardless of the above regulatory requirements, training is essential to a proper response in an emergency.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 Federal Regulations:

40 CFR 112—Oil Pollution Prevention²

40 CFR 265—Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities²

49 CFR 173—Shippers—General Requirements for Shipments and Packagings²

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² Available from U. S. Government Printing Office, Washington, DC 20402.

2.2 Other Documents:

DOT-P5800.2—DOT Emergency Response Guide Book³

NIOSH/OSHA—Pocket Guide to Chemical Hazards⁴

Emergency Handling of Hazardous Materials in Surface Transportation⁵

OSHA 20 or Materials Safety Data Sheets⁶

3. Summary of Guide

3.1 This guide covers the following areas:

3.1.1 Preplanning,

3.1.2 Initial Assessment,

3.1.3 Personal Safety Equipment,

3.1.4 Training, and

3.1.5 Implementation of Plan of Attack.

3.2 Preplanning covers the aspects of pre-accident planning that should be considered by the response team members. This includes identification of potential hazardous chemicals, spill locations, and resource identification.

3.3 Initial assessment outlines those assessments that should be made when arriving at the accident location to assist in the development of a plan of attack.

3.4 Personal Safety Equipment discusses those safety devices and their limitations that are available to the response team members.

3.5 Training describes the activities that could be conducted by the team on a regular basis and the improvement of training plans after training exercises are completed.

3.6 Implementation of plans describes how and in what order the plan of attack should be implemented.

4. Significance and Use

4.1 This guide summarizes the typical contents of a course to aid emergency response team training organizations in selecting important subjects for inclusion in existing or new training programs.

³ Available from U. S. Department of Transportation, 400 7th Street, S.W., Washington, DC 20590.

⁴ Available from U. S. Department of Health and Human Services, 200 Independence Ave, S.W., Washington, DC 20201. Or available from U. S. Department of Labor, 200 Constitution Avenue, N.W., Washington, DC 20210.

⁵ Available from the Association of American Railroads/Bureau of Explosives, 1920 L Street, N.W., Washington, DC 20036.

⁶ OSHA 20 or Materials Safety Data Sheets are available from the specific chemical manufacturers.

5. Preplanning

- 5.1 Identify all areas subject to hazardous materials spills:
- 5.1.1 Fixed facilities that store or produce hazardous materials.
- 5.1.2 Routes that are used by carriers to transport hazardous materials.
- 5.2 Determine the type of hazardous material:
- 5.2.1 Stored or produced.
- 5.2.2 Transported:
- 5.2.2.1 Contact truck companies.
- 5.2.2.2 Contact rail companies.
- 5.3 Identify physical, chemical, and hazardous characteristics of each material:
- 5.3.1 Obtain OSHA 20 or Materials Safety Data Sheets for each hazardous material identified.
- 5.3.2 Suggested reference documents for data include the following:
- 5.3.2.1 Chemical handbooks; for example, Condensed Chemical Dictionary.
- 5.3.2.2 DOT-P5800.2—DOT Emergency Response Guide Book, U. S. Department of Transportation.
- 5.3.2.3 NIOSH/OSHA Pocket Guide to Chemical Hazards, U. S. Department of Health and Human Services, U. S. Department of Labor.
- 5.3.2.4 Emergency Handling of Hazardous Materials in Surface Transportation, Bureau of Explosives/Association of American Railroads.
- 5.4 Determine the mitigation resources available to respond.
- 5.4.1 A suggested reference is *ASTM STP 825*.⁷
- 5.4.2 Determine the number, qualifications, and location of knowledgeable personnel:
- 5.4.2.1 Local community.
- 5.4.2.2 Private industry.
- 5.4.3 Determine type and quantity of mitigation equipment available:
- 5.4.3.1 Neutralizer.
- 5.4.3.2 Foams.
- 5.4.3.3 Water sources.
- 5.4.3.4 Sorbents.
- 5.4.3.5 Dispensing equipment.
- 5.4.3.6 Containment equipment.
- 5.4.4 Determine the type, location, and method of activation of all automatic response systems at the potential spill site.
- 5.5 Identify critical population and environment areas adjacent to hazardous material sites or routes:
- 5.5.1 Schools, hospitals, shopping centers, etc.
- 5.5.2 Water supplies, soil conditions, recreational areas, etc.
- 5.6 Estimate the volume of the potential spill as follows:
- 5.6.1 Obtain potential spill volume estimates from storer, producer, or carrier.
- 5.6.2 Calculate spill volume from tankage sizes.
- 5.7 Determine spill drainage path for site or route as follows:
- 5.7.1 Attempt to determine the final spill location.
- 5.7.2 Determine accessibility to the spill location.

- 5.7.2.1 Establish travel route, including alternates, to the location.
- 5.7.2.2 Establish entry procedures.
- 5.7.3 Evaluate resources that could be made available at final spill location (refer to 5.4).
- 5.8 Determine vapor dispersion path for the site or route as follows:
- 5.8.1 Obtain normal meteorological data for area.
- 5.8.2 Select a dispersion model.
- 5.8.3 Develop vapor hazard corridor estimation procedures.
- 5.8.4 Develop dispersion estimates for appropriate accident scenarios.
- 5.8.5 Evaluate dispersion modeling results uncertainties.
- 5.8.6 Utilize dispersion model data in conjunction with population data to estimate exposure potential.
- 5.8.7 Consider specific chemical health impacts to identify population risk.
- 5.9 Establish an evacuation plan.
- 5.10 Determine spill reporting responsibilities for the following:
- 5.10.1 Local.
- 5.10.2 State.
- 5.10.3 Federal.
- 5.11 Develop a response plan with site or carrier management.

6. Initial Assessment of Incident

- 6.1 *Hazardous Substance Physical Identification:*
- 6.1.1 Identify source of spill (that is, tanker truck, railcar, storage facility).
- 6.1.2 Accurately identify substance spilled and its hazards:
- 6.1.2.1 *Substance Identification:*
- (a) Department of Transportation (DOT) Placards.
- (b) United Nations (UN) Numbers.
- (c) Standard Transportation Commodity Code (STCC) Number.
- (d) Markings or material labels.
- (e) Shipping papers.
- 6.1.2.2 *Hazard(s) Identification:*
- (a) Department of Transportation (DOT) Labels/Placards.
- (b) National Fire Protection Association (NFPA) Labels.
- (c) Physical observations.
- (d) Detector measurements.
- 6.1.3 *Physical Characteristics:*
- 6.1.3.1 Solids.
- 6.1.3.2 Liquid.
- 6.1.3.3 Vapor.
- 6.1.4 Approximate the volume of spill or the total volume at source, or both.
- 6.1.5 For a transportation accident, determine the shipper's name.
- 6.1.6 For all types of accidents, determine the manufacturer's name.
- 6.1.7 Identify the person reporting spill.
- 6.1.8 Determine the approximate time of the spill (maintain chronological record of events).
- 6.1.9 Determine the time of spill report.
- 6.1.10 Estimate the material release rate.
- 6.2 *Identify the number and location of injured personnel:*

⁷ *Guide to the Safe Handling of Hazardous Materials Accidents, ASTM STP 825*, ASTM, 1983.

- 6.2.1 Notify medical authorities.
- 6.2.2 Conduct a rescue assessment.
 - 6.2.2.1 Safety implications.
 - 6.2.2.2 Equipment required.
- 6.3 *Collect Site Information:*
 - 6.3.1 *Current Weather Conditions:*
 - 6.3.1.1 Rain (snow) or prospects of rain (snow).
 - 6.3.1.2 Wind speed and direction.
 - 6.3.1.3 Air temperature.
 - 6.3.1.4 Weather stability.
 - 6.3.1.5 Forecast (immediate, long term).
 - 6.3.2 *Terrain Characteristics:*
 - 6.3.2.1 Type of topography.
 - 6.3.2.2 Porosity of ground surface.
 - 6.3.2.3 Surface water.
 - 6.3.2.4 Underground water.
 - 6.3.3 *Demographics:*
 - 6.3.3.1 Distance to public areas such as schools, churches, public buildings, busy intersections, shopping centers, recreational facilities, hospitals, convalescent centers, etc.
 - 6.3.3.2 Distance to drinking water supplies.
 - 6.3.3.3 Distance to sewers.
 - 6.3.3.4 Distance to food and feed processing facilities.
- 6.4 *Establish on-scene authority.*
- 6.5 *Determine plan of action:*
 - 6.5.1 Evaluate required response resources based on information collected.
 - 6.5.2 Identify logistics problems.
 - 6.5.3 Estimate impact area.

7. Personal Safety Equipment Requirements

Identification

Note—All personal safety equipment should be fit tested.

- 7.1 *Levels of Protection (EPA):*
 - 7.1.1 *Level A:*
 - 7.1.1.1 Highest level of protection.
 - 7.1.1.2 Self-contained breathing apparatus.
 - 7.1.1.3 Positive pressure suits.
 - 7.1.1.4 Total encapsulation.
 - 7.1.1.5 Resistant to specific chemicals.
 - 7.1.2 *Level B:*
 - 7.1.2.1 Self-contained breathing apparatus.
 - 7.1.2.2 Lighter weight rainwear.
 - 7.1.2.3 Chemical resistant.
 - 7.1.2.4 Minimum level recommended for initial site entry.
 - 7.1.3 *Level C:*
 - 7.1.3.1 Air purifying respirator with full face plate.
 - 7.1.3.2 Splash garments.
 - 7.1.3.3 Goggles, gloves, and head protection.
 - 7.1.3.4 Type and concentrations of chemical must be known.
 - 7.1.4 *Level D:*
 - 7.1.4.1 Lowest level of protection.
 - 7.1.4.2 Work uniforms.
 - 7.1.4.3 Goggles, gloves, and head protection.
 - 7.1.4.4 Optional use of escape mask.
- 7.2 *Breathing Protection Selection:*
 - 7.2.1 Self-contained breathing apparatus.
 - 7.2.2 Gas masks:
 - 7.2.2.1 Not for firefighting or oxygen deficient atmospheres.
 - 7.2.2.2 Need canister specific for atmosphere to be encountered.
 - 7.2.3 Respirators (needs filter cartridge specific for the hazard).
 - 7.2.4 Escape devices (not a duty cycle unit, for personal escape only).
 - 7.2.5 Supplied air units, need umbilical hose and source of air (bottled gas or compressor).
 - 7.2.6 Oxygen administrators (for resuscitation only)

7.3 *Personal Protection Selection:*

- 7.3.1 Head protection.
 - 7.3.2 Eye protection.
 - 7.3.3 Clothing, chemical protection.
 - 7.3.3.1 Needs to be chemical specific for permeation.
 - 7.3.3.2 Compatibility only is not sufficient but is necessary.
 - 7.3.4 Ear protection.
 - 7.3.5 Foot protection.
 - 7.3.6 Hand protection.
- ### 7.4 *Gas Concentration Analyzing and Dosage Instrument Selection—Portable:*
- 7.4.1 Detector tubes, chemical specific (with hand pump).
 - 7.4.1.1 Portable gas detectors.
 - 7.4.1.2 Personnel Dosimeters, passive badges to be worn by individuals.

8. Training

- 8.1 Develop a training plan and schedule as follows:
 - 8.1.1 Use other agency plans.
 - 8.1.2 Review existing plans by other response teams.
- 8.2 Test and evaluate plans as follows:
 - 8.2.1 Develop potential scenarios.
 - 8.2.2 Select test participants.
 - 8.2.3 Select evaluators.
 - 8.2.4 Conduct drills.
 - 8.2.5 Evaluate results.
 - 8.2.6 Prepare critique of plan.
- 8.3 Plan revisions as follows:
 - 8.3.1 Review test critique.
 - 8.3.2 Revise plan.
 - 8.3.3 Develop standard operating procedures for the initial response team.

9. Implementation of Plan

- 9.1 *Command Post:*
 - 9.1.1 Establish chain of command (that is, who's in charge?) in accordance with contingency plan.
 - 9.1.2 Establish communications system.
- 9.2 *Protection of the Public:*
 - 9.2.1 Evacuation.
 - 9.2.2 Remain in place.
 - 9.2.2.1 Audio warnings (close windows, remain inside).
 - 9.2.2.2 Media announcements.
 - 9.2.2.3 Atmospheric dispersion factors should be used to estimate public exposure risk as a basis for selection of public protection actions.
 - 9.2.2.4 Re-evaluate item 5.8 as atmospheric conditions change.
- 9.3 *Stabilize Incident:*

- 9.3.1 Determine the presence or threat of fire.
 - 9.3.1.1 Extinguish fire if safe to do so.
 - 9.3.1.2 Apply retardant (foam, etc.) to prevent ignition.
- 9.3.2 Determine if flow of chemical from container can be stopped or reduced.
 - 9.3.2.1 Close valves.
 - 9.3.2.2 Patch or plug.
- 9.3.3 Contain escaped chemical.

- 9.3.3.1 Dikes, berms, etc.
- 9.3.3.2 Floating spill control barriers.
- 9.3.3.3 Apply retardant if toxic or flammable vapor hazard.

10. Keywords

- 10.1 hazardous materials; initial response personnel; training curriculum

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