



Designation: F1011 – 22

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

This standard is issued under the fixed designation F1011; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

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 5, 6, 7, 8, and 9 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 U.S. Code of Federal Regulation 29 CFR 1910.120, 40 CFR 112 Subpart B, 40 CFR 264 Subpart D, 40 CFR 265 Subpart D, and 49 CFR 172 Subpart H specify that producers, handlers, and shippers of hazardous materials shall plan and train for hazardous spill response. Additional training may be required for shipments by vessel (49 CFR 176.13) and highway (49 CFR 177.800). 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recom-*

¹ This guide is under the jurisdiction of ASTM Committee F20 on Hazardous Substances and Oil Spill Response and is the direct responsibility of Subcommittee F20.21 on Initial Response Actions.

Current edition approved Jan. 1, 2022. Published April 2022. Originally approved in 1986. Last previous edition approved in 2013 as F1011 – 07(2013). DOI: 10.1520/F1011-22.

mentations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 Federal Regulations:²

29 CFR 1910.120 - Hazardous waste operations and emergency response (OSHA HAZWOPER)

40 CFR 112 —Oil Pollution Prevention, Subpart B - Requirements for Petroleum Oils and Non-Petroleum Oils

49 CFR 172 —Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plans, Subpart H

49 CFR 176.13 Carriage by Vessel - Responsibility for compliance and training

49 CFR 177.800 Carriage by Public Highway – Purpose and scope of this part and responsibility for compliance and training

40 CFR 264, Subpart D – Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, Contingency Plan and Emergency Procedures

40 CFR 265, Subpart D - Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, Contingency Plan and Emergency Procedures.

2.2 Other Documents:

2020 Emergency Response Guide Book³

NIOSH —Pocket Guide to Chemical Hazards, PDF (2005), ISO/ZIP (2010)⁴

Safety Data Sheets⁵

² Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <https://www.ecfr.gov>

³ Available from Transport Canada's Website (last revised 2020) <https://tc.canada.ca/en/dangerousgoods/canutec/2020-emergency-response-guidebook-pdf-version>.

⁴ Available from CDC (Centers for Disease Control and Prevention) website – The National Institute for Occupational Safety and Health as updated online guide, PDF, and iPhone or Android App. <https://www.cdc.gov/niosh/npg/>

⁵ Safety Data Sheets are available from the specific chemical manufacturers and/or distributors.

[Science and Technology – First Responders, Department of Homeland Security⁶](#)
[Hazardous Materials Release, Department of Homeland Security⁷](#)
[ANSI/ASSP Z490.1-2016 American National Standard Criteria for Accepted Practices in Safety, Health, and Environmental Training⁸](#)
[Hazardous Materials Guide for First Responders \(2000\), US Fire Administration⁹](#)
[Guide to Developing a Hazardous Materials Training Program, US DOT¹⁰](#)
[Wireless Information System for Emergency Responders \(WISER\), National Library of Medicine¹¹](#)

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 American National Standard Criteria for Accepted Practices in Safety, Health, and Environmental Training.⁸

5.3.2.2 Chemical handbooks; for example, Condensed Chemical Dictionary.

5.3.2.3 2020 Emergency Response Guide Book.

5.3.2.4 NIOSH Pub#2005–149, NIOSH/OSHA Pocket Guide to Chemical Hazards, U. S. Department of Health and Human Services, U. S. Department of Labor. <https://www.cdc.gov/niosh/docs/2005-149/default.html>

5.3.2.5 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 Manual 10 MNL10-2nd.¹²

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:

¹² *A Guide to the Safe Handling of Hazardous Materials Accidents, Second Edition, ASTM MNL10-2ND-EB, ASTM, 1990.*

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.

5. Preplanning

5.1 Identify all areas subject to hazardous materials spills:

⁶ Available from the Department of Homeland Security at <https://www.dhs.gov/science-and-technology/firstresponders>

⁷ Available from the Department of Homeland Security at <https://www.dhs.gov/hazardous-materials-release#>

⁸ Available from American Society of Safety Professionals, at <https://store.assp.org/PersonifyEbusiness/Store/Product-Details/productId/29237745>.

⁹ Available from the Homeland Security Digital Library, at <https://www.hsdli.org/?view&did=1258>

¹⁰ Available from the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, at <https://www.phmsa.dot.gov/training/hazmat/guide-developing-hazmat-training-program>

¹¹ Available from the National Library of Medicine, at <https://wiser.nlm.nih.gov>

- 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 including establishing decontamination sites for responders 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 Classification of Transported Goods (SCTG) markings or material labels.
 - (d) Shipping papers.
 - (e) Hazardous Waste Manifest.
 - 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:*
 - 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.*
 - 6.4.1 Incident Command System (ICS).
 - 6.4.2 National Incident Management System (NIMS).
 - 6.4.3 Alternate emergency management system.
- 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 1—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.
 - 7.1.1.6 Gas/Vapor impermeable.
 - 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.