



National Fire Academy

R0229 – Hazardous Materials Operating Site Practices

Version: 3rd Edition, 10th Printing, August 2017

Quarter:

ACE Credit: In the upper-division baccalaureate degree category, five semester hours in fire science, public safety management, emergency management, public administration, or occupational health and safety.

IACET Continuing Education Units: 5.6

Length of Course: 10 Days (57 hr., 30 min. contact hours, Monday – Friday)

Prerequisite: Yes

Curriculum: Hazardous Materials

Training Specialist: Wayne Yoder

Instructor:

Instructor email/phone:

Classroom: J-

Meeting Time: 8 AM – 5 PM

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Course Description (Catalog)

R0229 – Hazardous Materials Operating Site Practices. This 10-day course focuses on the relationship of incident priorities, strategies and tactics as they relate to implementing safe procedures for alleviating the risk at an accidental or intentional hazardous materials incident. It concentrates on integrating risk-based decision-making and knowledge about hazardous materials chemistry, storage, transportation and release scenarios with information about local response plans and systems. Through risk-based decision-making activities, the course participants apply the knowledge and skills gained from the course.

Subjects covered include, among others: regulations and standards as they apply to hazmat teams, hazard interpretation, damage assessment, site characterization, use and interpretation of environmental monitoring instruments, selection of personal protective equipment, assessment of tactical options, and development of operational plans.

NOTE: This is **not** a “hands-on” program. Some evening sessions are required.

Student Qualifications (Primary and Secondary Audience)

Emergency response personnel having hazardous materials response or training responsibility at the technician/specialist level as referenced in Title 29 of the Code of Federal Regulations (CFR) Section 1910.120 or 40 CFR 311 and NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*.

Course Scope (Goal)

Course Objectives (Course Learning Outcomes – TLOs)

After successfully completing this course, you will be able to accomplish the following:

- Demonstrate the ability to analyze an incident in order to assess hazards and risks then develop a "risk-based response" to mitigate the incident in a safe and effective manner.
- Explain the potential civil and criminal liability implications for the Incident Commander (IC) and other emergency responders during a hazardous materials/weapons of mass destruction (haz mat/WMD) incident.
- Gather and interpret product data required to form an accurate risk-based response and risk-based decision.
- Gather and interpret container data for the purpose of developing a strategic control plan.
- Gather and interpret environmental data for the purpose of conducting a risk assessment.
- Describe how determining incident objectives is used in the development of a safe and effective Incident Action Plan (IAP) for handling an incident.
- Identify strategies available to accomplish the incident objectives: isolation and notification.
- Identify the primary operational considerations available to accomplish the incident objective of identification.
- Identify the primary operational considerations available to accomplish the incident objective of protection.
- Identify the primary operational considerations available to accomplish the incident objective of control including spill control.
- Identify the primary operational considerations available to accomplish the incident objective of termination.

Course Delivery Method

The National Fire Academy (NFA) offers specialized training courses and advanced management programs of national impact in an academic classroom environment [on campus at the National Emergency Training Center \(NETC\) in Emmitsburg, Maryland.](#) This classroom course is designed for the national level fire service officer from State and local fire service organizations. During this 10-day delivery, students will reside in dormitories provided on campus with classes conducted in classrooms designed for critical student/instructor interaction. All course materials are designed for interactive classroom environments, in either paper notebook or electronic formats.

Course Schedule

The purpose of the course schedule is to give you, at a glance, the required preparation, activities, and evaluation components of your course.

Day 1		
Morning	Afternoon	Evening
Introduction Unit 1: Introduction Activity 1.1	Unit 1 (cont'd) Unit 2: Risk-Based Response and Decisionmaking Activity 2.1	Required Reading: Student Manual: Unit 1 Unit 2 Unit 3 Optional Readings: <i>Hazardous Materials Strategies and Tactics</i> There is a copy of <i>Hazardous Materials Strategies and Tactics</i> in each reference library, and there are 24 copies reserved for HMOSP students in the LRC. The text follows the course very closely and can be used as an additional source of information. Chapter 1 --Introduction to Hazardous Materials and the Chemical Revolution (pages 1 to 7) Chapter 2 --The Hazardous Materials Emergency Response Standard of Care (pages 8 to 35) Chapter 3 --Operational Decision Making: The Command Sequence and the GEDAPER Process (pages 36 to 49) Chapter 4 --Gathering Information (pages 50 to 68 and 174 to 180)
Day 2		
Morning	Afternoon	Evening
Unit 3: Laws, Regulations, and Standards Activity 3.1	Unit 3 (cont'd) Activity 3.2	Required Reading: Student Manual: Unit 4 Optional Reading: <i>Hazardous Materials Strategies and Tactics</i> Chapter 4 (pages 68 to 118 and 160 to 174) Homework problems as assigned by the instructor.

Day 3		
Morning	Afternoon	Evening
Unit 4: Information Requirements: Product (through Act 4.4) Activities 4.1, 4.2, 4.3, and 4.4	Unit 4 (cont'd) Activity 4.5 Team Project Part 1	Required Reading: Student Manual: Unit 5 Unit 6 Optional Reading: <i>Hazardous Materials Strategies and Tactics</i> Chapter 4 (pages 118 to 149 and 181 to 203) Homework problems as assigned by the instructor.
Day 4		
Morning	Afternoon	Evening
Unit 5: Information Requirements: Containers Activity 5.1	Unit 6: Information Requirements: Environment and Cause Activities 6.1 and 6.2 Test Review	Required Reading: Student Manual: Unit 7
Day 5		
Morning	Afternoon	Evening
Test 1 Unit 7: Incident Command System and Haz Mat/Weapons of Mass Destruction Incident Objectives Activity 7.1 Synopsis if TP1	Unit 7 (cont'd) Activity 7.2 Team Project Part 2	Required Reading: Student Manual: Unit 8 Unit 9 Optional Reading: <i>Hazardous Materials Strategies and Tactics</i> Chapter 7--Assessing Tactical Options and Resources (pages 263 to 286)

Day 6		
Morning	Afternoon	Evening
Test 1 Review Unit 8: Operational Considerations: Isolation and Notification Activity 8.1	Unit 9: Operational Considerations: Identification (through Act 9.2) Activities 9.1 and 9.2	Required Reading: Student Manual: Unit 10 Optional Reading: <i>Hazardous Materials Strategies and Tactics</i> Chapter 7--Assessing Tactical Options and Resources (pages 293 to 358)
Day 7		
Morning	Afternoon	Evening
Unit 9 (cont'd) Activity 9.3	Unit 10: Operational Considerations: Protection Activities 10.1 and 10.2 Team Project Part III	Required Reading: Student Manual: Unit 11 Unit 12 Optional Reading: <i>Hazardous Materials Strategies and Tactics</i> Chapter 7--Assessing Tactical Options and Resources (pages 359 to 403)
Day 8		
Morning	Afternoon	Evening
Unit 10 (cont'd) Activities 10.1, 10.2, and 10.3 (cont'd) Unit 11: Operational Considerations: Control	Unit 11 (cont'd) Activity 11.1 Unit 12: Operational Considerations: Termination	Study for Test 2. Work on Team Project Presentations Optional Reading: <i>Hazardous Materials Strategies and Tactics</i> Chapter 8--Plan of Action Implementation, Evaluation and Review (pages 404 to 412)
Day 9		
Morning	Afternoon	Evening
Test 2 Student Preparation for Team Project Presentation	Team Project Presentations Course Evaluations and Closeout	

Course Resources (Instructional Materials)

In order to be fully prepared, obtain a copy of the required textbooks and other instructional materials prior to the first day of class.

Required Readings

The student must complete required readings during the course to be able to thoughtfully participate in discussions and activities.

None.

Suggested Reading/Resources

Suggested readings and resources are not evaluated, but may enhance the student's understanding, serve as additional sources for citation and promote discussion of course material.

“Hazardous Materials Strategies and Tactics”

Required Resources (Course Textbook)

Student Manual.

Supplemental Resources (Supplemental Course Textbook)

None.

Grading Methodology (Evaluation Procedures)

A minimum final grade of at least 70 percent is required to pass this course.

Numerical Score	Letter Grade
100-90	A
89-80	B
79-70	C
69 or below	F

Required Reading Assignments

Student completion of reading assignments will be done via evaluation of their class participation and will not be a separately graded activity.

Suggested Readings

Suggested readings are not evaluated, but may enhance the student's understanding and promote discussion of course material.

Course Outline

Unit 1: Introduction (Day 1)

Objectives

1. Implement effective and compliant risk-based response for a hazardous materials/weapons of mass destruction (haz mat/WMD) incident.
2. Develop incident objectives and strategies for a haz mat/WMD incident.

Unit 2: Risk-Based Response and Decisionmaking (Day 1)

Terminal Objective

The students will be able to demonstrate the ability to analyze an incident in order to assess hazards and risks then develop a "risk-based response" to mitigate the incident in a safe and effective manner.

Enabling Objectives

The students will:

1. Describe the role of information in the development of an accurate risk assessment.
2. Define the term "risk-based response" and describe the process used to implement this type of response.
3. Identify the four components of risk.
4. Describe the three levels of information identified in this course that are necessary to formulate a risk-based response.

5. Identify the four incident components found in a hazardous materials/weapons of mass destruction (haz mat/WMD) incident that must be evaluated in order to formulate a thorough risk-based response.
6. Identify how these components (product, container, environment, and cause (PCEC)) contribute to the development of a risk-based response.

Unit 3: Laws, Regulations, and Standards (Day 2)

Objectives

Terminal Objective

The students will be able to explain the potential civil and criminal liability implications for the Incident Commander (IC) and other emergency responders during a hazardous materials/weapons of mass destruction (haz mat/WMD) incident.

Enabling Objectives

The students will:

1. Differentiate among Federal laws, regulations, and standards.
2. Describe at least four requirements found in the Code of Federal Regulations (CFR) 1910.120 that establish the regulatory basis for the haz mat/WMD standard of care.
3. Identify the three primary National Fire Protection Association (NFPA) standards that establish the basis for the haz mat/WMD emergency response.
4. Identify the legislative and regulatory basis for the haz mat/WMD standard of care.
5. Explain the components of the standard of care and their implications for haz mat/WMD response.
6. Explain the potential civil and criminal liability implications for the IC and other emergency responders during a haz mat/WMD incident.

Unit 4: Information Requirements: Product (Day 3)

Objectives

Terminal Objective

The students will be able to gather and interpret product data required to form an accurate risk-based response and risk-based decision.

Enabling Objectives

The students will:

1. Describe strengths and weaknesses between rapid and detailed risk assessment.
2. Identify and define important chemical and physical properties necessary for both rapid and detailed risk assessment.
3. Identify types and sources of information.
4. Describe the implications of physical and chemical properties.
5. Use material safety data sheets (MSDS) and primary and secondary reference manuals.
6. Find, document, and retrieve accurate product data.

Unit 5: Information Requirements: Containers (Day 4)

Objectives

Terminal Objective

The students will be able to gather and interpret container data for the purpose of developing a strategic control plan.

Enabling Objectives

The students will:

1. Identify the primary criteria used to identify the type of container involved in a hazardous material (haz mat) incident.
2. Identify and explain the design features of vertical, spherical, and horizontal aboveground storage tanks, and underground storage tanks.
3. Apply the design features of fixed storage tanks to identify their implications in the development of a strategic control plan.
4. Determine the proper transportation shipping name of a substance based on a shipping description and its elements.
5. Identify various shipping papers used in transportation of haz mats.
6. Given various containers including fixed, transportation, and portable, identify potential contents of the containers.

Unit 6: Information Requirements: Environment and Cause (Day 4)

Objectives

Terminal Objective

The students will be able to gather and interpret environmental data for the purpose of conducting a risk assessment.

Enabling Objectives

The students will:

1. Identify at least two primary environmental considerations.
2. Explain the roles of meteorologic, topographic, and geologic conditions in conducting an accurate risk assessment.
3. Identify a minimum of three considerations associated with indoor incidents.
4. Identify a minimum of three considerations associated with outdoor incidents.

Unit 7: Incident Command System and Haz Mat/Weapons of Mass Destruction Incident Objectives (Day 5)

Objectives

Terminal Objective

The students will be able to describe how determining incident objectives is used in the development of a safe and effective Incident Action Plan (IAP) for handling an incident.

Enabling Objectives

The students will:

1. Define the six incident objectives for a hazardous materials/weapons of mass destruction (haz mat/WMD) incident.
2. Describe the relationship between the risk assessment process and the development of incident objectives.
3. Explain the relationship among incident priorities, incident objectives, strategies, and tactics.
4. Identify 14 Essential Components of the Incident Command System (ICS).

Unit 8: Operational Considerations: Isolation and Notification (Day 6)

Objectives

Terminal Objective

The students will be able to identify strategies available to accomplish the incident objectives: isolation and notification.

Enabling Objectives

The students will:

1. Define the terms perimeter, Outer Perimeter, Cold Line, Inner Perimeter, Hot Line, subzoning, and three-dimensional zoning.
2. Describe at least three situations that may require subzoning.
3. Describe at least two situations for the use of three-dimensional zoning.
4. Identify appropriate isolation strategy when given a scenario involving hazardous materials/weapons of mass destruction (haz mat/WMD).
5. Explain the role of incident levels in haz mat/WMD response.
6. Identify six information components and methods of working with the media to provide routine and emergency public information.
7. Describe the importance of establishing communications links on the scene of incidents involving haz mat/WMD.
8. Identify at least three potential sources and types of assistance that may be required for an incident involving haz mat/WMD.

Unit 9: Operational Considerations: Identification (Day 6)

Objectives

Terminal Objective

The students will be able to identify the primary operational considerations available to accomplish the incident objective of identification.

Enabling Objectives

The students will:

1. Identify 12 identification tools.
2. Define monitoring, sampling, quantitative data, qualitative data, and differential monitoring.
3. Perform three mathematical conversions between the various units of measurement.
4. Identify the 11 sensor technologies discussed in this unit, and describe their technology, limitations, and uses.

Unit 10: Operational Considerations: Protection (Day 7)

Objectives

Terminal Objective

The students will be able to identify the primary operational considerations available to accomplish the incident objective of protection.

Enabling Objectives

The students will:

1. Describe the six primary hazards and at least one personal protective equipment (PPE) alternative for each.
2. When provided with a description of a given PPE ensemble, identify the level, type, use, and limitations.
3. Identify the criteria and determine the appropriate levels and types of PPE when given a scenario involving hazardous materials/weapons of mass destruction (haz mat/WMD).
4. Define the terms contamination, direct contamination, cross-contamination, decontamination, gross, emergency, mass, and technical decontamination.
5. Differentiate between responder and victim decontamination.
6. Determine appropriate decontamination procedures when given a scenario involving haz mat/WMD.
7. Identify at least three incident situations that suggest the use of either secondary evacuation or protection-in-place.

8. Define the role of Emergency Medical Services (EMS) in a haz mat/WMD incident.
9. Differentiate between medical surveillance and medical monitoring.
10. Define the role of the safety assessment.

Unit 11: Operational Considerations: Control (Day 8)

Objectives

Terminal Objective

The students will be able to identify the primary operational considerations available to accomplish the incident objective of control including spill control.

Enabling Objectives

The students will:

1. Explain the role of spill typing in the identification of appropriate tactical options.
2. Identify and describe the application of the primary tactical options for handling gas/air, liquid/surface, liquid/water, and solid/surface releases.
3. Identify the differences between direct and indirect leak control and the influence on personnel safety.
4. Identify the limitations of leak control.
5. Identify and describe the application of the primary direct leak control tactics.
6. Identify and describe the application of the primary indirect leak control tactics.
7. Calculate the proper foam application rate, concentrate reserves, and application time for extinguishing a flammable or combustible liquid fire.
8. Identify the four primary hazardous materials (haz mat) fire control tactics.
9. Identify the four primary types of firefighting foam and describe their weaknesses and advantages.

Unit 12: Operational Considerations: Termination (Day 8)

Objectives

Terminal Objective

The students will be able to identify the primary operational considerations available to accomplish the incident objective of termination.

Enabling Objectives

The students will:

1. Define termination.
2. Distinguish between operational and administrative termination procedures.
3. Explain the multiagency nature of operational termination.
4. Explain the role of demobilization in operational termination.
5. Describe the role of documentation and the Finance/ Administration function in the administrative termination phase.
6. Identify and describe the three steps in termination.
7. Differentiate between the debriefing process and critique.
8. Describe the role of after-action procedures in relation to followup.

Unit 13: Team Project (Day 9)

Objective

The students will be given a scenario, the students will analyze information related to the incident, extrapolate the potential course and harm, and using a risk-based approach, determine objectives, strategies, and tactics in order to develop a plan of action.

Policies

Class Attendance and Cancellation Policy

Attendance

- You are required to attend all sessions of the course. If you do not, you may not receive a certificate, and your stipend may be denied.
- If you need to depart campus early and miss any portion of the course and/or graduation, you must make the request in writing to the NFA training specialist. The training specialist, in collaboration with the superintendent, may waive the attendance requirement in order to accommodate you with extraordinary circumstances as long as you complete all course requirements. If you receive approval for departing early, you must forward the approval to the Admissions Office so your stipend reimbursement is not limited.

Student Substitutions

Substitutions for NFA courses are made from waiting lists; your fire department can't send someone in your place.

Cancellations or No-Shows

NFA's mission for delivery of courses is impaired significantly by cancellations and no-shows. It is very difficult and costly to recruit students at the last minute. Currently there is a two-year ban on student attendance for students who are no-shows or cancel within 30 days of the course start date without a valid reason. If you receive such a restriction, your supervisor needs to send a letter to our Admissions Office explaining the cancellation/no-show.

Course Failure

If you fail an on-campus course, you will not be issued a stipend for that course. You can reapply for the failed course or any other NFA course and go through the random selection process. You don't have to successfully complete the failed course before attending another NFA course.

Student Code of Conduct Policy

Students, instructors and staff are expected to treat each other with respect at all times. Inappropriate behavior will not be tolerated and may result in removal from campus and denial of stipends.

Writing Expectations

Student writing will conform to the generally accepted academic standards for college papers. Papers will reflect the original work of the student and give appropriate credit through citations for ideas belonging to other authors, publications or organizations. Student written work should be free of grammatical and syntax errors, free of profanity or obscene language or ideas, and reflect critical thinking related to the course subject matter.

Citation and Reference Style

Attention Please: Students will follow the APA, Sixth Edition as the sole citation and reference style used in written work submitted as part of coursework to NFA. Assignments completed in a narrative essay, composition format, abstract, and discussion posts must follow the citation style cited in the APA, Sixth Edition.

Late Assignments

Students are expected to submit classroom assignments by the posted due date (11:59 p.m. EDT/EST) and to complete the course according to the published class schedule. As adults, students, and working professionals, you must manage competing demands on your time. Discussion board postings submitted within 3 days after the submission deadline will receive up to a 20% deduction. Those that do not submit their discussion board postings within this timeline will receive a “0” grade for the week. Final assignment papers will not be accepted after the deadline. Any paper submitted after the deadline will receive a “0” grade for that assignment.

Netiquette

Online learning promotes the advancement of knowledge through positive and constructive debate – both inside and outside the classroom. Forums on the Internet, however, can occasionally degenerate into needless insults and “flaming.” Such activity and the loss of good manners are not acceptable in a professional learning setting – basic academic rules of good behavior and proper “Netiquette” must persist. Remember that you are in a place for the rewards and excitement of learning which does not include descent to personal attacks or student attempts to stifle the forum of others.

- **Technology Limitations.** While you should feel free to explore the full-range of creative composition in your formal papers, keep e-mail layouts simple. The NFA Online classroom may not fully support MIME or HTML encoded messages, which means that bold face, italics, underlining, and a variety of color-coding or other visual effects will not translate in your e-mail messages.
- **Humor Note.** Despite the best of intentions, jokes and especially satire can easily get lost or taken seriously. If you feel the need for humor, you may wish to add “emoticons” to help alert your readers: ;-), :), ☺ .

Disclaimer Statement

Course content may vary from the outline to meet the needs of this particular group.

Grading

Please review the following rubrics that explain how grades will be awarded.

Students who do not complete the entire course will be awarded an Incomplete (I) grade. In accordance with National Fire Academy academic policies, an Incomplete (I) grade must be removed by the end of the next semester following the course, or it automatically becomes a Failing (F) grade.

If you fail an on-campus course, you will not be issued a stipend for that course. You can reapply for the failed course or any other NFA course and go through the random selection process. You don't have to successfully complete the failed course before attending another NFA course.

http://www.usfa.fema.gov/training/nfa/admissions/student_policies.html

Academic Honesty

Students are expected to exhibit exemplary ethical behavior and conduct as part of the NFA community and society as a whole. Acts of academic dishonesty including cheating, plagiarism, deliberate falsification, and other unethical behaviors will not be tolerated.

Students are expected to report academic misconduct when they witness a violation. All cases of academic misconduct shall be reported by the instructor to the Training Specialist.

If a student is found to have engaged in misconduct and the allegations are upheld, the penalties may include, but are not limited to one or a combination of the following:

- expulsion,
- withholding of stipend or forfeiture of stipend paid,
- exclusion from future classes for a specified period; depending on the severity it could range from 1-10 years, and/or
- forfeiture of certificate for course(s) enrolled in at NETC.

Refer to NFA-specific Standard Operating Procedure 700.1 – *Academic Code of Conduct and Ethics* for more information.