HAZ - MAT
First Responder Operational

38

Section IV -Technical Operations

Governor's Office of Emergency Services
California Specialized Training Institute

Effective date of this edition: 10/24/07

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Hazardous Materials
First Responder Operations

Participant Notebook

Governor's Office of Emergency Services
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Hazardous Materials First Responder Operations

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Block A

Welcome and Course Overview

Main Points

- Introductions and Welcome
- Course Overview
- Key Administrative Announcements
- Need for First Responder Training
- "SAFE" Acronym Theme
- Class Groups and Teams

Block Outline

1. Introductions and Welcome.

a. Director/Course Coordinator welcome.

b. Faculty and staff introductions.

2. Course Overview.

a. Course purpose/goal and performance objectives (see attachment).

b. Scope via schedule.

3. Key Administrative Announcements.

a. Break info Start on time, finish on time.

b. Lunch, refreshment and restroom location.

c. Policy on smoking or eating in classroom.

d. Emergency telephone number.

e. Class critique sheet.

f. Certification Requirements, etc.

Course Goal

Purpose/Goal: To Train first responders to recognize a hazardous materials incident and implement actions to protect themselves, the public, the environment and nearby property while responding in a defensive fashion.

Course Requirements

Hours: 16 Minimum.

Exercise: Participate in simulated Hazmat exercise/event, requiring participants to explain safe and proper First Responder Operations actions, per exercise objectives; *and*

Demonstrate proper use of USDOT Emergency Response Guidebook during a Hazmat exercise; *and*

Exam: Complete a state certified written examination.

Performance Full class attendance at minimum hours, participate in an exercise, *and*

Minimum 70% score on exam required for certification.

Prepared by: Vance Bennett, CSTI Instructor/Coordinator

Approved by: Tim Abbott, Chief of CSTI Hazmat Section

Date: January 1, 2008

4. Need for First Responder Training.

a. Primary need: Overall safe and competent response, within the *Operations* level.

b. To give responders the ability to:
   1) Recognize potential or actual Hazmat incidents,
   2) Safely isolate and make proper notifications,
   3) Conduct initial identification and assessment,
   4) Initiate command,
   5) Conduct containment and protective actions,
   6) Contribute to effective and efficient response.

5. "SAFE" Acronym Theme.

a. **S**afety first, last and always.

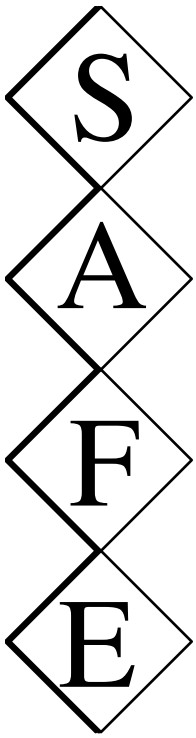
b. **A**nalyze all information per *your* needs.

c. **F**ocus on First Responder Operations safety and competence.

d. **E**nthusiastic involvement by all.

6. Class Groups and Teams.

Course Theme



Safety First, Last & Always.

Analyze all info in light of YOUR needs.

First Responder safety & competence.

Enthusiastic involvement by all.

Course Goal and Objectives

Purpose/Goal: To provide participants who are likely first responders with an improved capability to respond to hazmat events in a safe and competent manner, within the typical limited response resources and responder capabilities at the Operations Level.

At the conclusion of this course, participants will be able to achieve all of the following objectives through completion of a state certified exam meeting listed performance standards:

Objectives: Recognize what Hazardous Materials are; the problems they pose; the risks and outcomes hazmat events present; and identify the Hazmat First Responder's Awareness vs. Operations Role (including the limits of both roles).

Recognize a hazmat event through basic clues, warning signs, placards, labels, shipping papers and MSDSs; cite the need for a positive safety attitude; and describe a mental safe approach tactic upon recognition of the Hazmat event.

Describe basic First Responder actions, citing need for safety, isolating/denying entry, and making required notifications to begin a safe and effective response to a hazmat incident.

Course Goal and Objectives *(continued)*

Objectives:

Identify purpose and need to safely initiate command, and explain purpose, need and benefits of scene management. Also describe basic implementation of ICS to manage a hazmat event; and demonstrate proper information flow from first responders to the IC at an incident command post.

Describe identification and hazard assessment techniques; and demonstrate use of the USDOT Emergency Response Guidebook to initiate basic action planning.

Explain the need for, types, selection criteria and limits of protective equipment commonly used in hazmat events.

Describe the value, methods and limitations of stabilizing the Hazmat event through safe containment; and describe the proper protective action options available to first responders, within their capabilities and resources.

Identify need for the appropriate decontamination of initial victims, emergency response personnel and equipment, to avoid additional contamination; and describe proper disposal and documentation procedures during a hazmat response.

Identify need and method to communicate and coordinate with typical agencies from all levels of government having authorized activities dealing with a hazmat event, citing those agencies, their roles/responsibilities and capabilities.

Identify the local contingency plan to be followed in the participant's jurisdiction when dealing with a hazmat event; and cite the purpose, value, components, and limits of both Pre-Event and Event-Specific Planning.

Course Goal and Objectives *(continued)*

Objectives:

Describe the health effects hazardous materials present to the first responder's life safety.

Describe the process for a safe and competent response to a hazardous materials incident including the explanation of the "risk vs. gain" concept.

Given a simulated hazardous materials event, demonstrate the proper safe first responder actions (including deciding proper safe containment and protective action options; describing effective safety, isolation and notifications; identifying and assessing the hazard; and demonstrating proper information flow from the first responder to the IC at a command post).

Identify the legal role and rights of the media in a hazmat event; media capabilities that may aid in the incident response; and cite basic hazmat legal aspects.

How to get the most from this course.

Goals Make a goal sheet. Why did you register for this program? What do you expect to gain? Take a moment to think about your goals. Clarify them by writing them down on the inside cover of your notebook. Look over your goal page throughout the course, it will help you keep your goals focused.

Meet Others Meet other people. This is an excellent opportunity to expand your network of contacts. Sit next to someone you don't know, even if you've come with a group. Mingle during the breaks. Exchange business cards. Every participant has a specific area of expertise, find out what it is instead of chatting about the weather. Remember the goal sheet. Why not let one of your goals be to meet at least one person you intend to see again on a business or social basis.

Participate Ask questions, make contributions and actively participate in exercises. Consider the meeting room to be a "mental gymnasium" where it's okay to run, fall and get up again. You'll benefit much more by participating in the game than sitting on the sidelines.

Take Notes Why let even one good idea get away? Taking notes will help concentrate and organize your thoughts. Also, they'll allow you to take a "refresher" any time in the future.

Relate Learning Relate what you learn to yourself. Don't settle for "abstract" knowledge. Have your current problems, conflicts and interests foremost in your mind. As you learn new approaches and techniques, relate them to your own situation.

How to get the most from this course. *(continued)*

Main Idea Find the "Big Idea". Try to identify at least one main idea that alone will make this course worthwhile. The idea will be there, it's up to you to find it.

Review Make a commitment to review your notes. Take out your calendar and make a one hour appointment with yourself to "retake" this course. Don't put your good ideas away with your notes. Consider doing it this week while your ideas and enthusiasm are fresh.

Have Fun! Enjoy yourself. Start relaxed and you'll leave refreshed, inspired and recharged. Forget about what's happening at the office—unless you have telepathic powers you can't do much about it anyway. This is your chance. Get all you can out of it and have a good time.

Block B

Introduction to Hazardous Materials at the First Responder Operations Level

Main Points

- The Hazmat Problem
- Hazmat Laws and Regulations
- OSHA Hazwoper Regulation
- OSHA Hazwoper Levels
- Hazmat Definitions, Terms and Acronyms
- DOT Hazmat Classes and Examples
- Multiple Hazards
- Hazmat "Commons" and "Typicals"
- Hazmat Tactical Operations Acronym

Block Outline

1. The Hazmat Problem.

a. Hazardous Materials are made, transported, stored and used in every state, city and town.
   1) Standard of living requires hazmat use and transport.
   2) Millions of chemicals in existence, thousands classified as hazardous and hundreds as extremely hazardous.

b. Major elements of the Hazmat problem include:
   1) Volume of hazardous materials,
   2) Variety of hazardous materials,
   3) Widespread presence of hazardous material, and
   4) The human factor.

c. Because of these elements, "Events" (accidents, emergencies and incidents) *will* happen.

d. Hazmat "Events" can pose at least 3 primary risks (fire, health and reactivity risks) and can have negative outcomes on Life/Health, Environment, and Property — In that order!

e. Government or industry can't eliminate events, but can:
   1) Mitigate events,
   2) Prepare for events,
   3) More effectively and efficiently respond to events.
   4) Training helps us do all of the above!

f. Hazmat events are different from other emergencies:
   1) Many hazmats can injure or kill before you see or smell them.
   2) Some hazmat events can get suddenly worse (e.g. BLEVEs).
   3) Must respond *safely, slowly and methodically.*

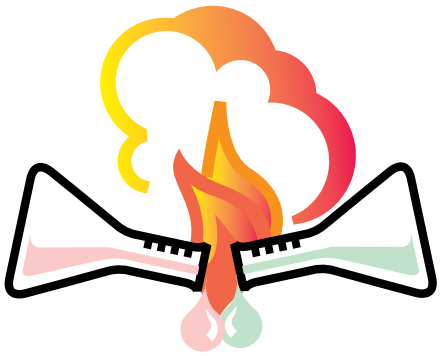
Hazardous Materials Events

Hazmat Math:

People

\+ Hazardous Materials

Hazmat Events!



Fundamental difference in a Hazmat response:

We must respond:

- *Safely*
- *Slowly*
- *Methodically*

Hazmat events cannot be eliminated—***interaction of hazmats and human beings will create hazmat events!***

2. Hazmat Laws and Regulations.

a. State:

1) Title 8 CCR §5192 (Hazwoper).
   a) Training requirements for emergency responders.
   b) General requirements for hazmat response.
   c) Foundation for this course.
   d) More on this soon.
2) Vehicle Code §2454 (on highway IC authority).
   a) More on this later.
3) Health and Safety Code Chapter 6.95.
   a) Mandated community right to know program (CRTK) in California prior to federal legislation.
   b) Requires submission of business plans. Business plan info must be given to emergency responders.
4) Penal Code §409.5 (disaster scene access).
   a) Allows peace officers to "close" a disaster scene.
   b) Exempts press representatives from prohibitions against entry to disaster scene (i.e. you have to let them in).
   c) 409.5 doesn't authorize press to enter crime scenes or private property.
   d) Doesn't allow press to interfere with operations.
5) Health & Safety Code §25400.
   a) Provides qualified immunity for hazmat responders against civil suits.
   b) Applies to government agencies and employees.
6) Government Code §8657.
   a) Volunteers used by government agencies in disaster or emergency response have the same immunities as government employees.

California Hazmat Laws and Regulations

California Penal Code §409.5

Authority "Whenever a menace to the public health or safety is created…[a peace officer] may close the area where the menace exists…"

Penalty "Any unauthorized person who willfully and knowingly enters an area closed…shall be guilty of a misdemeanor."

Media "Nothing in this section shall prevent a duly authorized representative of any news service, newspaper, or radio or television station or network from entering the areas closed…"

California Health & Safety Code §25400

Immunity "…whenever there is a discharge, spill or presence of hazardous substances on a public or private property; and that public entities… should be encouraged to abate those hazards, and to that end ***a qualified immunity from liability should be provided*** for public entities…"

Liability "…a public entity… ***shall not be liable for any injury or property damage caused by an act or omission*** taken…unless the act taken or omission was performed in bad faith or in a grossly negligent manner."

California Health & Safety Code §25504

Business Plans "Business plans shall include all of the following: …inventory of information required by Section 25509…Emergency response plans and procedures…Training for all new employees and annual training, including refresher courses, for all employees in safety procedures in the event of a release or threatened release of a hazardous material…"

2. Hazmat Laws and Regulations *(continued)*.

b. Federal:

1) CERCLA/SARA.

a) Mandated community right to know program (CRTK) for all states.

b) Required creation of Hazwoper regulation.

2) 29 CFR 1910.120 (Federal Hazwoper regulation).

a) Identical to state regulation.

3) 49 CFR (DOT hazmat transportation regulations).

a) Regulates transportation of hazardous materials.

b) Requires placards, labels, shipping papers, etc.

4) 14 CFR 91.137

a) Allows responders to request flight restrictions over incident scene.

b) Allows press access to restricted area.

5) 40 CFR 300, National Contingency Plan

a) Designates who's in charge for federal response.

b) Provides basic organization, structure and procedures.

c. Legal Liability.

1) Government and government employees can be held liable for negligent actions that cause injury. State laws cited previously provide qualified immunity.

2) Defenses against lawsuits.

a) Follow employer policies and guidelines.

b) Follow recognized good practices or guides like DOT ERG and other "Reasonable Person" efforts.

Federal Hazmat Laws and Regulations

14 CFR 91.137, Temporary Flight Restrictions

Closure "[FAA] will issue a Notice to Airmen (NOTAM) designating an area within which temporary flight restrictions apply …"

Press Access "…no person may operate an aircraft within the designated area unless that aircraft is participating in the hazard relief activities and is being operated under the direction of the [IC]…or ***The aircraft is carrying properly accredited news representatives***…"

DOT Hazmat Regulations (49 CFR Parts 171-180)

HMR They specify requirements for the safe transportation of hazardous materials in commerce by rail car, aircraft, vessel, and motor vehicle. These regulations govern transportation-related activities by offerors (e.g., shippers, brokers, forwarding agents, freight forwarders, and warehousers); carriers; packaging manufacturers, reconditioners, testers, and retesters; and independent inspection agencies.

Emergency Planning & Community Right to Know Act

EPCRA Also known as SARA Title III, EPCRA was designated to help local communities protect public health, safety, and the environment from chemical hazards. Each state appoints a State Emergency Response Commission (SERC). The SERCs divide their states into Emergency Planning Districts and to name a Local Emergency Planning Committee (LEPC) for each district. The LEPC members consist of fire fighters, health officials, government and media representatives, community groups, industrial facilities, and emergency managers. *(42 U.S.C. 11001 et seq.)*

3. OSHA Hazwoper Regulation.

a. **Haz**ardous **W**aste **Op**erations and **E**mergency **R**esponse (Hazwoper). 29 CFR 1910.120(q) (federal regulation) and Title 8 CCR 5192(q) (California regulation).

1) Regulates three activities:

a) Hazardous waste site cleanup.

b) Operation of treatment, storage and disposal facilities.

c) Emergency response to hazmat releases.

2) Requires employers to:

a) Plan for response and cleanup.

b) Train employees for assigned roles.

c) Follow basic response requirements.

b. Focus of this course is on emergency response.

c. Hazwoper specifies training for various levels of responders.

4. OSHA Hazwoper Levels.

a. The first people there (i.e. First Responders) are the first line of defense to protect Life, Environment & Property.

b. Primary First Responder role is to *safely and competently respond within appropriate level, resources and capabilities.*

c. First Responder at the "Awareness" Level:

1) Definition: One likely to witness/discover a Hazmat release and can initiate notifying authorities and take *no further actions*. [29 CFR 1910.120(q)(6)(i) & 8 CCR 5192(q)(6)(A)]

OSHA Policy for FRO Training

General "Fire fighters and police officers who are expected to be engaged in responding to emergencies involving hazardous substances are subject to the HAZWOPER training requirement."

Fire "Fire fighters expected to respond to releases of hazardous substances must be trained to at least the **first responder operations** level, since they will respond to releases, or potential releases, of hazardous substances for the purpose of protecting nearby persons, property, or the environment."

Releases *"*If the employer expects employees to handle incidental releases of hazardous substances…The employer must provide the appropriate training…in compliance with 29 CFR 1910.120(q)(6)(i) first responder awareness level training…"

Source: OSHA CPL 02-02-0259, Appendix D, Paragraph E.

Zones "Areas surrounding the danger area need to be controlled during emergencies by prohibiting unauthorized personnel from entering the exclusion zone, or hot zone. Personnel expected to set up the exclusion zone must be trained to the first responder operations level."
"An employee trained to first responder operations level could set up the exclusion zone to determine how close to the accident cars should be permitted to drive."

Source: OSHA CPL 02-02-073, Paragraph XI.G.2

4. OSHA Hazwoper Levels. *(continued)*

d. First Responder at the "Operations" Level:

1) Definition: One who responds to a hazmat release to protect nearby persons, environment or property (trained to act in a *defensive* fashion without trying to actually stop the release). [29 CFR 1910.120(q)(6)(ii) & 8 CCR 5192(q)(6)(B)]

e. First Responders at *both* levels have limits:

1) Equipment: Lack adequate protective equipment.
2) Training: Not trained/equipped to **stop** the release.

f. Other Responders levels:

1) Technicians — "...individuals who respond to releases or potential releases of hazardous substances for the purpose of stopping the release. They assume a more aggressive role than a first responder..."
2) Specialists — "...respond with and provide support to [hazmat] technicians...require a more directed or specific knowledge of the various substances...also act as the site liaison with federal, state, local and other government authorities..."
3) Incident Commander (IC) — "will assume control of the incident scene..." (Overall *management* of the incident.)
4) Skilled Support Personnel—"Personnel…skilled in the operation of certain equipment, such as mechanized earth moving or digging equipment or crane and hoisting equipment, and who are needed temporarily to perform immediate emergency support work… are not required to meet the training required in this paragraph…"
5) Specialist employees—"Employees who…work with and are trained in the hazards of specific hazardous substances, and…provide technical advice or assistance…"

g. Know your level, role/responsibility **and** limits!

First Responder Awareness vs. Operations

Awareness	Operations
Likely to witness or discover a release.	Likely to witness or discover a release.
Initiate an emergency response.	Initiate an emergency response.
Notify the authorities of the release.	Notify the authorities of the release.
	Respond to release in defensive fashion.
	Protect persons, property & environment.
	Contain the release from a safe distance.

First Responder vs. Technician/Specialist

First Responder	Tech/Spec
Part of *initial* response.	Implement emergency response plan.
Respond to release in *defensive* fashion.	Assume a more aggressive role.
Contain the release from a safe distance.	Control or stop the release.

For all levels,

Know your limits!!

5. Hazmat Definitions, Terms and Acronyms.

a. No one universal term or definition.
   1) In the workplace: **hazardous chemical** (OSHA).
   2) When transported: **hazardous material** (DOT).
   3) If it's otherwise regulated: **hazardous substance** (EPA).
   4) When you can't use it anymore: **hazardous waste** (EPA).

b. Other hazmat terms.
   1) **Extremely hazardous substance** (EPA): Stricter reporting requirements than other hazmats.
   2) **Highly hazardous chemical** (OSHA): Regulated by Process Safety Management regulations.
   3) **Toxic chemical** (EPA): Annual reporting required for releases.

c. Different laws, different definitions.
   1) Laws/regs passed at different times for different purposes.
   2) Some (definitions and laws) may overlap.
   3) For FROs, "hazardous" means what it says.

d. Hazmat terms and acronyms.
   1) There are a lot.
   2) Some may be confusing.
   3) Don't be afraid to ask (See Annex).

e. Classification of hazardous materials.
   1) UN and USDOT classification system.
   2) Uses 9 hazard classes.
   3) Used worldwide (and in this course!).

What are hazardous materials?

Definitions: **There is no one definition!** Here are the important ones.

OSHA **Hazardous Chemical**: Any substance to which exposure "results or may result in adverse affects on the health or safety of employees:" or "any chemical which is a physical hazard or a health hazard." 29 CFR 1910.1200(c)

EPA **Hazardous Substance**: "Any substance designated pursuant to section 311(b)(2)(A) of the CWA [Clean Water Act]; any element, compound, mixture, solution or substance designated pursuant to section 102 of CERCLA; any hazardous waste having the characteristics identified under or listed pursuant to section 301 of the Solid Waste Disposal Act... any toxic pollutant listed under section 307(a) of the CWA; any hazardous air pollutant listed under section 112 of the clean Air Act; and any imminently hazardous chemical substance or mixture with respect to which the EPA Administrator has taken action pursuant to section 7 of the Toxic Substances Control Act." 40 CFR 300.5

DOT **Hazardous Material**: "...substance or material, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce… The term includes hazardous substances, hazardous wastes, marine pollutants, and elevated temperature materials as defined in this section..." 49 CFR 171.8

6. DOT Hazmat Classes and Examples.

a. USDOT Hazmat classes and divisions.

1) Explosives (Class 1) — Trinitrotoluene (TNT).
   1.1 Mass explosion hazard.
   1.2 Projection hazard.
   1.3 Predominately a fire hazard.
   1.4 No significant blast hazard.
   1.5 Very insensitive explosives or blasting agents.
   1.6 Extremely insensitive detonating substances.
2) Gases (Flammable or Poisonous) (Class 2) — Ammonia.
   2.1 Flammable gas.
   2.2 Non-flammable compressed gas.
   2.3 Poisonous gas.
3) Flammable and Combustible Liquids (Class 3) — Gasoline.
4) Flammable Solids (Class 4) — Naphthalene.
   4.1 Flammable solid.
   4.2 Spontaneously combustible.
   4.3 Dangerous when wet.
5) Oxidizers and Organic Peroxides (Class 5) — Calcium Nitrate.
   5.1 Oxidizer.
   5.2 Organic peroxide.
6) Poisonous and Infectious Materials (Class 6) — Acrolein.
   6.1 Poisonous.
   6.2 Infectious substance (etiologic agent).
7) Radioactive Materials (Class 7) — Uranium Hexafluoride.
8) Corrosive Materials (Class 8) — Sulfuric Acid.
9) Misc. Hazardous Materials (Class 9) — Asbestos.

Definitions of DOT Hazard Classes.

Class 1	Any substance, article or device designed to function by explosion (extremely rapid release of gas and heat).
Class 2	Flammable gas: Ignitable at low concentrations (<13%). Compressed gas: Shipped at >41 psia. Poisonous gas: Toxic to humans or hazardous to health (or LC50 of not more than 5000 ml/m3 for laboratory animals). (i.e. Toxic in low concentrations.)
Class 3	Flammable Liquid: Flash point <141°F. Combustible Liquid: Flash point >141°F. (100°-200°F for domestic shipments.)
Class 4	Explosives shipped with sufficient wetting agent to suppress explosive properties. Substance that can ignite if in contact with air <5 minutes. Substance that gives off flammable or toxic vapors or is spontaneously flammable upon contact with water.
Class 5	A material that can cause or enhance the combustion of other materials (usually by giving up oxygen.)
Class 6	Toxic to humans, hazardous to human health or presumed toxic to humans based upon tests on laboratory animals.
Class 7	Substance with specific activity > 0.002 microcuries per gram.
Class 8	Substance that causes visible destruction or irreversible alterations in human skin tissue or a liquid that has a severe corrosion rate on steel or aluminum.
Class 9	Material with anesthetic, noxious or similar property that could cause extreme annoyance or discomfort to flight crew and prevent performance of assigned duties. Does not meet the definition of any other class.

7. Multiple Hazards.

a. DOT regulations are performance standards—a material is "hazardous" because it meets the DOT definition. Not all materials neatly fall into those definitions. It's possible for a substance to meet the definition of more than one hazard class.

b. Substances that meet the definition of more than one hazard class are classified according to the highest applicable hazard class (49 CFR 173.2a) and are placarded accordingly.

c. Shipping papers and placards may not indicate all subsidiary or multiple hazards. A material may not be classified as "hazardous" by these regulations but still, under certain circumstances, be hazardous (e.g. ammonia and flammability).

d. *Responders should always think of multiple hazards regardless of how a substance is placarded or labeled!*

8. Hazmat Commons and Typicals.

a. Commons:
   1) Common release: Petroleum products (diesel or gasoline).
   2) Common release locations: Fixed facilities (in over 25% of the incidents the surrounding area was *residential*).
   3) Common release factor: Equipment failure.

b. Typicals:
   1) Typical responder exposure: *Inhalation;*
   2) Typical number of response agencies: *Four;*
   3) Typical first responder: ***You!***

Multiple Hazards.

49 CFR 171.8 A material may meet the defining criteria for more than one hazard class but is assigned to only one hazard class.

49 CFR 172.505 Hazardous materials that possess secondary hazards ***may*** exhibit subsidiary placards.

Examples

Material	**Primary Hazard**	**Subsidiary Hazard(s)**
Acrolein	Poisonous	Flammable
Ammonia, anhydrous	Poisonous	Corrosive
Chlorine	Poisonous	Corrosive
Denatured Alcohol	Flammable	Poisonous
Hydrazine, anhydrous	Corrosive	Flammable, Poisonous
Hydrofluoric Acid	Corrosive	Poisonous
Methanol	Flammable	Poisonous
Nitric Acid, red fuming	Corrosive	Oxidizer, Poisonous
Phosphorous, white	Spontaneously Combustible	Poisonous
Sulfur Dioxide	Poisonous	Corrosive
Uranium Hexafluoride	Radioactive	Corrosive

Commons and Typicals

The most commonly released hazardous substance in my location is: _____

The most commonly shipped or manufactured hazardous substance in my location is: _____

The most common release location where I live/work is: _____

9. Hazmat Tactical Operations Acronym.

a. **S**afety.

b. **I**solate and deny entry.

c. **N**otifications.

d. **C**ommand.

e. **I**dentification and hazard assessment.

f. **A**ction planning.

g. **P**rotective equipment.

h. **C**ountermeasures.

i. **P**rotective actions.

j. **D**econtamination.

k. **D**isposal.

l. **D**ocumentation.

m. Use it or, *develop your own acronym/checklist/memory jogger!*

Hazmat Tactical Operations/Priorities Acronym

S	*Safety*
I	*Isolate and Deny Entry*
N	*Notifications*

C	*Command/Management*
I	*Identification and Hazard Assessment*
A	*Action Planning*

P	*Protective Equipment*
C	*Containment and Control*
P	*Protective Actions*

D	*Decontamination and Cleanup*
D	*Disposal*
D	*Documentation*

First Responder Awareness

29 CFR 1910.120(q)(6)(i), Title 8 CCR 5192(q)(6)(A)

General "(6) Training. … based on the duties and function to be performed by each responder of an emergency response organization. The skill and knowledge levels required for all new responders…shall be conveyed to them through training before they are permitted to take part in actual emergency operations on an incident. Employees who participate, or are expected to participate, in emergency response, shall be given training in accordance with the following paragraphs:"

FRA "(i) First responder awareness level. …individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the authorities of the release. First responders at the awareness level shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:"

Competencies "(A) An understanding of what hazardous substances are, and the risks associated with them in an incident.
(B) An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
(C) The ability to recognize the presence of hazardous substances…
(D) The ability to identify the hazardous substances, if possible.
(E) An understanding of the role of the first responder awareness individual in the employer's emergency response plan including site security and control and the [ERG].
(F) The ability to realize the need for additional resources, and to make appropriate notifications…"

Minimum hours None specified.

First Responder Operations

29 CFR 1910.120(q)(6)(ii), Title 8 CCR 5192(q)(6)(B)

FRO "(ii) First responder operations level. …individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First responders at the operational level shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the awareness level and the employer shall so certify:"

Competencies "(A) Knowledge of the basic hazard and risk assessment techniques.
(B) Know how to select and use proper personal protective equipment provided to the first responder operational level.
(C) An understanding of basic hazardous materials terms.
(D) Know how to perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.
(E) Know how to implement basic decontamination procedures.
(F) An understanding of the relevant standard operating procedures and termination procedures."

Minimum hours 8 hours.

DOT Classifications of Hazardous Materials

Class #	Division #	Name of Class or Division	49 CFR §
1	1.1	Explosives (with mass explosion hazard)	173.50
1	1.2	Explosives (with projection hazard)	173.50
1	1.3	Explosives (with predominately a fire hazard)	173.50
1	1.4	Explosives (with no significant blast hazard)	173.50
1	1.5	Very insensitive explosives; blasting agents	173.50
1	1.6	Extremely insensitive detonating substances	173.50
2	2.1	Flammable gas	173.115
2	2.2	Non-flammable compressed gas	173.115
2	2.3	Poisonous gas	173.115
3		Flammable and combustible liquid	173.120
4	4.1	Flammable solid	173.124
4	4.2	Spontaneously combustible material	173.124
4	4.3	Dangerous when wet material	173.124
5	5.1	Oxidizer	173.128
5	5.2	Organic peroxide	173.128
6	6.1	Poisonous materials	173.132
6	6.2	Infectious substance (Etiologic agent)	173.134
7		Radioactive material	173.403
8		Corrosive material	173.136
9		Miscellaneous hazardous material	173.140
None		Other regulated material: ORM-D	173.144

Definitions of DOT Hazard Classes

Class 1	Any substance, article or device designed to function by explosion (extremely rapid release of gas and heat).
Class 2	Flammable gas: Ignitable at low concentrations (<13%).
	Compressed gas: Shipped at >41 psia.
	Poisonous gas: Toxic to humans or hazardous to health (or LC_{50} of not more than 5000 ml/m^3 for laboratory animals). (i.e. Toxic in low concentrations.)
Class 3	Flammable Liquid: Flash point <141°F.
	Combustible Liquid: Flash point >141°F. (100°-200°F for domestic shipments.)
Class 4	Explosives shipped with sufficient wetting agent to suppress explosive properties.
	Substance that can ignite if in contact with air <5 minutes.
	Substance that gives off flammable or toxic vapors or is spontaneously flammable upon contact with water.
Class 5	A material that can cause or enhance the combustion of other materials (usually by giving up oxygen.)
Class 6	Toxic to humans, hazardous to human health or presumed toxic to humans based upon tests on laboratory animals.
Class 7	Substance with specific activity > 0.002 microcuries per gram.
Class 8	Substance that causes visible destruction or irreversible alterations in human skin tissue or a liquid that has a severe corrosion rate on steel or aluminum.
Class 9	Material with anesthetic, noxious or similar property that could cause extreme annoyance or discomfort to flight crew and prevent performance of assigned duties. *Does not meet the definition of any other class.*

Annex I — Acronyms, Abbreviations, etc.

AB	Assembly Bill
ACGIH	American Conference of Governmental Industrial Hygienists
AFFF	Aqueous Film Forming Foam
AIHA	American Industrial Hygiene Association
ALARA	As Low As Reasonably Achievable
ANSI	American National Standards Institute
APR	Air Purifying Respirator
ATSDR	Agency for Toxic Substances and Disease Registry
AQMD	Air Quality Management District
BLEVE	Boiling Liquid Expanding Vapor Explosion
CAA	Clean Air Act (1980)
CAC	California Administrative Code
CAER	Community Awareness/Emergency Response Program
CAL-OSHA	California Occupational Safety and Health Administration
CAMEO	Computer-Aided Management of Emergency Operations
CAS	Chemical Abstracts Service
CCR	California Code of Regulations
CDF	California Department of Forestry
CEEL	Community Emergency Exposure Level
CEO	Chief Executive Officer
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (1981)
CFIRS	California Fire Information Response System
CFR	Code of Federal Regulations
CGA	Compressed Gas Association
CGC	California Government Code
CHEMTREC	Chemical Transportation Emergency Center
CHLOREP	Chlorine Emergency Program
CHP	California Highway Patrol
CHRIS	Chemical Hazards Response Information System
CIH	Certified Industrial Hygienist
CMA	Chemical Manufacturer's Association
CP	Command Post
CPC	Chemical Protective Clothing
CRWQCB	California Regional Water Quality Control Board
CUPA	Certified Unified Program Agency
CVC	California Vehicle Code
CWA	Clean Water Act (1972) = FWPCA
DFG	California Department of Fish and Game
DOT	Department of Transportation
DTSC	Department of Toxic Substances Control
EOC	Emergency Operations Center
EOD UNIT	Explosives Ordnance Disposal Unit
EPA	Environmental Protection Agency
ERD	Emergency Response Division (EPA)
EHS	Extremely Hazardous Substance
EMS	Emergency Medical Service
EPCRA	Emergency Planning and Community Right-to-know Act
ERP	Emergency Response Plan
FAA	Federal Aviation Administration

FEMA	Federal Emergency Management Agency
FHSA	Federal Hazardous Substance Act (1960)
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FIRESCOPE	Fire Fighting Resources of California Organized for Potential Emergencies
FOSC	Federal On-Scene Coordinator
FRA	First Responder Awareness
FRO	First Responder Operations
FWPCA	Federal Water Pollution Control Act (1972) = CWA
HAZ CAT	Hazard Categorization
HAZMAT	Hazardous Material
HEPA	High Efficiency Particulate Air filter
HHS	U. S. Department of Health and Human Services
HMTA	Hazardous Materials Transportation Act
IC	Incident Commander
ICS	Incident Command System
ICP	Incident Command Post
IDHA	Identification and Hazard Assessment
IDLH	Immediately Dangerous to Life or Health
IMO	International Maritime Organization
LC_{LO}	Lethal Concentration, low
LC_{50}	Lethal Concentration, 50%
LD_{50}	Lethal Dosage, 50%
LEL	Lower Explosive Limit
LEPC	Local Emergency Planning Committee
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NAERG	North American Emergency Response Guidebook
NBC	Nuclear, Biological & Chemical
NCP	National Contingency Plan
NCRIC	National Chemical Response and Information Center
NEPA	National Environmental Policy Act (1970)
NFPA	National Fire Protection Association
NIIMS	National Interagency Incident Management System
NIOSH	National Institute for Occupational Safety and Health
NOAA	National Oceanic and Atmospheric Administration
NOS	Not Otherwise Specified
NPR	Notice of Proposed Rulemaking
NRC	National Response Center
NSC	National Safety Council
NSF	National Strike Force
OES	Office of Emergency Services (State or County)
OPA '90	Oil Pollution Act of 1990
ORM	Other Regulated Material
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
OSPR	Office of Spill Prevention and Response (DF&G)
PCB	Polychlorinated Biphenyls
PEAC	Palmtop Emergency Action for Chemicals
PEL	Permissible Exposure Limit
PIO	Public Information Officer
PPB	Parts Per Billion
PPE	Personal Protective Equipment
PPM	Parts Per Million

RCRA	Resource Conservation and Recovery Act (1976)
RQ	Reportable Quantity
RTECS	Registry of Toxic Effects of Chemical Substances
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SB	Senate Bill
SCBA	Self-Contained Breathing Apparatus
SDWA	Safe Drinking Water Act (1974)
SEMS	Standardized Emergency Management System
SERC	State Emergency Response Commission
SINCIAPCPDDD	Safety, Isolation & Deny Entry, Notifications, Command/Management, Identification & Hazard Assessment, Action Planning, Protective Equipment, Containment & Control, Protective Actions, Decontamination & Cleanup, Disposal, and Documentation
SLC	State Lands Commission
STEL	Short Term Exposure Limit
SWRCB	State Water Resources Control Board
TLV	Threshold Limit Value
TOMES	Toxicology, Occupational Medicine & Environmental Series Database
TSCA	Toxic Substances Control Act (1976)
TSCD	Toxic Substances Control Division
TSDF	Treatment, Storage and Disposal Facility
UBC	Uniform Building Code
UFC	Uniform Fire Code
UL	Underwriter's Laboratories
USA	Underground Services Alert
USCG	U. S. Coast Guard
USDOT	U. S. Department of Transportation
USEPA	U. S. Environmental Protection Agency (EPA)
USGS	U. S. Geological Survey
USFWS	U. S. Fish and Wildlife Service
USNRC	U. S. Nuclear Regulatory Commission
UV	Ultraviolet radiation
WMD	Weapons of Mass Destruction
VOC	Volatile Organic Compound
Z list	The OSHA table of Permissible Exposure Limits, so named because the tables are identified as Z-1, Z-2, and Z-3, and because they are found in “Subpart Z - Toxic and Hazardous Substances” of the OSHA regulations. This subpart contains 29 CFR 1910.1000 through 29 CFR 1910.1500.

Participant Worksheet

1. In your own words, describe the fundamental difference in responding to a hazmat incident vs. a "Normal" day-to-day emergency response:

2. Identify your jurisdiction's primary hazmat problem, including three potential negative outcomes of the problem:

3. Describe the difference in roles between First Responders at the "Awareness" and "Operations" levels:

4. Identify the most common hazardous material in your workplace:

Block C

Hazardous Materials Recognition and Safety

Main Points

- Recognizing Hazmat Incidents
- Hazmat Recognition Clues
- Hazmat Outward Warning Signs
- Hazmat Locations and Occupancies
- Hazmat Containers and Packages
- US DOT Placards and Labels
- Special Markings
- Shipping Papers and MSDSs
- First Operational Thought

Block Outline

1. Recognizing Hazmat Incidents.

a. *Any responder* can encounter hazardous materials. According to an ongoing federal government study (ATSDR HSEES 2004), of the injuries to responders in Hazmat incidents:
   1) 59% are law enforcement personnel.
   2) 32% are firefighters (career and volunteer).
   3) 9% are other responders (includes in-house response teams).

b. If you don't know it's there you can't protect yourself.
   1) Recognition leads to safety,
   2) Safety leads to lives preserved!

c. ***Initial reports may not indicate the presence of hazardous materials! May be reported as:***
   1) Traffic accident,
   2) Medical aid,
   3) Fire,
   4) Person down.
   5) Or, _____

Hazmat Recognition

Reporting Hazmat events may be reported as:

Traffic accident,

Medical aid call,

Fire,

Investigation, etc.

2. Basic Hazmat Recognition Clues.

a. Occupancy/Location (e.g. plating shop or highway).
   1) Hazmats manufactured/stored/used/transported anywhere but be aware of common locations.

b. Container Shapes (e.g. 55-gallon drum or ribbed tanker).
   1) Shape may be clue to its contents (they are shaped the way they are for a reason—know common silhouettes).

c. Markings & Colors (e.g. package/label markings or colors).

d. Placards & Labels (e.g. orange placard = Explosive).

e. Shipping Papers and MSDS (e.g. consist for railroad incident).

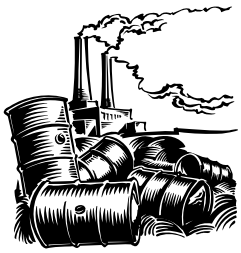
f. Senses (e.g. sight, hearing and smell - *last resort*).

g. Other Clues (e.g. responsible party, witness, business plan, etc.).

h. "Clues" are *clues*, not absolutes! They are…
   1) A warning,
   2) A note of caution,
   3) An indication of things to come,
   4) *But not always all the answers you need.*

Recognition—Standard Hazmat Recognition Clues:

Occupancy/Location



Container Shapes

Markings & Colors

Placards & Labels

Shipping Papers & MSDS

Senses

3. Hazmat Outward Warning Signs.

a. General examples:

1) People running from, or collapsed in the area,
2) Evidence of leak (fire, smoke, visible vapors, unusual colors/odors, sheen on water),

"Clouds are bad. Clouds with color are worse."

Michael Callan, *Street Smart Hazmat Response*

3) Activated pressure relief valve.
4) Evidence of recent fumigation (e.g tented building).
5) Dead animals/insects or discolored vegetation.
6) People in the area reporting symptoms of exposure.
7) Something just doesn't look right…

b. Industrial facilities examples:

1) Alarm from installed monitoring system.
2) Activation of emergency decon shower.
3) Change in paint color on piping or storage system.
4) Signs warning of unspecified hazards.
5) Presence of unknown liquid within containment system.
6) Something just doesn't look right…

c. Remember: *If you see any warning sign then assume hazardous materials are there* and look for other clues or warning signs until you confirm the absence of hazardous materials!

Excerpts from Recognition Case Studies

"On June 13, 1992, the two boys, who had been playing in the company's trash dumpster, were overcome by — and later died as a result of inhaling — fumes from toluene…"

"…a department store employee…was ordered to dispose of some outdated Ortho products in a waste oil drum in the back of the store. The employee was caught in the act by the Fire Lt. after Fire/EMS was called to an adjacent store by a sick clerk complaining of a strong offensive odor."

"My partner and I responded to a burglary in progress at a house that was being tented for termites. …A few minutes later here comes Dumbcrook out from underneath the tent. We move in on him and the chase was on. We finally catch up to him, and the fight is on. We get him into custody and see this guy isn't doing too well so we call the paramedics (No, not from being taken into custody…). As the paramedics arrive we start to have difficulty breathing."

"Our engine company (3 man fire engine) arrived on scene at the local high school for an apparent poisoning. The male student ingested Lannate pesticide (quarter pound mixed in water). The student was unconscious with vital signs dropping rapidly. The powder was airborne and floating freely with movement of the patient and wind. The captain started to cough and nearly vomited."

"I treated a 28 year old for trouble breathing after she was trying to clean her house. She was using a 'flea' powder to help control fleas in her home from the family dog… As it turned out, her husband got an industrial strength pesticide…"

4. Hazmat Locations and Occupancies.

a. Obvious locations.
   1) Petroleum refinery (flammable liquids).
   2) Welding supply business (compressed gases).
   3) Garden supply business (pesticides).
   4) Auto parts store (flammable liquids).

b. Not so obvious locations.
   1) Swimming pool supply business (acids and chlorine).
   2) Hardware store (flammable liquids).
   3) Refrigerated warehouse (anhydrous ammonia).
   4) Soft drink distributor (compressed gases).

5. Hazmat Containers and Packages.

a. DOT specification containers for motor vehicle transportation.
   1) DOT 406/MC 306.
   2) DOT 407/MC 307.
   3) DOT 412/MC 312.
   4) MC 331.
   5) MC 338.

b. Radiological containers.
   1) Type A.
   2) Type B.

c. Container materials.
   1) Water proof or water resistant.
   2) Inert material.

d. They are made they way they are for a reason. The shape and material can give you important clues about the contents.

DOT Specification Vehicles

406/306 Elliptical cross section. Usually carries petroleum products such as gasoline and diesel fuel. Usually made of aluminum (it will melt if the cargo catches fire so the tank won't explode). 49 CFR 178.346.

407/307 Horseshoe-shaped cross section due to external insulation around the circular tank. Outer covering is usually aluminum. Designed to hold liquids with low vapor pressures. 49 CFR 178.347

412/312 Circular cross section with external "ribs" for added strength. Usually carries corrosives but may be used to carry petroleum products. 49 CFR 178.348.

331 Circular cross section with spherical ends. Designed to carry compressed gases. Usually made of steel. 49 CFR 178.337.

338 Cylindrical shape. Covered with external insulation. Designed to carry cryogenic materials (i.e. liquefied gases).

Radiological Material Containers

Type "A" Container used to transport low-level radioactive material. They are often steel drums, thick plastic containers or steel boxes. Often referred to as "pigs" due to their bulky shape. 49 CFR 173.415.

Type "B" Large, heavy metal cask. Designed to carry radioactive materials with a high level of activity. Strict requirements for construction and testing. 49 CFR 173.416 and 10 CFR 71

6. USDOT Hazmat Placards and Labels.

a. Purpose of system.

1) Provide initial warning information in the event of an incident involving a shipment of hazardous materials.
2) Warn responders, handlers, and bystanders that hazards are present and reduce the chance of someone inadvertently entering a hazmat incident site.

b. General marking requirements for transport vehicles or freight containers.

1) Must be marked with the identification number and the applicable placard (ID number may be on an orange panel or on the placard).
2) Markings must be on each side and each end.

c. Placards.

1) Displayed on a shipping vehicle (e.g. trailer, railcar, shipping container, bulk package, etc.).
2) Diamond shaped, at least 10.8 inches on each side.
3) Background color, symbol and digit at the bottom of the placard correspond to the hazard class.

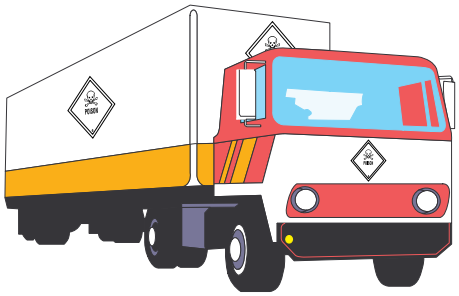
d. Labels.

1) Displayed on "packages or containment devices" (e.g. bag, drum, box, bottle, compressed gas cylinder, etc.).
2) Diamond shaped, at least 3.9 inches on each side.
3) Background color, symbol and digit at the bottom of the label correspond to the hazard class.

Placarding Requirements (49 CFR 172.504)

Display

Must placard each bulk packaging, freight container, unit load device, transport vehicle or rail car on each side and each end. Required on two opposite sides of portable tanks (less than 1000 gallons capacity).



"Dangerous"

May use a "Dangerous" placard on a freight container, unit load device, transport vehicle or rail car containing two or more categories of hazardous materials, with a combined weight of 1,001 pounds or more, that require different placards specified in Table 2. However, if they load more than 2,205 lbs of one category of a hazardous material at one loading facility then they must use the placard for that category in addition to any other required placards or the "Dangerous" placard.

Exception

Regulations allow some shipments of hazardous materials (e.g. consumer commodities in small packages) of less than 1,001 lbs aggregate gross weight to be shipped without *any* placards.

Subsidiary Hazards

The regulations *require* some hazardous materials to include placards for subsidiary hazards and *allows* the use of multiple placards for other hazardous materials that have subsidiary hazards. If the subsidiary hazard is Dangerous When Wet or Poison Inhalation Hazard then the shipment must display placards indicating those hazards.

6. USDOT Hazmat Placards and Labels. *(cont.)*

e. Hazmat Placard colors/symbols and examples:

1) Explosives — Trinitrotoluene.
   a) Division 1.1-1.3 (Orange/Bursting Ball)
   b) Division 1.4-1.6 (Orange/Division Number)
2) Gases.
   a) Division 2.1 (Red/ Flame) — Propane.
   b) Division 2.2 (Green/Cylinder) — Carbon Dioxide.
   c) Division 2.3 (White/ Skull & Crossbones) — Chlorine.
3) Flammable Liquids (Red/Flame) — Gasoline.
4) Flammable Solids.
   a) Division 4.1 (Red & White Stripes/Flame) — Fusee.
   b) Division 4.2 (White over Red/Flame) — White Phosphorus.
   c) Division 4.3 (Blue/Flame) — Calcium Carbide.
5) Oxidizers.
   a) Division 5.1 (Yellow/Flaming "O") — Hydrogen Peroxide.
   b) Division 5.2 (Red over Yellow/Flame) — MEKP.
6) Poisons/Toxics.
   a) Division 6.1 (White/Skull & Crossbones)— Arsenic.
   b) Division 6.2 (No Placard) — Infectious Substances.
7) Radioactives (Yellow over White/Trefoil) — Thorium.
8) Corrosives (White over Black/Test Tube) — Sulfuric Acid.
9) Miscellaneous Hazardous Materials (White & black vertical stripes over solid white/no symbol): Asbestos.

f. Specialized placards.

1) "Dangerous" placard.
   a) Used for mixed loads of Table 2 commodities.
2) "Oxygen" placard.
3) "Inhalation Hazard" placard.
   a) Used for both Hazard Classes 2 and 6.

DOT Placarding Tables (Table 1)

Category	Placard Name	49 CFR §
1.1	EXPLOSIVES 1.1	172.522
1.2	EXPLOSIVES 1.2	172.522
1.3	EXPLOSIVES 1.3	172.522
2.3	POISON GAS	172.540
4.3	DANGEROUS WHEN WET	172.548
5.2*	ORGANIC PEROXIDE	172.552
6.1[a]	POISON INHALATION HAZARD	172.555
7#	RADIOACTIVE	172.556

*Type B, liquid or solid, temperature controlled.
[a]Packing Group I (Zone A and B, inhalation hazard).
#Radioactive Yellow III label only.

DOT Placarding Tables (Table 2)

Category	Placard Name	49 CFR §
1.4	EXPLOSIVES 1.4	172.523
1.5	EXPLOSIVES 1.5	172.524
1.6	EXPLOSIVES 1.6	172.525
2.1	FLAMMABLE GAS	172.532
2.2	NON-FLAMMABLE GAS	172.528
3	FLAMMABLE	172.542
Comb. Liq.	COMBUSTIBLE	172.544
4.1	FLAMMABLE SOLID	172.546
4.2	SPONTANEOUSLY COMBUSTIBLE	172.547
5.1	OXIDIZER	172.550
5.2	ORGANIC PEROXIDE	172.552
6.1[a]	POISON	172.554
6.1#	KEEP AWAY FROM FOOD	172.553
6.2	(none)	
8	CORROSIVE	172.558
9	CLASS 9	172.560
ORM-D	(none)	

[a]Packing Group I or II (other than Packing Group I inhalation hazard).
#Packing Group III.

6. USDOT Hazmat Placards and Labels. *(cont.)*

g. Placard limits.
   1) Multiple and subsidiary hazards.
   2) "Dangerous" placard meaning (Table 1 & 2 commodities).
   3) Compliance and enforcement.

h. When placards are required.
   1) Bulk shipments.
   2) Table 1 commodities (in any amount).
   3) Table 2 commodities (more than 1001 lbs aggregate gross weight loaded at one facility).

i. Placards versus labels.
   1) Placards – affixed to shipping containers.
      a) Railcar, trailer, intermodal container, etc.
   2) Labels – affixed to shipping packages.
      a) 55-gallon drum, bag, box, etc.

j. Other transportation-related markings.
   1) Orange panel and hazard codes.
   2) Stenciled railcars.
   3) Package labels (e.g. orientation arrows).
   4) Pipeline markers.

k. Purpose of transportation markings.
   "Placard and labels are a method of communication for ***you***!"
   John Falat, CHP

Placarding Requirements (49 CFR 172)

Limits "Hazardous materials that possess secondary hazards ***may*** exhibit subsidiary placards that correspond to the placards described in this part, even when not required by this part…" (49 CFR 172.505). A commodity may have other hazards that aren't always indicated by placards.

Dangerous A freight container, unit load device, transport vehicle, or rail car which contains non-bulk packages with two or more categories of hazardous materials that require different placards specified in Table 2 ***may*** be placarded with a DANGEROUS placard ***instead of*** the separate placarding specified for each of the materials in Table 2. (49 CFR 172.504)

Requirement A transport vehicle or freight container that contains less than 454 kg (1001 pounds) aggregate gross weight of hazardous materials covered by Table 2 does ***not*** have to display a placard. Rule of thumb: a shipment of more than 1001 lbs will generally be more than one 55 gallon drum or equivalent amount. So, if the shipment contains more than one 55 gallon drum of a Table 2 hazmat then it will usually require a placard.

ID Numbers Identification (UN) numbers may be displayed on either a rectangular shaped orange panel or on a plain white placard (49 CFR 172.336). The orange panel will have a black border and orange background. It must be at least 6.3 inches high and 15.7 inches wide.

7. Special Markings.

a. NFPA 704,

b. Biohazard markings,

c. Military markings,
   1) Fire/Ordnance Hazards.
   2) Chemical Hazards.

d. Industrial pipe markings (ANSI A13.1-1981),
   1) Colors.
   2) Identification markings.

e. Hazard communication markings (e.g. HMIS®),

f. Railcar stenciling.

g. Pipeline markers (USDOT).

h. Pesticide and consumer product labels.
   1) Packages.
   2) Applications.
   3) Signal Words.

Note: For detailed information on these marking systems see, the pages at the end of this chapter.

Special Markings

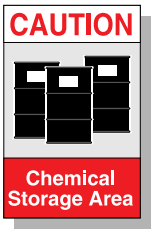
NFPA 704

Biohazard markings

Military markings

Pipeline markers

Hazcom markings



8. Shipping Papers and MSDSs.

a. Preferred hazmat identification source.

b. Types and location of shipping papers:
   1) Truck: Bill of Lading (In cab near driver seat or with driver),
   2) Air: Air Bill (With pilot in cockpit),
   3) Rail: Waybill and Consist (With conductor),
   4) Vessel: Dangerous Cargo Manifest (On bridge).

c. Shipping papers. "…each person who offers a hazardous material *for transportation* shall describe the hazardous material on the shipping paper…" (49 CFR 172.200) They include information such as: proper shipping name; hazard class or division; ID number, packing group; subsidiary hazard(s); total quantity and weight; reportable quantity, emergency phone number; etc. If non-hazardous commodities are listed on the shipping papers then the hazardous materials must be clearly indicated (e.g. listed first or in contrasting color). ***BUT shipping papers may not always be accurate, complete or readable, especially if there was an accident.***

d. MSDS (Material Safety Data Sheet). "Employers shall have a material safety data sheet *in the workplace* for each hazardous chemical which they use." [29 CFR 1910.1200(g)] It provides valuable information such as chemical name, company identification, hazard identification, response information, chemical/physical properties, etc.

Locations of Shipping Papers, 49 CFR 172, Subpart C

General "…each person who offers a hazardous material for transportation shall describe the hazardous material on the shipping paper…"

Contents
- Proper shipping name.
- Hazard class or division.
- Identification number (UN number).
- Packing group.
- Total quantity and unit of measure.
- Other information (see DOT regs).

Aircraft "…operator shall provide the pilot-in-command…information in writing… A copy…shall be readily available…during flight." (49 CFR 175.33)

Vessels "This document [Dangerous Cargo Manifest] must be kept in a designated holder on or near the vessel's bridge." (49 CFR 176.30)

Highway "…shipping papers shall be: Within his immediate reach…readily visible to a person entering the driver's compartment or in a holder which is mounted to the inside of the door on the driver's side of the vehicle…The driver shall ensure that the shipping papers are readily available to and recognizable by authorities in the event of accident or inspection." (49 CFR 177.817)

Rail "A member of the crew…must have a copy…" (49 CFR 174.24)

9. *First Operational Thought is Safety.*

a. Think safety with every breath you take — or it may be your last *(Think safety first, last and always)*.

b. Must go *slow* in Hazmat event — A quick vs. go *slow* Hazmat response can kill or injure you and others.

c. Must have "Positive" vs. "Negative" safety attitude.

d. Negative safety attitude.
   1) "I've been handling this stuff for years…"
   2) "This is the way we've always done it. Nothing bad has happened to us yet."
   3) Or, _____

e. Experienced responders have some positive safety attitudes:
   1) Use recognized safety procedures via vigilance and discipline.
   2) Develop awareness of possible secondary and tertiary hazards.
   3) Treat all Hazmat events with respect *and* anticipate problems.
   4) Cross-reference 3 or more sources before action planning.
   5) Ensure back-up plans are in place for failure of safety devices.
   6) Set-up and *use* decon procedures early.

f. Maintain a "Mental Safe Approach Tactic" while on-scene!
   1) Always keep your distance.
   2) Approach Upwind, Upgrade and Upstream.
   3) Be a "responder" not an "indicator".

Mental Safe Approach

Respond at a Safe Distance:

Upwind

Upgrade

Upstream

9. *First Operational Thought is Safety (continued).*

g. Hazmat Death & Injury Due to Lack of Safety.

1) Ways Hazmats can kill you—follow safety guides for *your own safety!*

a) Toxicity

b) Radioactivity

c) Asphyxiation

d) Explosion

e) Flammability

f) Corrosion

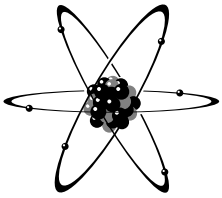
2) There's a reason why they call it "hazardous" after all!

3) Remember: *First Operational Thought = Safety!*

Six Ways Hazardous Materials Can Kill You...

Toxicity

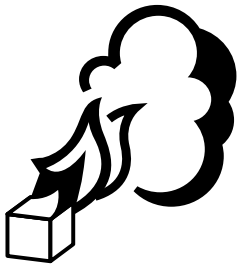
Radioactivity



Asphyxiation

Explosion

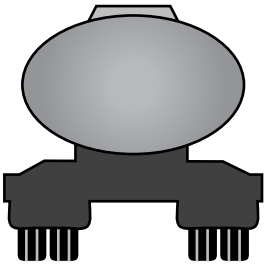
Fire



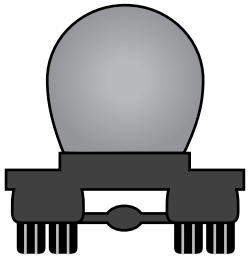
Corrosion

Recognition—Common Vehicle Shapes:

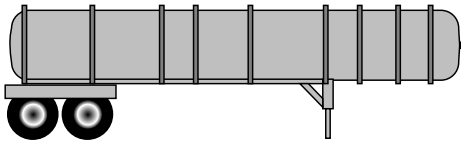
MC 306/DOT 406



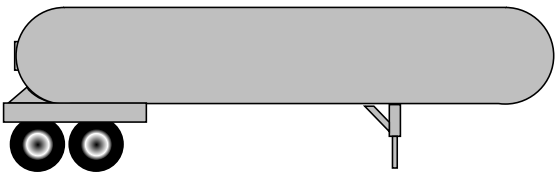
MC 307/DOT 407



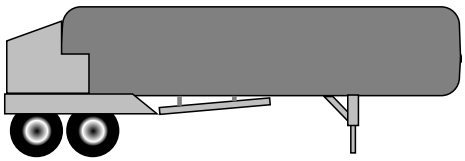
MC 312/DOT 412



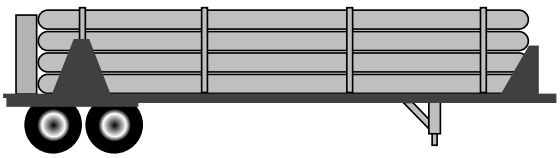
MC 331



MC 338

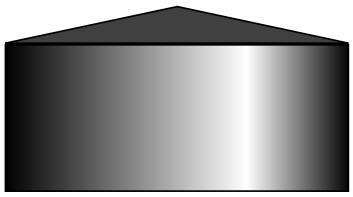


MC 331 ("tube trailer")

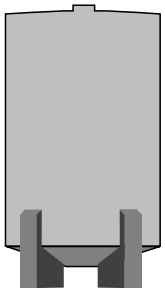


Recognition—Above-Ground Storage Tanks:

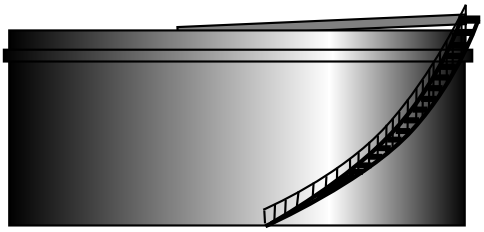
Cone Roof Tank



Cryogenic Tank

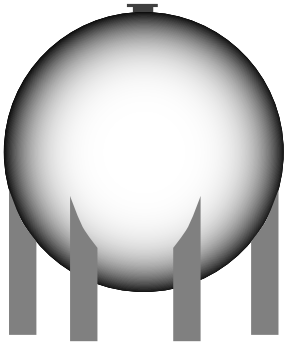


Floating Roof Tank



Horizontal Pressurized Tank

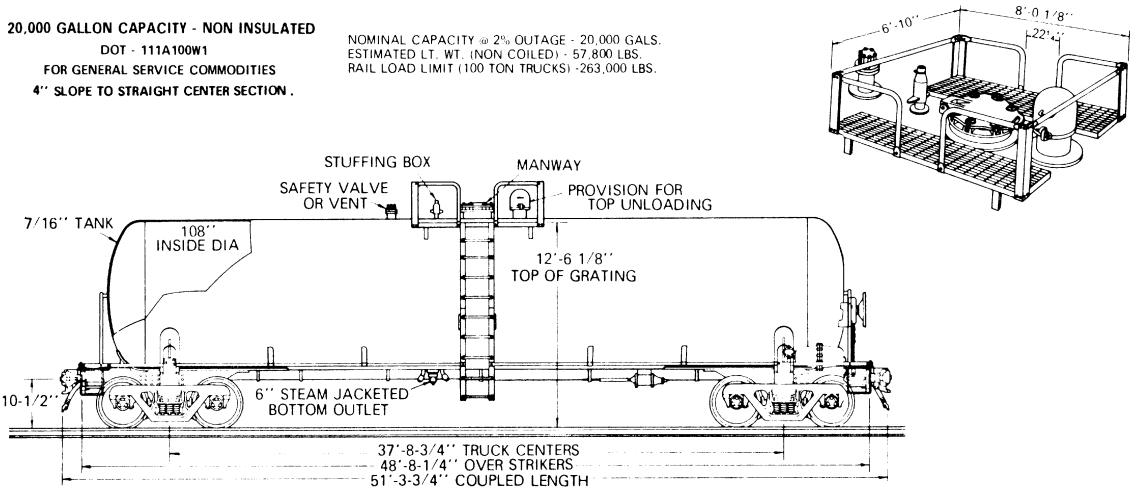
Spherical Pressurized Tank



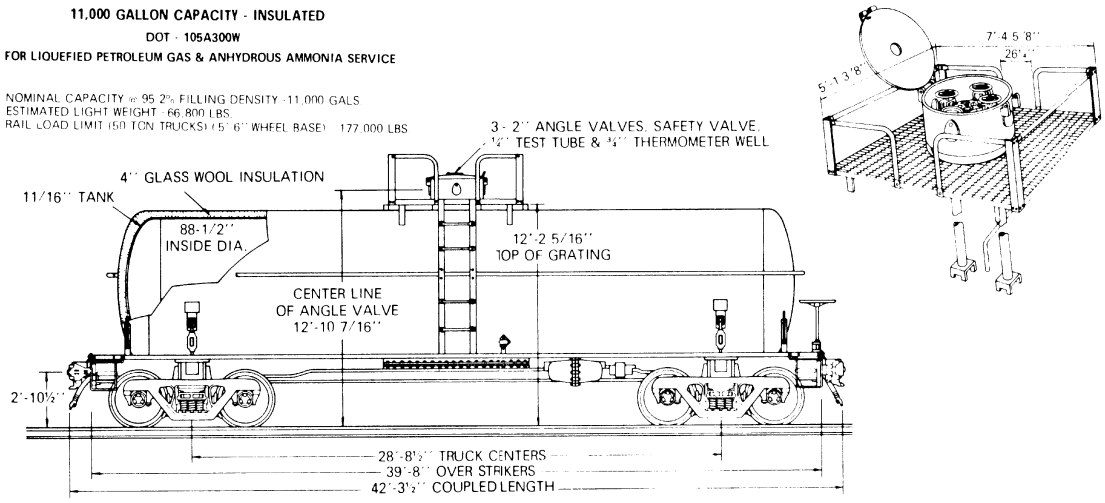
Rail Tank Car Recognition

Rail tank cars may have visual clues that will help you distinguish between pressure and non-pressure tank cars. Non-pressure tank cards may have visible fittings and/or one or more expansion domes. Pressure tanks cards typically have all fittings out of sight under a single protective housing on top of the tank (although some non-pressure tank cars may also have this protective housing).

Non-Pressure Car



Pressure Car



Material Safety Data Sheet (MSDS).

General Info

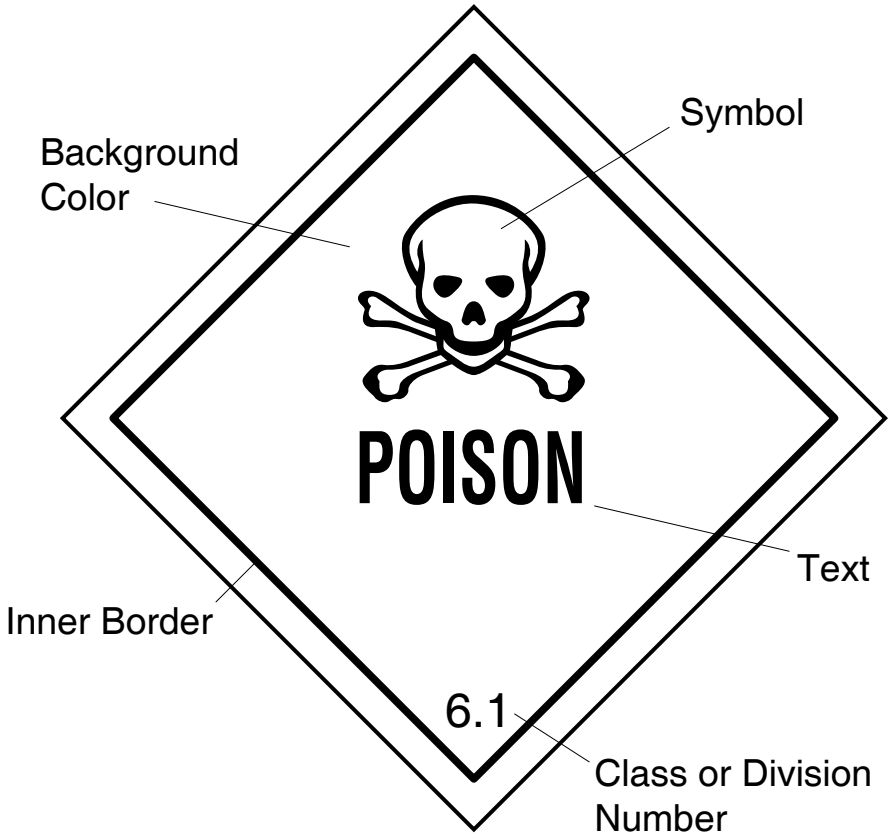
The Occupational Safety and Health Act, Hazard Communication Standard and the regulations issued under that Act require employers that use or produce hazardous substances to prepare written documentation describing the hazards the substance may present. OSHA regulations require 10 types of information. The American National Standard Institute (ANSI) has developed a standard (ANSI Z400.1) for MSDSs that expands on the OSHA requirements and requires an MSDS to have the following sections:

Requirements

- Chemical product and company identification. (OSHA reg)
- Composition/information on ingredients. (OSHA reg)
- Hazards identification (including an emergency overview subsection to describe the material's appearance and the most significant concerns). (OSHA reg)
- First aid measures. (OSHA reg)
- Fire fighting measures. (OSHA reg)
- Accidental release measures. (OSHA reg)
- Handling and storage. (OSHA reg)
- Exposure controls/personal protection. (OSHA reg)
- Physical and chemical properties. (OSHA reg)
- Stability and reactivity. (OSHA reg)
- Toxicological information (including background toxicological information).
- Ecological information (including information on the material's effect on plants, animals and the environment).
- Disposal considerations.
- Transport information (including basic shipping classification information).
- Regulatory information (with additional regulatory information affecting the material).
- Other information.

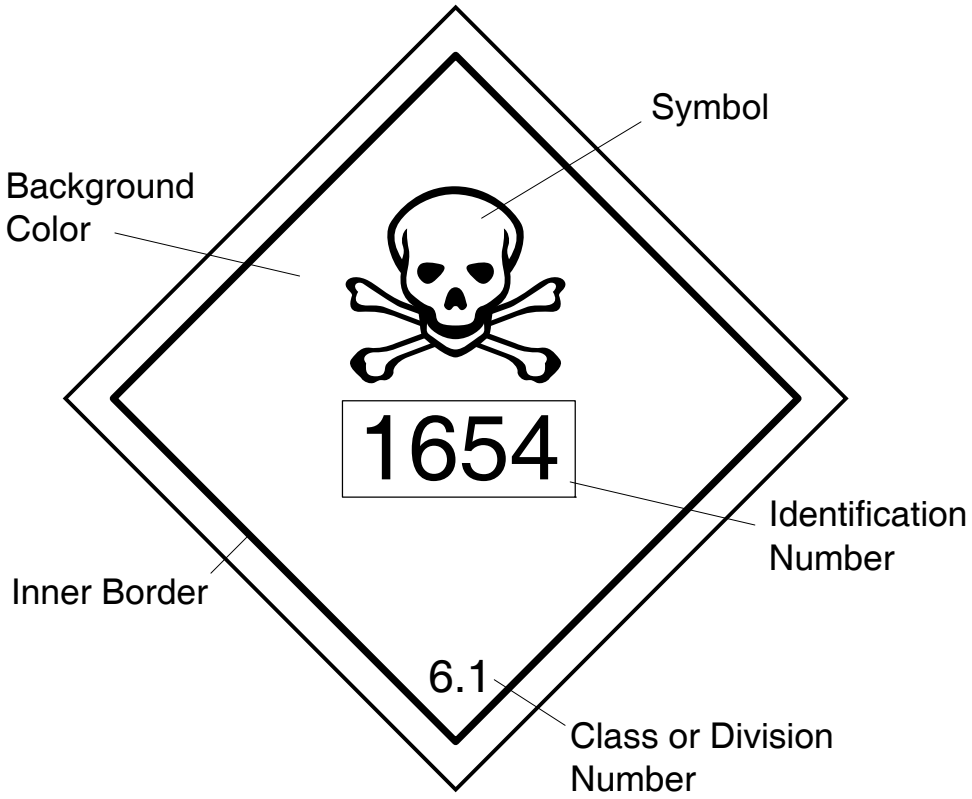
Specifications for Placards (49 CFR 172.519).

Placard with no ID number.



Specifications for Placards (49 CFR 172.519)

Placard with ID number.



Retention of DOT Placards and Labels—29 CFR 1910.1201 (effective October 17, 1994)

(a) *Any employer* who receives a package of hazardous material which is required to be marked, labeled or placarded in accordance with the U. S. Department of Transportation's Hazardous Materials Regulations (49 CFR Parts 171 through 180) *shall retain those markings, labels and placards on the package* until the packaging is sufficiently cleaned of residue and purged of vapors to remove any potential hazards.

(b) *Any employer* who receives a freight container, rail freight car, motor vehicle, or transport vehicle that is required to be marked or placarded in accordance with the Hazardous Materials Regulations *shall retain those markings and placards on the freight container, rail freight car, motor vehicle or transport vehicle* until the hazardous materials which require the marking or placarding are sufficiently removed to prevent any potential hazards.

(c) Markings, placards and labels shall be maintained in a manner that ensures that they are readily visible.

(d) For non-bulk packages which will not be reshipped, the provisions of this section are met if a label or other acceptable marking is affixed in accordance with the Hazard Communication Standard (29 CFR 1910.1200).

(e) For the purposes of this section, the term "hazardous material" and any other terms not defined in this section have the same definition as in the Hazardous Materials Regulations (49 CFR Parts 171-180).

Specifications for Pipeline Markers (49 CFR 195.410)

Who Each pipeline "operator shall place and maintain line markers over each buried pipeline…".

Where Markers must be located at each public road crossing, at each railroad crossing, and in sufficient number along the remainder of each buried line so that its location is accurately known. Each operator shall provide line marking at locations where the line is above ground in areas that are accessible to the public.

What The marker must state at least the following on a background of sharply contrasting color: The word "Warning", "Caution", or "Danger" followed by the words "Petroleum (or the name of the hazardous liquid transported) Pipeline", or "Carbon Dioxide Pipeline", all of which… must be in letters at least 1 inch high…; The name of the operator and a telephone number (including area code) where the operator can be reached at all times.

But not here Line markers are not required for buried pipelines located: offshore or at crossings of or under waterways and other bodies of water; in ***heavily developed urban areas such as downtown business centers*** where the placement of markers is impractical and would not serve the purpose for which markers are intended; and the local government maintains current substructure records.

Bloodborne Pathogens — Warnings. (CCR 5193)

Labels

Warnings labels required on:
Containers of regulated waste.
Refrigerators and freezers containing blood or other potentially infectious material.
Other containers used to store, transport or ship blood or other potentially infectious materials.
May substitute red bag or red container for label under certain conditions. (Regulated waste must also have a label.)

Signs

Work areas containing infectious materials must have a Biohazard sign posted on every entrance. Must also have the name of the infectious agent, information on special requirements for entering the area and the name and phone number of the responsible person.

Symbol

Lettering

The symbol must have the words “BIOHAZARD” or “BIOHAZARDOUS WASTE” under the symbol.

Hazardous Materials Identification System®

History

The National Paints and Coatings Association (NPCA) developed a voluntary method of hazard communication compliance, called the Hazardous Materials Identification System® (HMIS), and made it available to the coatings industry as a hazard communication compliance tool. J. J. Keller is the exclusive provider of the components of the system (www.jjkeller.com).

System

The system uses color-coded labels with numbers and symbols to present acute and chronic health, flammability, and physical hazard warnings, as well as to designate appropriate personal protective equipment (PPE) and indicate target organs. The color scheme and hazard ranking is similar to NFPA 704. (HMIS® is intended to inform employees of hazards while NFPA 704 is intended to inform responders of hazards.)

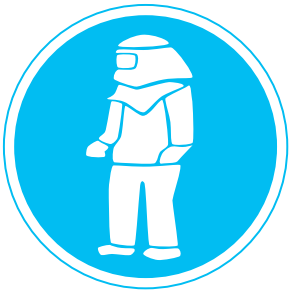
DOD Hazard Identification System.

Applicability The Department of Defense (DOD) established a standard firefighting hazard identification system for all DOD facilities. This system classifies fires involving ammunition or explosives into four divisions according to the hazard they present to emergency responders. (Note: Use of these symbols is at the discretion of the facility commander. Under some conditions security considerations may make it undesirable to identify storage locations of munitions.)

Fire Divisions This system uses four symbols to indicate a fire hazard. The symbols are orange and have the Fire Division number in the center.

Fire Division	**Hazard**	**Symbol Shape**
1	Mass Explosion	Octagon
2	Explosion with fragment hazard	Cross
3	Mass fire	Inverted triangle
4	Moderate fire	Diamond
5	Mass explosion (blasting agents)	Octagon
6	Nonmass explosion	Cross

Chemical Agents The system uses two symbols to indicate the recommended protective equipment to use when responding to a fire.



Wear full protective clothing. (Color-coded to indicate the degree of hazard.)

Wear breathing apparatus.

Identification of Piping Systems.

Introduction The American National Standards Institute (ANSI) has a recommended standard for identifying piping systems that contain something hazardous. ANSI standards, like NFPA standards, are industry consensus standards and may be required in some jurisdictions. ANSI standard A13.1-1981, *Scheme for the Identification of Piping Systems*, provides recommendations for a common labeling system.

Organization This standard divides hazardous materials into the following three categories:

High-Hazard Materials: Corrosive and caustic materials; substances that are toxic or capable of creating toxic gases; explosive and flammable materials; radioactive substances; and materials that, if released, would have a potential for inflicting injury, or property damage by burns, impingement, or flashing to a vapor state.

Low-Hazard Materials: Materials that are not inherently hazardous and have a small chance of harming employees through mild temperatures and low pressures.

Fire Suppression Materials: Fire protection materials such as foam, carbon dioxide (CO2), Halon and water.

Markings The standard requires color-coded labels for the three hazard classes. High-hazard materials: black characters on a yellow background. Low-hazard material: liquids or liquid mixtures, white characters on a green background; gases or gaseous mixtures, white characters on a blue background. Fire suppression class: white letters on a red background. An arrow is often used to show the direction of material flow.

"Stenciled" Railcars, 49 CFR 172.330.

General

"A tank car containing any of the following materials must be marked on each side with the key words of the **proper shipping name** specified for the material in the Sec. 172.101 table, or with **a common name authorized** for the material in this subchapter (e.g., 'Refrigerant Gas'):"

Acrolein, stabilized
Ammonia, anhydrous, liquefied
Ammonia solutions (more than 50% ammonia)
Bromine or Bromine solutions
Bromine chloride
Chloroprene, stabilized
Dispersant gas or Refrigerant gas
Division 2.1 materials
Division 2.2 materials (in Class DOT 107 tank cars only)
Division 2.3 materials
Formic acid
Hydrocyanic acid, aqueous solutions
Hydrofluoric acid, solution
Hydrogen cyanide, stabilized (less than 3% water)
Hydrogen fluoride, anhydrous
Hydrogen peroxide, aqueous solutions (greater than 20% hydrogen peroxide)
Hydrogen peroxide, stabilized
Hydrogen peroxide and peroxyacetic acid mixtures
Nitric acid (other than red fuming)
Phosphorus, amorphous
Phosphorus, white dry or…under water or…in solution
Phosphorus white, molten
Potassium nitrate and sodium nitrate mixtures
Potassium permanganate
Sulfur trioxide, stabilized
Sulfur trioxide, uninhibited

Additional DOT Labeling Requirements.

Marine Pollutant "The **MARINE POLLUTANT** mark shall be placed in association with the hazard warning labels required by subpart E of this part or, in the absence of any labels, in association with the marked proper shipping name." 49 CFR 172.322

Biohazard "In addition to other requirements of this subpart, after September 30, 2003, a bulk packaging containing a regulated medical waste, as defined in Sec. 173.134(a)(5) of this subchapter, must be marked with a **BIOHAZARD** marking conforming to 29 CFR 1910.1030(g)(1)(I)." 49 CFR 172.323

Hot "…a bulk packaging containing an elevated temperature material must be marked on two opposing sides with the word **"HOT'** in black or white Gothic lettering on a contrasting background. The marking must be displayed on the packaging itself or in black lettering on a plain white square-on-point configuration having the same outside dimensions as a placard. (See Sec. 172.302(b) for size of markings on bulk packagings.)" 49 CFR 172.325

Orientation "…each non-bulk combination package having inner packagings containing liquid hazardous materials must be… Legibly marked, with **package orientation markings**…with the arrows pointing in the correct upright direction. Depicting a rectangular border around the arrows is optional." 49 CFR 172.312

Pesticide Labels, 40 CFR 156.10.

General "Contents of the label. Every pesticide products shall bear a label containing the information specified by the Act and the regulations in this part. The contents of a label must show clearly and prominently the following:"

Name, brand, or trademark.
Name and address of the producer.
Net contents .
Product registration number.
Producing establishment number.
An ingredient statement.
Hazard and precautionary statements for human and domestic animal hazards and environmental hazards.
The directions for use.
The use classification(s).

Field Postings, Title 3 CCR §6776.

Signs "The operator of the property shall assure that signs are posted around treated fields…The signs shall contain the following: (1) The skull and crossbones symbol near the center of the sign; (2) The words "DANGER" and "PELIGRO" and "PESTICIDES" and "PESTICIDAS" in the upper portion of the sign; (3) The words "KEEP OUT" and "NO ENTRE" in the lower portion on the sign;"

Posting "The signs shall…Be posted before the application begins…Remain posted and clearly legible throughout the application and the restricted entry interval…The signs shall be posted so that they are visible at all usual points of entry to the treated area…"

Hazmat Recognition – Case Histories.

U. S. EPA Press Release Monday, January 10, 1995

A Federal District Court Judge in Tampa, Fla., on Tuesday, Jan. 3, 1995, imposed a $1.5 million criminal fine, the maximum allowable penalty, against the William Recht, Co. Inc. for illegal hazardous waste violations that resulted in the death of two nine-year old boys. U.S. District Court Judge Elizabeth Kovachevich also placed the company on five years' probation and required an environmental education program for the company employees. The William Recht Co. Inc. facility, doing business in Tampa under the name Durex Industries Inc., manufactures rollers for the printing industry. ***On June 13, 1992, the two boys, who had been playing in the company's trash dumpster, were overcome by — and later died as a result of inhaling — fumes from toluene, a clear, colorless, flammable liquid used by Durex Industries as a cleaning agent. A criminal investigation revealed that it had been the company's practice to routinely and illegally dispose of spent toluene in the dumpster.*** A federal grand jury indicted the William Recht Company Inc., William Whitman, Durex's plant manager and Duane Whitman, the shop foreman, for illegally treating, storing and disposing of hazardous waste without a permit and for knowing endangerment under the Resource Conservation and Recovery Act. The William Recht Co. entered a no-contest plea to the two-count indictment on the day before trial. The Whitmans were convicted by a jury on July 28, 1994, for knowingly treating, storing and disposal of hazardous waste, although they were acquitted on the knowing endangerment charge. In October 1993, each was sentenced to 27 months in prison. For further information, contact Bruce Bellin, EPA Office of Criminal Enforcement at 202-260-9668.

Hazmat Recognition – Case Histories *(cont.)*

From the Emergency Response Forum on America Online.

"An Ames Department Store employee in Derry NH was ordered to dispose of some outdated Ortho products in a waste oil drum in the back of the store. The employee was caught in the act by the Fire Lt. after Fire/EMS was called to an adjacent store by a sick clerk complaining of a strong offensive odor.

The employee had dumped into the drum concentrated liquid and powdered fertilizer and at least seven other concentrated liquid Ortho Pesticides, including malathion and Liquid Sevin. We estimated between 30 and 35 gallons of stuff was fermenting in the barrel. I will be looking forward to seeing the lab report on this stuff.

Believe it or not the employee never got sick, but eight other people in other parts of the strip mall did. All complaining of varying degrees headache, nausea, dizziness, blurred vision etc. Also we had to close and evacuate several other stores. ORTHO products was very cooperative and faxed us a tremendous amount of information, and also faxed the same information to all the hospitals."

Submitted by: Jack Webb, Firefighter/Paramedic
Haz-Mat Technician, Derry Fire Department
Derry, NH

Hazmat Recognition – Case Histories *(cont.)*

A law enforcement perspective…

From the Emergency Response Forum on America Online.

"Unfortunately I learned the hard way. My partner and I responded to a burglary in progress at a house that was being tented for termites. They use a chemical call Ethyl Bromide. Well, we set up a perimeter on the house and waited, A few minutes later here comes Dumbcrook out from underneath the tent. We move in on him and the chase was on. We finally catch up to him, and the fight is on. We get him into custody and see this guy isn't doing too well so we call the paramedics (No, not from being taken into custody…). As the paramedics arrive we start to have difficulty breathing. To make a long story short, we spent a night in the Cardiac Care Unit. You know, the place where people, usually real old people with bad tickers, end up. (Name deleted) and I were 23 at the time. Scary!! Anyway, the doctor told us that we absorbed the concentrated Ethyl Bromide through our skin from the bad guy. Because of this incident I was able to go to a 3 day Haz Mat class. Majorly boring, but enlightening.

Be careful everyone, there is more stuff out there to harm us than just knives and guns. Remember, stay upwind, read the placard from a distance with binoculars, don't step in it and call in the cavalry with the expertise and big red trucks. Be Safe!!

P.S. Remember, we are usually the first ones on scene. Learn as much as you can about hazardous materials, take a class if one is offered. It's just as important as range time... It will keep you alive and healthy!"

Hazmat Recognition – Case Histories *(cont.)*

An emergency medical perspective…

"Our engine company (3 man fire engine) arrived on scene at the local high school for an apparent poisoning.

The male student ingested Lannate pesticide (quarter pound mixed in water). The student was unconscious with vital signs dropping rapidly. The powder was airborne and floating freely with movement of the patient and wind. The captain started to cough and nearly vomited.

I was a firefighter at the time… and rode into the hospital with the private ambulance (paramedic trained). Epi cardio converted the patient and all were excited about a great save.

However, lessons learned:

Safety - recognize danger of spread of pesticide (it's designed to kill).

Isolate and deny entry - keep students away call for police to secure area.

Notifications - notify ambulance of impending danger; environmental health, allied agencies…

We now have a full haz mat team in place as well as shift haz mat team members on duty; first responder operations haz mat training for all fire fighters…"

Scott Coffman
Fire Captain

Hazmat Recognition – Case Histories *(cont.)*

A hospital and emergency medical perspective…

"I treated a 28 year old for trouble breathing after she was trying to clean her house. She was using a "flea" powder to help control fleas in her home from the family dog. Most often these powders are placed on the carpet and swept up, however she decided to place it on the wood floor as well and use a broom to agitate it causing a "dust" in the air which she inhaled.

This was her first experience with this powder and we approached it as a possible allergic reaction. Consultation with Poison Control did not lead us to a pesticide poisoning since her symptomology was not consistent with organophosphate OD.

We were also at a disadvantage because she was intercepted on the way to the hospital so we did not have access to the actual product.

In the [hospital] emergency department, she started getting worse and other patients and nurses began complaining of various things, mostly nausea.

I talked to Poison Control again who explored the issue some more and determined that it might be a pesticide (industrial) and she should be decon'ed. She was taken into the hazmat area where her clothes were removed and red-bagged, [she was] showered and put into a gown. All the effected ED personnel were required to go to the locker room, shower and change clothes.

The patient's condition cleared in about 20 minutes.

As it turned out, her husband got an industrial strength pesticide which is used in a house (you know when they put that big tarp over your house for a few days)."

Robert M. Sklar, NREMT-P
University of Maryland
Department of Emergency Health Services
Howard County, Fire and Rescue

Hazmat Recognition – Case Histories *(cont.)*

A "multi-disciplinary" perspective…

In August 1996 Los Angeles County Sheriff's deputies and paramedics entered a motel room in Carson, CA in response to a report of an unknown number of persons suffering from a possible drug overdose. They found three bodies in the room, one on a bed, one on the floor behind the door and one in the bathroom laying on the floor. None of the bodies showed any signs of injury.

The deputies found a collection of typical drug lab chemicals and apparatus including a 2 liter flask in the bathroom. They also noticed a "heavy chemical odor". Although the air conditioner was on and the bathroom window was slightly open, there were bed sheets surrounding the edge of the door as if the occupants had attempted to keep any vapors or gasses from escaping. The responders exited the location and notified the Bureau of Narcotics Enforcement (BNE) Clandestine Laboratory Task Force. Members of that Task Force and the Los Angeles County Health Hazardous Materials unit assessed the scene and detected the presence of phosphine gas. The Coroner later found that the three victims died of pulmonary edema caused by inhalation of phosphine gas.

Phosphine is a colorless gas that may have a fishy or garlic-like odor. It has been widely used as a grain fumigant and is also used in the manufacture of semiconductors. Certain processes used in clandestine drug labs can generate phosphine gas. It can be toxic at levels as low as 400 parts per million.

Participant Worksheet

1. State a standard hazmat clue and give an example of it from your experience:

2. List four DOT Placards you've seen recently:

3. State an example of a "Positive Safety Attitude" you have seen used recently:

4. Describe a "Mental Safe Approach Tactic" for a location in your workplace:

Block D

Safety, Isolation and Notifications: (S.I.N.)

Main Points

- Definition of "First Responder" & "SIN"
- The First Operational Thought—Safety
- The First Operational Priority—Isolation
- The First Operational Alert—Notifications

Block Outline

1. Definition of First Responder and "SIN".

a. Definition of First Responder Awareness and Operations levels:

1) First Responder "Awareness": One likely to witness or discover a Hazmat release and can initiate a response by notifying authorities, *taking no further actions* (SIN only). 29 CFR 1910.120(q)(6)(i), Title 8 CCR 5192(q)(6)(A).

2) First Responder "Operations": One who responds to Hazmat releases for purpose of protecting nearby persons, environment or property — *trained in a defensive fashion without trying to stop the release* (SINCIAPCPDDD). 29 CFR 1910.120(q)(6)(ii), Title 8 CCR 5192(q)(6)(B).

b. Definition of "SIN":

1) **S**afety,

2) **I**solation,

3) **N**otifications.

c. All Hazmat responders should "SIN" as the basic initial on–scene actions at all Hazmat incidents.

Response Levels and Tactical Acronym

Tactic	FRA	FRO	IC	Tech/Spec
Safety	X	X	X	X
Isolation	X	X	X	
Notify	X	X	X	
Command		X	X	
IDHA		X	X	X
Action Plan		X	X	X
Protective Equip.		X	X	X
Countermeasures		X	X	X
Protective Action		X	X	X
Decon		X	X	X
Disposal		X	X	X
Documentation		X	X	X

2. The First Operational Thought — SAFETY

a. The first operational *thought* for everyone = **S**afety!
   1) Safety starts with the first responder on-scene!
   2) Responders must have a "Positive Safety Attitude".

b. Three techniques to ensure safety and a positive safety attitude:
   1) Safe Approach,
   2) Safe Assessment,
   3) Key Safety Guides for all responders to follow.

c. Approach Hazmats from a safe *direction* (Upwind, Upgrade & Upstream), and a safe *distance* (per ERG).
   1) Remember to keep vehicles headed away from incident.

d. Conduct a safe assessment/size-up:
   1) Do not get close enough for positive identification.
   2) Slow vehicle down, shut off air/ventilation and observe area.
   3) Position vehicles headed away from incident.
   4) Use binoculars to identify/assess incident.

e. Desired First Responder initial actions:
   1) **S**afe approach at a safe distance
   2) **I**solate and deny entry,
   3) Make initial **N**otifications,
   4) Establish temporary command.

S.I.N.

First Operational Thought: ***Safety***

First Operational Priority: ***Isolate and Deny Entry***

First Operational Alert: ***Notifications***

Not all notifications are mandatory but the following are:

- *Local Dispatch*
  Local 911
- *Administering Agency/CUPA*
  ???-????
- *State OES/Warning Center*
  800-852-7550
- *National Response Center*
  800-424-8802

Note: Specific incidents may require other notifications!

2. The First Operational Thought — SAFETY *(cont.)*

f. Ten key safety guides on-scene:

1) Be cautious; treat materials as hazardous until proven otherwise.
2) Approach upwind, upgrade and upstream.
3) Keep safe distance until IDHA complete and risk is confirmed.
4) Isolate and deny entry (limit numbers of responders).
5) Do not rush to victims without doing a risk assessment (Risk vs. Gain) and wearing proper protective equipment.
6) Do not touch, taste or breath unknown released material (do not assume vapor is harmless due to lack of smell).
7) Do not eat, drink or smoke in incident area.
8) Eliminate all ignition sources (incl. flares) near incident area.
9) Establish and observe safety perimeters and control zones.
10) Do not worry about looking foolish (your health and the health of others is at stake). Think safety!

g. OSHA regulations, 29 CFR 1910.120(q) and Title 8 CCR 5192(q), *require* IC to designate a Safety Official/Officer.

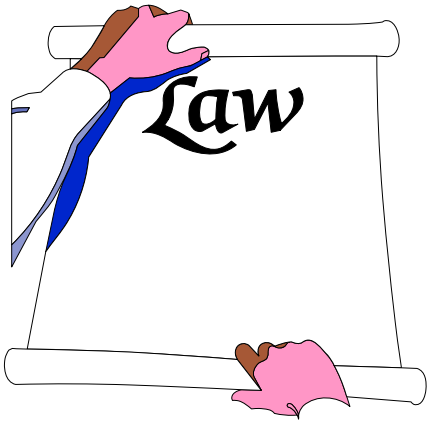
1) Safety Officer ensures safety on-scene by conducting safety related activities—*can suspend any unsafe act.*
2) Checklist of safety "Rules" vs. "Guides" may provide a better tool for "Safety Official" to enforce safe response on-scene.
3) Every hazmat response should have a Safety Officer assigned and a Site Safety Plan (preferably in writing).
4) You should know who the Safety Officer is and should read (and follow!) the site safety plan.

Safety Official

29 CFR 1910.120(q)(3), Title 8 CCR 5192(q)(3)

"(vii) The individual in charge of the ICS shall designate a safety official, who is knowledgeable in the operations being implemented at the emergency response site, with specific responsibility to identify and evaluate hazards and to provide direction with respect to the safety of the operations for the emergency at hand.

(viii) When activities are judged by the safety official to be an IDLH and/or to involve an imminent danger condition, the safety officer shall have the authority to alter, suspend, or terminate those activities. The safety official shall immediately inform the individual in charge of the ICS of any actions needed to be taken to correct these hazards at the emergency scene."



3. The First Operational Priority — ISOLATION

a. The first operational *priority* = **I**solate and deny entry!

1) Responders can safely attempt to isolate and deny entry by establishing Perimeters & Control Zones via ERG.

2) The dilemma of distance. Safety vs. isolation (distance is safety's #1 ally, while it is isolation's #1 enemy).

b. Perimeter and Zones.

1) Purpose: ensure safety and isolation, control the scene, limit contamination spread and allow for safe working areas.

2) Main difference: FRAs can be can establish the Perimeter but only FRO or above can establish the Exclusion Zone.

c. Perimeter and Control Zone terminology:

1) **Perimeter** (Outside security line around all Control Zones).

2) **Exclusion**/Hot **Zone** - Area of isolation (only responders with specific task & proper level of protective clothing in this Zone).

3) **Contamination Reduction**/Warm **Zone** - Used to control areas like Safe Refuge and Decontamination (may use a reduced protective clothing level in this Zone).

4) **Support**/Cold **Zone** - Safe area for Command Post, Media, medical aid, etc. (No protective clothing or SCBA required).

5) Exclusion Zone, Contamination Reduction Zone and Support Zone are all within the Perimeter.

Perimeters and Zones

First Operational Thought — ***Safety***

First Operational Priority — ***Isolate & Deny Entry...***
Via Perimeter and Zones.

Perimeter Security line surrounding control zones to isolate and deny entry to any unnecessary people, usually established by law enforcement.

Zone Zones to ensure safety, limit spread of the hazard, control hazard area, conduct decon and support emergency operations *as established by Haz Mat Group/Team.*

Examples **Exclusion Zone:** Also called Hot Zone, Red Zone, Inner Perimeter.
Contamination Reduction Zone: Also called Warm Zone, Yellow Zone, Secondary Perimeter.
Support Zone: Also called Cold Zone, Green Zone, Outer Perimeter.
Control Zone terms from *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, NIOSH Publication 85-115, October 1985.

3. The First Operational Priority — ISOLATION *(cont.)*

d. Perimeter Control Objectives:

1) Control "**Entry Points**" (secure doors, stairways, gates, intersections, on and off ramps, etc.).
2) Control "**Perimeter**" between all Entry Points.
3) Control "**Access**" inside Perimeter (incl. responders).

e. Perimeter Control Tactics:

1) Determine size and extent of perimeter (per ERG, downwind perimeter will usually be longer),
2) Identify all entry points,
3) Control all entry points,
4) Identify and establish boundaries for perimeter,
   a) Unstaffed barricades usually ineffective,
   b) Be aware of ignition sources from vehicles,
   c) Use existing barriers.
5) Control access to the perimeter,
   a) Deny entry to all unauthorized personnel (incl. responders),
   b) Stage all responders without an immediate mission,
   c) Establish emergency exit procedures for all responders,
   d) Hazmat Group will establish Control Zones,
   e) Watch out for wind shifts!

Isolation and Deny Entry Objectives

Entry Points *Control Entry Points*

•Visually determine isolation distance for Perimeter.
(ERG may often recommend downwind perimeter up to 2-3 times larger distance than crosswind perimeter.)

•Identify closest entry/control points for Perimeter. (e.g. Doorways, Intersections, Gates, etc.) Others: _____

•Start with most obvious and most commonly used Perimeter entry point. (FEMA studies have showed people will evacuate through exits they are accustomed to using.)

•Make early request for sufficient units to secure entry points. (Use Law Enforcement or Auxiliary/Reserve Units. Give incident location and safe routes for ingress.)

•Use all available methods of restricting access (e.g. vehicles, barricades, cones, etc.) Others: _____

•Identify staging areas for responders.

Hazard *Control Area Around Hazard*

•Secure the area around the hazard area.

•Use tape, natural barriers, patrols, etc.

•Remember, it's easier to make a perimeter small than bigger after you establish it. Don't be afraid to start big.

Perimeter *Control Access Inside Perimeters.*

•Keep public and nonessential responders out.

•Maintain patrol of Perimeter area.

•Provide security for Support Zone work areas.

•Provide traffic control as necessary.

•Maintain communications with security group at all times!

•Have an emergency escape route and watch the wind!!

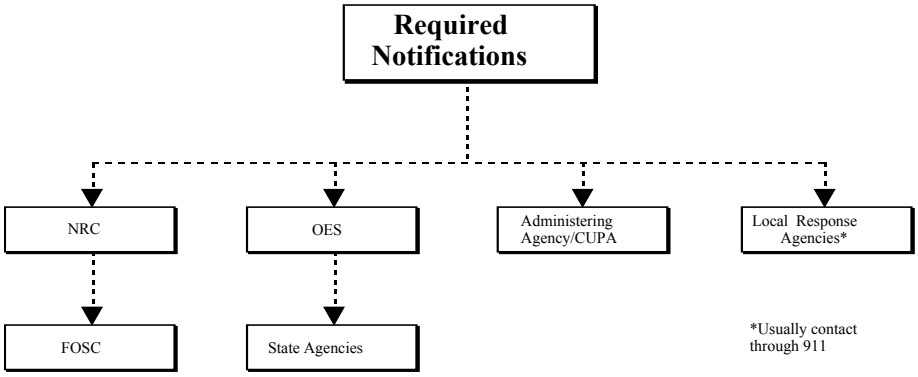
4. The First Operational Alert — NOTIFICATIONS

a. Three types of "Notifications" to alert others of a Hazmat event:
   1) "Mandatory" Notifications,
   2) "Resource" requests,
   3) "Report of Conditions".

b. Responsible Party must notify authorities of a Hazmat release or potential release. *Legal penalties possible for non-notification.*
   1) Responders should make same notifications as back-up.
   2) Mandatory notifications:
      a) Local dispatch (Local 911),
      b) CUPA/Local Administering Agency (#:_____),
      c) State Warning Center (800-852-7550),
      d) National Response Center (800-424-8802).
   3) Other notifications per specific incident:
      a) Pesticide spill - County Agriculture,
      b) Spill in state waters - OES (who must notify RWQCB, OSPR & State Lands Commission),
      c) Spill on state highway/freeway (incl. county roads) – CHP,
      d) Radiological release - DHS (Radiological Branch),
      e) Release impacting state wildlife – DFG,
      f) Acutely hazardous material within $^1/_2$ mile of school - School District Superintendent,
      g) Oil spills (if responsible party has not done so).
      h) Prop 65 Haz Mats - Board of Supervisors & Health Officer. (For "designated employees" only. If you're not sure if you're a designated employee then you're not one.)

   Note: Responders must make notifications for f-h.

Legal Requirements for Notifications



NRC "Notice of an oil discharge or release of a hazardous substance in an amount equal to or **greater than the reportable quantity** must be made immediately…to the NRC duty…" 40 CFR 300.125(c).

CUPA/AA "(a) … provide an immediate, verbal report of **any release or threatened release** of a hazardous material to the Administering Agency and the [OES]…(d) The [AA] may designate a call to the 911 … as meeting the requirement to call the [AA]." Title 19 CCR 2703.

OES "… immediately report any release or threatened release of a hazardous material to the administering agency and the [Office of Emergency Services]." §25507, California Health & Safety Code.

Transportation "…each carrier who transports hazardous materials (including hazardous wastes) shall give notice in accordance with paragraph (b) of this section after each incident…" 49 CFR 171.15 (federal regulation) Title 13 CCR 1166 (equivalent California regulation).

Schools "Emergency rescue personnel…shall immediately advise the superintendent…where the location of the release or threatened release is within one-half mile of a school." §25507.10 California Health & Safety Code.

Oil "Any local or state agency responding to a spill of oil shall notify the Office of Emergency Services, if notification…has not occurred." §8670.26 California Government Code.

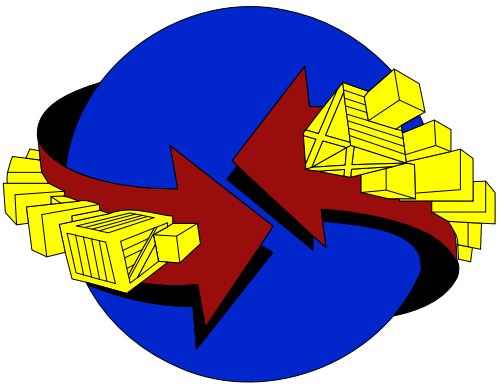
4. The First Operational Alert — NOTIFICATIONS *(cont.)*

4) General information needed for mandatory notifications:
   a) Name/Agency of person reporting,
   b) Location of Hazmat release,
   c) Haz Mat involved,
   d) Nature of problem,
   e) Quantity released,
   f) Potential hazards, etc.
5) Key point of notification for state agencies is State Warning Center.
   a) State OES will provide control number (important for mutual aid and funding).
6) Notification checklist may help.

c. Resource Request Notification.
   1) Types of resources:
      a) Agencies/Personnel (Law, Fire, EMS, Health, etc.),
      b) Materials/Equipment (Hazmat Team),
      c) Facilities (ICP, EOC, evacuee shelters, etc.),
      d) Other (Information sources, Hazmat Teams, etc.).
   2) Possible off-site resources (CHEMTREC, CHLOREP, USA and Poison Control Centers). Other: _____
   3) Key question: How do I get help? Who do I call?

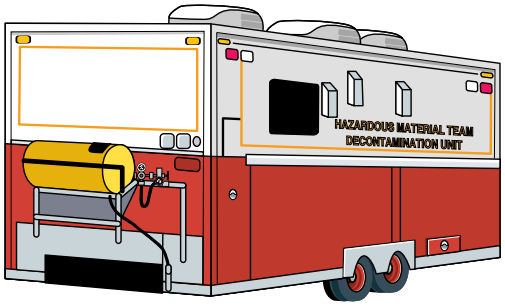
When Do You Need Help?

You don't have enough stuff.

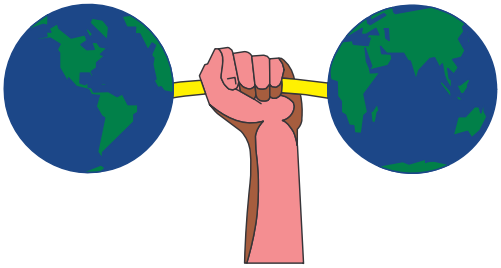


You don't have enough people.

You don't have the right stuff.



You just need "more"!



4. The First Operational Alert — NOTIFICATIONS *(cont.)*

4) Know your local resources for Haz Mat and request early.
5) Stage incoming resources until needed and give arriving resources a safe route of access.
6) You are not alone (many Hazmat resources are available), *but* you must contact, coordinate and manage resources properly!

d. Report of Conditions Notification.
   1) Report of Conditions includes:
      a) What you see in and around hazard area,
      b) What you want,
      c) What you are doing.
   2) Report of Conditions helps IC assess basic actions, identify needed resources, and begin the IDHA process.

Haz Mat Notification Guide

Agency/Organization	Phone #	Time	Person Notified
Local			
First Responders (Fire, PD, etc.)*	_____	_____	_____
Administering Agency*	_____	_____	_____
County OES	_____	_____	_____
County Agriculture Dept.	_____	_____	_____
County Health	_____	_____	_____
Local Haz Mat Team	_____	_____	_____
Animal Control	_____	_____	_____
Other	_____	_____	_____
State			
OES Warning Center*	_____	_____	_____
Highway Patrol	_____	_____	_____
Fish and Game	_____	_____	_____
Dept. of Toxic Substances Control	_____	_____	_____
Other	_____	_____	_____
Federal			
National Response Center*	_____	_____	_____
Coast Guard	_____	_____	_____
EPA Region IX	_____	_____	_____
Other	_____	_____	_____
Private			
CHEMTREC	_____	_____	_____
Local Cleanup Company	_____	_____	_____
Underground Services Alert	_____	_____	_____
Regional Poison Control Center	_____	_____	_____
Hospitals	_____	_____	_____
Other	_____	_____	_____
Special Districts			
Air Quality Mgt. District	_____	_____	_____
Regional Water Quality Cntl. Brd.	_____	_____	_____
Flood Control Districts	_____	_____	_____
School Districts	_____	_____	_____
Sewer Districts	_____	_____	_____
Other	_____	_____	_____

**Mandatory Notifications*

Do This!

DO	think safety and consider it a big deal!!!
DO	report your location.
DO	stay upwind, uphill and upgrade.
DO	isolate and deny entry.
DO	establish perimeters and observe zones.
DO	notify and request assistance early.
DO	establish command & practice unity of command.
DO	complete identification and assessment.
DO	have alternative plans and consider no action.
DO	recognize your limits.
DO	forecast your intervention and expect change.
DO	weigh risk against gain (benefits).
DO	wear protective clothing.
DO	maintain control of the incident.
DO	evacuate and warn public early.
DO	decontaminate & document before demobilization.
DO	communicate & coordinate with other agencies.
DO	ensure the safety of all on-scene personnel!
DO	_____
	(Fill in your recommendation)

Don't Do This!

DON'T	be overly aggressive.
DON'T	have a negative safety attitude.
DON'T	get coaxed into a bad situation.
DON'T	touch, breathe or swallow it.
DON'T	act without a plan.
DON'T	lose sight of your mission.
DON'T	act on emotion.
DON'T	confuse rescue with evacuation.
DON'T	believe everything you're told.
DON'T	intervene unless sure of positive outcome.
DON'T	drive through spills or clouds.
DON'T	pick up or move containers needlessly.
DON'T	key in on only one hazard.
DON'T	take victims to the incident.
DON'T	let small amounts fool you.
DON'T	use flares.
DON'T	be lulled into a false sense of security.
DON'T	fail to competently respond to the event!
DON'T	_____
	(Fill in your recommendation)

Required Training for Public Safety Agencies

OSHA CPL 02-02-073, Paragraph XI.A.6(4)

General "…States with OSHA-approved State plans are required to extend coverage to these employees. Public sector employees in States with an OSHA-approved State plan are protected by the hazardous waste standards adopted by these State plans."

OSHA CPL 02-02-073, Paragraph XI.G.2

Police "Generally, law enforcement…personnel should be trained to the first responder awareness level since they are likely to witness or discover a release of a hazardous substance." (Your mission determines what level you must be trained to. You may be required to train to the FRO level if your department requires you to perform FRO functions.)

Fire "Fire fighters expected to respond to releases of hazardous substances must be trained to at least the first responder operations level, since they will respond to releases, or potential releases, of hazardous substances for the purpose of protecting nearby persons, property, or the environment."

Safety Officer

OSHA CPL 02-02-073, Paragraph XI.D.7

General "The safety official must have the following competencies…Be knowledgeable in the operations being implemented…Have ability to identify the hazards and to provide direction with respect to the safety of operations for the emergency at hand."

Authority "When the safety official believes that there is a situation that poses an imminent danger to life or health, the safety official must be vested with the authority to suspend operations**. [*Evidence to the contrary] shall be cited as a (q)(3)(viii violation).*"**

California Vehicle Code and Notifications

Public Health

CVC §2451 "The Legislature finds and declares that a statewide program for the management of hazardous substances highway spills, under the jurisdiction of the California Highway Patrol, is necessary to protect the public health and environment."

Hazardous Spill Notification System

CVC §2453 "The California Highway Patrol shall serve as a statewide information, assistance, and notification coordinator for all hazardous substances spill incidents occurring on highways within the State of California. The California Highway Patrol shall establish a single notification mechanism…"

Incident Command Authority

CVC §360 "'Highway' is a way or place of whatever nature, publicly maintained and open to the use of the public for purposes of vehicular travel. *Highway includes street.*" (italics added)

CVC §2454 (a) The authority for incident command at the scene of an on-highway hazardous substance spill or disaster shall be vested in the ***appropriate law enforcement agency having primary traffic investigative authority on the highway where the spill or disaster occurs.*** Responsibility for incident command at the scene of an on-highway hazardous substance spill or disaster shall continue until all emergency operations at the scene have been completed and order has been restored.

Off-Site Information Resources

Chemical Transportation Emergency Center (CHEMTREC)

CHEMTREC CHEMTREC serves as a round-the-clock resource for obtaining immediate emergency response information for accidental chemical releases. CHEMTREC is linked to the largest network of chemical and hazardous material experts in the world including chemicals and response specialists, response specialists within the carrier community, public emergency services, and private contractors. Shippers of hazardous materials use CHEMTREC to comply with U.S. DOT emergency notification regulation. This regulation requires hazmat shippers to provide a 24-hour emergency telephone number on shipping documents that can be called in the event of an emergency involving the hazardous material that was shipped. 49 CFR §172.604). Phone: 800-262-8200 24 hours a day.

Chlorine Emergency Plan (CHLOREP)

CHLOREP CHLOREP, **CHLOR**ine **E**mergency **P**lan administered and coordinated by The Chlorine Institute, is a program to provide an organized and effective system for responding to chlorine emergencies in the United States and Canada. It operates on a 24-hour, 7-day-a-week basis. Contact through CHEMTREC.

California Poison Control System

Poison Control The California Poison Control System (CPCS) is the statewide provider of immediate, free and expert treatment advice and assistance in case of exposure to poisonous, hazardous or toxic substances. Pharmacists, physicians, nurses, and poison information providers answer the phones. Call the Poison Action Line at 1-800-222-1222 toll-free, 24 hours a day, 7 days a week, 365 days a year.

Participant Worksheet

1. List at least three common safety guides/rules your workplace can improve based on what you've learned in this course:

2. Identify the "First Operational Priority" and the reference guide you should use to decide how far to isolate the area around the incident:

3. In your own words, identify three objectives for setting the "Perimeter":

4. Who will you notify in a hazmat release now that you didn't notify before you took this course?

Block E

Introduction to Incident Command: (C.)

Main Points

- Need for Incident Command
- National Incident Management System (NIMS)
- ICS Organization
- Hazmat and "Who's In Charge"
- Single versus Unified Command
- Incident Command Post (ICP)
- Agency Coordination at Hazmat Incidents

Block Outline

1. Need for Incident Command.

a. Purpose of Scene Management: provide one workable "System" for all responders to use, to make the most efficient and effective use of all resources, to minimize impacts of the incident.

b. Goal: Better protect life, environment and property.

c. Effective emergency response requires immediate coordination at the emergency scene. Don't wait for someone else to do it.

d. 29 CFR 1910.120(q) and Title 8 CCR 5192(q) mandate an "IC" and require the use of ***the*** Incident Command System (ICS).

   1) ICS is an organized system of roles, responsibilities and S.O.P.s used to manage and direct emergency operations.
   2) CCR 5192(q)(3) requires the use of "the" ICS as the command system for hazmat events. (29 CFR 1910.120 requires the use of "a site-specific Incident Command System".)
   3) CGC 8607, also known as the "Standardized Emergency Management System" (SEMS), mandates the use of ICS in any field emergency involving two or more agencies.

e. First Responders at the Operations level should assume temporary/initial command until the authorized Incident Commander arrives.

Requirements for using ICS

California Government Code Section 8607

SEMS

"By December 1, 1993, the Office of Emergency Services…shall jointly establish by regulation a standardized emergency management system for use by all emergency response agencies… This system shall be applicable, but not limited to, those emergencies or disasters referenced in the state emergency plan. …state agencies shall use the standardized emergency management system…to coordinate multiple jurisdiction or multiple agency emergency and disaster operations. …each local agency…shall use the standardized emergency management system…to coordinate multiple jurisdiction or multiple agency operations."

29 CFR 1910.120(q)(3)(i)

Fed OSHA

"The senior emergency response official responding to an emergency shall become the individual in charge of a site-specific Incident Command System (ICS). All emergency responders and their communications shall be coordinated and controlled through the individual in charge of the ICS assisted by the senior official present for each employer."

Title 8 CCR Section 5192(q)(3)(A)

State OSHA

"The senior emergency response official who has ultimate site control responsibility shall confirm that the Incident Command System (ICS) is in place and the position of Incident Commander (IC) instituted. All emergency responders and their communications shall be coordinated and controlled through the ICS."

2. National Incident Management System (NIMS).

a. Established on February 28, 2003 by Homeland Security Presidential Directive (HSPD)–5, *Management of Domestic Incidents.*

1) Directs Secretary of Homeland Security to develop and administer a National Incident Management System (NIMS).

b. Provides a consistent nationwide system.

1) Includes Federal, State, local, and tribal governments, private-sector and nongovernmental organizations.

2) Enables effective and efficient response to domestic incidents.

c. NIMS provides a core set of doctrine, concepts, principles, terminology, and organizational processes.

d. NIMS concepts.

1) Flexibility. Provides a consistent, flexible, and adjustable national framework for response.

2) Standardization. Provides a set of standardized organizational structures, processes, procedures, and systems designed to improve interoperability.

e. NIMS components.

1) Command and Management.

2) Preparedness.

3) Resource Management.

4) Communications and Information Management.

f. Command and Management.

1) Incident Command System.

2) Multi Agency Coordination Systems.

3) Public Information.

Command and Management

NIMS standard incident command structures are based on three key organizational systems.

The ICS

ICS

The ICS defines the operating characteristics, interactive management components, and structure of incident management and emergency response organizations engaged throughout the incident.

Multiagency Coordination Systems

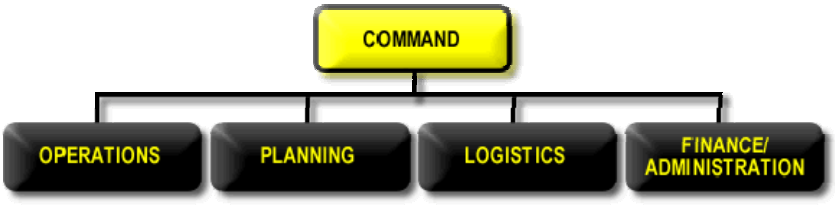
MACS

These define the operating characteristics, interactive management components, and organizational structure of supporting incident management entities engaged at the Federal, State, local, tribal, and regional levels through mutual-aid agreements and other assistance arrangements.

Public Information Systems

PIO

These refer to processes, procedures, and systems for communicating timely and accurate information to the public during crisis or emergency situations.



INCIDENT COMMAND SYSTEM: COMMAND STAFF & GENERAL STAFF

3. ICS Organization.

a. Critical components of ICS:
   1) One unified organization,
   2) Clear functional elements (division of labor),
   3) Flexibility and expandability,
   4) Unity of command,
   5) Manageable span of control,
   6) Effective communications and coordination.

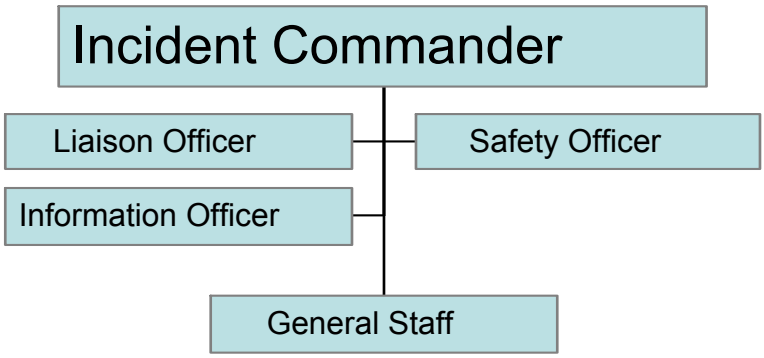
b. ICS Organization.
   1) **Incident Commander** (overall management),
   2) General Staff positions (and functions):
      a) **Operations Section** (manages tactical operations),
      b) **Planning/Intel Section** (does incident action planning),
      c) **Logistics Section** (procures incident resource needs),
      d) **Finance/Admin Section** (manages incident financial aspects).
   3) Command Staff Positions.
      a) **Information Officer** (releases incident info),
      b) **Liaison Officer** (POC for assisting/cooperating agencies),
      c) **Safety Officer** (ensures safety of all personnel),

c. Key ICS hazmat positions.
   1) Incident Commander*.
   2) Safety Officer*.
   3) Information Officer.

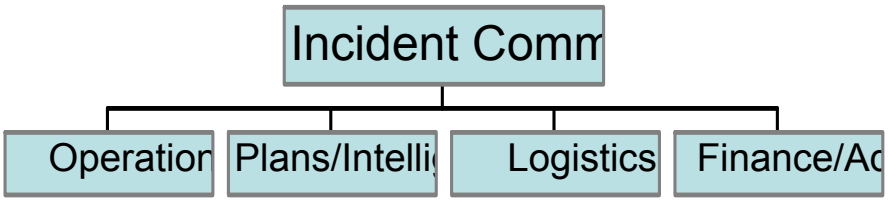
   **Required by OSHA regulations.*

d. Know where you may best fit in to the organization.
   1) What position are you assigned to?
   2) Who do you report to?

ICS Command Staff



ICS General Staff



3. ICS Organization. *(continued)*

e. Role of the IO in hazmat.

1) Media is often involved in hazmat incidents.

a) They often arrive first.

b) Can be valuable intelligence gathering tool.

c) Can quickly warn, inform and instruct public of hazards.

d) They have a legal right of access (CPC §409.5)

2) Things that will attract the media:

a) Evacuations (actual or potential).

b) Road closures.

c) Unusual substances (e.g. radioactives).

d) Presence of "celebrities" (e.g. politicians, activists, etc.)

e) Any politically "hot" issue or location.

f) Obvious indicators (e.g. big orange cloud).

3) FRO responsibilities.

a) Know employer policies regarding media.

b) Know how to contact IO.

c) Inform Media of facts (only what you know).

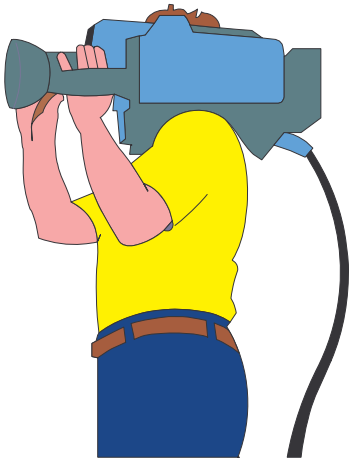
d) Advise them of potential danger and need for decon.

e) Inform them that IO will arrive soon.

When to Call for an IO

When employer plan says to do so.

When the Media is already there.



When something "newsworthy" is happening.

4. Hazmat and "Who's In Charge".

a. 29 CFR 1910.120 and Title 8 CCR 5192 mandate an "IC".

b. OSHA regulations don't specify who it should be!

c. CVC 2454 designates "Incident Command Authority" for hazmat events on the "highway" to be the *law enforcement agency with primary traffic investigative authority where the spill occurs* (state highway or county road: CHP, city street: Police Department).

d. CVC 2454 doesn't apply to Off-Highway hazmat events.

e. CGC §8670.7 gives Dept. of Fish and Game responsibility for hazmat incidents on marine waters.

f. Fish and Game Code §5650 gives Dept. of Fish and Game responsibility for hazmat incidents on state waters.

g. Agencies owning or operating government-owned property may be the designated Incident Commander for that property.
   1) Military vessels and facilities.
   2) State buildings.
   3) State universities (UC and Cal State system).
   4) State mental health institutions.
   5) Correctional institutions.

h. If in doubt about who is in charge, ask!

IC Authorities in State Law

General Authority

CGC §8618 "… the responsible local official in whose jurisdiction an incident requiring mutual aid has occurred shall remain in charge at such incident, including the direction of personnel and equipment provided him through mutual aid."

Incident Command Authority

CVC §2454 "The authority for incident command at the scene of an on-highway hazardous substance spill or disaster shall be vested in the *appropriate law enforcement agency having primary traffic investigative authority on the highway where the spill or disaster occurs… Department of the California Highway Patrol is responsible for incident command at the scene of an on-highway hazardous substance spill or disaster on all highways where the department has primary traffic investigative authority***.** Any law enforcement agency having primary traffic investigative authority may enter into written agreements with other public agencies to facilitate incident command…"

What's a "highway"?

CVC §360 "'Highway' is a way or place of whatever nature, publicly maintained and open to the use of the public for purposes of vehicular travel. *Highway includes street.*" (italics added)

Department of Fish and Game

CGC §8670.7 "…has the primary authority to direct prevention, removal, abatement, response, containment, and cleanup efforts with regard to all aspects of any oil spill in the marine waters of the state…"

F&GC §5650 *"*...it is unlawful to deposit in…the waters of this state…Any substance or material deleterious to fish, plant life, or bird life."

5. Single versus Unified Command.

a. Single Command—one person in charge.

b. Unified Command—two or more people in charge.
   1) Objectives: one set of objectives developed.
   2) Organization: one organization staffed by individuals from multiple entities.
   3) Resources: all resources are assigned to and directed by one response organization.
   4) Operations: one individual (Operations Section Chief) manages incident operations.

c. Unified command is often desirable in hazmat incidents.
   1) Hazmat incidents often involve multiple agencies.
   2) Hazmat incidents often cross jurisdictional boundaries.

d. Advantages of unified command in hazmat response.
   1) Collective approach to response strategies.
   2) Improved information flow between agencies.
   3) Takes into account government agencies' authorities, jurisdictions and legal requirements.
   4) Reduces duplication of effort and costs.

Unified Command

What The act of directing and/or controlling resources by virtue of explicit legal, agency, or delegated authority. May also refer to the Incident Commander. *ICS Glossary of Terms, ICS-0010-1*

Who In ICS, Unified Command is a unified team effort which allows all agencies with responsibility for the incident, either geographical or functional, to manage an incident by establishing a common set of incident objectives and strategies. This is accomplished without losing or abdicating agency authority, responsibility, or accountability. *ICS Glossary of Terms, ICS-0010-1*

Why Experience has proven that at incidents involving multi-agencies, there is a critical need for integrating management of resources into one operational organization that is managed and supported by one command structure. This is best established through an integrated, multidisciplined organization. In the ICS, employing what is known as Unified Command fills this critical need. *ICS Field Operations Guide ICS 420-1*

How Unified Command is a team effort that allows all agencies with jurisdictional responsibility for an incident, either geographical or functional, to participate in the management of the incident. This participation is demonstrated by developing and implementing a common set of incident objectives and strategies that all can subscribe to, without losing or abdicating agency authority, responsibility or accountability. *ICS Field Operations Guide ICS 420-1*

6. Incident Command Post (ICP).

a. Establish an ICP as soon as possible:
   1) First arriving unit should set temporary ICP until IC arrives.
   2) Purpose of ICP is to provide a location to execute command functions for the incident.
   3) Locate ICP upwind, upgrade and upstream from the incident scene (when possible).
   4) Watch out for wind shifts (ICP may need to be relocated).

b. **Info from all responders ultimately goes to IC at Incident CP!**
   1) Communicate through channels with IC when:
      a) Mission is accomplished,
      b) You need more resources to accomplish your mission,
      c) There is a "Significant Event" the IC needs to know,
      d) You are requested to give a "Situation Report/Update".
      e) Be succinct and use plain English.

c. ICP is the key location for agency coordination.

7. Agency Coordination at Hazmat Incidents.

a. Typical First Responders.
   1) Fire services (Fire Departments/Districts, CDF, etc.).
   2) Law enforcement agencies (Police, Sheriff, CHP, etc.).
   3) Emergency medical services (Private or government).
   4) Health agencies (County Health, Environmental Health).
   5) Public Works Departments (CalTrans, etc.).
   6) Responsible party.

First Responder Agencies

Fire Municipal fire departments, local special district fire departments (paid or volunteer), county fire departments, California Department of Forestry and Fire Protection, or the U.S. Forest Service. May be responsible for containment of hazardous material releases, and are frequently the best local sources of specialized response capabilities for hazardous material releases. Frequently responsible for decontamination of incident victims. Local plans often designate the fire department as the Incident Commander for hazmat incidents.

Law City police departments may be the Incident Commander for hazardous material incidents occurring on roadways within their jurisdiction. Some cities have contracted with their local sheriff's department for law enforcement and traffic control rather than establish a police department, making that sheriff the Incident Commander in absence of local codes or ordinances to the contrary.

EMS Provide care and/or transportation to the sick and injured, including victims of contamination. (No patient contact should be made without adequate decontamination.)

Health Protect the public and environmental health and often coordinate emergency medical services. Have authority to declare hazardous waste-related "health emergencies" in any area within their jurisdiction if there is an immediate threat to human health.

Public Works May assist in road closures, cleanup, or decontamination.

7. Agency Coordination at Hazmat Incidents. *(continued)*

b. Other Local Hazmat Agencies.
   1) Emergency Services.
   2) County Agriculture.
   3) Air Pollution Control Districts.
   4) Flood Control/Sanitation Districts.
   5) Parks and Recreation Districts.
   6) Port Authorities.
   7) Local agencies are first line of defense for hazmat incidents.

c. Key State Hazmat Agencies.
   1) CHP: Incident Commander (State highways & buildings).
   2) DFG: State trustee for wildlife and their habitat.
   3) OSPR" State IC for oil spills in marine waters.
   4) State OES: Focal point for notification of state agencies.
   5) Other key state agencies: CalFire, CalTrans, Cal EPA.
   6) Most state agencies have support role to local agencies but some may be first responders.

d. Key Federal Hazmat Agencies.
   1) U. S. Environmental Protection Agency (EPA): Federal OSC—Inland Zone.
   2) U. S. Coast Guard (USCG): Federal OSC—Coastal Zone.
      a) Boundaries of Inland & Coastal Zones specified in Regional Contingency Plans.
   3) Other key federal agencies: DOD, DOE, FEMA, DOJ, etc.
      a) DOD is OSC for hazmat releases on DOD facilities or vessels.
      b) DOD is OSC for incidents involving military munitions.
      c) DOE is OSC for incidents on DOE facilities.
   4) Other federal agencies usually have designated support role as specified by National Contingency Plan (NCP).

Federal Jurisdiction 40 CFR 300.120 (NCP)

OSC	The On-Scene Coordinator "directs response efforts and coordinates all other efforts at the scene of a discharge or release."
USCG	"The USCG shall provide OSCs for oil discharges, including discharges from facilities and vessels under the jurisdiction of another federal agency, within or threatening the coastal zone…"
EPA	"EPA shall provide OSCs for discharges or releases into or threatening the inland zone…" *(Note: this includes navigable waters in the inland zone such as Lake Tahoe.)*
DOD & DOE	"DOD or DOE shall provide OSCs…For releases of hazardous substances, pollutants, or contaminants, when the release is on, or the sole source of the release is from, any facility or vessel…under the jurisdiction, custody, or control of [DOD & DOE]…"
Coastal Zone	"…all United States waters subject to the tide, United States waters of the Great Lakes, specified ports and harbors on inland rivers, waters of the contiguous zone, other waters of the high seas subject to the NCP, and the land surface or land substrata, ground waters, and ambient air proximal to those waters."
Inland Zone	"…the environment inland of the coastal zone excluding the Great Lakes and specified ports and harbors on inland rivers."

7. Agency Coordination at Hazmat Incidents. *(continued)*

e. Private Sector Hazmat Resources.

1) Responsible Party.

a) Has financial and legal liability to abate and mitigate the adverse effects of a release.

b) May own the property involved or affected.

c) May have resources you need.

2) Other resources.

a) Industry cooperatives (e.g. CHEMTREC),

b) Local private sector expertise (e.g. chemist),

c) Volunteer agencies (e.g. American Red Cross).

f. Enhancing Agency Coordination and Communication.

1) #1: Use Standardized Emergency Management System (SEMS) and Incident Command System (ICS).

2) Use one Incident Command Post (ICP).

3) Others:

a) Notify all interested parties.

b) Keep IC informed of who shows up.

Duties of Responsible Party

National Contingency Plan (40 CFR 300)

Oil Spills

"…the OSC may allow the responsible party to voluntarily and promptly perform removal actions, provided the OSC determines such actions will ensure an effective and immediate removal of the discharge or mitigation or prevention of a substantial threat of a discharge." 40 CFR 300.305(c)

"Removal is being done properly when: The cleanup is fully sufficient to effectively and immediately remove, minimize, or mitigate threat(s) to public health and welfare and the environment…and the removal efforts are in accordance with applicable regulations including the NCP." 40 CFR 300.320(a)(3)

Hazmat

"A removal site evaluation shall be terminated when the OSC…determines:…A party responsible for the release, or any other person, is providing appropriate response, and on-scene monitoring by the government is not required…" 40 CFR 300.410(f)

State Hazmat Incident Contingency Plan

Definition

The responsible party is the, "…legally recognized entity (person, corporation, business, partnership, etc.) that has a legally recognized status of financial accountability and liability for actions necessary to abate and mitigate adverse impacts to human health and safety and the environment resulting from a non-permitted release or discharge of hazardous materials. The Responsible Party should be consulted in decisions that impact the hazardous material response, and should be given the opportunity to abate the incident using their own resources, as long as it isn't a detriment to the overall operations."

IC

"The Unified Command staff may consist of empowered officials representing each jurisdiction, *as well as the responsible party*…"

ICS General Premise/Basic Overview

System

The Incident Command System (ICS) should be a *customized tool* to help you manage major emergencies or disasters. In its essence, ICS is a predetermined and standardized emergency/disaster *organization and management system.* It is ideally suited for a multi-agency/jurisdictional response to several types of major emergencies/disasters including hazardous material releases, earthquakes, dam failures and floods. ICS is designed to make the most efficient use of multi-agency/jurisdictional resources in order to more effectively combat the effects of a major emergency/disaster. ICS (a management system developed by FIRESCOPE in the 1970s) is a proven tool that can help organize and manage the many agencies and resources that inevitably become involved in a major emergency/disaster.

Coordination

In "normal" day-to-day emergencies, each department and agency has their own organization and system that works quite well for them in that particular situation. However, the problem in a major emergency or disaster is that you have several agencies and departments working the same situation (e.g. hazardous materials incident): each with their own organization and system. Typically all these organizations and systems do not mesh well together, and poor management and coordination is the result. What is needed in a major emergency/disaster, is one common and predetermined single organization and management system that is acceptable to the agencies involved. In many jurisdictions in California, the Incident Command System has been used as that common, predetermined and agreed upon organization and management system.

ICS General Premise/Basic Overview *(cont.)*

Premise

ICS is based on simplicity, flexibility and sound management practices as applied to an emergency/disaster. ICS operates under the premise that authority will not be compromised, but rather united. Assisting agencies and jurisdictions function within their capacity in a compatible ICS position, under the general direction and coordination of a jurisdictional agency having Incident Commander (IC) authority.

The combining of forces and resources requires cooperation, flexibility and some compromise on the part of all concerned. ICS also requires the same. ICS works if there is a mutual understanding and agreement by the participating agencies of *ICS basic incident operating procedures, common terminology and structural organization.* The following areas provide a continuation of a basic overview of ICS.

Incident Operating Procedures

Introduction

ICS begins with the first response unit on scene and continues until management of incident operations is no longer needed.

Basics

Essentially, emergency responders want to know four basics that ICS addresses:

- Who's in charge?
- What's my basic role, responsibility and specific task?
- Where do I fit in to the overall organization?
- Whom do I report to?

Incident Operating Procedures *(continued)*

Authority Every emergency requires a jurisdictional agency assuming Incident Commander (IC) authority in either a single or unified command structure.

Positions "Position Descriptions" developed for each ICS position (along with vests) provide easy expansion of the system, *and* act as a "mind jogger" to identify the position's basic role, responsibility and specific tasks to be accomplished.

Organization An ICS organization chart, attached to Position Descriptions, shows where a specific position fits into overall organization and to whom it reports.

Command In an emergency response, the activation of the Incident Command Post is *mandatory (*as a central location for multi-agency/jurisdictional contact, communications and coordination) for key agency representatives to report to. They may possibly fill the following major ICS sections: IC/Command, Plans/Intelligence, Logistics, Finance/Administration and Operations.

Procedures

- All other units may report to the Staging Area/Manager to hold until assigned.
- Upon arrival at the Incident Command Post, assisting agencies check in, are assigned an ICS position (with description), and given a mission.
- Position Leader will then organize and brief "Teams/Units" as needed, execute mission and supervise tactical/unit operations.

Incident Operating Procedures *(continued)*

Procedures

•Communications back to primary position should be confined to essential messages (including reporting significant events, situation status summaries, resource shortfalls/requests and when the mission is accomplished).
•Position Leader to maintain unit log (including times of operation, significant events, equipment used, names of personnel in team/unit).
•When ordered by IC, all incident operations will be secured and response agency personnel will be demobilized via formal termination procedures.

Common Terminology

Introduction

In ICS, as with any organization with different disciplines working together, common terminology is essential for:

- Positions Titles
- Facilities
- Resources
- Inter-Agency Communications

Titles

Terminology for ICS Position titles is predetermined, standardized and consistent with the agreed upon ICS Organization Chart.
When assigned ICS Position title, agency personnel hold *Position* title (e.g. Law Branch Director) rather than agency title (e.g. Sergeant) during a response.

Facilities

Common identifiers for facilities in and around the incident area are used, such as:

Common Terminology *(continued)*

Facilities

• EOC: Facility activated only for disaster response as a central location for multi-agency/jurisdiction, management, communications and coordination.
• Unified/Joint Command Post: Multi-agency contact point for a field emergency for management, communications and coordination.
• Staging Area: Location for personnel and equipment to temporarily hold until directed to release to a given assignment and/or mission.
• Camp: Location equipped and staffed to provide food, water and sanitation services to incident personnel.

Resources

The Fire Services have categorized their resources into the following categories:

• Single Resources: Individual agency unit.
• Strike Team: Specified combination of same kind and type units with common communications and leader.
• Task Force: A group of resources with common communications and leader temporarily assembled for a specific mission.

Agency resources can be identified as being in 1 of 3 status conditions: Assigned, Available and Out of Service.

Resource Lists should list all potential public/private resources that may be called upon to assist in an emergency/disaster.

Communications

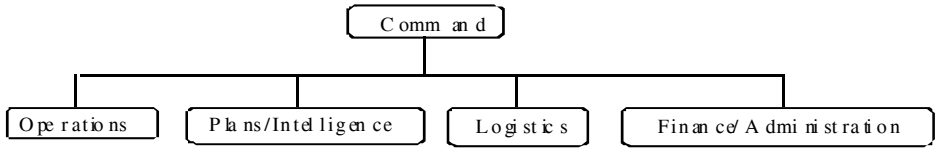
Responders should avoid codes, agency vernacular or other potential sources of confusion and use "Clear Text" (plain English) for multi-agency/discipline communications.

Structural Organization

Introduction ICS is an evolving structure, from simple to complex, based on management needs of the emergency/disaster and the Incident Commander's span of control.

Structure The ICS organization is made up of positions or modules activated by the IC. Activated positions are filled by a leader and "Teams" from assisting response agency personnel — within their capabilities and training. A Hazmat response may have from 2 to 50+ positions.

Organization A predetermined organization chart identifies positions by title. This ICS organization chart maintains clear lines of authority. It maintains a manageable span of control by using five major Sections: Command, Operations, Planning/Intelligence, Logistics and Finance/Administration.



Structural Organization *(continued)*

Expansion The actual organization structure builds from the top down with responsibility and performance initially placed with the Incident Commander. As management needs of the emergency are identified, the Incident Commander may activate any of the other major sections, branches or individual positions *as needed*. Further, each major section or branch may activate positions within their section or branch if needed. If one individual can simultaneously manage all positions within his/her responsibility, no further position activation is needed. If subordinate positions haven't been assigned, the primary position retains responsibility and performance for the subordinate position. Remember, the organizational structure is designed to help, not hinder. Activate positions only when necessary to accomplish the job. *Don't fill positions just to serve the system!*

Bottom Line The organizational structure must be predetermined, accepted, planned for and trained upon!

Incident Command Post

Introduction One of the most effective methods for enhancing communications and coordination at the scene of a multi-agency incident is the use of what was known as a "Joint/Unified" Command Post. This CP is known as the "Incident Command Post".

Purpose A Incident CP provides for better management, coordination, communication and control of a multi-agency response.

Participant Worksheet

1. Who would be in charge of a hazmat incident where you work?

2. What agencies will likely be involved in a hazmat incident where you work?

3. What is your employer's policy about talking to the press?

4. What federal agency is the OSC where you work?

Block F

IDHA and Action Plans: (I.A.)

Main Points

- Identification and Hazard Assessment Process
- Hazard Identification Sources
- Hazard Assessment Sources
- Emergency Response Guidebook
- Container System Stress and Behavior
- Assessing Hazards
- Is The Material Toxic
- How Will the Material Behave
- Managing Risk
- Action Planning

Block Outline

1. Identification and Hazard Assessment Process.

a. The most critical aspects of a hazardous materials response is "Identification and Hazard Assessment" (IDHA).
   1) All further decisions flow from this.
   2) OSHA regs require the IC to do IDHA ("identify… all hazardous substances or conditions present…").
   3) Can't protect yourself from a problem if you can't identify ***and*** assess the problem!

b. Hazard assessment starts immediately.
   1) Starts with initial discovery/notification.
   2) Use recognition clues and common sense.
   3) Caution: Initial reports may not be accurate or complete.

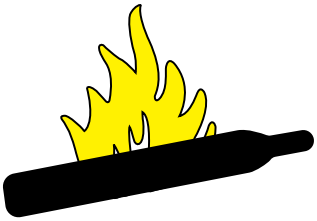
c. The basic FRO IDHA process:
   1) Identify material(s) involved,
   2) Consult ERG and/or MSDS,
   3) Do what it says and follow your employer's policies.

d. Basic IDHA questions.
   1) Will something bad happen *right now*?
      a) Is it on fire?
      b) Can it explode or burn?
      c) Is it a gas or vapor that can come after me?
   2) If something bad happens, will it hurt *me*?
      a) Is it toxic?
      b) Is it flammable?
      c) Is it corrosive?
      d) Is it radioactive?

Will it Burn or Blow Up ***Right Now***?

"Explosive" placard visible?

Gas cylinder under stress?



Polymerization hazard? **"POL" "130P"**

Visible gas or vapor?

Bottom line:

Will this happen?

2. Hazard Identification Sources.

a. MSDS (Material Safety Data Sheet).

1) Required by OSHA Hazard Communication Regulation.

a) 29 CFR 1910.1200

b) Title 8 CCR §5194

2) Required in the "workplace" *(not just fixed facilities).*

3) Informs employees of "hazardous chemicals" present.

4) Purpose: ensure that the hazards of all chemicals are:

a) Evaluated and that,

b) Information is transmitted to employees.

5) Methods of transmitting information.

a) Comprehensive hazard communication programs,

b) Container labeling and other forms of warning,

c) Material safety data sheets and,

d) Employee training.

6) Does not apply to:

a) Pesticides (covered by a separate regulation),

b) Any food, food additive, color additive, drug, cosmetic, or medical or veterinary device or product,

c) Any distilled spirits (alcoholic beverages), wine, or malt beverage intended for non-industrial use**,**

d) Consumer products,

e) Hazardous waste (including those at waste sites),

f) Tobacco and tobacco products,

g) Wood and wood products,

h) Drugs (legal ones!),

i) Radiation,

j) Biological hazards.

Hazard Communication (Hazcom).

Who "This section requires chemical manufacturers or importers to assess the hazards of chemicals which they produce or import, and ***all employers to provide information to their employees*** about the hazardous chemicals to which they are exposed, by means of a hazard communication program, labels and other forms of warning, material safety data sheets, and information and training." 29 CFR 1910.1200(b)(1)

What "This section applies to ***any chemical which is known to be present in the workplace*** in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency." 29 CFR 1910.1200(b)(2)

When & Where "Employers shall maintain copies of any material safety data sheets that are received with incoming shipments…and shall ensure that the material safety data sheets are readily accessible ***during each work shift*** to employees when they are ***in their work area(s)***…" 29 CFR 1910.1200(b)(4)(ii)

Training & Info "Employers shall ensure that employees are provided with information and training in accordance with paragraph (h) of this section…to protect them in the event of a spill or leak of a hazardous chemical from a sealed container." 29 CFR 1910.1200(b)(4)(iii)

2. Hazard Identification Sources. *(continued)*

b. Placards and labels (e.g. colors and symbols).
   1) Stenciled railcars.
   2) ID # on placards and orange panels.

c. Shipping papers (e.g. Bill of Lading, Way Bill, etc.).

d. Pipeline markers (product, owner & emergency number).

e. Three information sources *preferred minimum* for IDHA.

3. Hazard Assessment Sources.

a. Reference guides (e.g. DOT Emergency Response Guidebook).
   1) More on this later.

b. NFPA 704 warning system:
   1) Blue = Health.
   2) Red = Flammability.
   3) Yellow = Reactivity.
   4) No Color = Special Hazard Information.
   5) 0-4 hazard rating scale.

c. Pesticide and consumer product labeling
   1) "Danger"—highest hazard.
   2) "Warning"—moderate hazard.
   3) "Caution"—lowest hazard.

Signal Words.

16 CFR 1500 (Consumer Product Safety Commission)

Background "(a)(1) Background and scope. Section 2(p)(1) of the Federal Hazardous Substances Act (FHSA) or "the Act"), 15 U.S.C. 1261(p)(1), requires that hazardous substances bear certain cautionary statements on their labels. These statements include: signal words; affirmative statements of the principal hazard(s) associated with a hazardous substance; the common or usual name, or chemical name, of the hazardous substance; the name and place of business of the manufacturer, packer, distributor, or seller; statements of precautionary measures to follow; instructions, when appropriate, for special handling and storage; the statement "Keep Out of the Reach of Children" or its practical equivalent; and, when appropriate, first-aid instructions. Section 2(p)(2) of the Act specifies that all such statements shall be located prominently on the label of such a substance and shall appear in conspicuous and legible type in contrast…with other printed matter on the label."

15 USC §1261(p)(1)

"DANGER" Substances that are extremely flammable, corrosive, or highly toxic.

"WARNING" *"CAUTION"* On all other hazardous substances.

"POISON" Any hazardous substance that is defined as "highly toxic".

3. Hazard Assessment Sources. *(continued)*

d. CHEMTREC – Chemical Transportation Emergency Center.

1) 24 hour technical information center.

2) *One person* call 1 (800) 424-9300 (stay on phone).

3) Information CHEMTREC will want:

a) Name of caller and call back number,

b) Name of product, nature and location of problem,

c) Shipper or manufacturer, carrier and consignee name,

d) Container type and local conditions.

4) Limited primarily to MSDS-type info. Will notify shipper, NRC and other industry Mutual Aid teams (e.g. CHLOREP).

e. Other IDHA assessment sources.

1) MSDS.

a) Contains IDHA info such as physical properties, physical & health hazards, PPE required, signs & symptoms of exposure, exposure limits and first aid procedures.

2) Pesticide labels.

a) In addition to signal words they will have info on active ingredients, PPE required and first aid procedures.

3) NIOSH Pocket Guide to Chemical Hazards.

a) Contains chemical names, synonyms, trade names, exposure limits, chemical & physical properties, PPE recommendations, and information on health hazards including route(s) of entry, symptoms, first aid and target organ information.

CHEMTREC Emergency Checklist.

Intro

CHEMTREC has been helping First Responders handle hazmat emergencies for more than 33 years. CHEMTREC can provide valuable information and guidance even when limited information is available about the product or incident. However, the more information available when you call, the faster and better they can help you.

Info Needed

Types of information CHEMTREC Emergency Service Specialists will request when you call:
Caller's name, title & organization
Callback number at scene
Dispatch-center phone number
Description of incident and actions taken
Type and number of injuries/exposures
Material involved, including:
Name of the products(s), preferably a trade name
Carrier and trailer or car number - UN, NA (placard) or STCC number of the products
Shipper and point of destination
Consignee and destination
Type or description and number of containers/packages
Specific information you need right away (MSDSs, medical help, contact with manufacturer, etc.)
Size of or amount of release
Location, time, weather at the scene

Contacts

Phone: 800-424-9300 URL: www.chemtrec.org

4. DOT Emergency Response Guidebook (ERG).

a. ERG purpose: *Basic* safety tool for *basic* identification, *basic* assessment and *initial* response (recognized good practice/standard for FROs to follow).
   1) Use the current version of ERG for transportation-related hazmat incidents!
   2) Use current MSDS if available for other incidents.

b. ERG page border colors and basic organization:
   1) **White** - Basic information and instructions (+Placard Table),
   2) **Yellow** – ID number index (materials listed by ID number),
   3) **Blue** - Material name index (materials listed alphabetically),
   4) **Orange** – Numbered guide pages,
   5) **Green** - Initial Isolation & Protective Actions/Water Reactives.

c. ERG is a good user-friendly basic guide *but is limited:*
   1) Classifies by major hazard class or general chemical family.
   2) *Guides are general guidance with specific recommendations for some hazards.*
      a) Guide 111.
      b) "P" – Polymerization hazard.
      c) List of Dangerous Water–Reactive Materials.
   3) Isolation and evacuation distances in back of book are guides.
   4) Use table of placards only if materials cannot be identified.
   5) Intended for use in transportation-related incidents.
   6) Intended only for use in "initial response phase".

d. Responders should have ready access to an ERG and other guides, and *must know how to efficiently and effectively use it.*

Emergency Response Guidebook Exercise.

ID Number

Use the ERG to identify the material associated with this ID number and find the proper Guide page for this material.

ID #	Name	Guide #	Major Hazard
3065			
1365			
1654			
1327			
2794			
1356			

Material Name

Use the ERG to find the proper Guide page for this material.

Name	Guide #
Ammonia, Anhydrous	
Butyl Acrylate	
Chlorine	
Hafnium Powder	
Aluminum Phosphide Pesticide	
Sarin	

5. Container System Stress and Behavior.

a. Hazmats are released when their containment system fails.
   1) Container failure can be minor (e.g. leaking can of paint thinner) or catastrophic (e.g. BLEVE).
   2) Nature of failure determines immediate potential harm.
      a) Kingman BLEVE versus Tokyo Sarin release.

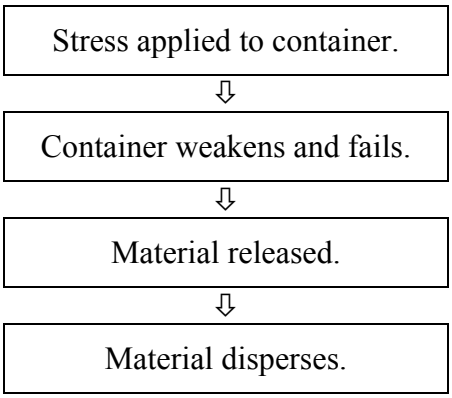
b. Hazmat release process.
   1) Stress on container.
   2) Container weakens and fails.
   3) Material released.
   4) Material disperses.
   5) ***Hazard to you depends on what step the process is on when you arrive!***

c. Types of container stress. (Can occur individually, in combination or in sequence.)
   1) Thermal (hot or cold).
   2) Mechanical.
   3) Chemical.

d. Evaluating container stress. (If something bad *might* happen, how much time do I have before it *does* happen?)
   1) What type of stress is the container subjected to?
   2) What will the container likely do? (BLEVE?)
   3) When will it likely do it?

Evaluating Container Stress.

Steps Container failure process.



Hierarchy Evaluating risk from container stresses.

Situation	**Risk to Responders**
Damaged pressurized container with flame impingement, Pressure relief valve is operating.	Immediately Dangerous
Pressurized container with flame impingement.	Immediately Dangerous
Damaged pressurized container.	Dangerous
Pressurized containers that have been stressed but not visibly damaged.	Cause for Concern
Any container exposed to temperature extremes (hot *or* cold).	Cause for Concern
Any container exposed to any other form of stress.	Cause for Concern

6. Assessing Hazards.

a. If the container fails what will the material do to you?
   1) Will it explode?
   2) Will it burn?
   3) Will it hurt you some other way (i.e. toxic)?

b. How can you tell?
   1) What are the properties of the material?
   2) Sources of toxicological info for FROs.
      a) Material Safety Data Sheets (MSDS).
      b) NIOSH Pocket Guide.
      c) CHEMTREC.

c. What properties tell us it will explode or burn?
   1) BP - Boiling Point.
      a) Will the material be a solid, liquid or gas?
      b) Only gases and vapors burn!
   2) FP - Flash Point.
      a) At what temperature will the material flash?
   3) IT - Ignition Temperature.
      a) At what temperature will the material burn?
   4) FR - Flammable Range (also referred to as UEL and LEL - Upper Explosive and Lower Explosive Limit).
      a) At what concentration will the material burn?
      b) If the concentration of the material is within the flammable range the material could easily burn.

When Will It Burn Or Explode?

BP If the boiling point of a material is less than or near the ambient air temperature then the material will be more likely to produce vapors. If the boiling point is well below the ambient air temperature then the material may be a gas. ***Remember: liquids don't burn, gases and vapors do!***

FP If the flash point of a material is less than or near the ambient air temperature then the material could easily begin to burn (if there is a source of ignition). The higher the flash point the less likely the material will burn.

IT If the ignition temperature of a material is less than or near the ambient air temperature then the material could easily begin to burn (if there is a source of ignition) and continue to burn.

FR Flammable range is expressed as a per cent. It tells you how much of the material must be in the air for it to burn. If the lower explosive limit (LEL) is a low number (i.e. single digits) then it is more flammable than a material with a higher LEL. If the concentration of the material is less than the LEL then it won't burn in a normal atmosphere (but it may burn in an atmosphere that is oxygen-enriched). If the concentration is above the upper explosive limit (UEL) then it won't burn (unless you open the door to the room and let in some fresh air).

6. Assessing Hazards. *(continued)*

d. Will the material be a solid, liquid or gas?
   1) Vapor pressure.
   2) Boiling point.
   3) Freezing/melting point.

e. Will the material float or sink?
   1) VD - Vapor Density (in air).
   2) SG - Specific Gravity (in water).

f. Will the material dissolve in water?
   1) Sol – Solubility.

g. Will the material be acidic, basic or neutral?
   1) pH - Acidity/Alkalinity.

h. Many variables will affect hazard assessment and may significantly influence the behavior of the material.
   1) Many properties will vary with temperature. Time/date will affect evaporation rate and potential for flammability or reactivity (liquids evaporate faster on hot days/during the day, slower on cold days/at night). High temperatures generally make things worse.
   2) Location will determine how material will disperse and where it will go (liquids and most vapors will go downhill),
   3) Weather will affect how material will disperse and where it will go (gases and vapors usually travel downwind),
   4) The same material with different variables may significantly change the incident and the way you respond to it. You may not find the answer in a book—use your head!

Physical & Chemical Property Terms.

BP Boiling Point. Temperature at which a liquid will boil and become a gas or vapor. (Hint: Compare BP with air temp.)

FP Flash Point. Lowest temperature at which vapors will ignite in air when exposed to a flame. (Hint: Compare FP with air temp.)

IT Ignition Temperature. Minimum temperature at which the material will ignite without a spark or flame being present. (Hint: Compare the ignition temperature with the air temperature.)

FR/FL Flammable Range and Flammable Limit. Range of concentration of a flammable gas or vapor at which fire or explosion can occur upon ignition. (Hint: A wider range indicates a greater hazard.)

Sol Solubility. Amount of a material that will dissolve in water. (Hint: Will this material mix with or dissolve in water?)

SG Specific Gravity. Ratio of weight of material to weight of an equal volume of water. Greater than 1, it sinks. Less than 1, it floats. (Hint: Oil: less than 1. Pesticides: greater than 1.)

VD Vapor Density. Ratio of weight of a vapor or gas to weight of an equal volume of dry air at the *same* temperature and pressure. VD less than 1: vapors tend to rise. VD greater than 1: vapors tend to sink. (Hint: Most petroleum vapors sink?)

VP Vapor Pressure. Pressure exerted by vapor that is in equilibrium with the liquid at a specified temperature. The pressure over a liquid that is confined in a closed container. (Hint: VP varies greatly with temperature.)

pH Acidity/Alkalinity. Measure of the degree of acidity or alkalinity. pH of less than 7: acid. pH of greater than 7: alkaline substance. (Hint: Get advice from competent sources. Reactions with other materials can vary greatly.)

7. Is The Material Toxic?

a. Toxicology: The study of adverse systemic effects of chemicals.
   1) Not just the study of poisons. ***Many substances can be toxic even thought they aren't classified as poisons!***

b. Poison: Chemical that produces illness or death when taken in very small quantities (DOT: LD_{50} < 50 mg per kg of body weight):
   1) "Poison Gas 2" placard: Gas (compressed or liquid),
   2) "Poison 6.1" placard: Liquid or solid,
   3) "Poison 6.2" placard: Infectious substance or etiological agent.

c. Toxicology has limits — Tests usually on animals (rats, guinea pigs, etc.), and there are often wide variations of health effects between animals and humans.

d. Importance of Toxicology.
   1) Related to ***your*** life and health!
   2) Exposure can cause deaths and injuries. *You and other responders must consider short and long term health effects!*

e. Assessing toxicity.
   1) Measures of toxicity.
      a) There are many.
      b) More on this later.
   2) Sources of information on toxicity.
      a) NIOSH Pocket Guide.
      b) Material Safety Data Sheets (MSDS).

Minimizing Toxic Exposure in a Response.

The Law "The individual in charge of the ICS shall limit the number of emergency response personnel at the emergency site, in those areas of potential or actual exposure to incident or site hazards, to those who are actively performing emergency operations." 29 CFR 1910.120(q)(3)(v), Title 8 CCR 5192(q)(3)(E)

Inhalation
Approach the scene from upwind.
Establish control zones.
Require all entry teams to wear SCBAs.
Evaluate potential vapor/gas dispersion.
Consider the possibility of wind shifts.
Decontaminate all exposed personnel and equipment.

Absorption
Require all entry teams to wear proper PPE.
Isolate all sources of potential exposure.
Decontaminate all exposed personnel and equipment.

Ingestion
Forbid eating, drinking and smoking until decon is complete.
Require all responders to thoroughly wash hands, face and hair.
Decontaminate all exposed personnel and equipment.

Injection
Require all responders to wear proper PPE and basic safety equipment (hardhats, steel-toed shoes, gloves, etc.)
Evaluate hazards of debris, wreckage, etc.

7. Is The Material Toxic? *(continued)*

f. Tools for determining relative toxicity and selecting appropriate levels of PPE. Many measure occupational (chronic) exposures and may not apply to emergency (acute) response exposures.

1) IDLH — Immediately Dangerous to Life and Health,
2) TLV™ — Threshold Limit Value (guides),
   a) TLV™-TWA
   b) TLV™-STEL
   c) TLV™-C
3) STEL — Short Term Exposure Limit,
4) PEL — Permissible Exposure Limit (OSHA regulation),
5) MLD — Minimum Lethal Dose,
6) LD/LC_{50} — Lethal Dose/Lethal Concentration 50%,
7) LD_{lo} — Lethal Dose, low,
8) PPM/MgM^3 — Parts Per Million/Milligrams Per Cubic Meter,
9) ERPG — Emergency Response Planning Guide.

g. Dose-Response Relationship.

1) Effect produced depends on the dose you receive.
2) As dose increases, severity of toxic response increases.
   a) Humans exposed to 100 ppm of tetrachloroethylene, a solvent that is commonly used for dry-cleaning fabrics, may experience relatively mild symptoms, such as headache and drowsiness.
   b) Exposure to 200 ppm tetrachloroethylene can result in a loss of motor coordination in some individuals.
   c) Exposure to 1,500 ppm tetrachloroethylene for 30 minutes may result in a loss of consciousness.
3) Severity of toxic effect also depends on duration of exposure.

The "Law" (Permissible Exposure Limit—PEL).

The Limit "An employee's exposure to any substance listed in Tables Z-1, Z-2, or Z-3 of this section shall be limited in accordance with the requirements of the following paragraphs of this section." 29 CFR 1910.1000

Table Z-1 Limits for Air Contaminants. The exposure limit shall at no time exceed the exposure limit given for that substance, or an exposure to any substance in Table Z-1 shall not exceed the 8-hour Time Weighted Average given for that substance in any 8-hour work shift of a 40-hour work week. 29 CFR 1910.1000(a)(1)-(2)

Table Z-2 Toxic and Hazardous Substances. An exposure to any substance listed in Table Z-2, in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time weighted average limit given or, an exposure shall not exceed at any time during an 8-hour shift the acceptable ceiling concentration limit. 29 CFR 1910.1000(b)(1)-(2)

Table Z-3 Mineral Dusts. An exposure to any substance listed in Table Z-3, in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time-weighted average limit given for that substance. 29 CFR 1910.1000(c).

7. Is The Material Toxic? *(continued)*

h. Routes of entry and avoiding exposure.

1) Inhalation—Breathing vapors, fumes, gases, etc.

a) Isolate and deny entry.

b) Wear SCBAs.

c) Just stay away!

2) Ingestion—Eating it.

a) Isolate and deny entry.

b) Don't eat, smoke or drink near the scene.

c) You have a natural ability to resist ingestion exposures (i.e. barfing).

3) Absorption—Soaks through your skin.

a) Isolate and deny entry.

b) Wear proper PPE.

c) May absorb hazmats through skin, eyes or wounds.

4) Injection/Physical Contact—Puncture wound.

a) Isolate and deny entry.

b) Wear proper PPE (e.g. steel toed shoes).

c) Ways this can occur: _____

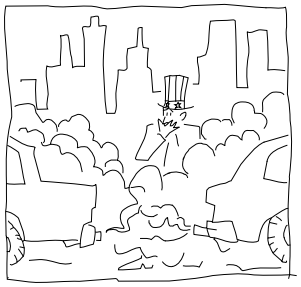
5) **Remember**: many toxic vapors lack color, odor and taste.

a) You may get exposed before you even know it.
"If you think it is burning, it already is!", *Martin Yan*.

b) Exposure occurs from approaching downwind, from windshifts or not wearing protective clothing and SCBAs, etc.

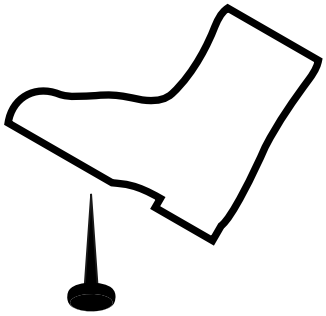
Routes of Entry.

Inhalation



Ingestion

Injection



Absorption

7. Is The Material Toxic? *(continued)*

i. Acute vs. Chronic.

1) Acute — One time, limited or short term exposure.

a) Acute effects may not manifest themselves immediately. Many substances will cause problems that won't show up for hours or even days after exposure.

2) Chronic — Continuous, repeated or long term exposure.

a) Chronic effects: Often not detectable for years—could cause death, injury, birth defects or illness.

j. Toxicology variables—Reactions to exposure may depend on:

1) Kind/type of Hazardous Material,

2) Route of exposure,

3) Dose (concentration) received,

4) Duration and frequency of exposure,

5) Personal tolerances and variable sensitivities.

a) Age, medical history, gender, general state of health, personal habits, medications taken, etc.

Acute vs. Chronic—Not as Simple as it Seems…

Differences Responders should keep in mind the great differences between the effects of acute exposures and chronic exposures. *The two may bear no relationship whatsoever.*

Endpoints For example, the target organ for a chronic exposure to carbon tetrachloride is the liver while acute exposures can cause damage to the central nervous system.

Dose Some substances may be acutely toxic but chronically essential. Vitamin D is a highly toxic material with the same LD_{50} as Parathion yet humans require minute amounts of Vitamin D regularly for good health.

Route of Entry Other substances such as mercury have effects that vary greatly with the route of entry. If ingested, the body will easily eliminate a large, one time dose with little noticeable ill effects. Inhaling fumes from the same amount of mercury each day for a long period can cause severe health effects.

Source *The Dose Makes the Poison,* M. Alice Ottoboni, Ph.D.

8. How Will the Material Behave?

a. Many variables will affect hazard assessment and may significantly influence the behavior of the material.

1) Location will determine how material will disperse and what it will affect.

a) Liquids and most vapors usually go downhill.

b) Buildings can trap contaminants and cause unpredictable shifts in wind direction and speed.

2) Time/date will affect evaporation rate and potential for flammability or reactivity (liquids evaporate faster on hot days/during the day, slower on cold days/at night),

3) Weather will affect how material will disperse and where it will go (and where it will end up).

a) Gases and vapors usually travel downwind.

b) Vapor clouds may take longer to disperse in cold temperatures.

4) Nature of materials (Bad stuff? How bad?).

a) See paragraph 6.

5) Type of release.

a) Small, slow leak or large leak or instantaneous release.

6) Size of problem (Bad stuff? How much?).

7) Type, condition, nature and behavior of container.

a) See paragraph 5.

b. The same material with different variables may significantly change the incident and the way you respond to it.

c. You may not find the answer in a book—use your head!

IDHA Complications.

Wind Very low wind speeds can make it difficult to predict where and how far a vapor or gas will spread. Generally, wind direction is least predictable and most variable when wind speed is low.

Stability Atmospheric stability determines how quickly a vapor or gas cloud will disperse. Under the most stable atmospheric conditions, there is usually very little wind and almost no mixing of the pollutant cloud with the surrounding air. Gas concentrations within the cloud can remain high far from the source. The cloud spreads slowly, and high gas concentrations may build up in valleys or depressions and remain for long periods of time, even at distances far from the release point.

Terrain The wind typically shifts speed and direction as it flows up or down slopes, between hills or down into valleys, turning where terrain features turn. In urban areas, wind flowing around large buildings forms eddies and changes direction and speed, significantly altering a cloud's shape and movement. Through streets bordered by large buildings can generate a "street canyon" wind pattern that constrains and funnels a dispersing cloud.

Fires/Reactions The smoke from a fire, because it has been heated, rises before it moves downwind carrying contaminants with it. In addition, many chemicals react with dry or humid air, water, other chemicals, or even themselves. Because of these chemical reactions, the chemical that disperses downwind might be very different from the chemical that originally escaped from containment. In some cases, this difference may be substantial enough to make computer dispersion predictions inaccurate.

9. Managing Risk.

a. The IDHA process will help answer the following questions:
   1) What will this stuff do?
   2) Where will it go?
   3) Who will it hurt?

b. Answering above will help answer the basic IDHA questions:
   1) Will something bad happen *right now*?
   2) If something bad happens, will it hurt *me*?

c. If something bad can happen how do we manage that risk?

d. Risk management process.
   1) ID the hazards.
   2) Assess the risks.
   3) ID your options.
   4) Evaluate risk versus gain.
   5) Monitor and reevaluate the situation.

e. Assessing risks.
   1) What is the potential severity?
   2) What is the probability it will happen?
   3) What is the potential exposure?

Sources of Information for Hazard Assessment.

Sources Identification and Assessment Sources

- Material Safety Data Sheets (MSDS)
- Shipping Papers
- Technical Information Centers
- Computer Databases
- Hazmat Technicians and Specialists
- Placards and Labels
- Reference Guides and Books
- NFPA 704 System
- Responsible Party
- Pipeline Markers
- Others?

Important Use at least 3 sources for IDHA!

ERG Emergency Response Guidebook is a basic tool. All First Responders and Incident Commanders should keep a copy in their vehicles and use it.

CHEMTREC CHEMTREC operates a 24-hour Technical Information Center and can transmit data to First Responders via fax. Have one person call them at (800) 424-9300.

9. Managing Risk. *(continued)*

f. Rating risks.

1) Low, Moderate, High or Unacceptable.

2) Related to amount of material involved, physical state of material, container stress, properties of material and potential exposures (i.e. people, environment and/or property).

3) Low risks.

a) Small quantities.

b) Inert solid materials.

c) Undamaged container.

4) Moderate risks.

a) Smaller quantities.

b) Low vapor-pressure liquid materials.

c) Undamaged or slightly damaged container.

5) High risks.

a) Larger quantities or multiple containers.

b) Moderate vapor-pressure liquid materials or gases.

c) Slightly or moderately damaged container.

6) Unacceptable risks.

a) Larger quantities and/or gas cylinders involved.

b) High vapor-pressure liquids, gases, explosives and/or reactive materials.

c) Visibly stressed container and/or flame impingement on a gas cylinder.

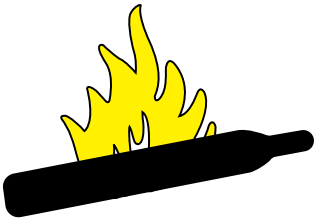
d) An unacceptable risk where I work is:

_____

Unacceptable Risks.

"Explosive" placard visible?

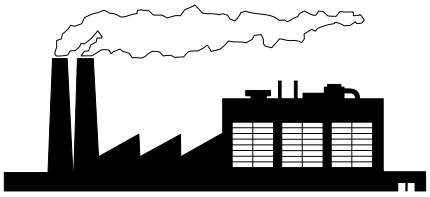
Gas cylinder under stress?



Polymerization hazard? **"POL" "130P"**

Visible gas or vapor?

Large quantity?



10. Action Planning.

a. After identifying and assessing hazards FROs should develop (informal) objectives and (unwritten) plans prior to taking action.
   1) As incident progresses responders may develop a written Incident Action Plan (IAP).
   2) IAP will usually include a Site Safety Plan (ICS HM208).
   2) FROs should know and follow IAP and Site Safety Plan.

b. Components of action planning.
   1) Identify the problem,
   2) Assess the problem,
   3) Identify the resources available,
   4) Use available resources to solve the problem.

c. Sources of FRO objectives and action plans.
   1) ERG guides.
   2) MSDS recommendations.
   3) Employer standard operating guides.

d. Basic FRO actions.
   1) All incidents: isolate and deny entry.
   2) Acceptable risk present: containment and protective actions.
   3) Unacceptable risk present: isolate and deny entry ***only***.

Action Planning—What OSHA Says…

Appendix C to 1910.120 - Compliance guidelines

6. Incident Command System.

FRO "The first responding senior officer would implement and take command of the ICS. That person would size-up the incident and determine if additional personnel and apparatus were necessary; would determine what actions to take to control the leak; and determine the proper level of personal protective equipment." *(In other words, the first responder will develop an action plan.)*

7. Site Safety and Control Plans.

Plans "The safety and security of response personnel and others in the area of an emergency response incident site should be of primary concern to the incident commander. The use of a site safety and control plan could greatly assist those in charge of assuring the safety and health of employees on the site."

Plan Contents "A comprehensive site safety and control plan should include the following: summary analysis of hazards on the site and a risk analysis of those hazards; site map or sketch; site work zones (clean zone, transition or decontamination zone, work or hot zone); use of the buddy system; site communications; command post or command center; standard operating procedures and safe work practices; medical assistance and triage area; hazard monitoring plan (air contaminate monitoring, etc.); decontamination procedures and area; and other relevant areas. This plan should be a part of the employer's emergency response plan or an extension of it to the specific site."

Hazardous Material IDHA Sheet (Sample).

Material Identification

Name: _____ ID #: _____

Hazard Class: _____ NFPA Ratings: _____

Common Names: _____

Physical Description

Physical State: _____ Color: _____

Odor: _____ Other: _____

Properties

Boiling Point: _____ Melting Point: _____

Vapor Pressure: _____ Vapor Density: _____

Solubility: _____ Specific Gravity: _____

Health Hazards

IDLH: _____ STEL: _____

TLV/TWA: _____ LD50/LC50: _____

Other hazards: _____

Fire Hazards

Flash Point: _____ Ignition Temp: _____

UEL: _____ LEL: _____

Products of combustion: _____

Reactivity Hazards

Water: _____ Organics: _____

Others: _____

Other Hazards

Radioactivity: _____ Explosive: _____

Shock Sensitive: _____ Bio Hazard: _____

Modifying Conditions

Modifiers: _____

Risk vs. Gain _____

Behavior/Outcome

_____

Sources of Info

1. _____ 2. _____ 3. _____

NFPA 704 Warning System.

Background The Standard System for the identification of the fire hazards of materials was first adopted by the NFPA in 1961. The purpose of the standard is to safeguard the lives of those individuals who may be concerned with fires or emergencies occurring in an industrial plant or storage location where the hazards of materials on-site may not be readily apparent.

Applicability Applies to facilities that manufacture, store or use hazardous materials.

Purpose Provides a simple system of readily recognizable and easily understood markings which will give, at a glance, the general idea of the inherent hazards of any hazardous material.

Components Identifies the hazards of a material in terms of three principle categories: Health, Flammability and Reactivity.

Indicates order of severity numerically by five divisions ranging from four (4), indicating a severe hazard, to zero (0), indicating no special hazard.

Presents information by a standard pattern of shapes and colors. Health (blue), left; Flammability (red), top; Reactivity (yellow), right.

The bottom space indicates unusual hazards such as reactivity with water, oxidizing properties or radioactivity.

Health Hazard – Blue.

Signal	Type of Possible Injury
4	Materials which on very short exposure could cause death or major residual injury even though prompt medical treatment was given.
3	Materials which on short exposure could cause serious temporary or residual injury even though prompt medical treatment was given.
2	Materials which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given.
1	Materials which on exposure would cause irritation but only minor residual injury even if no treatment is given.
0	Materials which on exposure under fire conditions would offer no hazard beyond that of ordinary combustible material.

Flammability – Red.

Signal	Type of Possible Injury
4	Materials which will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or which are readily dispersed in air and which will burn readily.
3	Liquids or solids that can be ignited under almost all ambient temperature conditions.
2	Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.
1	Materials that must be preheated before ignition can occur.
0	Materials that will not burn.

Reactivity – Yellow.

Signal	Type of Possible Injury
4	Materials which are readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.
3	Materials which are capable of detonation or explosive reaction but require a strong initiating source or which must be heated under confinement before initiating or which react explosively with water.
2	Materials which are normally unstable and readily undergo violent chemical change but do not detonate. Also, materials which may react violently with water or which may form potentially explosive mixtures with water.
1	Materials which are normally stable but which can become unstable at elevated temperatures and pressures or which may react with water with some release of energy but not violently.
0	Materials which are normally stable, even under fire exposure conditions, and which are not reactive with water.

Special Hazards – White.

Signal	Type of Possible Injury
POL	Polymerization hazard.
COR	Corrosive hazard.
W	Use no water.
OX	Oxidization hazard.
	Radiation hazard.

Pesticide Label Info.

Availability **"A copy of the registered labeling that allows the manner in which the pesticide is being used shall be available at each use site."** (Title 3 CCR §6602)

Placement "The label shall appear on the pesticide or the immediate container thereof. If the immediate container is enclosed within a wrapper or outside container through which the label cannot be clearly read by a person with normal vision, the label must also appear on such outside wrapper or container if it is a part of the retail package." (Title 3 CCR §6237)

Statements "Warning or caution statements…must appear on the label in a place sufficiently prominent to warn the user, and must state clearly and in nontechnical language the particular hazard involved in the use of the pesticide, e.g., ingestion, skin absorption, inhalation, flammability or explosion, and the precautions to be taken to avoid accident, injury, or damage."
(a) The label of every pesticide shall bear warnings or cautions which are necessary for the protection of the public, including the statement, "Keep out of reach of children," and a signal word such as "Danger," "Warning," or "Caution" as the director may prescribe, on the front panel or that part of the label displayed…
(b) The label of every pesticide which is highly toxic to man shall bear the word "Danger" along with the word "Poison" in red on contrasting background in immediate proximity to the skull and crossbones, and an antidote statement including directions to call a physician immediately on the front panel or that part of the label displayed…"(Title 3 CCR §6242)

Toxicological Terms.

REL	**R**ecommended **E**xposure **L**imit. Developed by NIOSH to reflect exposure limits for hazardous substances or conditions in the workplace. OSHA and MSHA use these recommendations to develop regulatory exposure limits. Time weighted average. Up to a 10 hour workday. 40 hour workweek.
STEL	**S**hort **T**erm **E**xposure **L**imit. Unless otherwise stated, an exposure limit for a short period of time. Can't exceed this level during any part of the work period. (Usually measured over a short period of time because it's often impossible to obtain an instantaneous measurement of an airborne concentration.) Time weighted average. 15 minutes.
PEL	**P**ermissible **E**xposure **L**imit. Legal limit for exposures in the workplace. OSHA/CALOSHA regulation. Majority adopted from TLV's. (CALOSHA PEL's usually more up to date.) Uses time weighted averages, short-term exposure limits and ceilings.
TLV–TWA	**T**hreshold **L**imit **V**alue – **T**ime **W**eighted **A**verage. Exposure limit recommended by the American Conference of Governmental Industrial Hygienists (ACGIH). Level to which nearly all workers may be repeatedly exposed without adverse effect. Time weighted average. 8 hour workday. 40 hour workweek. Derived from data on healthy, adult male workers (levels may not apply to women or children).
TLV®–C	**T**hreshold **L**imit **V**alue – **C**eiling. Workplace exposure limit recommended by the American Conference of Governmental Industrial Hygienists (ACGIH). Ceiling concentration you shouldn't exceed at any time *in the workplace*.

Toxicological Terms. *(continued)*

TLV®–STEL	**T**hreshold **L**imit **V**alue – **S**hort **T**erm **E**xposure **L**imit. Exposure limit recommended by the American Conference of Governmental Industrial Hygienists (ACGIH). All workers should be able to withstand up to four exposures per day at this concentration with no ill effects (if TLV®-TWA not exceeded). Applied to supplement the TLV®-TWA when there are recognized acute effects from a substance whose toxic effects are primarily of a chronic nature. Time weighted average. 15 minutes. 8 hour workday. 40 hour workweek.
IDLH	**I**mmediately **D**angerous to **L**ife and **H**ealth. Maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects. Recommendation from NIOSH. Recommended ceiling for a healthy, adult, male worker. *Values determined only for the purpose of respirator selection.*
Odor Threshold	Level at which most people can detect the odor of a substance. *Great variation in individual response to odors and in data in various reference sources.* Average figure normally based on empirical research. Usually expressed in parts per million.
WEEL	**W**orkplace **E**nvironmental **E**xposure **L**evel. Exposure limits recommended by the American Industrial Hygienists Association. Used in absence of TLV® or PEL. Time weighted average. 8 hour workday.

Toxicological Terms. *(continued)*

EEGL	**E**mergency **E**xposure **G**uidance **L**evel. Concentration of a substance judged acceptable for the performance of specific tasks by military personnel during emergency conditions lasting 1-24 hours. Acceptable only to perform tasks necessary to prevent greater risks. Developed by National Research Council (NRC) for the DOD. Ceiling level for single substances considered acceptable for rare situations. *Acceptable, but not safe, level of exposure.* Acute toxicity is primary concern.
SPEGL	**S**hort–Term **P**ublic **E**xposure **G**uidance **L**evel. Acceptable ceiling concentration for a single, unpredicted short–term exposure to the public. Developed by NRC primarily for materials used as rocket fuels. Usually one tenth to one half of the EEGL. Ceiling level for single substance. Exposure period usually 1 hour or less; never more than 24 hours. Takes into account sensitive subpopulations.
ERPG–1	**E**mergency **R**esponse **P**lanning **G**uide–1. Maximum airborne concentration to which nearly all individuals could be exposed for up to one hour without experiencing or developing health effects more severe than sensory perception or mild irritation. Ceiling recommended by the American Industrial Hygiene Association. Not *intended for repeated exposures.*
ERPG–2	**E**mergency **R**esponse **P**lanning **G**uide–2. Maximum airborne concentration below which, it is believed, nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible adverse or other serious health effects or symptoms which could impair an individual's ability to take protective action. Ceiling recommended by the American Industrial Hygiene Association. Not *intended for repeated exposures.*

Toxicological Terms. *(continued)*

ERPG–3	**E**mergency **R**esponse **P**lanning **G**uide–3. Maximum airborne concentration below which, it is believed, nearly all individuals could be exposed for up to one hour without experiencing or developing life threatening health effects. Ceiling recommended by the American Industrial Hygiene Association. Not *intended for repeated exposures.*
LC_{50}	**L**ethal **C**oncentration, 50%. Concentration level at which 50 percent of the test animals died when exposed by inhalation for a specified time period. Standard measurement used by toxicologists.
LD_{50}	Median **L**ethal **D**ose. Dose at which 50 percent of test animals died following exposure. Standard measurement used by toxicologists. Dose is usually given in milligrams per kilogram of body weight of the test animal.

Special Hazard—BLEVE.

Basics Thermal stress on a container can cause an extremely hazardous event known as a Boiling Liquid Expanding Vapor Explosion (BLEVE). This occurs when a liquid or liquefied gas within a container is heated to a temperature well above its boiling point at atmospheric temperature. The increase in pressure causes the container to rupture catastrophically. When the container breaches the pressure in the container drops suddenly. The sudden drop in pressure inside the container causes the volatile liquid to expand rapidly generating a large amount of vapor. This sometimes happens with tremendous force. A BLEVE can occur when fire impinges on the container at a point or points above the liquid level of the contents of the container. This flame impingement causes the metal to weaken and fail from the internal pressure.

Hazards BLEVE hazards can include fireballs, blast effects, projectiles and possible toxic clouds or vapor cloud explosions. BLEVEs of large containers can cause large pieces of debris to travel nearly one mile. These events have caused deaths hundreds of feet away from the source of the explosion. If the liquid in the container is flammable, the rapid expansion of the vapor can cause a fireball that may be hundreds of feet in diameter. A BLEVE is one of the most dangerous events an emergency responder can face.

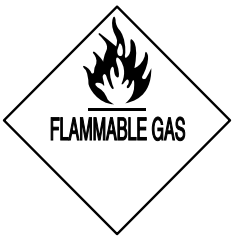
Cause A BLEVE can occur in a vessel that stores a substance that is usually a gas at atmospheric pressure but is a liquid when pressurized (for example, liquefied petroleum gas). The substance is usually stored partly in liquid form, with a gaseous vapor above the liquid filling the remainder of the container.

DOT Exercise #2

Problem #1 The placard on the side of a tank car looks like this:

What Guide # would you choose?

Problem #2 The placards on the side of a tank car look like this:



What Guide # would you choose:

Problem #3 You arrive at the scene of an overturned truck. The placards on the side of the truck look like this:

What Guide # would you choose?

Participant Worksheet

1. In your own words, identify conditions in a hazmat incident that would generate a risk of fire and/or explosion:

2. List at least three (3) common sources for IDHA available to you:

3. What would you consider to be an unacceptable risk in a hazmat incident?

4. What markings, placard, signs, labels, etc. in your workplace indicate the presence of hazardous materials?

Block G

Protective Equipment & First Responder Limitations: (P.)

Main Points

- IDHA and Personal Protective Equipment
- Need for PPE
- Typical Hazards On-Scene
- Protective Clothing
- Criteria for Selecting Protective Clothing Level
- Respiratory Protection
- Environmental Monitoring and Sampling Devices
- Risks and Limits of Protective Equipment

Block Outline

1. IDHA and Personal Protective Equipment (PPE).

a. After IDHA, need to determine protective equipment needs.

b. "Personal Protective Equipment" (PPE) includes:
   1) Protective Clothing (at proper level),
   2) Respiratory Protection (SCBA, APR or SAR) and
   3) Monitoring Devices.

c. Level of PPE determined by:
   1) Physical state of material.
   2) Hazards of material.
   3) Route(s) of entry and potential exposure(s).

d. IDHA process will determine type and level of PPE needed.
   1) OSHA regs ***require*** SCBA for inhalation hazards.
   2) FROs normally lack PPE for hazmat.
   3) FROs are limited to defensive actions because they lack PPE that protects against hazardous materials.

e. Bottomline: PPE keeps responders safe!

PPE Requirements.

PPE "Based on the hazardous substances and/or condition present, the individual in charge…shall…assure that the PPE worn is appropriate for the hazards…" Title 8 CCR §5192(q)(3)(C), 29 CFR 1910.120(q)(3)(iii).

SCBA "Employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard shall wear [SCBA]…" Title 8 CCR §5192(q)(3)(D), 29 CFR 1910.120(q)(3)(iv).

Monitoring "The individual in charge…shall identify…all hazardous substances or conditions present…" Title 8 CCR §5192(q)(3)(B), 29 CFR 1910.120(q)(3)(ii).
"Employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard shall wear [SCBA]…until…the individual in charge…determines through the use of air monitoring that a decreased level of respiratory protection will not result in hazardous exposures to employees." Title 8 CCR §5192(q)(3)(D), 29 CFR 1910.120(q)(3)(iv).

Selection Level B is, "…the minimum level recommended for initial site entries until hazards have been further identified." *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities,* NIOSH Publication 85-115.

2. Need for Personal Protective Equipment (PPE).

a. Responders may be exposed via inhalation, ingestion, absorption and/or injection.

b. PPE protects you from the bad stuff by getting between the bad stuff and route(s) of entry.

c. Limits of PPE that first responders usually wear.
   1) Firefighter turnouts are ***not*** chemical protective clothing (read the label!). Even with SCBA they are *Level D*.
   2) Law enforcement equipment (e.g. leather) may actually absorb hazardous materials.
   3) EMS universal precautions won't protect against inhalation of vapors, gases, fumes, etc. Latex gloves may be ineffective against many common hazardous substances (e.g. gasoline, paint thinner and nail polish remover).

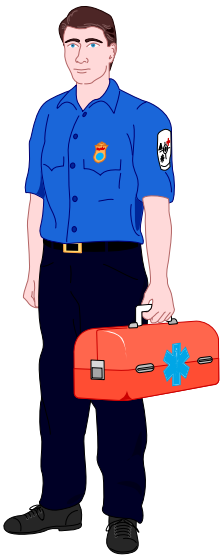
3. Typical Hazards On-Scene.

a. First Responders.
   1) Primary hazard is inhalation exposure.
   2) Others: oxygen deficiency, burns (chemical and thermal), toxicity and radioactivity.

b. Technicians and Specialists.
   1) Primary hazard is heat stress from PPE.
   2) Others: damaged containers, slips, trips and falls.

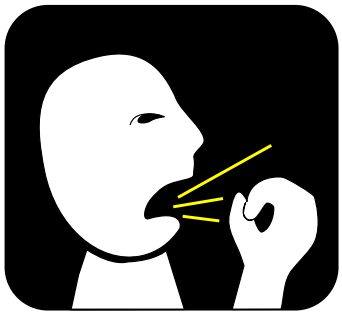
c. Injuries to responders.
   1) Minor injuries are usually from inhalation exposure.
   2) Major injuries are usually chemical burns from exposure to corrosive materials.

Examples of Level "D" PPE.



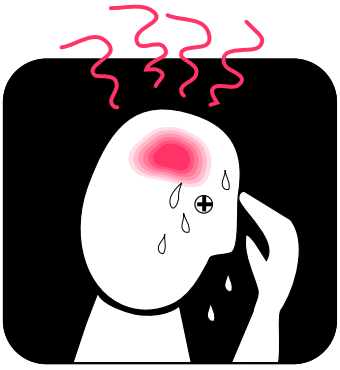
Hazard to Responders

FROs



Inhalation

Technicians and Specialists



Heat Stress

4. Protective Clothing.

a. Levels of Protective Clothing (PC) include:
   1) Level A — Best respiratory and skin protection.
      a) Positive pressure SCBA and
      b) *Fully encapsulated, vapor tight* chemical protective suit.
   2) Level B — High level of respiratory protection but less for skin
      a) Positive pressure SCBA and
      b) Hooded chemical resistive clothing.
   3) Level C — Air purifying respirators and modest skin protection
      a) Full or half-mask APR and
      b) Hooded chemical resistive clothing.
   4) Level D — Ordinary work uniform, *Minimal protection*.
      a) No respiratory protection.
      b) Minimal splash and vapor protection.
      c) May actually absorb vapors, gases and liquids.

b. Limitations of PPE levels.
   1) Levels A and B: limited mobility, restricted vision, finite air supply and heat stress.
   2) Level C: limited mobility, restricted vision, difficulty breathing and heat stress.

c. Number 1 responder limitation is lack of Protective Clothing. (i.e. FROs don't usually have *any* PPE.)
   1) First Responders are usually in *Level D*.
   2) Level D provides no respiratory protection and only limited chemical resistance.

Levels of Protective Clothing.

Level A When greatest level of skin, respiratory and eye protection is required; site operations and work functions involve a high potential for splash, immersion or exposure to unexpected vapors, gases or particulates that are harmful to skin or capable of being absorbed through the skin; substances with high degree of hazard to the skin are present; operations being conducted in confined, poorly ventilated areas in the absence of conditions requiring Level A haven't yet been determined.

Level B When highest level of respiratory protection is needed, but a lesser level of skin protection is needed; atmosphere contains less than 19.5% oxygen; presence of vapors indicated but vapors aren't harmful to skin or capable of being absorbed through the skin; no confined space.

Level C When atmospheric contaminants, liquid splashes or direct contact won't adversely affect or be absorbed through any exposed skin; concentrations and types of airborne substances have been identified and measured; appropriate air purifying respirators (APRs) are available. *These criteria make Level C impractical for emergency response.*

Level D When the atmosphere contains no known hazard; work functions preclude splashes, immersion or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals. A work uniform affording minimal protection, used for nuisance contamination only.

NOTE: **Work uniforms and firefighter turnouts are Level D protection! Firefighter turnouts and police uniforms often contain materials that may absorb hazardous materials.**

5. Criteria for Selecting Protective Clothing Level.

a. Selection of Protective Clothing level based on solid IDHA and,
   1) Physical form of material (e.g. vapor or splash potential),
   2) Degree of hazard (e.g. length of exposure, dermal hazard),
   3) Other (Oxygen level, PC chemical compatibility, work activity, uncertain/unknown hazards, etc).

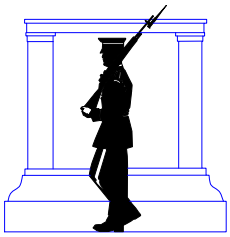
b. Criteria for each level:
   1) Level A: Unknown and/or skin absorptive material, high splash hazard, confined space.
   2) Level B: Less than 19.5% O_2, incompletely ID'd gas or vapor.
   3) Level C: No skin hazard, no unknowns, sufficient O_2.
   4) Level D: No Hazard.

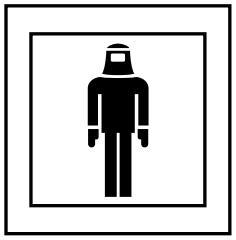
c. Control Zones and PPE.
   1) Exclusion Zone: Level A-C.
      a) No PPE? Then stay our of Exclusion Zone!
   2) Contamination Reduction Zone: Level A-C.
   3) Support Zone: None required (no hazard!).

d. The Safety Officer *approves* proper level of PC and submits recommendation to IC for final approval.

Control Zones and Protective Clothing

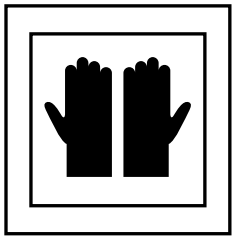
Exclusion Zone





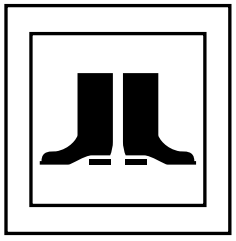
Requires proper level of protective clothing, including Level A, B or C. (Also called Hot Zone, Red Zone, Inner Perimeter, etc.)

Contamination Reduction Zone



Requires proper level of protective clothing, **usually one level down** from that required in the Exclusion Zone (e.g. Entry to Exclusion Zone requires Level A, entry to CRZ will require at least Level B.) (Also called Warm Zone, Yellow Zone, Secondary Perimeter, etc.)

Support Zone



No special protective clothing required. Level D is acceptable. (Also called Cold Zone, Green Zone, Outer Perimeter, etc.)

6. Respiratory Protection.

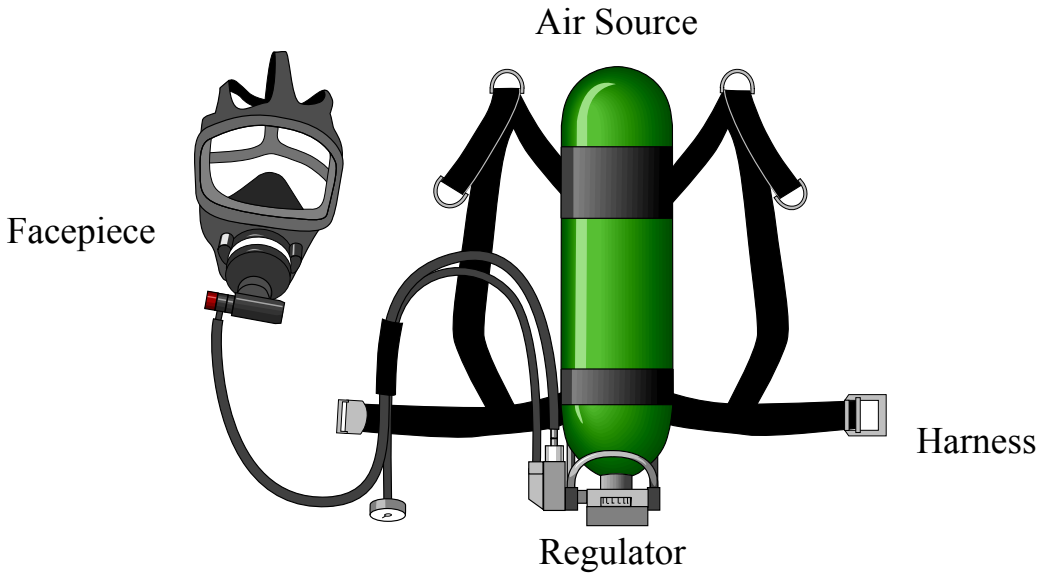
a. Respiratory protection helps to prevent you from inhaling dangerous substances.

b. Basic types of respiratory protection:
   1) SCBA (Self-contained breathing apparatus).
   2) APR (Air purifying respirator).
   3) SAR (Supplied Air Respirator. Rarely used in emergency response due to practical limitations.)

c. Components of respiratory protection:
   1) Self-Contained Breathing Apparatus.
      a) Facepiece,
      b) Harness,
      c) Regulator,
      d) Air source.
   2) Air-Purifying Respirators.
      a) Facepiece,
      b) Air-purifying device (hazard-specific).

d. Limitations of respiratory protection.
   1) SCBA: finite supply of air.
   2) SAR: length of hose limited.
   3) ARP: filter life limited.
   4) All will eventually fail.

Components of SCBA.



OSHA "Employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard shall wear [SCBA]…" Title 8 CCR §5192(q)(3)(D), 29 CFR 1910.120(q)(3)(iv).

7. Environmental Monitoring and Sampling Devices.

a. Purpose: Detect Haz Mat presence & concentration, aid in IDHA & PPE selection, assist in documentation, help investigations, etc.

b. Common types FROs use:
   1) Combustible Gas Indicators and Oxygen Meters.
   2) Radiation survey instruments.

b. Common types technicians and specialists use:
   1) Photoionization Detector (PID).
   2) Flame Ionization Detector (FID).
   3) Direct Reading Colormetric Indicator Tubes.
   4) Other: Radiation Meters; CO and H_2S Meters; etc.

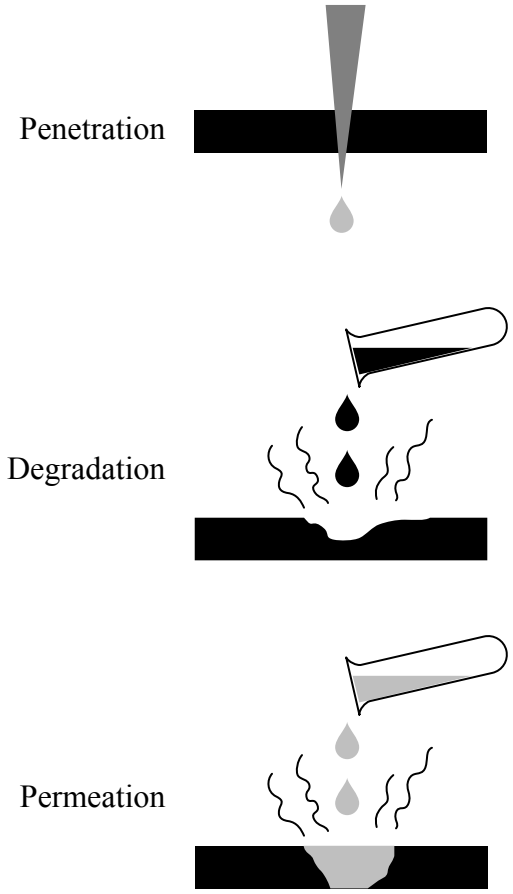
8. Risks and Limits of Protective Equipment.

a. "Penetration", "Degradation" and "Permeation".

b. Even Level A protection has limitations (heat stress, impaired vision and mobility, impaired communications, no one suit protects for all Hazmats, etc.).

c. Thermal influences (seal-a-meal, cryogenic hazards, effect of temperature extremes on shelf-life).

Limits of Protective Clothing Material.



Penetration The movement of chemicals through zippers, stitched seams or imperfections (e.g. holes) in the clothing material.

Degradation The loss of or change in the fabric's chemical resistance or physical properties due to exposure to chemicals, use (or misuse) or ambient conditions (e.g. sunlight).

Permeation The process by which a chemical dissolves in and/or moves through a protective clothing material on a molecular level.

29 CFR 1910.120 & CCR 5192 (Excerpts)

General Description and Discussion of the Recommended Levels of Protection & Protective Equipment

Part A: Personal protective equipment is divided into four categories based on the degree of protection afforded. (See part "B" for further explanation of Levels A B, C, and D hazards.)

I. Level A To be selected when the greatest level of skin, respiratory, and eye protection is required.

The following constitutes Level "A" equipment; it may be used as appropriate: [1]= Optional, as applicable

1. Positive pressure, full face-piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape BA, approved by the National Institute for Occupational Safety and Health (NIOSH).
2. Totally-encapsulating vapor tight chemical protective suit.
3. Coveralls [1].
4. Long underwear [1].
5. Gloves, outer, chemical-resistant.
6. Gloves, inner, chemical-resistant.
7. Boots, chemical-resistant, steel toe and shank.
8. Hard hat (under Suit) [1].
9. Disposable protective suit, gloves and boots (depending on suit construction, may be worn over totally-encapsulating suit).
10. Flashover protection.

General Description and Discussion of the Recommended Levels of Protection & Protective Equipment *(continued)*

II. Level B

The highest level of respirator protection is necessary but a lesser level of skin protection is needed.

The following constitutes Level "B" equipment; it may be used as appropriate:

1. Positive pressure, full face-piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved).
2. Hooded chemical resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls).
3. Overalls [1].
4. Gloves, outer, chemical-resistant.
5. Gloves, inner, chemical-resistant.
6. Boots, outer, chemical-resistant steel toe and shank.
7. Boots, outer, chemical-resistant (disposable) [1].
8. Hard hat [1].
9. [Reserved].
10. Face shield [1]. [1]= Optional, as applicable

General Description and Discussion of the Recommended Levels of Protection & Protective Equipment *(continued)*

III. Level C The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air purifying respirators is met. The following constitutes Level "C" equipment; it may be used as appropriate:

1. Full-face or half-face air purifying respirator (NIOSH approved).
2. Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls).
3. Coveralls [1].
4. Gloves, outer, chemical-resistant.
5. Gloves, inner, chemical-resistant.
6. Boots, (outer), chemical-resistant steel toe and shank [1].
7. Boot-covers, outer, chemical-resistant (disposable) [1].
8. Hard hat [1].
9. Escape mask [1].
10. Face shield [1]. [1]= Optional, as applicable

IV. Level D A work uniform affording minimal protection, used for nuisance contamination only.

The following constitutes Level "D" equipment; it may be used as appropriate:

1. Coveralls.
2. Gloves. [1]
3. Boots/shoes, chemical-resistant steel toe and shank.
4. Boots, outer, chemical-resistant (disposable). [1]
5. Safety glasses or chemical splash goggles .
6. Hard hat. [1]
7. Escape mask. [1]
8. Face shield. [1] [1]= Optional, as applicable

29 CFR 1910.120 & CCR 5192 (Excerpts)

General Description & Discussion of the Levels of Protection & Protective Gear

Part B The *type of hazards* for which Levels A, B, C, and D protection are appropriate are described below:

I. Level A **Level "A" protection should be used when:**

1. The hazardous substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either the measured (or potential for) high concentration of atmospheric vapors, gases, or particles; or the site operations and work functions involve a high potential of splash, immersion, or exposure to unexpected vapors, gases, or particles of materials that are harmful to skin or are capable of being absorbed through the skin;

2. Substances with a high degree of hazard to the skin are known or are suspected to be present; and skin contact is possible; or

3. Operations are being conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level "A" have not yet been determined.

General Description & Discussion of the Levels of Protection & Protective Gear *(continued)*

II. Level B Level "B" protection should be used when:

1. The type and atmospheric concentration of substances have been identified and requires a high level of respiratory protection, but less skin protection;

2. The atmosphere contains less than 19.5 percent oxygen; or

3. The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors or gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin.

NOTE: This involves atmospheres with IDLH concentration of specific substances that present severe inhalation hazards and that do not represent a severe skin hazard; or that do not meet the criteria for use of air-purifying respirators.

III. Level C Level "C" protection should be used when:

1. The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin;

2. The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove the contaminants; and

3. All criteria for the use of air-purifying respirators are met.

General Description & Discussion of the Levels of Protection & Protective Gear *(continued)*

IV. Level D Level "D" protection should be used when:

1. The atmosphere contains no known hazard; and

2. Work functions preclude splashes, immersions, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

NOTE: As stated before, combinations of personal protective equipment other than those described for Levels A, B, C, and D protection may be more appropriate and may be used to provide the proper level of protection.

Remember: Typically, FROs have Level "**D**" protective clothing,

D = Defensive!

Participant Worksheet

1. In your own words, explain the need for "Protective Equipment":

2. Why does Level **D** PPE limit you to **d**efensive actions?

3. Which route of entry is the most dangerous to you?

4. Of the hazardous materials in your workplace, would any of them require Level A?

Block H

Hazmat Release Countermeasures: (C.)

Main Points

- Review of the Basics
- All Hazmat Events Eventually Stabilize
- Non-intervention Strategy
- Defensive "Containment" Strategy
- Offensive "Control" Strategy
- General Tips and Techniques

Block Outline

1. Review of the Basics.

a. Responders' goal: Protect life, environment and property.

b. The role of any Hazmat Responder: Safely and competently respond within level, resources and capabilities.
   1) First Responder Operations actions (S.I.N.C.I.A.P.C.P**.**D.D.D.) *within safety and resource capabilities.*

c. Block focus on "C" — **C**ontainment.

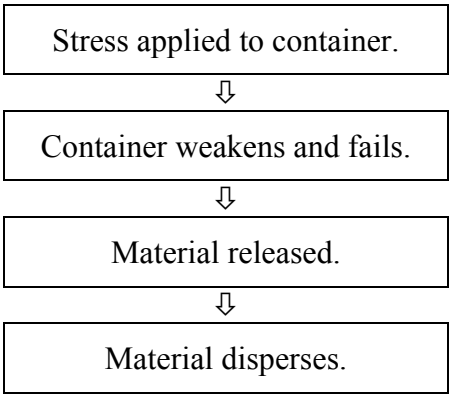
d. Hazmats are released when their containment system fails.
   1) Nature of failure determines how material disperses.

e. Hazmat release process.
   1) Stress on container.
   2) Container weakens and fails.
   3) Material released.
   4) Material disperses.

c. Types of dispersion.
   1) Catastrophic failure of container (e.g. BLEVE).
   2) Energetic dispersion.
   3) Rapid flow through visible opening.
   4) Slow leak through crack or small opening.
   5) How much disperses and how fast it disperses determine the countermeasures you can employ.

Evaluating Container Stress.

Failure Container failure process.



Dispersion Material escapes from container.

Dispersion Type	**Example**
Catastrophic failure.	BLEVE, explosion or polymerization.
Energetic dispersion.	55 gallon drum struck by a moving vehicle or a bottle falling from a shelf.
Rapid flow through visible opening.	55 gallon drum punctured by a forklift.
Slow leak through crack or small opening.	55 gallon drum leaking through a pinhole in a rusted chine.

2. All Hazmat Incidents Eventually Stabilize.

a. Responders should contribute to the solution, not the problem!
   1) The baseline question: What if I don't intervene?
   2) Next question: Will my intervention help?

b. Three strategies to stabilize a Hazmat event:
   1) Non-Intervention: No direct actions other than S.I.N.
   2) Containment (Defensive): Slow & restrict Hazmat spread.
   3) Control (Offensive): Stop Hazmat release.

c. Protection hierarchy:
   1) Non-Intervention: protects life (i.e. people).
   2) Containment (Defensive): protects the environment.
   3) Control (Offensive): protects property.
   4) Move from No Fight, to Defensive, to Offensive when the potential gains outweigh the potential risks.
   5) Shouldn't risk life to protect environment and property.

Offensive vs. Defensive Actions (OSHA Regs).

FRA "…trained to initiate an emergency response…by notifying the proper authorities of the release. They would take no further action…" (Non-intervention only!) Title 8 CCR §5192(q)(6)(A) 29 CFR 1910.120(q)(6)(i).

FRO "…trained to respond in a *defensive* fashion without actually trying to stop the release. Their function is to *contain* the release from a safe distance, keep it from spreading, and prevent exposures." (Defensive actions only. Generally, containment only.) Title 8 CCR §5192(q)(6)(B) 29 CFR 1910.120(q)(6)(ii).

Technician "…respond to releases…for the purpose of stopping the release. They assume a more *aggressive* role than a [FRO] in that they will approach the point of release in order to plug, patch or otherwise stop the release…" (Defensive or offensive actions. Containment or control.) Title 8 CCR §5192(q)(6)(C) 29 CFR 1910.120(q)(6)(iii).

Specialist "…respond with and provide support to [technicians]. …require a more directed or specific knowledge of the various substances…also act as the site liaison with federal, state, local, and other government authorities…" (Defensive or offensive actions. Containment or control.) Title 8 CCR §5192(q)(6)(D) 29 CFR 1910.120(q)(6)(iv).

3. Non-intervention Strategy.

a. Non-intervention.
   1) No direct action to stop, slow, contain or restrict the release.
   2) May be required by standard operating guides.

b. When to not intervene?
   1) Actions would be unsafe, risk is unacceptable,
      a) Presence of explosives (known or suspected).
      b) Pressure vessels subject to thermal stress.
      c) Material that may polymerize.
      d) Visible vapor cloud.
      e) Threat of fire.
   2) No threat to life,
   3) Lack of response resources,
   4) Lack of proper PPE.
      a) No PPE for explosions.
      b) No such thing as a BLEVE suit!

c. Why no intervention? (Responders are to save, not risk, lives.)

d. Who can follow non-intervention strategy? (Anyone!)

e. Typical method of non-intervention:
   1) Isolate and deny entry.
   2) Retention (e.g. let collect in natural low area or sump).

A Hazmat SPE Risk Assessment Model.

Risk = **S**everity X **P**robability X **E**xposure

Severity: Container Size

1	Slight	Small
2	Minimal	Less than 55 gallons
3	Significant	More than 55 gallons
4	Major	Small pressure vessel/gas cylinder
5	Catastrophic	Large pressure vessel/gas cylinder

Severity Material State

1	Slight	Solid
2	Minimal	Liquid w/low VP
3	Significant	Liquid w/high VP
4	Major	Flammable/Toxic Gas
5	Catastrophic	Explosive/BLEVE potential

Probability Stress

1	Impossible/Remote	No stress
2	Unlikely	Possible mechanical stress
3	50/50	Mechanical stress visible
4	Greater than 50%	Thermal or chemical stress
5	Very Likely	Combined stress

Exposure People

1	None	Vacant land
2	Average	Some structures nearby, possibly occupied
3	Above Average	Many structures nearby, confirmed occupied
4	High	People and structures adjacent to scene
5	Great	Large number of people at the scene

Values	Degree of Risk
320-625	Unacceptable
108-319	High
24-107	Substantial
5-23	Moderate
1-4	Low

4. Defensive Containment Strategy.

a. Safe acts to restrict, slow or redirect spread of Hazmat.
   1) Key FRO action to defensively protect nearby exposures.

b. When to contain: When it's safe and practical. (Sometimes it's **not** safe and/or practical.)

c. Why contain: Limit spread; reduce life and health risks; protect environment and property; reduce cleanup costs; limit liability.

d. Who does containment: FROs usually do containment if safe, and they have proper training and equipment. (Techs/Specs also.)

e. Typical methods of *defensive* containment:
   1) Dike (e.g. make a small curb with dirt around drain).
   2) Dam (e.g. build overflow dam for product that sinks in water).
   3) Divert (e.g. build small dike to change direction of flow).
   4) Disperse (e.g. apply fog spray in chlorine cloud).
   5) Dilute (e.g. apply water to water-soluble material).
   6) Cover (e.g. lay salvage cover over powder spill).
   7) Foam (e.g. apply AFFF to large gasoline spill).
   8) Other: _____

f. Practical containment tools/equipment include:
   1) Shovels, dump trucks, dirt, sand bags, plastic bags, plastic sheet, heavy earth moving equipment, foam, salvage covers, absorbents, firehose, etc.
   2) Presence of flammables may require use of non–sparking or intrinsically safe equipment.
   3) Some Hazmats may react with common containment materials or common substances such as water. Consult last few ERG green bordered pages.

Containment Methods.

Method **Dams** — barriers across a waterway or between two objects intended to hold back flowing water or material.

Simple Dam

Constructed of dirt, sandbags, fire hoses, hay bales, lumber, trash bags, plastic sheeting, etc.

Underflow Dam

Used for releases involving materials that float on water (e.g. gasoline).

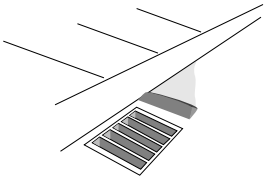
Overflow Dam

Used for releases involving materials that sink in water (e.g. PCB's)

Pros Can construct with any material on-hand.
Can buy time or completely contain spill.

Cons May require constant monitoring and reinforcement.
Spilled material may permeate through dam or react with organic material in dam.

Method **Dike** — A bank constructed to control or confine a liquid. Can use an absorbent or non-absorbent material (e.g. dirt, plastic sheeting, sand bags, sorbent boom, etc.).



Pros Easy to construct. (Can use materials on hand.)

Cons Usually holds small amounts of material.
Hard to do when it's raining.

5. Offensive "Control" Strategy.

a. Control: Safe acts to actually stop, control or stabilize the release.
   1) Responders must clearly know the difference between "Containment" and "Control".
   2) If the method has the potential for moderate or high intimate contact with the material then it is a control method. Control often requires a high level of PPE.

b. When to control: When it's safe and practical.

c. Why control: Stop release; reduce life and health risks; protect environment and property; start cleanup; limit liability.

d. Who does control: *Usually* technicians and specialists.

e. Typical methods of offensive control:
   1) Plug and patch (e.g. fix faulty valve or hole in drum).
   2) Absorb/Adsorb (e.g. apply pads to oil spill).
   3) Transfer (e.g. remove product to waste vacuum truck).
   4) Containerize (e.g. put leaking drum into overpack drum).
   5) Stop (e.g. simply reposition drum or shut off valve).
   6) Other _____

f. Selection considerations for control method based on: Physical state of material (solid, liquid or gas); physical & chemical properties; amount & rate of release; topography & terrain; time available; resources & tools; risk vs. gain.

g. Practical containment tools/equipment include: Shovels, dump trucks, dirt, sand bags, plastic bags, plastic sheet, heavy earth moving equipment, foam, salvage covers, absorbents, hose, redwood plugs, etc. *Note: presence of flammables will require use of non–sparking or intrinsically safe equipment.*

Control of Hazardous Materials

Method **Absorption** — To take in and make part of or to take up and hold. Can use natural materials (e.g. dirt, sand, sawdust, diatomaceous earth, vermiculite, etc.) or materials specifically made for this purpose.

Caution ***Some sorbents (either natural or man-made) may react with certain hazardous substances.***

Method **Isolation/Diverting** — Diverting material to less environmentally sensitive area and isolating the area. Effective tactic for incidents involving slowly leaking liquids that have low volatility. Can create an area to isolate the material with dikes and dams.

Method **Covering** — Something placed over or about another thing, an overlay. Cover the spilled material with plastic sheeting, tarpaulin, foam, water, etc. to prevent powders from becoming airborne or to slow down evaporation of liquids.

Method **Containerizing** — To pack in containers. Place leaking drums into overpack drums, put plastic bucket under leaking pipe or valve, etc. Usually done by technicians or specialists.

Method **Plugging and Patching** — A piece used to fill a hole/material used to cover a hole. Use available material or prepared tools to stop leaks from containers or pipes. Note: Closing existing valves is a method of plugging and patching. Many piping systems and cargo containers may have such systems — look for them before trying something complex.

6. General Tips and Techniques.

a. Strategies and methods should be based on solid IDHA *with valid selection criteria for strategy.*

1) Done safely with proper protective equipment.

2) Should attempt to use safest and simplest method to get job done, *in line with resource and safety capabilities.*

3) Should be consistent with law.

b. Theoretically, contain as close to source as safe & practical.

c. Remember — FROs usually do Containment (defensive), but on occasion may do Control (offensive) or may take a non-intervention strategy based on safety and common sense.

Containment and Control Methods Worksheet

Determine if the following methods are:

No Action (non intervention)
Containment (defensive action)
Control (offensive action)

		Method*
Isolate	To deny entry or prevent access...	_____
Plug & Patch	A piece used to fill a hole/material used to cover a hole...	_____
Retain	To hold back, hold secure or intact (in natural low area)...	_____
Dike	A bank constructed to control or confine a liquid...	_____
Absorb/Adsorb	To take in and make part of/to take up and hold...	_____
Dam	A barrier built across a watercourse for impounding liquids...	_____
Divert	To turn aside, to turn from one course to another...	_____
Containerize	To pack in containers...	_____
Disperse	To break up, spread widely, from a fixed source evaporate...	_____
Dilute	To diminish strength by admixture...	_____
Cover	Something placed over or about another thing, an overlay...	_____
Transfer	To move to a different place or situation...	_____
Foam	A stabilized froth produced chemically or mechanically...	_____

Be prepared to defend your selection!

Offensive vs. Defensive Actions.

OSHA CPL 02-02-073

Fires First Responder Operations Level. Fire fighters responding to propane and gasoline fires.

Propane Fire fighters trained to the operations level, who are also trained in the hazards of propane, may enter the danger area to shut off the valves that will starve the fire and thus extinguish it. Normally, employees trained to the operations level would be restricted from taking aggressive action. This is considered to be a special case. The principle hazards from propane are fire and explosion, not toxicity. Because propane fires are common, most fire fighters are fully trained and equipped to respond to propane fires, including taking aggressive action by shutting off the valves in the danger area.

Policy If fire fighters are fully trained and equipped (which is a high degree of training), and have also received first responder operations level training, OSHA believes they have sufficient training to take aggressive action due to propane's relatively low toxicity.

Violation? It would be only a technical violation of 29 CFR 1910.120(q)(6) for not having the additional training required of a HAZMAT technician if a fire fighter took aggressive action in the danger area during a propane fire or leak, was fully trained and equipped to handle the fire and had first responder operations level training. In this circumstance OSHA would not issue a citation.

Offensive vs. Defensive Actions. *(continued)*

Gasoline

Releases of gasoline similar to the example involving propane discussed above may be addressed by operations level emergency responders if they have the required PPE, emergency response equipment, and specific training in the safety and health hazards associated with gasoline.

Employers who expect fire fighters to shut off a gasoline valve in the danger area, and who can show that employees are trained to the operations level and adequately trained in the hazards of gasoline, have committed a technical violation of 1910.120(q)(6)(iii) for such employees not having the training required of a HAZMAT technician.

NOTE: The fire and explosion hazards of propane and gasoline are very substantial. The interpretations herein are applicable only when fire fighters are fully trained and equipped to handle the explosion and fire hazards of propane, gasoline, or similar flammable gases and liquids.

Facilities

Process Operators responding within a facility.

Criteria

Process operators who have (1) informed the incident command structure of an emergency (defined in the facility's emergency response plan), (2) adequate PPE (3) adequate training in the procedures they are to perform, and (4) employed the buddy system, may take limited action in the danger area (e.g., turning a valve) before the emergency response team arrives. The limited action taken by process operators must be addressed in the emergency response plan. *Once the emergency response team arrives, these employees would be restricted to the actions that their training level allows.*

Participant Worksheet

1. In your own words, define "Containment" and "Control" and explain why the First Responder usually takes "Containment" action:

2. List at least 1 method of "Defensive" Containment and 1 method of "Offensive" Control for an MC 312 Tank Truck leaking UN1789 into a small creek bed:

3. Provide an example when "Non-Intervention" would be an appropriate strategy for use by First Responders:

4. Provide an example when "Offensive Control" would be an appropriate action for First Responders who are firefighters:

Block I

Protective Actions: (P.)

Main Points

- Protective Actions
- Authorities for Protective Actions
- Protective Action Considerations
- Pre-event and Event-Specific Planning
- Protective Actions Issues
- Special Populations and Protective Actions
- Protective Action Selection

Block Outline

1. Protective Actions.

a. Two key "Protective Actions" — "Evacuation" & "In-Place Protection/Sheltering in Place".

b. Evacuation.
   1) Purpose of Evacuation: to remove people from threatened area of hazard to safe area of refuge (e.g. evacuation shelter).
      a) Evacuation may be the preferred protective action,
      b) But, can be logistically and operationally difficult to execute for large evacuation area.

c. Shelter in Place/In-Place Protection.
   1) Purpose of "Sheltering in Place" (In-Place Protection): keep threatened people inside a protective structure:
      a) Sometimes is the only practical protective action (especially in congested urban areas or with special populations).

d. CCR 5192(q)(3)(C) and 29 CFR 1910.120(q)(3)(iii) *requires* the responders to implement "appropriate emergency operations" with proper PPE.

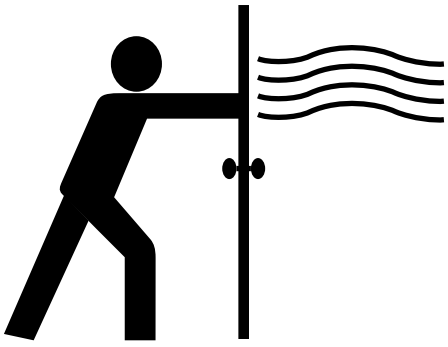
e. Decision regarding protective action will be one of the most important and difficult decisions. (Often there is no right answer.)

Protective Action Options.

Options Two (2) protective action options:

1) Evacuation — Removing public from areas at risk to areas of safety/refuge (*most common protective action*).

2) In-Place Protection/Sheltering In Place — Keeping public inside structures and having them close doors, windows, ventilation systems, etc., to make structure as air-tight as possible.



2. Authorities for Protective Actions.

a. Basic police power of the state.
   1) Have basic authority to restrict movement of people and property in an emergency. Usually done through ordinances, resolutions, disaster or health emergency declarations, or other orders.

b. Specific peace officer authority. Penal Code §409.
   1) §409.5 — allows peace officers to close or restrict access to a specific area (i.e. disaster scene).

c. Emergency Services Act. Authorizes local government to issue orders and regulations necessary to provide for the protection of life and property. Government Code §8634.

d. Specific areas and locations.
   1) Highways.
      a) CalTrans — can restrict traffic or close any state highway for the protection of the public. Streets & Highway Code §124.
      b) Highway Patrol — can close any highway if there is a threat to public health or safety caused by hazardous materials. Vehicle Code §2812.
   2) Waterways.
      a) Dept. of Boating and Waterways — has basic police authority to close waterways during emergencies.
      b) Dept. of Water Resources — can close waterways under their jurisdiction to protect health, safety, convenience and welfare of the public. Water Code §128.
      c) U.S. Coast Guard — can close navigable waterways and adjacent shorelines. 33 CFR 147.

Authorities for Protective Actions.

ESA

"A local emergency may be proclaimed only by the governing body of a city, county, or city and county, or by an official designated by ordinance…" Gov't Code §8630(a).

"During a local emergency the governing body of a political subdivision, or officials designated thereby, may promulgate orders and regulations necessary to provide for the protection of life and property, including orders or regulations imposing a curfew within designated boundaries where necessary to preserve the public order and safety. Such orders and regulations and amendments and rescissions thereof shall be in writing and shall be given widespread publicity and notice." Gov't Code §8634.

Peace Officers

"Whenever a menace to the public health or safety is created by a calamity…[peace officers] may close the area where the menace exists… If the calamity creates an immediate menace to the public health, the local health officer may close the area where the menace exists…" Penal Code §409.5.

Highways

"The department may restrict the use of, or close, any State highway whenever the department considers such closing or restriction of use necessary: (a) For the protection of the public." Streets and Highway Code §124.

"Whenever poisonous gas, explosives, dust, smoke, or other similar substances, or fire exist upon or so near a public highway as to create a menace to public health or safety, members of the California Highway Patrol, police departments, or sheriff's office may close any highway to traffic…" Vehicle Code §2812.

3. Protective Action Considerations.

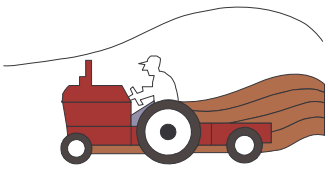
a. Decisions to evacuate or shelter-in-place can be complex, requiring six basic considerations:

1) Materials involved.
    a) Chemical, physical and toxicological properties.
2) Population threatened.
    a) Who are they and can they leave?
3) Responder resources and capabilities.
    a) Amount of people and equipment.
    b) Command and control resources available.
4) Time factors involved.
    a) Time of day.
    b) Expected duration of incident.
5) Current and predicted weather.
6) Ability to communicate with public.
    a) Receptiveness of public to protective action recommendations.
    b) Methods of communication available.
    c) Past experiences with such incidents.

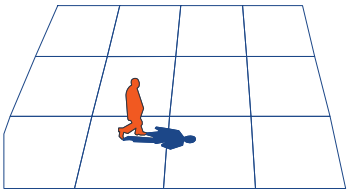
Protective Action Considerations.

Material Involved

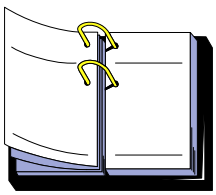
Population Threatened



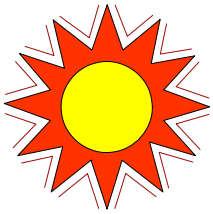
Responder Resources



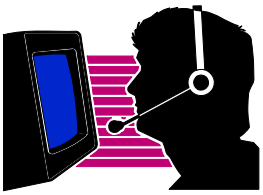
Time Factors



Weather



Communications



4. Pre-event and Event-Specific Planning.

a. Many groups needed to plan and implement protective actions.
   1) Law Enforcement (actually conduct evacuation).
   2) Fire Service (technical advice on size of evacuation area).
   3) Schools and universities (for possible shelter locations).
   4) Volunteers (American Red Cross for shelter management).
   5) Media (to assist with issuing evacuation message).
   6) Industry (individual companies, CAER Associations, etc.).
   7) Others - Mental Health Professionals; local OES; etc.

b. In many workplaces evacuation plans may exist before the event occurs. (Often called an "Emergency Action Plan".)

c. Public and responders will react the way they are trained and they should be trained according to their plans. Realistic plans + effective drills/exercises = safe responses.

Organizations Involved in Protective Actions.

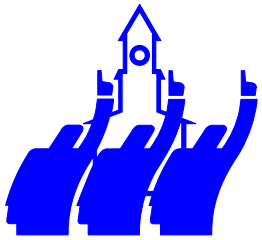
Hazmat personnel (For technical advice. Usually from Fire Service.)

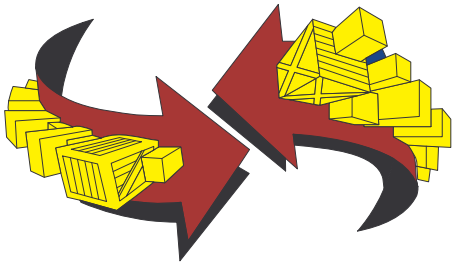
Law Enforcement (Evacuations often need door–to–door notification in addition to security.)

News Media (radio/TV)

Schools (Provide shelter locations and transportation.)

Volunteer groups (Manage shelters, provide food, clothing, etc.)





Private sector (Can provide specialized response resources and advice.)

5. Protective Actions Issues.

a. Coordinate with all agencies.
   1) Both before and during the event.
   2) Public education programs on what citizens should do to help themselves if any protective actions are needed can pay big dividends during an actual incident.

b. Put out clear and concise evacuation message.
   1) Clear delineation of area to be evacuated.
   2) Procedures set for lifting evacuation order.
   3) Clear evacuation routes to use.
   4) Speak with one voice. Mixed messages confuse the public and result in public not taking any action.

c. Set-up traffic control measures.
   1) People tend to exit the way they entered.
   2) Evacuees tend to follow familiar routes.

d. Shelter issues.
   1) Only 10-20% of evacuees will use shelters.
   2) Possible shelter locations include: schools, universities, recreation halls, churches, National Guard Armories.
   3) Pets and high-value livestock can complicate shelter issue.

Evacuation Message
(Sample only.)

Sample Radio Message

High hazard spill/release — General evacuation requested/mandatory

This is _____ at the _____. A large/small amount of _____, a highly hazardous substance, has been spilled/released at _____. Because of the potential health hazard, authorities are requesting/requiring all residents within _____ blocks/miles of the area to evacuate. If you are _____(give evacuation zone boundaries)_____, you and your family should/must leave as soon as possible/now. Go immediately to the home of a friend or relative outside the evacuation area or to _____. If you can drive a neighbor who has no transportation, please do so. If you need transportation, call _____. Children attending the following schools: _____(list)_____ _____ will be evacuated to _____.

Do not drive to your child's school. Pick your child up from school authorities at the evacuation center. Listen to this station for instructions.

The material is highly toxic to humans and can cause the following symptoms: _____ _____. If you are experiencing any of these symptoms, seek help at a hospital outside the evacuation area, or at the evacuation center at _____.

To repeat, if you are in the area of _____, you should/must leave, for your own safety. Do not use your telephone unless you need emergency assistance.

6. Special Populations and Protective Actions.

a. Evacuation of hospitals, high rise buildings and institutions may not be practical. Needs lots of time, resources and joint planning.

b. May need to use "Sheltering-in-Place/In-Place Protection".

c. Evaluating ability of special/unique population to participate in protective action.
   1) The six basic considerations and,
   2) Ability of population to help themselves.
      a) Unrestrained, cooperative, ambulatory and coherent.
      b) Need assistance to move.
      c) Incapable of being moved due to security or health concerns.

d. Issues to address with special populations.
   1) Effective communications with institution are essential.
   2) Expect problems with any protective action.
      a) Feeding and securing the population.
      b) Shift changes for staff.
      c) Shortage of supplies needed for in-place protection.
      d) Transportation of the residents/patients/inmates.

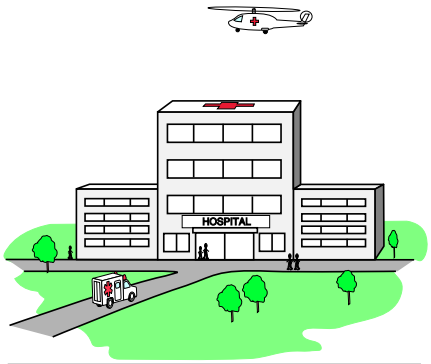
7. Protective Action Selection vs. Management.

a. Selecting the best Protective Action is only half the job; Implementing the action will present many problems to solve!

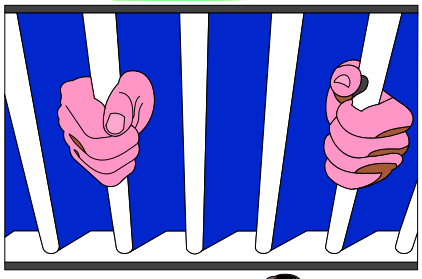
b. No choice will be easy or obviously correct. Expect problems and count on being second-guessed!

Special Populations.

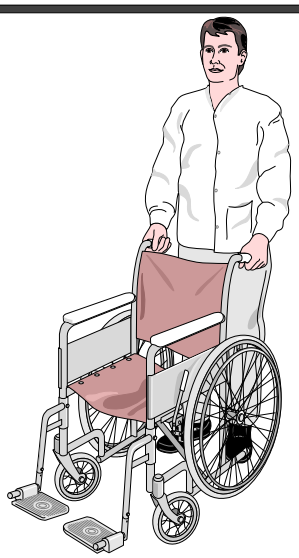
Hospitals



Correctional Facilities



Rest Homes



Others? _____

Evacuations and Movement.

Purpose The purpose of evacuation is to remove people from the area threatened by a hazardous material incident. Depending on the nature of the incident and the means for propagating the hazardous condition (e.g., a vapor cloud transported by the wind, gravity flow of a toxic liquid down a gutter, underground flow through utility conduits, or advection by current flow of a material spilled in a waterway), the size of the danger zone, and the time available for protective measures may vary considerably.

Responsibility It is the responsibility of a local government to assess the situation, make the decision to evacuate, and formulate an evacuation plan. Urgency, population density, possible evacuation routes and terrain must be considered when selecting the means to effect the warning and evacuation. Evacuation may be voluntary or mandatory depending on the nature of the hazard and the conditions surrounding the incident. The evacuation warning should include such information as: type of evacuation (mandatory vs. voluntary); best available routes out of the area; location of reception and care facilities, if established; anticipated duration of the emergency; and time remaining before the situation becomes critical. You should advise the OES Regional Office when conditions require a significant evacuation.

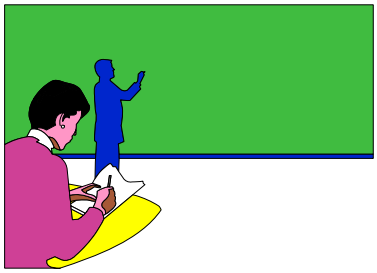
Law Duties If evacuation is necessary, it will be the responsibility of the law enforcement agencies to conduct an orderly evacuation (*outside of the control zones*) and to ensure property evacuated is secure.

Performance According to FEMA research, the average evacuation performance is 10,000 people per hour for communities that have accomplished significant planning (such as with nuclear power plants).

Sequence The following is a sequence of operations that may assist in determining if an evacuation is necessary and steps to make the evacuation safe and orderly for citizens and public safety personnel.

Evacuations and Movement. *(continued)*

Step One *Step one is to analyze the information:*



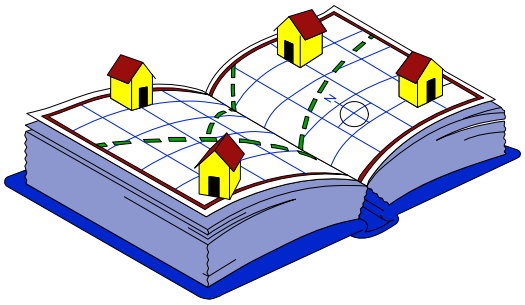
A. Collect all the information about the threat and the threatened area, by reviewing communicated radio reports, live TV or radio newscasts and personal observations.

B. Validate the information by reviewing all sources of conflicting information and substantiate as much information as possible with a second source.

C. Determine the degree of the hazard by examining the potential of the hazardous material by type, amount and spread (looking at the immediate, midterm and long-range problems).

Evacuations and Movement. *(continued)*

Step Two *Step two is the evacuation preparation:*



A. Determine the area that will require evacuation, using considerations of terrain, flow rate, wind and cleanup time.

B. Estimate the number of people in the evacuation area. If it is a residential area the City Clerk or Planning Department can give you a close estimate. If it is a business area the businesses know the number of their employees. Remember the variance due to time of day.

C. Estimate the number of people needing assistance with transportation, such as people without autos or with handicaps that may prevent them from using private transportation.

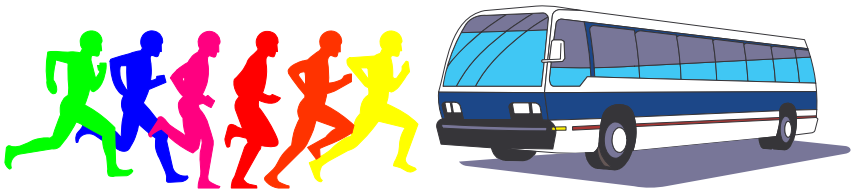
D. Coordinate with the Evacuation Group Supervisor to identify major evacuation routes and establish traffic control points taking into consideration the condition of the roads and their load carrying capacity.

E. Coordinate with the Public Works Department to establish preliminary evacuation assembly points and then ask the Parks and Recreation Department to locate shelters for evacuees and pets and notify the Red Cross to open designated reception centers.

Evacuations and Movement. *(continued)*

F. Notify the Emergency Alert System to broadcast the evacuation warning (coordinate this notification with the jurisdiction Public Information Officer) and dispatch units to warn the threatened area.

Step Three *Step three is the evacuation:*



A. The Evacuation Group Supervisor should dispatch units to traffic and access control points. Place two trucks on standby to assist disabled vehicles along the evacuation routes, and assist the on-scene manager with monitoring the status of the warning and evacuation processes. Law enforcement should be prepared to provide crowd control at assembly points.

B. Public Works or Parks and Recreation Coordinator should dispatch buses to the designated assembly points. They should also dispatch specialized transportation to homes and facilities housing the elderly, disabled and others requiring special assistance.

C. Know your agency's policy on "resisters" (e.g. those that won't evacuate). Practically speaking — will you have enough time and personnel to enforce a mandatory evacuation?

Evacuations and Movement. *(continued)*

Step Four *Step Four is security of the evacuated area:*

This is the most difficult due to harmful vapors that may enter into the evacuated area.

A. Establishment of security patrol and access control procedures. Coordinate with the Public Works Department to obtain and position barricades and signs.

During notification and evacuations, in a residential area, law enforcement personnel will need to know the location of people with physical impairments so they may be contacted personally.

Expect to find people who have refused to leave the area. IC must anticipate and plan for this.

Overview of "Shelter-in-Place" Concepts.

Introduction

There are two ways to protect the public from toxic gas/vapor discharges into the atmosphere. One of these methods is evacuation and involves relocation of threatened populations to shelters in safer areas. The other involves giving instructions to people to remain inside their homes or places of business until the danger passes. In other words, it involves telling people to "shelter-in-place" or use "In-Place Protection".

Evacuation

Evacuation is clearly safer with respect to the specific hazards posed by a toxic gas or vapor release but has certain limitations and may pose new problems. A major evacuation takes time and may not be feasible once large amounts of toxic gases or vapors have entered the atmosphere. If people in the path of a toxic cloud or plume leave their homes this may cause greater harm than good. Large-scale evacuations in response to toxic gas or vapor hazards are best considered when:

1. There is a strong potential for a toxic discharge, the discharge has not yet taken place, and there appears to be time available to safely relocate people.

2. The discharge has taken place but people are sufficiently far downwind to permit time for evacuation.

3. People not yet in the direct path of a cloud or plume are threatened by a future shift in the wind direction.

4. The safety hazards of evacuation are outweighed by benefits of the action, and/or

5. In-Place Protection might not fully protect threatened populations from serious consequences of a release.

Recommended Shelter-In-Place Instructions.

Introduction

The previous sections have demonstrated the circumstances under which sheltering-in-place can provide some degree of protection from toxic gases and vapors in the atmosphere and those circumstances under which the practice may not be effective. They have also demonstrated limitations of the practice and shown how minimizing outdoor air infiltration and/or ventilation rates into buildings is critical. This section draws upon the information presented above and substantial other data to present a list of suggested instructions to be given populations asked to shelter-in-place, these being:

Instructions

1. Close all doors to the outside and close and lock all windows (windows sometimes seal better when locked). Close curtains/drapes.

2. Building superintendents should set all ventilation systems to 100 percent recirculation so that no outside air is drawn into the structure. If not possible, shut off ventilation systems.

3. Turn off all heating systems.

4. Turn off all air-conditioners and switch inlets to the “closed” position. Seal any gaps around window type air-conditioners with tape and plastic sheeting, wax paper, wet towels or aluminum wrap.

5. Turn off all exhaust fans in kitchens, bathrooms, etc.

6. Close all fireplace dampers.

7. Close as many internal doors as possible.

Recommended Shelter-In-Place Instructions. *(cont.)*

Instructions (cont.)

8. Use tape and plastic food wrapping, wax paper, or aluminum wrap to cover and seal bathroom exhaust fan grills, range vents, dryer vents, and other openings to the outside to the extent possible (including any obvious gaps around external windows and doors).

9. If the gas or vapor is soluble or even partially soluble in water, hold a wet cloth or handkerchief over your nose and mouth if the gases start to bother you. For a higher degree of protection, go into the bathroom, close the door, and turn on the shower in a strong spray to "wash" the air. Seal any openings to the outside of the bathroom as best as you can. Don't worry about running out of air to breathe. That is highly unlikely in normal homes and buildings.

10. If an explosion is possible outdoors — close drapes, curtains, and shades over windows. Stay away from external windows to prevent potential injury from flying glass.

11. Minimize the use of elevators. These tend to "pump" outdoor air in and out of a building as they travel up and down.

12. Tune into the Emergency Alert System on your ratio or television for further information and guidance.

Summary

As a final note, this appendix mostly deals with the problem of toxic gases and vapors in the atmosphere. Since these substances can pass through tiny spaces where dusts and other aerosols in air may not, sheltering-in-place may provide a much greater degree of protection when airborne contaminants are in the form of liquid or solid particles.

Evacuation vs. Shelter in Place.

Considerations Six (6) basic considerations:

1) Materials involved;
2) Population threatened;
3) Capability of emergency responders;
4) Time factors involved;
5) Current & predicted weather;
6) Ability to communicate with public.

Materials When evaluating the materials involved, responders should consider the physical/chemical characteristics, condition and location of the material.

Physical/chemical characteristics: Is it solid, liquid or gas? If it's a solid, is it powdered or crushed so it can give off dust particles? If it's a liquid, will it give off flammable, explosive and/or toxic vapors? Will the material rise or sink in air/water? Is it flammable? Are the characteristics unknown?

Toxicity: Is the material toxic or irritating to human tissues? What is the route of entry? If the material burns, will it give off toxic byproducts?

Amount and Condition: Is there a potential for a large spill? Is the material presently contained? Is the container exposed to flame impingement? Is the container damaged?

Location: Is the container/spill near a populated area? Is it near sensitive populations or special facilities? Are there areas where the vapors will collect? Are there things such as waterways or storm drains that may trap the material or transport it to another location?

Evacuation vs. Shelter in Place. *(continued)*

Population

The number and status of the people potentially affected will have a major impact on a decision involving protective actions.

Location: How far away are the people from the incident? Are they downstream, downwind and downgrade? If not, and if the wind shifts, is this location at risk.

Characteristics: What type of area is at risk? Residential, commercial or industrial? Is it a densely populated area? What language do the residents speak? Will the number of people in the area vary with the time of day? What structural protection is available? Can the potentially affected population help themselves?

Responders

The capabilities and resources of available response organizations will determine the Incident Commander's ability to implement and control any protective actions.

Mobilization: Can responders deploy their resources quickly? What specialized resources do they have available immediately? What specialized resources do they have available under mutual aid?

Operations: Can responders control or contain the spill? Can responders transport special populations? Can they control expected traffic? Can responders set up and manage shelters?

Time

The time of day the incident occurs and how long it may last will largely determine what type of protective action to select. What day of the week is it? How long will the release last? How long will it take vapors/gases to reach populations at risk? How long will it take to deploy responders? How long will it take to set up environmental monitoring?

Evacuation vs. Shelter in Place. *(continued)*

Weather

The existing and predicted weather will affect both the dispersion of the material and the ability of people to evacuate.

Dispersion: How will the weather affect the movement of the vapors/gases? Which way is the wind blowing? How strong? Is there any rain, snow, hail, etc. (or any chance of any)? What are the normal weather patterns for the area? What is the expected weather for the next operational period?

Movement: Will bad weather block escape routes? Will the weather slow down evacuation? Will high air temperatures/humidity reduce the ability of people to remain in shelters?

Communication

The ability to communicate with the public will impact the Incident Commander's ability to notify people of protective action plans and the ability to communicate with responders will impact the Incident Commander's ability to manage the operations.

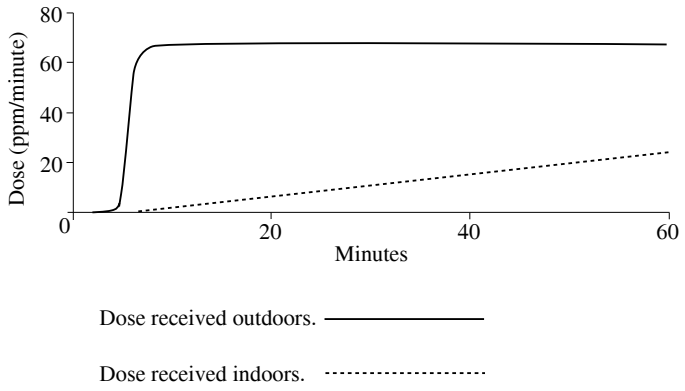
Public: Can you quickly warn the public? Can you clearly (in their own language) communicate protective action instructions?

Responders: Can you notify and deploy responders? Can responders communicate with each other? Can you access mutual aid?

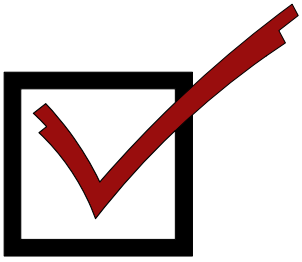
Evacuation vs. Shelter in Place. *(continued)*

Education Prior public planning and education efforts through such vehicles as the CMA Community Awareness & Emergency Response (CAER) programs can greatly increase the effectiveness of protective actions.

Dose The dose a person would receive in a structure is usually less than what they would receive in an unprotected location. The following graph from the CAMEO Air Model shows the difference between doses for a person about 200 yards downwind from a chlorine release.



Sample Evacuation Checklist



Analysis
Determine the area(s) that will require evacuation.
Estimate the number of people in the evacuation area.
Estimate the number of people needing transportation assistance.

Preparation
Coordinate with the Law Enforcement Coordinator to identify major evacuation routes and establish traffic control points.
Establish evacuation assembly points.
Notify radio and TV stations to broadcast warning.
Notify Red Cross to open designated reception centers.
Coordinate with Public Works to obtain barricades and signs.

Operational
Dispatch units to warn threatened area.
Dispatch transportation to special facilities and to the disabled, elderly and other requiring assistance.
Dispatch buses to designated assembly points.
Dispatch units to traffic and access control points.
Provide crowd control at assembly points.
Place tow trucks to assist disabled vehicles on evacuation routes.
Establish security patrols and access control procedures.

Evacuation
Monitor status of warning and evacuation progress.
Monitor traffic flow on evacuation routes.
Maintain security in evacuated area.

Evacuation Behavior.

FEMA

Research by the Federal Emergency Management Agency (FEMA) has shown some patterns in evacuations.

Route

When evacuating buildings, people will tend to follow familiar routes of exit, not the exits identified by emergency planners. Regular drills can modify this behavior.

People will follow known or familiar leaders in an evacuation.

Evacuation route capacity is 500-800 vehicles per hour per lane.

Shelters

Most evacuees view shelters as a temporary stopping point rather than a final destination. Most people (90%) won't stay in shelters at all. Shelter population will often be highly transient. Less affluent and more elderly people are more inclined to seek shelter with friends and relatives.

Information

People will often give rumors and official message equal weight in evaluating the need to evacuate. (One of the biggest factors in convincing people to evacuate is the departure of their neighbors.)

Warning messages are often seen as "orders to evacuate" regardless of the intended content of the message. Warnings from the media, although often widespread, are often less effective than word of mouth spread of information.

People will often disregard warning messages that lack specific information or that don't recommend specific actions.

Different ethnic groups will often interpret and act on warning messages differently than authorities expect or intend.

The press is often not a factor in the initial warning phase but can be a calming influence and assist in rumor control.

Evacuation Behavior. *(continued)*

Behavior

Families tend to evacuate as a unit. They will often wait to account for missing family members before evacuating.

A clear threat and clear messages from public officials can bring about evacuation rates of up to 90%. A lack of belief in the seriousness of the threat and conflicting or vague warning messages can reduce that rate. Ambiguous warning messages will lead to inaction.

Single residents, living alone, are less likely to evacuate than families. Families with children are more likely to evacuate than families without children. Elderly residents may be hesitant to evacuate.

Panic in evacuations is rare. It usually occurs when transportation routes are blocked and people feel trapped.

It is possible to evacuate special populations (including incapacitated persons in private homes) but this requires planning and long lead times for preparation.

People outside of, but near, evacuation areas will often evacuate voluntarily even in the absence of any official warning message.

Evacuation Laws.

CPC 148.3. (c) "Emergency" as used in this section means any condition which results in, or which could result in, the response of a public official in an authorized emergency vehicle, or any condition which jeopardizes or could jeopardize public safety and results in, or could result in, *the evacuation of **any** area, building, structure, vehicle or of **any** other place which any individual may enter.*

CPC 409.5(a) Whenever a menace to the public health or safety is created by a calamity such as flood, storm, fire, earthquake, explosion, accident, or other disaster, officers of the California Highway Patrol, California State Police Division, police departments, marshal's office or sheriff's office, any officer or employee of the Department of Forestry and Fire Protection designated a peace officer by subdivision (h) of Section 830.2, any officer or employee of the Department of Parks and Recreation designated a peace officer by subdivision (g) of Section 830.2, any officer or employee of the Department of Fish and Game designated a peace officer under subdivision (f) of Section 830.2, and any publicly employed full-time lifeguard or publicly employed full-time marine safety officer while acting in a supervisory position in the performance of his or her official duties, *may **close** the area where the menace exists* for the duration thereof by means of ropes, markers, or guards to any and all persons not authorized by the lifeguard or officer to enter or remain within the enclosed area. *If the calamity creates an immediate menace to the public health, the local health officer may close the area* where the menace exists pursuant to the conditions set forth in this section.

CPC 409.5(c) *Any* unauthorized person who willfully and knowingly enters an area closed pursuant to subdivision (a) or (b) *and who **willfully remains** within the area after receiving notice to evacuate* or leave shall be guilty of a misdemeanor.

Evacuation Laws.

H&SC 25149(b) The director shall, pursuant to subdivision (c), conduct the hearing specified in subdivision (a) to determine whether the operation of an existing hazardous waste facility may present an imminent and substantial endangerment to health and the environment whenever any of the following occurs:…(1) …a state or federal public agency ***requires*** *any person to evacuate a* ***residence*** or requires the evacuation of a school, place of employment, commercial establishment, or other facility to which the public has access, because of the release of a hazardous substance from the facility.

H&SC 25396(r) "Remove" or "removal" means the cleanup or removal of released hazardous substances from the environment, those actions which may be necessarily taken in the event of the threat or release of hazardous substances into the environment, those actions which may be necessary to monitor, assess, and evaluate the release, or threat of release, of hazardous substances, the disposal of removed material, and the taking of other actions which may be necessary to prevent, minimize, or mitigate damage to the public health or the environment, which may otherwise result from a release or threat of release. ***"Remove" or "removal" also includes,*** but is not limited to, security fencing or other measures to limit access, provision of alternative water supplies, and ***temporary evacuation and housing*** of threatened individuals not otherwise provided.

H&SC 25375(a) …the following losses are compensable pursuant to this article: (5) One hundred percent of the expenses incurred due to the *evacuation of a* ***residence ordered*** *by a state or federal agency.* For purposes of this paragraph, "evacuation expenses" include the cost of shelter and any other emergency expenditures incurred due to an *evacuation ordered by a state or federal agency.*

If They Don't Want to Leave…

Notice of Evacuation

Issuing Agency: _____ Date: _____

_____ Time: _____

Evacuee Information:

Name: _____ Phone: _____

Address: _____ Sex: _____ DOB: _____

City: _____ State: _____ Race: _____

You have been ordered, instructed and/or informed to vacate the premises listed above forthwith due to: _____.

The immediate, temporary evacuation of the indicated premises is ordered in the interest of public safety. If you willfully fail to obey the lawful order of the Peace Officer issuing this warning you may be subject to arrest under the provisions of Section 409.5 of the California Penal Code.

By your refusal to leave this area immediately you hereby release all City, County, State and Federal Government Agencies and all their employees, Officers, Agents and Members (involved in this specific incident only) from any present or future obligation or responsibility, and that you by your signature below, relieve the same from any and all actions, causes of actions, damages, claims and demands, in law or in equity, of every kind and character, due to your failure or refusal to vacate the area.

Your signature below certifies you have been so informed and refuse to leave.

_____ _____

Name of person refusing evacuation. Signature of person refusing evacuation.

_____ _____

Person issuing Notice. Witness.

Participant Worksheet

1. In your own words, define "Evacuation" and "In-Place Protection":

2. List at the reasons why "Materials Involved" is the most important consideration in deciding what protective action to implement:

3. Provide an example when "Evacuation" would be an appropriate Protective Action taken by First Responders:

4. Provide an example when "Shelter-in-Place" would be an appropriate Protective Action taken by First Responders:

Block J

Decontamination, Disposal & Documentation: (D.D.D.)

Main Points

- Review of Primary FRO Actions
- Decontamination
- Minimizing Exposure and Contamination
- Why, When, Who/What and How of Decon
- Emergency Decontamination
- Decon Team Personnel, Roles and Responsibilities
- Disposal Requirements
- Funding Requirements
- Hazmat Documentation and Reporting
- Chemical Exposure Records

Block Outline

1. Review Primary FRO Actions.

a. **S**afety, **I**solation, **N**otifications, **C**ommand, **I**DHA and **A**ction Plans, **P**rotective equipment; **C**ontainment and **P**rotective actions.

b. Response actions *within safety and resource capabilities:*
   1) Conduct **D**econ as needed.
   2) Ensure clean-up and proper **D**isposal.
   3) Keep **D**ocumentation for later records and reports.

2. Decontamination.

a. Decon: process of removing or neutralizing contaminants from personnel and/or equipment.
   1) Responder decon.
      a) Provided to personnel working in Exclusion Zone and/or Contamination Reduction Zone.
      b) Normally done by hazmat teams.
   2) Emergency decon.
      a) Urgent, field expedient process.
      b) Use any available water source.
      c) Intended for exposed persons displaying symptoms.
      d) Normally done by first responders.

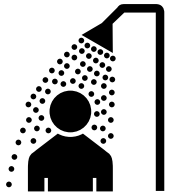
3. Minimizing Exposure and Contamination.

a. Follow basic safety precautions.

b. Establish and observe control zones.

c. Ensure all responders follow above!

Decontamination



Purpose **To prevent spread of contamination.**

When Anytime contamination is suspected.

What People (victims and responders), equipment, etc.

How Only general *guides* based on needs of the event.

Decon Tips/Guides

Initial planning, training and SOGs are important.
Establish contamination reduction zone/corridor.
Use decon set-up/stations as per SOG.
Establish a decon team under a decon leader.
Ensure that decon team has the proper tools.
Observe standard safety guides.
Use proper PPE level.
For medical emergency decon prior to transport.
Decon equipment & retain run-off.

4. Why, When, Who/What and How of Decon.

a. Why: Prevent spread of contamination/Hazmat problem.
   1) Exposure vs. contamination.
      a) Exposure: it **might** be on you.
      b) Contamination: it **is** on you.
   2) Factors affecting degree of exposure/contamination:
      a) Amount of material on you.
      b) Length of time material is on you.
      c) Concentration of stuff you're exposed to.
      d) Physical state of material.
      e) Ambient temperature.

b. When to decon: Anytime you suspect contamination.
   1) Indications of contamination:
      a) Material is visible.
      b) Victim(s) complains of pain, odor, etc.
      c) Victim(s) was/were in area of a known release.
      d) Warning: many hazardous materials are odorless, colorless, tasteless and their acute effects may not show up immediately. You may not be able to confirm contamination. If in doubt, decon!

Exposure vs. Contamination.

Exposure

Contamination

4. Why, When, Who/What and How of Decon. *(cont.)*

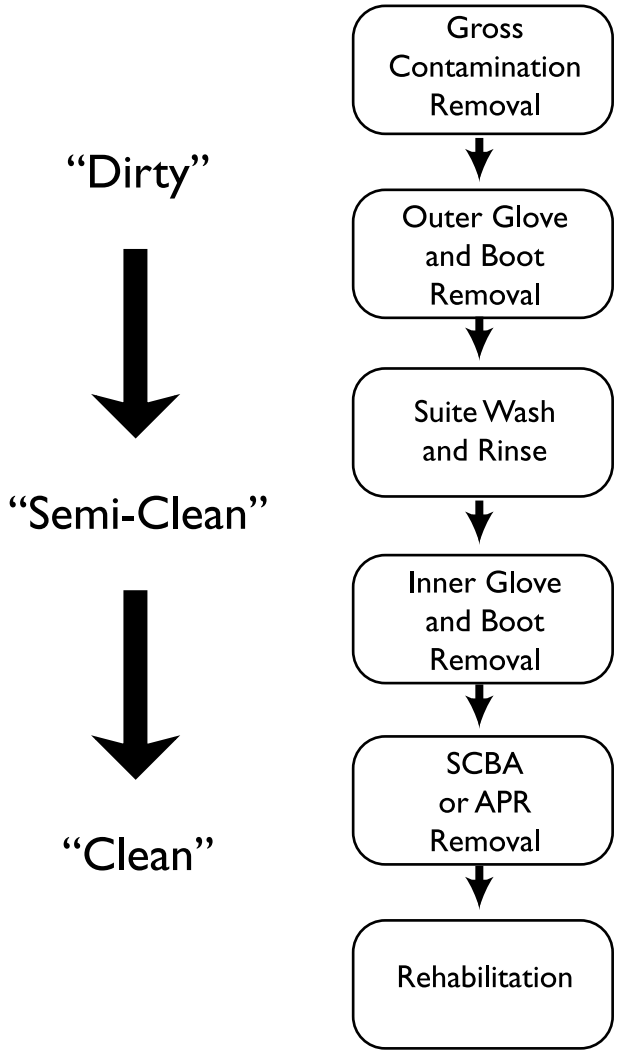
c. Who/What should you decon?
   1) Victims,
   2) Responders and
   3) Equipment.

d. Who usually does responder decon?
   1) FROs (properly trained and equipped).
   2) Hazmat Technicians and Specialists on a Hazmat Team.

e. How to perform decon.
   1) No absolute methods.
   2) *Only general guides.*
      a) Physical removal.
      b) Chemical removal.
      c) Emergency decon.
   3) Procedures follow a logical order of going from "dirty" (i.e. contaminated) to "clean" (i.e. uncontaminated).
      a) Check your emergency response plan for further details.
   4) Protective clothing for planned decon.
      a) Same level as entry team or,
      b) One level below that of entry team.
      c) Decision depends on degree of hazard, amount of contamination and potential time of exposure.

f. Consequences of no decon/improper decon.
   1) Acute/Chronic health effects.
   2) Spread of problem.
   3) Death!

Typical Contamination Reduction Corridor Stations.



5. Emergency Decontamination.

a. FROs should perform emergency decontamination when victims have been exposed or anytime you suspect exposure.

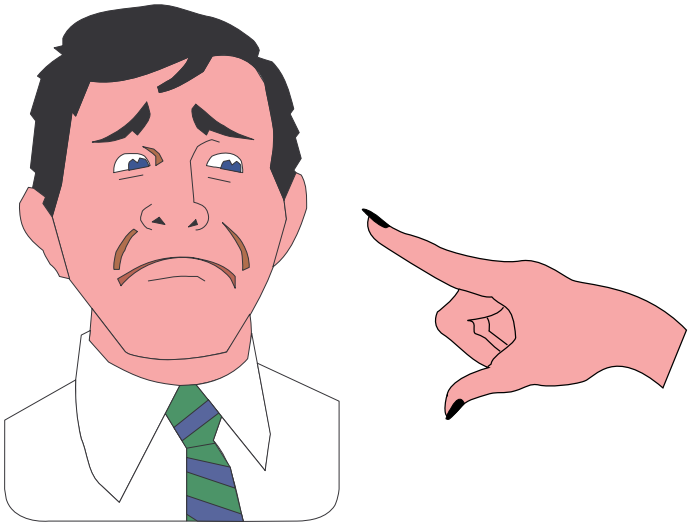
b. Guidelines for emergency decon.
   1) Move victim to least environmentally sensitive area.
   2) Flush with copious amount of water.
   3) Remove *all c*ontaminated clothing (including underwear) and continue flushing with water.
   4) Avoid the following:
      a) Brushes and abrasives: can produce skin lesions that allow further contamination.
      b) Hot water: promotes peripheral vasodilation and can increase absorption of toxins.
      c) Decon solutions: can cause drastic changes in pH. Dilute bleach can damage body tissues (e.g. eyes or wounds).

c. Precautions in emergency decon.
   1) Remove clothing (may have to cut off).
   2) Minimize contact with contaminated clothing.
   3) Segregate/isolate removed clothing.
   4) Ensure modesty of anyone decontaminated.
      a) Provide barriers to shield victims from spectators.
      b) Provide temporary garments or covering.
      c) Segregate sexes.

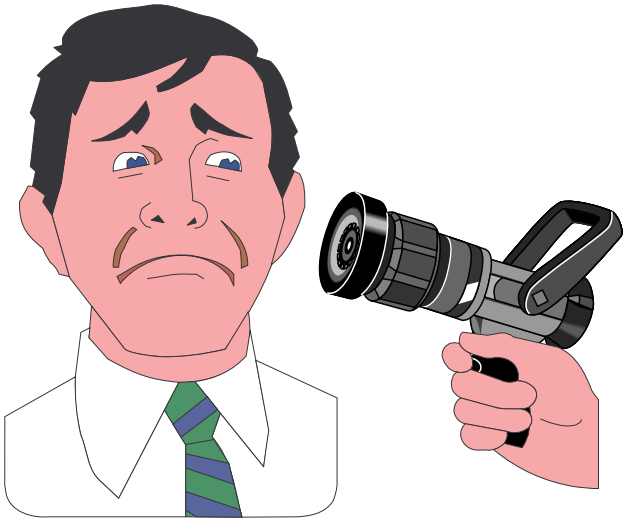
d. Emergency decon and emergency medical treatment.
   1) Decon contaminated victims prior to transporting.
   2) Protect equipment and vehicles from contamination.
   3) Segregate any contaminated materials.

Emergency Decon Procedures.

1. Move victim(s) to least environmentally sensitive area.



2. Flush victim(s) with water (low pressure!).



3. Remove clothing (all!).

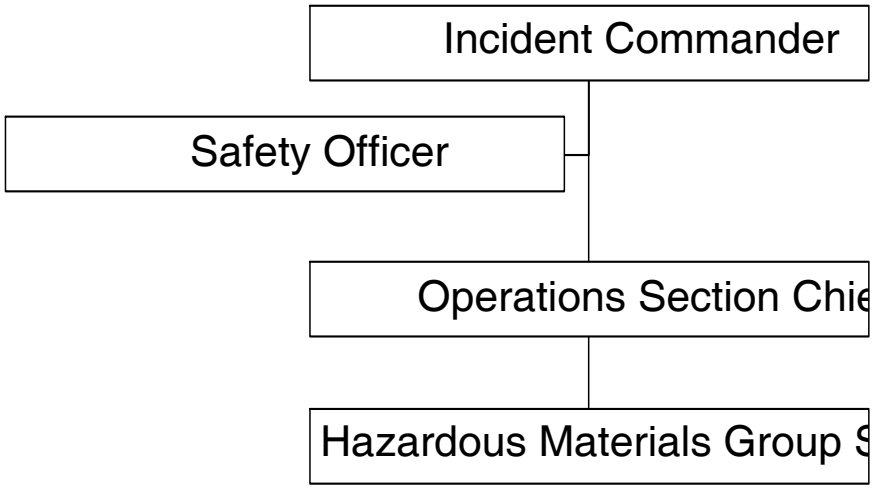
(Sorry, no more room on the page for illustrations!)

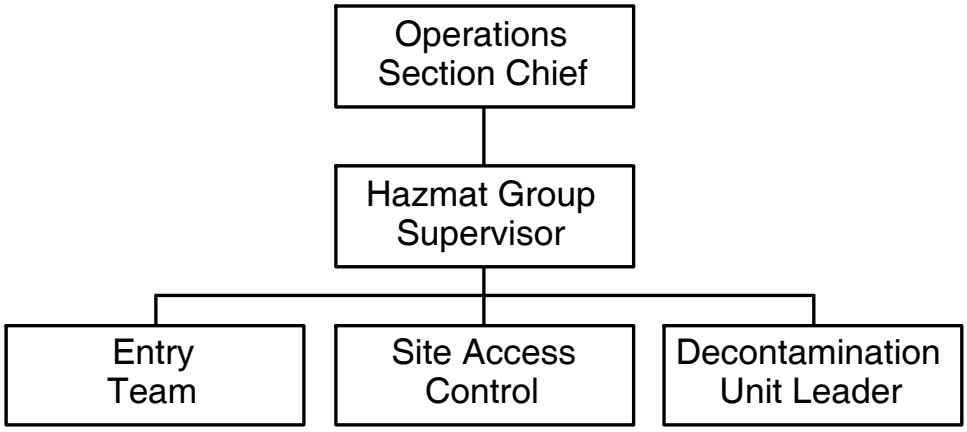
6. Decon Team Personnel, Roles and Responsibilities.

a. Emergency response plan must include provisions for decon.
   1) Know required equipment & procedures.
   2) Know location of emergency showers & eyewash stations.

b. Incident Command System roles.
   1) Hazmat Group Supervisor (under Operations). Manages all tactical operations carried out in the Exclusion Zone.
      a) Entry Team.
      b) Site Access Control.
      c) Decon Unit Leader (responsible for all decon operations).
   2) Decon Unit Leader (under Hazmat Group Supervisor). Responsible for operations of Decontamination Unit.
      a) Establish Contamination Reduction Corridor (CRZ).
      a) Identify contaminated people and equipment.
      a) Supervise decon unit.
      a) Control of movement within CRZ.
      a) Coordinate transfer of contaminated patients.
      b) FROs may be trained to fill Decon Unit roles.

Hazardous Materials Group.





7. Disposal Requirements.

a. A Hazmat incident almost always creates Hazardous Waste.
   1) Hazardous Waste is any Hazmat that can't be reused.
   2) Hazardous Waste possesses one or more characteristics:
      a) Toxic.
      b) Reactive.
      c) Ignitable (Flash Point of 141 degrees or less).
      d) Corrosive (pH of 2 or less/12.5 or more).

b. Federal and State Governments have hazardous waste disposal requirements—You must know them and follow them.
   1) Hazardous Waste must legally be tracked from "Cradle to Grave" (i.e. Generator ∏ Transporter ∏ Treatment, Storage & Disposal Facility).
      a) Disposing of hazardous waste has strict requirements for documentation that apply to all generators (including government agencies).
      b) "Flushing Hazmats Away" harms the environment, is no longer acceptable, *and is often a violation of the law!*
   2) Original owner (e.g. DRMO for military waste) may recover abandoned hazardous waste if requested.

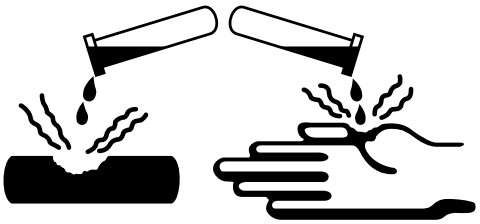
Hazardous Waste.

For Hazardous Waste to be ***"Hazardous"*** it must be…

Toxic

Reactive

Ignitable



Corrosive

…as per the definitions in Title 22, CCR §66261.

8. Funding Requirements.

a. Funding for Hazmat emergencies and clean-up should start and end with "Responsible Party" provided:
   1) Responsible party accepts clean-up duty.
   2) Conducts clean-up adequately and safely.

b. Local agencies have clean-up funding responsibility if:
   1) No responsible party identified.
   2) Responsible party refuses or does inadequate clean-up.

c. State may provide funding if:
   1) No responsible party or local funding, *and threat to life.*
   2) You ask for the money!
      a) Call State Warning Center at (800) 852-7550.
      b) Don't spend money until you get authorization.

d. Main state funding agencies:
   1) Department of Toxic Substances Control (DTSC).
   2) Dept of Fish and Game (DFG or OSPR).
   3) Others (RWQCB, CalTrans, State Lands, etc.)

e. Federal Funds — access via the Federal On-Scene Coordinator (FOSC) — call (800) 424-8802.
   1) "Superfund" (CERCLA)
   2) Oil Spill Liability Trust Fund (OSLTF)

Funding Sources.

Agency	**U. S. Coast Guard, Oil Spill Liability Trust Fund.**
Criteria	The discharge must involve "oil" (Includes animal, mineral or vegetable oils.) and must be in or threaten a "navigable waterway". (Includes tributaries thereof and adjoining shorelines.)
Max. Amount	$250,000.00 per incident.
Contact	State OES Warning Center 800-852-7550.
Agency	**U. S. EPA, CERCLA (i.e. "Superfund")**
Criteria	Release of a hazardous substance into the environment.
Max. Amount	$25,000.00 per incident. (Reimbursement)
Criteria	Access via FOSC: 1-800-424-9346.
Agency	**CAL/EPA, Emergency Reserve Account.**
Criteria	No responsible party. No alternate funding available.
Max. Amount	$20,000.00 per incident.
Contact	State Warning Center 800-852-7550.
Agency	**Dept. of Fish and Game, Cleanup and Abatement Account**
Criteria	Discharges/releases that threaten wildlife or their habitat.
Max. Amount	$5,000.00 immediately available (more with approval).
Contact	State Warning Center 800-852-7550.

9. Hazmat Documentation and Reporting.

a. Documentation needed in Hazmat incidents.
   1) Role of FRO in documentation.
      a) Capture key info in initial stages of incident.
      b) May be your only chance to do this!
   2) Use ICS 214 (Unit Log).

b. Reasons for documentation.
   1) Cost recovery,
   2) Exposure records,
   3) Training records,
   4) Investigations,
   5) Future lawsuits.

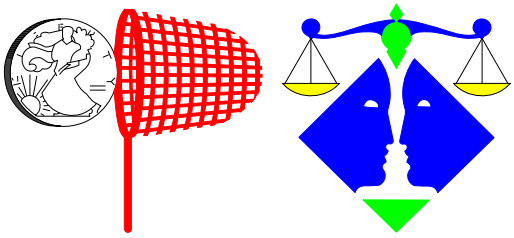
c. Basic components of good scene documentation:
   1) Date, time and location,
   2) Names of all response personnel and exposure times,
   3) Incident conditions, observations and statements,
   4) Chemical names, weather conditions, release factors, etc.
   5) Actions taken, resources used, costs incurred, etc.
   6) Casualties, sample data, extraordinary circumstances, etc.
   7) Statements & observations of witnesses,
   8) Diagrams, photos, video, samples, etc.

d. Hazmat incident reports:
   1) CHP 407E.
   2) CFIRS report.
   3) Employer may require own Hazmat reports.
   4) Responsible party report (SARA Title III §304).

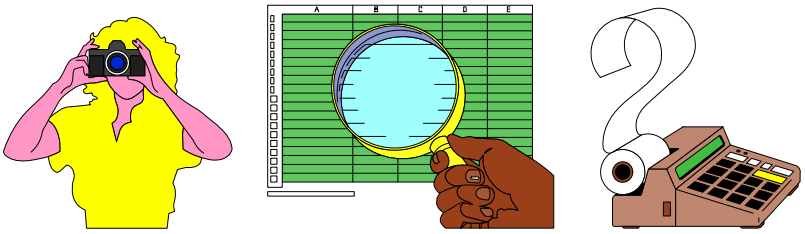
Documentation & Reporting.

Remember: Documentation & Reporting helps managers understand the Hazardous Materials Problem.

Documentation also helps with cost recovery & lawsuits.



Know Basic Components of good Documentation.



Keep your own chemical exposure records.

Hazmat reports should be complete and accurate.

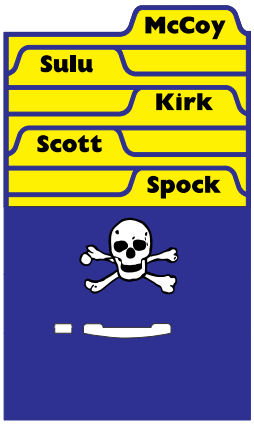
10. Chemical Exposure Records.

a. Employer shall keep exposure records for employees (and retain them for 30 years).

b. All responders should also keep their own exposure records.

c. Exposure Records should include:
   1) Date, time, location and incident number,
   2) Responder's name,
   3) Chemical name,
   4) Type and concentration/duration of exposure,
   5) Decon and medical aid given, etc.

Exposure Records



Chemical Exposure Records Should Include:

Dates, Time, Location & Incident/Event Number

Names of Material(s) & Responder

Type, Concentration & Duration of Exposure

Decon, Medical Treatment, Related Circumstances, etc.

Employer must retain exposure records for at least 30 years.

Title 8 CCR 3204(d)(1)(A) Employee Medical Records

Title 8 CCR 3204(d)(1)(B) Employee Exposure Records

29 CFR 1910.1020(d)(1)(i) Employee Medical Records

29 CFR 1910.1020(d)(1)(i)(C)(ii) Employee Exposure Records

Disposal Issues

Remember:	Need to dispose of hazardous materials legally and properly!!! Know State law and your jurisdiction's disposal policy/SOP.
Funding	Funding for Hazmat clean-up should start with the responsible party — BUT, may end up in local, state and federal government's lap.
Funding	Know how and where to request funds through proper channels!
RP	Responsible Party should: Accept responsibility for clean-up Give clean-up high priority Conduct clean-up safely and adequately
Local Govt.	Local agencies have a clean-up role if: There is no responsible party or... Responsible Party refuses to take safe & adequate action.
State	State agencies may provide funding.* Call State Warning Center (800) 852-7550
Federal	Federal agencies may provide funding.* Call National Response Center (800) 424-8802

*Strict conditions apply. *Obtain authorization first!*

Decontamination Case History

Problem A large chemical manufacturer experienced a chemical reaction to one of its large blending tanks. The primary chemical involved was Hexanediacrylate.

Action Taken Upon arrival, a Captain and two firefighters donned turnouts and SCBAs before entering the structure to size-up conditions.

Error Made Upon exiting the structure, the Captain walked over to the Command Post, removed his facepiece and proceeded to report on conditions. The two firefighters, however, kept their SCBA facepieces in place until after they had taken a booster hose line and decontaminated themselves by thoroughly flushing each other off with water.

Results By not decontaminating himself before removing his SCBA facepiece, the Captain breathed lethal chemical vapors evolving from his turnouts. Due to this error, he has been medically retired and is expected to die due to the chemical vapors permanently altering his central nervous system.

Decontamination Liability—Runoff.

42 USC §9607(d) (CERCLA)

General "… no person shall be liable under this subchapter for costs or damages as a result of actions taken or omitted in the course of rendering care, assistance, or advice in accordance with the National Contingency Plan ('"NCP"') or at the direction of an on-scene coordinator appointed under such plan, with respect to an incident creating a danger to public health or welfare or the environment as a result of any releases of a hazardous substance or the threat thereof. This paragraph shall not preclude liability for costs or damages as the result of negligence on the part of such person."

Government "No state or local government shall be liable under this subchapter for costs or damages as a result of actions taken in response to an emergency created by the release or threatened release of a hazardous substance generated by or from a facility owned by another person."

Fine Print "This paragraph shall not preclude liability for costs or damages as a result of gross negligence or intentional misconduct by the state or local government. …reckless, willful, or wanton misconduct shall constitute gross negligence."

EPA Policy "EPA will not pursue enforcement actions against state and local responders for the environmental consequences of necessary and appropriate emergency response actions…Contaminated run-off should be avoided whenever possible, but should not impede necessary and appropriate actions to protect human life and health." USEPA letter dated September 17, 1999, Office of Solid Waste and Emergency Response, Mr. Jim Makris.

Decontamination Liability—Emergency Decon.

Federal Way, WA 1996

Drug Lab

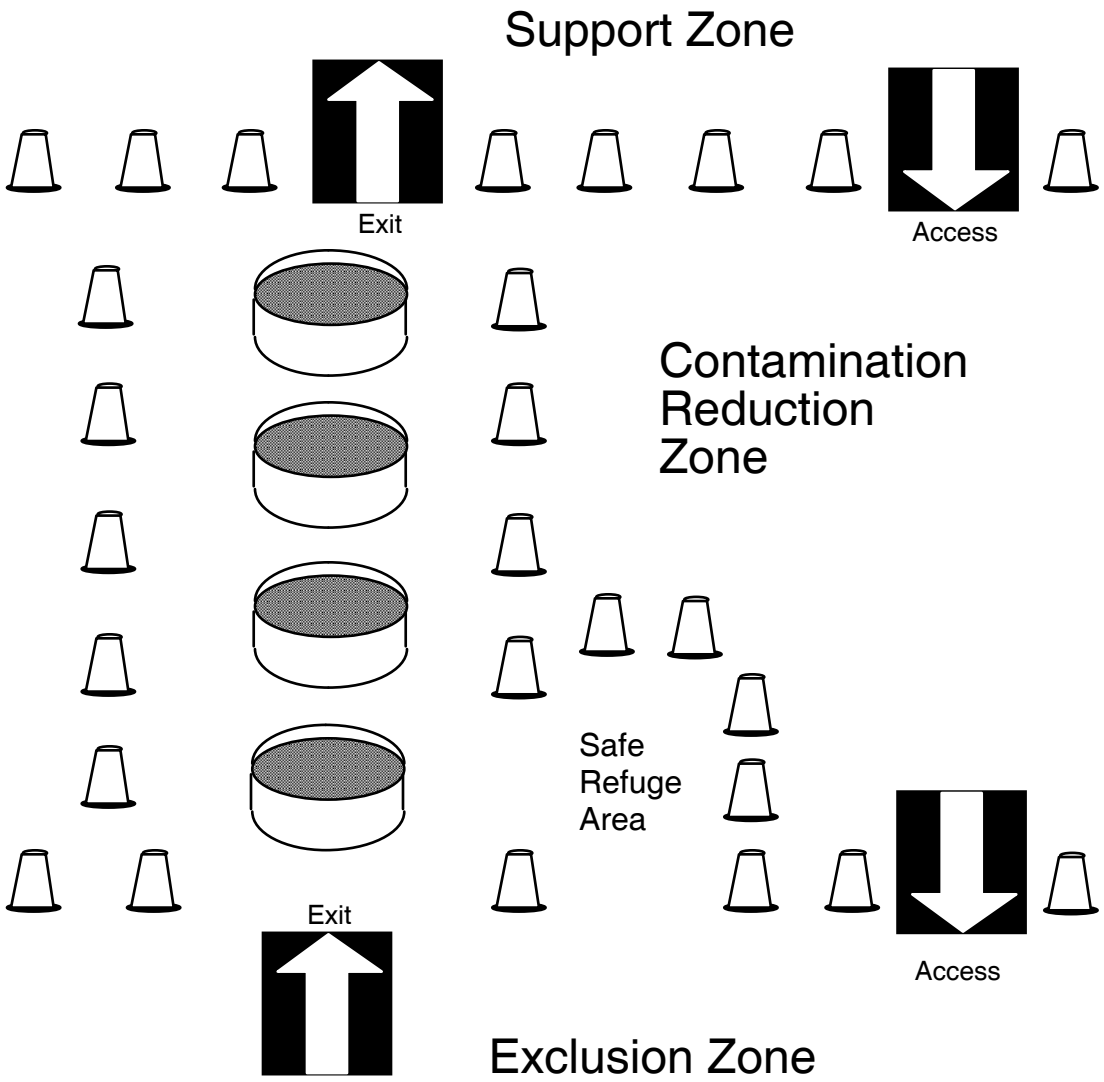
On April 15, 1996 police officers raided a clandestine methamphetamine lab in an apartment house. They arrested two suspects. Shortly thereafter, the local fire department directed seven of the officers to undergo emergency decontamination. Two of the officers were women. The women later filed a complaint against the fire district alleging the firefighters (all male) forced them to take off all of their clothes behind a makeshift shelter. They alleged the male firefighters "peered at them and made degrading remarks about their figures…" during the decontamination process. A mediator agreed with them and awarded each of the female police officers $105,000.00. The fire district had to pay $100,000.00 to each woman and the county had to pay $5,000.00. (Source: Seattle Times, July 11, 1996, page B1)

Earlimart, CA 1999

Pesticides

On November 13, 1999 farm workers applied a soil fumigant (Sectagon 42) to a 75-acre potato field. A noticeable odor from the product later drifted into a residential area. Emergency responders arrived and found the substance contained metam sodium. They began emergency decontamination procedures for everyone who had been exposed. Although the responders provided temporary shelters, the residents felt this was inadequate and objected to having to remove their clothes in the presence of emergency response personnel, spectators and the media. They later voiced their objections to the County Board of Supervisors and a member of the California Assembly. (Source: Fresno Bee, December 9, 1999 and Associated Press, December 9, 1999)

Typical Contamination Reduction Corridor.



Participant Worksheet

1. In your own words, define "Decontamination" and explain why it is necessary during Hazmat incidents:

2. Per local jurisdictional policy, briefly describe your Decon procedures:

3. Per local jurisdictional policy, briefly identify how Hazardous Materials will be properly disposed of at Hazmat incidents:

4. Identify the reasons for, and components of, good documentation during Hazmat incidents:

Block K

Exercises & FRO Exercise Briefing

Main Points

- Exercise Definition
- Why Exercise
- Four Types of Exercises
- Instructions for FRO Exercise

Block Outline

1. Exercise Definition.

a. Training tool to improve performance.

b. An activity to promote preparedness, test plans, operations, SOGs or facilities, and train personnel in proper response.

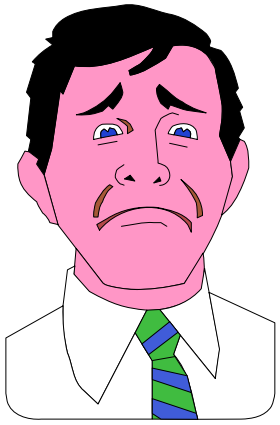
2. Why Exercise.

a. Many benefits including:
   1) Reveal planning weaknesses,
   2) Identify resource gaps,
   3) Clarify real roles and capabilities,
   4) Improve coordination, performance and confidence,
   5) Build *teamwork,*
   6) Foster cooperation and support,
   7) Help responders stay alive.

Testing versus Training.

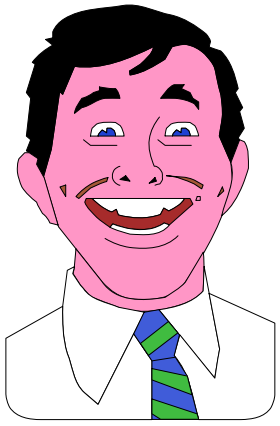
We test…

Plans,
Procedures &
Equipment.



We train…

People!



3. Four Types of Exercises.

a. Orientation Seminar — "Tell Me" exercise/discussion.

b. Tabletop Exercise — "Talk Me Thru It" exercise/discussion.

c. Functional Exercise — "Partial Practice" exercise.

d. Full Scale Exercise — "Full Practice" exercise.

4. Instructions for First Responder Exercise.

a. What we will do.

b. Where we'll do it.

c. Who will do what.

d. Safety briefing.

Types of Exercises.

Orientation Seminar

Tabletop Exercise

Functional Exercise

Full Scale Exercise

Participant Worksheet

1. Given the Exercise and/or Case Study Scenario provided by the Instructor, describe proper safety, isolation and notifications:

2. Given the Exercise and/or Case Study Scenario provided by the Instructor, provide IDHA using the DOT Emergency Response Guide:

3. Given the Exercise and/or Case Study Scenario provided by the Instructor, identify the proper and safe Containment method and Protective Action option you would select for the incident:

4. Given the Exercise and/or Case Study Scenario provided by the Instructor, identify the key information to give to the IC:

OR Per First Responder Exercise Introduction & Instruction Sheet — Participate in a FRO exercise meeting required objectives.

Block L

Putting it all Together and Graduation

Main Points

- Course Purpose & Content
- How This Fits Together
- Know Your Limitations
- Course Critique
- Issue Certificates
- Concluding Remarks

Block Outline

1. Course Purpose and Key Course Content.

a. Course Purpose: Be a safe & competent responder within your appropriate level, resources and capabilities!

b. Key course content: Review performance objectives.

c. Know Dos for FROs.

d. Review final exam (as needed).

e. The key class teaching point: _____.

2. How This All Fits Together.

a. First Responder "Awareness": **S.I.N.**

b. First Responder "Operations": S.I.N.C.I.A.P.C.P.D.D.D.

c. **F**aithfully **R**espond to any Hazmat event with **S**afety and **C**ompetence. (FRSC — the final acronym in this class!)

3. Know Your Limitations.

a. You are at the First Responder Operations level:
   1) Know your real resources and capabilities.

b. You are not a Technician or Specialist:
   1) "A little bit of knowledge can be more dangerous than none."

First Responder Course Key Points.

DO	Recognize your level and role in a hazmat response.
DO	Understand the capabilities and limits of responders.
DO	Make proper notifications and requests for aid.
DO	Understand hazmat is a multi-agency response.
DO	Understand need to coordinate with those agencies.
DO	Appreciate need for pre-event & event planning.
DO	Recognize that toxicology is deadly important.
DO	Demand response is safe via isolation & perimeters.
DO	Assume command, set unified CP & use ICS.
DO	A complete identification and hazard assessment.
DO	Ensure proper safety equipment for responders.
DO	Try for safe containment and protective actions.
DO	Proper decon, clean-up and disposal.
DO	Maintain good documentation and reporting.
DO	Know the hazmat laws and points of liability.
DO	Recognize the need for investigations during response.
DO	Strive for increased competence and safety.
DO	Use the tools of training, exercising and critiques.
DO	Be careful and competent out there!

4. Complete Verbal and Written Class Critique.

a. Please candidly identify what was positive about class, and more importantly what we can do to better meet your training needs.

b. We want your constructive comments.

5. Issue Certificates to Participants Meeting Performance Standards.

a. Hope that means YOU!!

b. Check your certificate. (Did wee spell yur naim currectlee?)

6. Concluding Remarks.

a. Make a positive difference in responding to Hazmat events!

b. Be part of the solution — Not part of the problem!

c. And don't forget: ***Let's be careful and competent out there!!!***

Congratulations!