



Hazardous Materials for First Responders

4th Edition

Chapter 3 — Awareness-Level Actions at Hazardous Materials Incidents

**HAZ MAT FOR
FIRST RESPONDERS**



International Fire Service Training Association

DISCUSSION QUESTION



What are the Awareness-Level personnel's responsibilities at an incident involving hazardous materials?

Learning Objective 1

Discuss predetermined procedures and emergency response plans.

DISCUSSION QUESTION



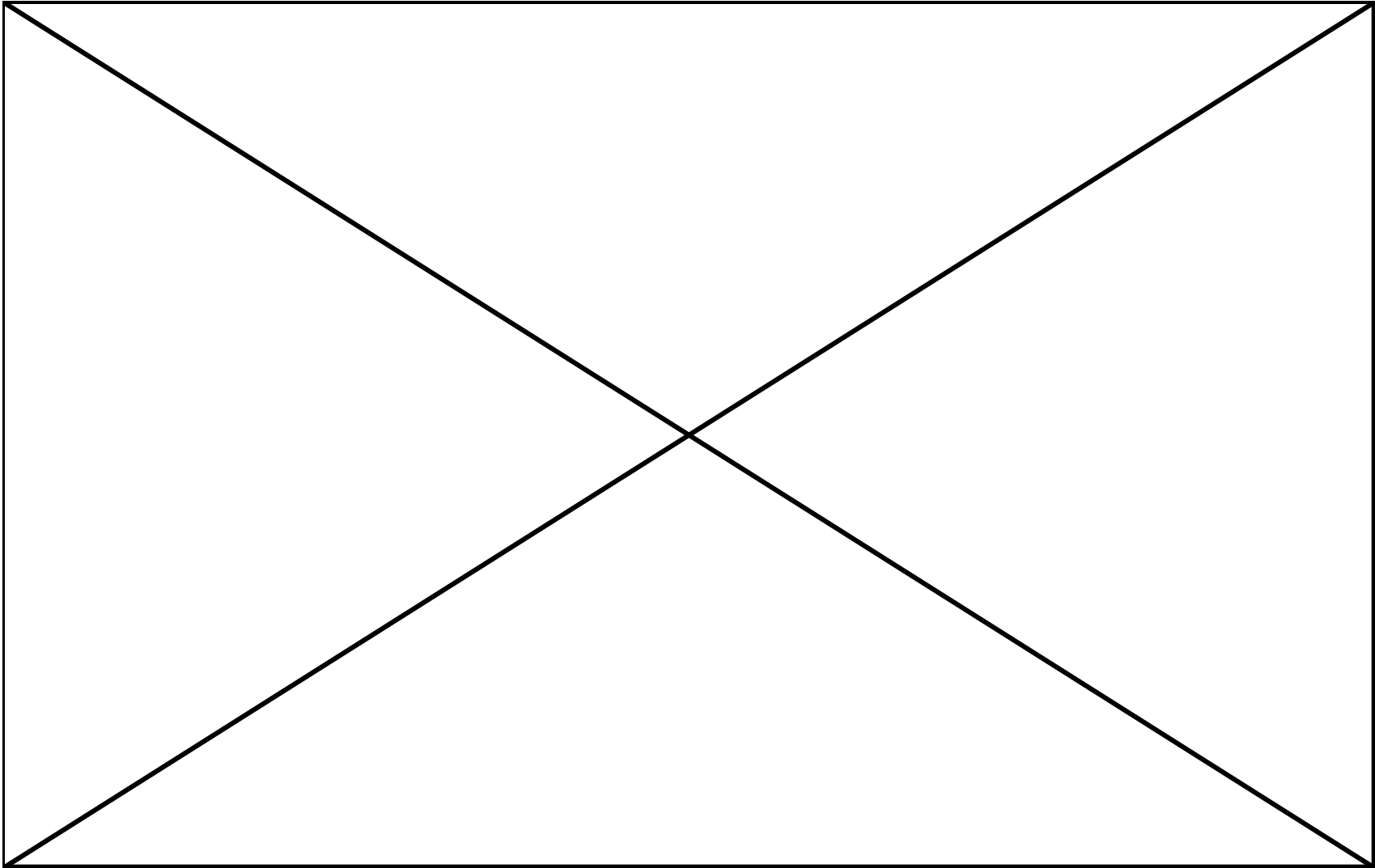
What are predetermined procedures called in your jurisdiction?

Predetermined procedures give guidance on-scene.

Click for
next slide



Courtesy of U.S. Air Force



Learning Objective 2

Describe notification requirements.

Notification requirements for contacting law enforcement should be in SOPs.



*Courtesy of U.S. U.S. Army Corps of Engineers,
photo by RobHaynes*

REVIEW QUESTION



What is the purpose of predetermined procedures and emergency response plans?

Learning Objective 3

Discuss the use of the *Emergency Response Guidebook (ERG)*.

The Emergency Response Guidebook (ERG) has several uses.

Aides in quickly identifying specific or generic habits



Aides in protecting responders and general public



Does not address all possible circumstances



Designed for use at highway or railroad incidents




Associated with open areas



Limited value in fixed-facility locations or urban settings

The *ERG* ID Number Index is marked by yellow pages.



ID No.	Guide No.	Name of Material	ID No.	Guide No.	Name of Material
1560	157	Arsenic chloride	1581	123	Methyl bromide and Chloropicrin mixture
1560	157	Arsenic trichloride	1582	119	Chloropicrin and Methyl chloride mixture
1561	151	Arsenic trioxide	1582	119	Methyl chloride and Chloropicrin mixture
1562	152	Arsenical dust	1583	154	Chloropicrin mixture, n.o.s.
1564	154	Barium compound, n.o.s.	1585	151	Copper acetoarsenite
1565	157	Barium cyanide	1586	151	Copper arsenite
1566	154	Beryllium compound, n.o.s.	1587	151	Copper cyanide
1567	134	Beryllium powder	1588	157	Cyanides, inorganic, n.o.s.
1569	131	Bromoacetone	1588	157	Cyanides, inorganic, solid, n.o.s.
1570	152	Brucine	1589	125	CK
1571	113	Barium azide, wetted with not less than 50% water	1589	125	Cyanogen chloride, stabilized
1572	151	Cacodylic acid	1590	153	Dichloroanilines
1573	151	Calcium arsenate			
1574	151	Calcium arsenate and Calcium			

(Continued)


REVIEW QUESTION



What does it mean if the material in the yellow or blue index is highlighted?

What is a TIH material?

The *ERG* Material Name Index is marked by blue pages.



Name of Material	Guide No.	ID No.	Name of Material	Guide No.	ID No.
H	153	2810	Hexafluoroacetone hydrate	151	2552
Hafnium powder, dry	135	2545	Hexafluoroacetone hydrate, liquid	151	2552
Hafnium powder, wetted with not less than 25% water	170	1326	Hexafluoroacetone hydrate, solid	151	3436
Halogenated irritating liquid, n.o.s.	159	1610	Hexafluoroethane	126	2193
Hay, wet, damp or contaminated with oil	133	1327	Hexafluoroethane, compressed	126	2193
Hazardous waste, liquid, n.o.s.	171	3082	Hexafluorophosphoric acid	154	1782
Hazardous waste, solid, n.o.s.	171	3077	Hexafluoropropylene	126	1858
HD	153	2810	Hexafluoropropylene oxide	126	1956
Heating oil, light	128	1202	Hexaldehyde	130	1207
			Hexamethylenediamine, solid	153	2280

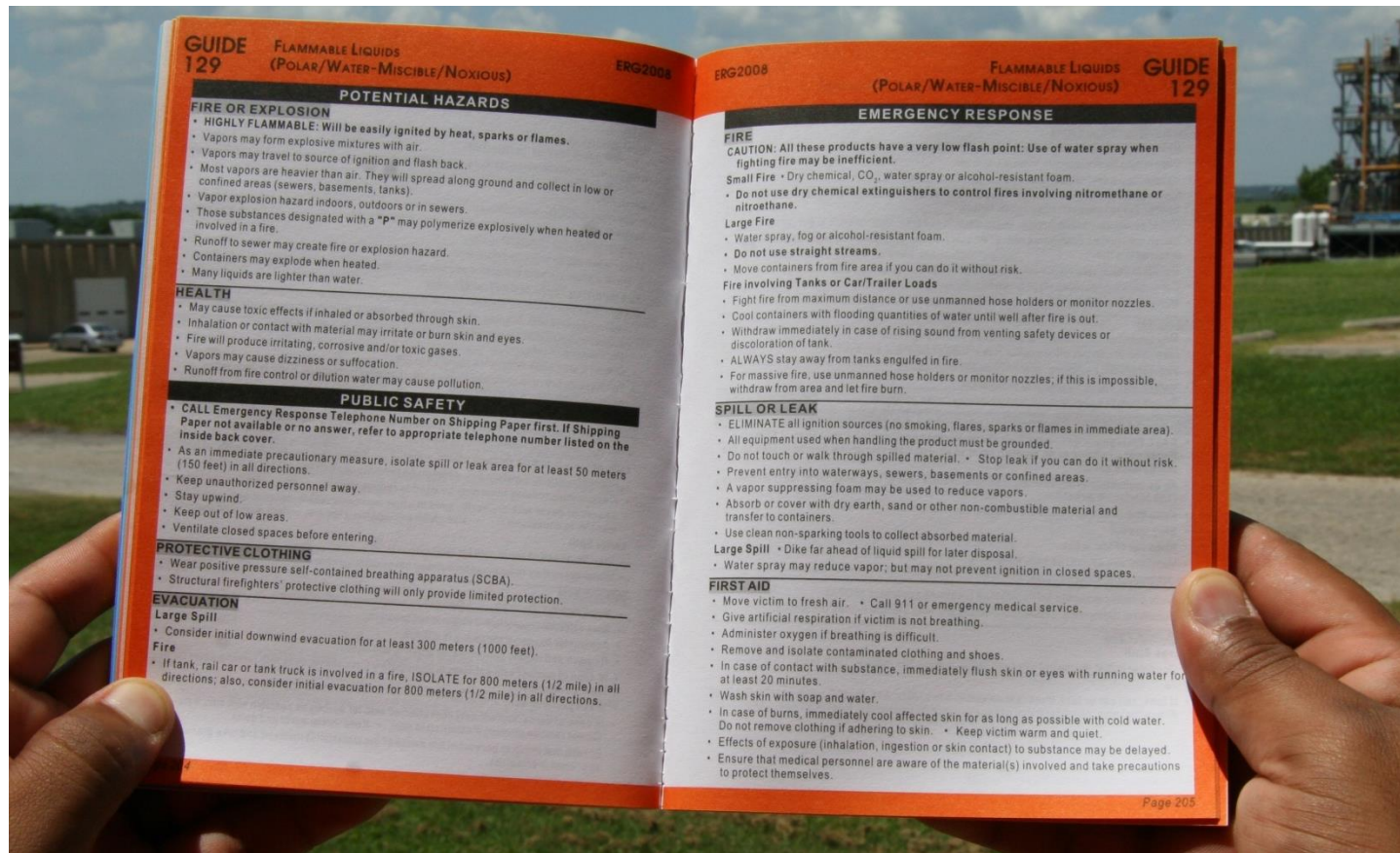
REVIEW QUESTION



What is provided on the yellow-shaded pages of the *ERG*?

What is provided on the blue-shaded pages of the *ERG*?

ERG Initial Action Guides are marked by orange pages.



The left page has safety related information.

GUIDE 117	GASES - TOXIC - FLAMMABLE (EXTREME HAZARD)	ERG2008
POTENTIAL HAZARDS		
HEALTH <ul style="list-style-type: none">• TOXIC; Extremely Hazardous.• May be fatal if inhaled or absorbed through skin.• Initial odor may be irritating or foul and may deaden your sense of smell.• Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.• Fire will produce irritating, corrosive and/or toxic gases.• Runoff from fire control may cause pollution.		
FIRE OR EXPLOSION <ul style="list-style-type: none">• These materials are extremely flammable.• May form explosive mixtures with air.• May be ignited by heat, sparks or flames.• Vapors from liquefied gas are initially heavier than air and spread along ground.• Vapors may travel to source of ignition and flash back.• Runoff may create fire or explosion hazard.• Cylinders exposed to fire may vent and release toxic and flammable gas through pressure relief devices.• Containers may explode when heated.• Ruptured cylinders may rocket.		
PUBLIC SAFETY <ul style="list-style-type: none">• CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.• As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.• Keep unauthorized personnel away.• Stay upwind.• Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).• Keep out of low areas.• Ventilate closed spaces before entering.		
PROTECTIVE CLOTHING <ul style="list-style-type: none">• Wear positive pressure self-contained breathing apparatus (SCBA).• Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.• Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.		
EVACUATION <p>Spill</p> <ul style="list-style-type: none">• See Table 1 - Initial Isolation and Protective Action Distances. <p>Fire</p> <ul style="list-style-type: none">• If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.		
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(Continued)



The right page has response information.

ERG2008	GASES - TOXIC - FLAMMABLE (EXTREME HAZARD)	GUIDE 117
EMERGENCY RESPONSE		
FIRE <ul style="list-style-type: none">• DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED. Small Fire <ul style="list-style-type: none">• Dry chemical, CO₂, water spray or regular foam. Large Fire <ul style="list-style-type: none">• Water spray, fog or regular foam.• Move containers from fire area if you can do it without risk.• Damaged cylinders should be handled only by specialists. Fire involving Tanks <ul style="list-style-type: none">• Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.• Cool containers with flooding quantities of water until well after fire is out.• Do not direct water at source of leak or safety devices; icing may occur.• Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.• ALWAYS stay away from tanks engulfed in fire.		
SPILL OR LEAK <ul style="list-style-type: none">• ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).• All equipment used when handling the product must be grounded.• Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.<ul style="list-style-type: none">• Do not touch or walk through spilled material.• Stop leak if you can do it without risk.• Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.<ul style="list-style-type: none">• Do not direct water at spill or source of leak.• If possible, turn leaking containers so that gas escapes rather than liquid.• Prevent entry into waterways, sewers, basements or confined areas.• Isolate area until gas has dispersed.• Consider igniting spill or leak to eliminate toxic gas concerns.		
FIRST AID <ul style="list-style-type: none">• Move victim to fresh air. • Call 911 or emergency medical service.• Give artificial respiration if victim is not breathing.• Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.• Administer oxygen if breathing is difficult.• Remove and isolate contaminated clothing and shoes.• In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.• In case of contact with liquefied gas, thaw frosted parts with lukewarm water.• In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.• Keep victim warm and quiet. • Keep victim under observation.• Effects of contact or inhalation may be delayed.• Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.		
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The potential hazards section should be consulted first.

**GUIDE
117**

GASES - TOXIC - FLAMMABLE (EXTREME HAZARD)

ERG2008

POTENTIAL HAZARDS

HEALTH

- **TOXIC; Extremely Hazardous.**
- May be fatal if inhaled or absorbed through skin.
- Initial odor may be irritating or foul and may deaden your sense of smell.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control may cause pollution.

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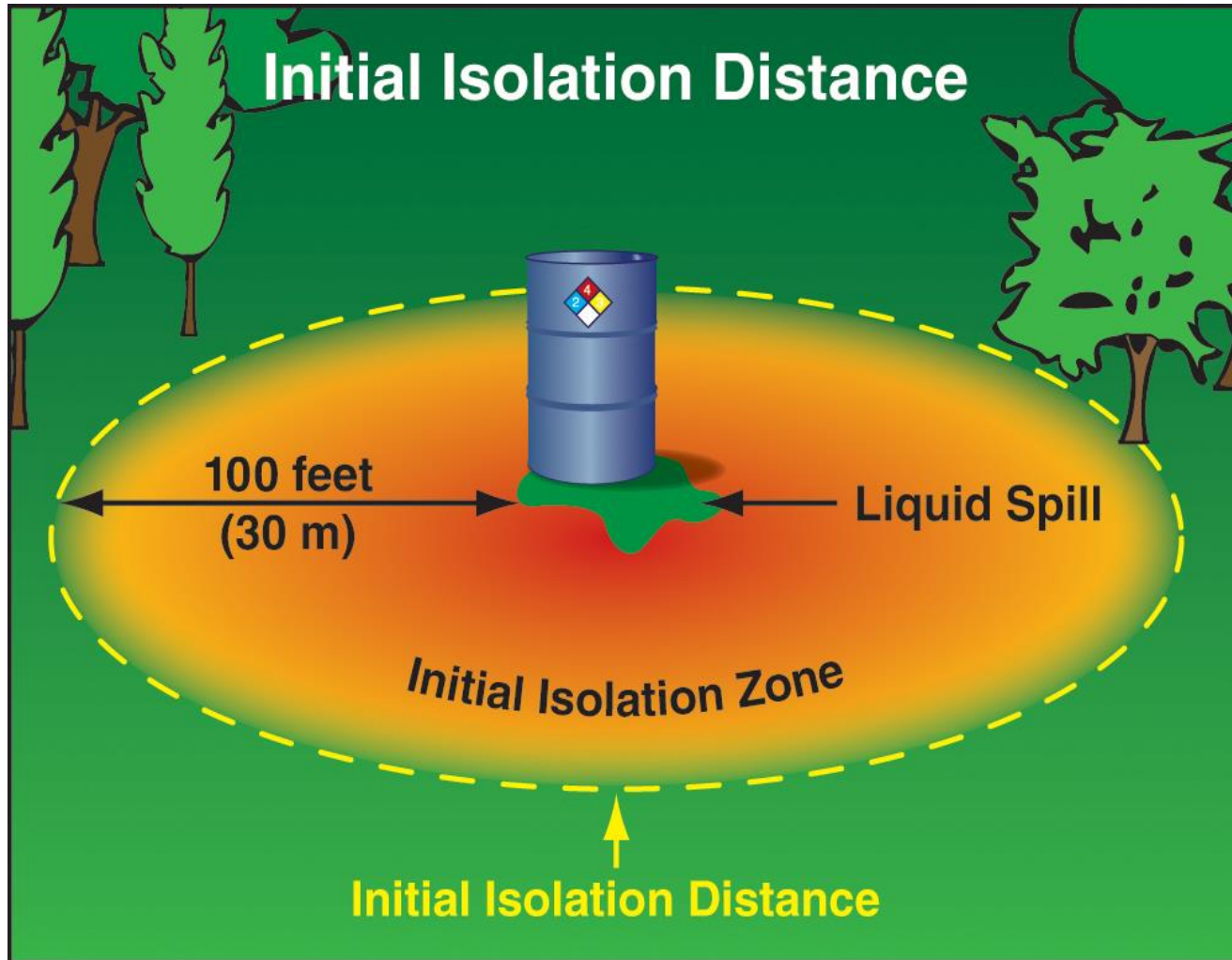
The public safety section provides more detail.

PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

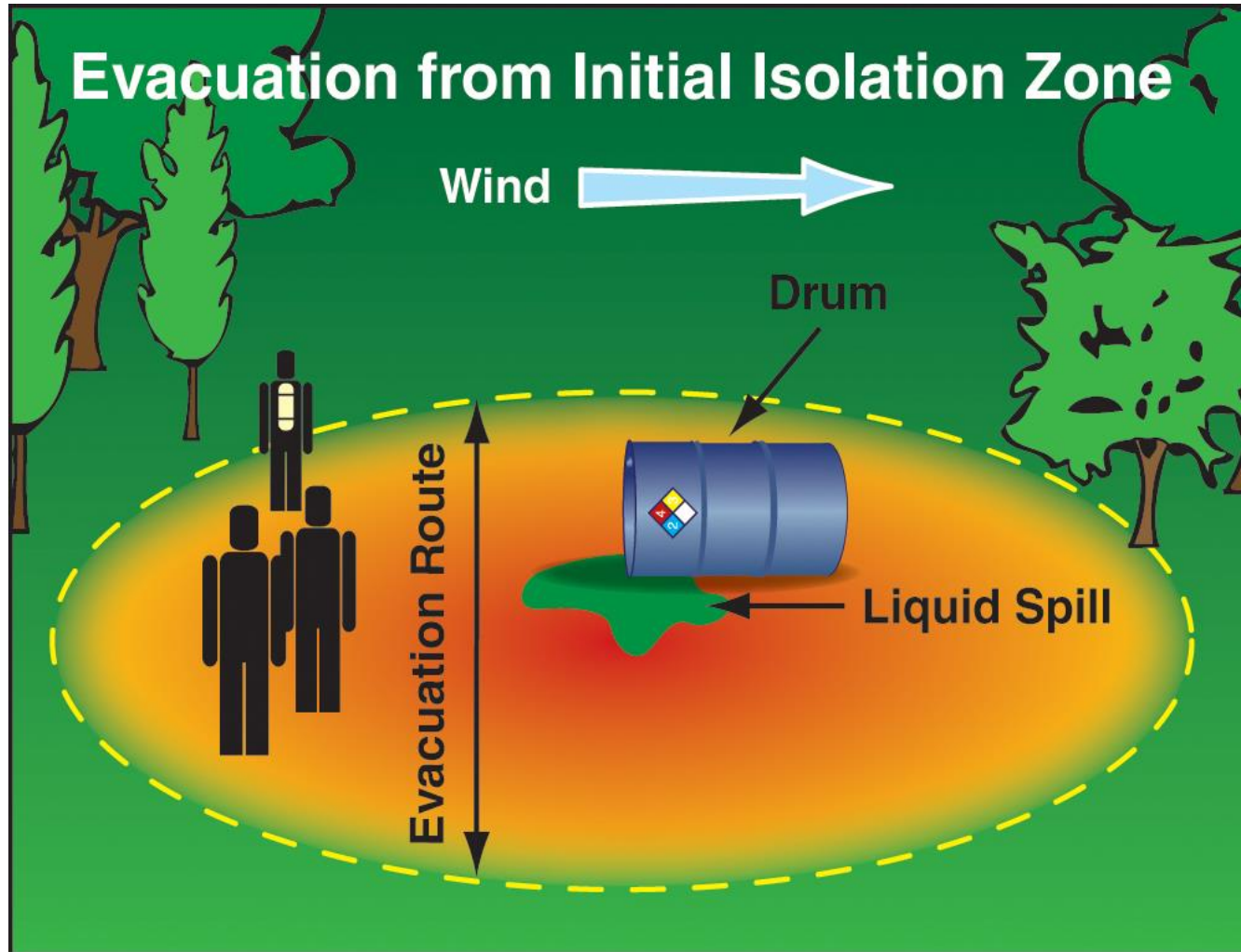
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Initial isolation distance is provided below public safety section.



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How to determine the evacuation zone.



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CAUTION

First responders must be properly trained to conduct the actions recommended by the ERG before attempting to perform them. They must also have the proper equipment to do so.

The emergency response section has three parts.

ERG2008	GASES - TOXIC - FLAMMABLE (EXTREME HAZARD)	GUIDE 117
EMERGENCY RESPONSE		
FIRE		
• DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.		
Small Fire		
• Dry chemical, CO ₂ , water spray or regular foam.		
Large Fire		
• Water spray, fog or regular foam.		
• Move containers from fire area if you can do it without risk.		
• Damaged cylinders should be handled only by specialists.		
Fire involving Tanks		
• Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.		
• Cool containers with flooding quantities of water until well after fire is out.		
• Do not direct water at source of leak or safety devices; icing may occur.		
• Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.		
• ALWAYS stay away from tanks engulfed in fire.		
SPILL OR LEAK		
• ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).		
• All equipment used when handling the product must be grounded.		
• Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.		
• Do not touch or walk through spilled material.		
• Stop leak if you can do it without risk.		
• Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.		
• Do not direct water at spill or source of leak.		
• If possible, turn leaking containers so that gas escapes rather than liquid.		
• Prevent entry into waterways, sewers, basements or confined areas.		
• Isolate area until gas has dispersed.		
• Consider igniting spill or leak to eliminate toxic gas concerns.		
FIRST AID		
• Move victim to fresh air. • Call 911 or emergency medical service.		
• Give artificial respiration if victim is not breathing.		
• Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.		
• Administer oxygen if breathing is difficult.		
• Remove and isolate contaminated clothing and shoes.		
• In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.		
• In case of contact with liquefied gas, thaw frosted parts with lukewarm water.		
• In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.		
• Keep victim warm and quiet. • Keep victim under observation.		
• Effects of contact or inhalation may be delayed.		
• Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.		
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WARNING

Awareness-Level personnel should not handle or touch contaminated or potentially contaminated victims!

The Table of Initial Isolation and Protective Action Distances is marked by green pages.

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TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

ID No.	NAME OF MATERIAL	SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
		First ISOLATE in all Directions		Then PROTECT persons Downwind during-		First ISOLATE in all Directions		Then PROTECT persons Downwind during-	
		Meters	(Feet)	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)	Meters	(Feet)	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)
2810	CS (when used as a weapon)	30 m	(100 ft)	0.2 km (0.1 mi)	0.7 km (0.4 mi)	100 m	(300 ft)	0.5 km (0.3 mi)	2.1 km (1.3 mi)
2810	DC (when used as a weapon)	30 m	(100 ft)	0.1 km (0.1 mi)	0.6 km (0.4 mi)	100 m	(300 ft)	0.5 km (0.3 mi)	2.0 km (1.3 mi)
2810	GA (when used as a weapon)	30 m	(100 ft)	0.2 km (0.1 mi)	0.2 km (0.1 mi)	100 m	(300 ft)	0.6 km (0.4 mi)	0.7 km (0.4 mi)
2810	GB (when used as a weapon)	60 m	(200 ft)	0.4 km (0.3 mi)	1.2 km (0.8 mi)	800 m	(2500 ft)	2.3 km (1.4 mi)	4.5 km (2.8 mi)
2810	GD (when used as a weapon)	60 m	(200 ft)	0.4 km (0.3 mi)	0.8 km (0.5 mi)	400 m	(1250 ft)	1.7 km (1.1 mi)	2.4 km (1.5 mi)
2810	GF (when used as a weapon)	60 m	(200 ft)	0.2 km (0.2 mi)	0.3 km (0.2 mi)	150 m	(500 ft)	0.9 km (0.6 mi)	1.1 km (0.7 mi)
2810	H (when used as a weapon)	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	60 m	(200 ft)	0.4 km (0.2 mi)	0.4 km (0.3 mi)
2810	HD (when used as a weapon)								
2810	HL (when used as a weapon)	30 m	(100 ft)	0.2 km (0.1 mi)	0.3 km (0.2 mi)	100 m	(300 ft)	0.5 km (0.3 mi)	1.0 km (0.7 mi)
2810	HN-1 (when used as a weapon)	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	60 m	(200 ft)	0.4 km (0.2 mi)	0.5 km (0.4 mi)
2810	HN-2 (when used as a weapon)	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	60 m	(200 ft)	0.3 km (0.2 mi)	0.5 km (0.3 mi)
2810	HN-3 (when used as a weapon)	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)
2810	L (Lewisite) (when used as a weapon)	30 m	(100 ft)	0.2 km (0.1 mi)	0.3 km (0.2 mi)	100 m	(300 ft)	0.5 km (0.3 mi)	1.0 km (0.7 mi)
2810	Lewisite (when used as a weapon)								

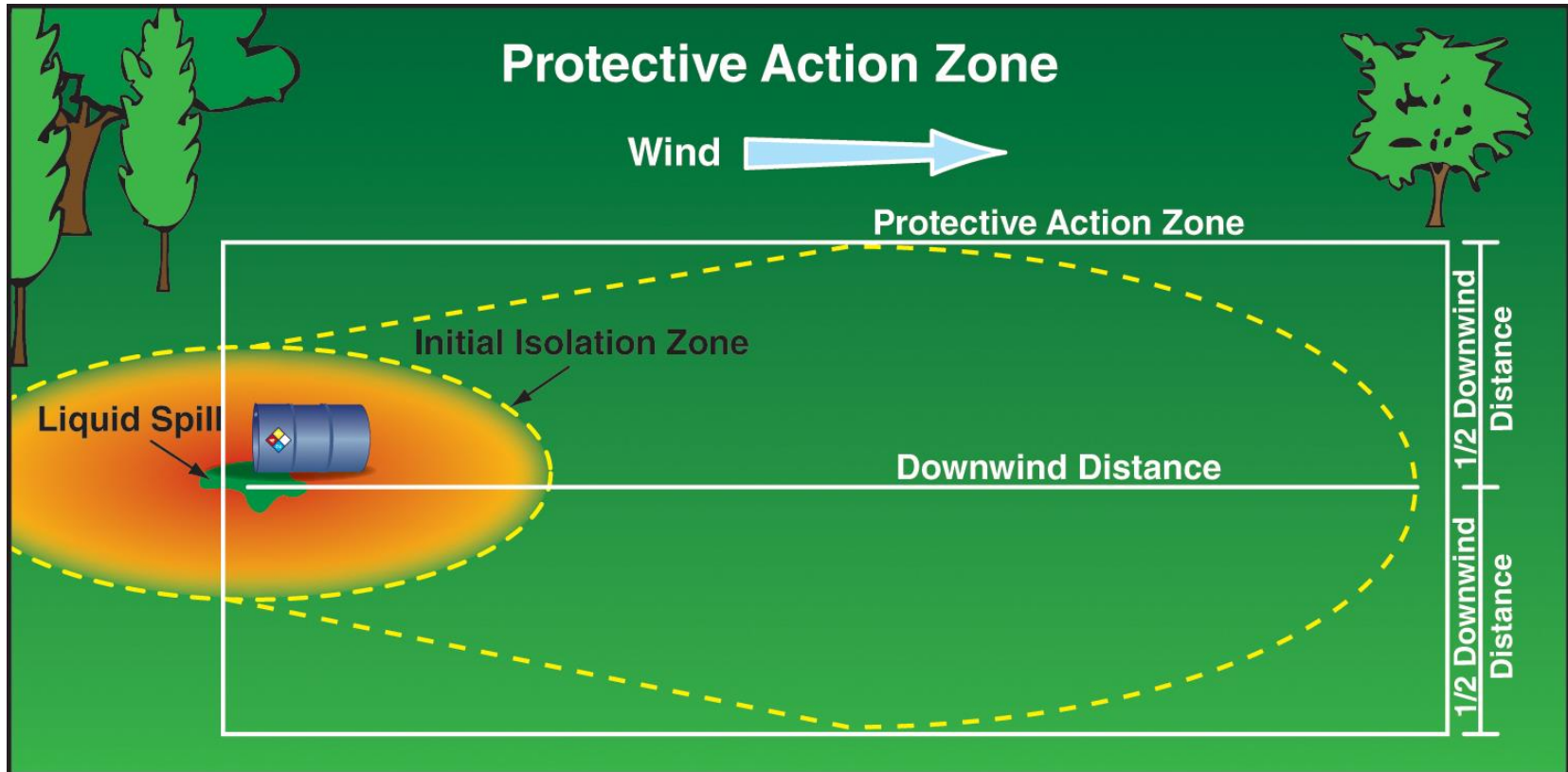
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DISCUSSION QUESTION



What is the difference between a small spill and a large spill?

How to calculate Protective Action Distances.



REVIEW QUESTION



What is provided on the orange-shaded pages of the *ERG*?

What is provided on the green-shaded pages of the *ERG*?

Emergency Response Centers are found in the white pages.

FOR HAZARDOUS MATERIALS EMERGENCY

Spill, Leak, Fire, Exposure or Accident

CALL CHEMTREC® — Day or Night

800-424-9300

Outside the United States,
Call 703-527-3887
Collect Calls Accepted

www.chemtrec.com

See reverse for more instructions

In a Hazardous Materials Emergency:

Isolate the area and contact CHEMTREC® immediately with as much of the following information as possible.

IDENTIFY:

- ☐ Your name/organization
- ☐ Location you are calling from
- ☐ Call-back number

INCIDENT:

- ☐ Location of incident
- ☐ Time of incident
- ☐ Weather/environment
- ☐ Product(s) involved
- ☐ Quantity
- ☐ Container type
- ☐ Any injuries/deaths
- ☐ Assistance on site/en route/requested

OTHER INFO:

- ☐ UN, NA, or STCC Code
- ☐ Origin of shipment and shipper
- ☐ Carrier
- ☐ Destination/consignee
- ☐ Truck/car/trailer/flight #
- ☐ Bill of lading #

CHEMTREC® • 800-424-9300

Before calling gather specific information.

- Caller's name, callback telephone number, and FAX number
- Location and nature of problem
- Name and ID number of material
- Shipper/consignee/point of origin
- Carrier name, railcar reporting marks, or truck number

(Continued)

Before calling gather specific information.

- Container type and size
- Material quantity transported/released
- Local conditions
- Injuries, exposures, current conditions involving spills, leaks, fires, explosions, and vapor clouds, etc.
- Local emergency services that have been notified

REVIEW QUESTION



What types of information should be provided to an emergency response center?

Learning Objective 4

Obtain information about a hazardous material using the *ERG*.

This objective is measured in Skill Sheet 3-1.

Learning Objective 5

Describe isolation and discuss denial of entry.

The concept of isolation works to secure the emergency scene.



Courtesy of U.S. Air Force

(Continued)



The isolation perimeter establishes a boundary.



REVIEW QUESTION



What is an isolation perimeter?

Learning Objective 6

Discuss terrorist incidents.

Terrorist incidents require unique actions.



Courtesy of August Vernon

Awareness and Operations duties at terrorist incidents.

Protect selves and others through isolation perimeter



Avoid contacting contaminants or contaminated surfaces



Document observations, with pictures if possible

Make note of other witnesses and observes at the scene



Protect evidence at the crime scene as best able

Summary

- Responsibilities of Awareness-Level personnel
 - Understand predetermined procedures
 - Be able to use *ERG* and sections
 - Be familiar with safety procedures
 - Be aware of responsibilities at terrorist or criminal activities