Unit 6:
Analyzing and Predicting the Incident Behavior

1

Unit 6 Objectives

- Given information and factors of a simulated hazardous materials/WMD incident, the student shall conduct an analysis of the simulated incident and will assess the type and degree of risk to life, critical systems, property, and the environment.
- Identify and describe the elements of a hazardous material incident analysis.
- Identify and explain the factors that may influence the behavior of a hazardous material at an incident.

2

Unit 6 Objectives

- Demonstrate the ability to apply the General Hazardous Material Behavior Model and the Hazardous Material Dispersion Matrix in analyzing an incident.
- Accurately complete an 'Incident Conditions Profile" worksheet.
- Accurately complete an HM Incident 'Risk Assessment' worksheet.

3

Factors that Influence the Incident Conditions

4

Initial Incident Analysis Emergency Response Guidebook

- Resist Rushing In
- Approach Cautiously
- Secure Scene
- Identify the Hazards
- Assess the Situation
- Obtain Help
- Respond

5

Incident Analysis

- Identify and understand the hazards and behavior
  - *Chemical Hazard Profile*
- Identify and understand the incident conditions
  - *Incident Conditions Profile*
- Evaluate and prioritize the risk
  - *Risk Assessment*

6

Incident Conditions Profile Worksheet

7

Identify which BEHAVIOR MODEL EVENTS have occurred or are occurring.

STRESS	BREACH	RELEASE	ENGULFMENT	IMPINGEMENT	HARM

8

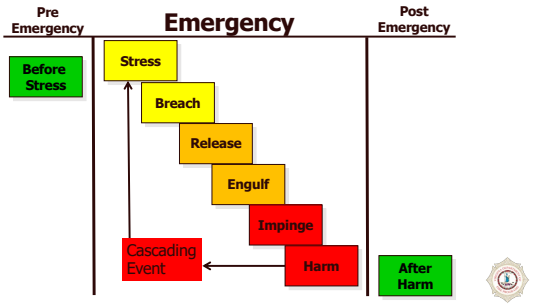
General Hazardous Materials Behavior Model

STRESS	BREACH	RELEASE	ENGULF	IMPINGEMENT	HARM
Thermal	Disintegration	Detonation	Hemisphere	Short Term	Thermal
Mechanical	Runaway Linear Cracking	Violent Rupture	Cloud	Medium Term	Radiation
Chemical	Closures Open Up	Rapid Relief	Plume	Long Term	Asphyxiation
	Punctures	Spill or Leak	Cone		Chemical
	Splits or Tears		Stream		Etiological
			Pool		Mechanical
			Irregular		

Most Acceptable — LOSS — Least Acceptable

9

Assessing the Emergency Situation



10

Identify EXPOSURES and potential exposures

Life	Critical Systems	Environment	Property

11

Evaluate DISPERSION PATTERNS

ENERGY	MATERIAL	PATH OF MOVEMENT	DISPERSION PATTERN

12

Energy & Material Dispersion Model

MODEL DISPERSION CONSIDERATIONS				
What is jumping out at you?	What is its form?	What is making it move?	What path will it follow?	What pattern could it form?
Energy	Infrared radiation	Thermal diffusion	Linear or radial	Hemispherical or Spherical
	Gamma radiation	Self-propelled	Linear or radial	Cone or Hemispherical
	Pressure waves	Self-propelled	Linear	Hemispherical

13

MODEL DISPERSION CONSIDERATIONS				
What is jumping out at you?	What is its form?	What is making it move?	What path will it follow?	What pattern could it form?
Solids	Finely-divided dusts or powders	Air entrainment	Linear	Plume
		Personal transport	Random	Irregular
	Fragments / Shrapnel	Self-propelled	Linear	Cloud
	Organisms	Air entrainment	Linear	Plume
		Personal transport	Random	Irregular
	Alpha and Beta particles	Self-propelled	Linear	Cone or Cloud
Liquids	Free flowing	Gravity	Follows contours	Stream or Pool

14

MODEL DISPERSION CONSIDERATIONS				
What is jumping out at you?	What is its form?	What is making it move?	What path will it follow?	What pattern could it form?
Gases	Vapors	Gravity Air entrainment Diffusion	Follows contour with wind Linear or Radial	Plume Cloud above liquid product
	Gases	Diffusion	Linear or Radial outward from source	Plume or Cloud or shape of confining area
Liquefied Gases	Liquid	Gravity	Follow contours	Stream or Pools
	Gas	Diffusion	Linear or Radial outward from source	Plume or Cloud or shape of confining area

15

Identify CONTAINER Information

TYPE	CAPACITY	PRESSURE	WORKING PRESSURE	SAFETY RELIEF DEVICE	EMERGANCY SHUT OFF

16

INCIDENT CONDITIONS

TIME

Hour	Day of Week	Month/Season

WEATHER

Temperature	Wind Direction	Wind Speed	Humidity	Precipitation

TERRAIN

Slope	Type of Terrain

INTERIOR BUILDING CONDITIONS

Type of Structure	Location in Structure	HVAC	Floor Drains/Slope

17

PHYSICAL HAZARDS

IDENTIFY ENERGY SOURCES

Electrical	Mechanical	Thermal	Other

IDENTIFY WORK AREA HAZARDS

Excessive Temperature	Limited or Remote Access	Visibility	Mechanical Hazards	Other Hazards

18

Risk Assessment Matrix

EXPOSURE / RISK	LIFE	CRITICAL SYSTEM	ENVIRONMENT	PROPERTY
SEVERE Immediate exposure and Critical harmful effects				
MODERATE Probable exposure and Serious harmful effects				
MINOR Possible exposure and Minor/ not likely harmful effects				
NONE No exposure or no harmful effects				

19

What would you do?

20

21