Incident Management

12 September 2013

Albuquerque, New Mexico

International

BIOLOGICAL THREAT REDUCTION

Overview

- *Incident* Defined

- Types of Incidents

- Incident Management

  – Planning

  – Incident Command System

    - Response

  – Recovery

- Biological Framework

Incident Defined

An event that is likely to have **adverse consequences**

All emergencies are incidents, but not all incidents are emergencies

All accidents are incidents but not all incidents are accidents

Incidents

- Hazardous materials releases
  - Accidental
  - Intentional
- Fires
- Explosions
- Medical

- Natural Occurrences
  - Earthquakes, typhoons, fires, floods, etc.
- Other incidents
  - Bomb threat
  - Terrorism

Management

- Planning
  - A continuous process
  - Purpose:
    - Avoid the emergency
    - Reduce the impact
- Response/Mitigation
  - Requires highly-trained personnel
- Recovery/Stabilization
 - Community or government support

Planning

General Plan

▶ Involve engineering, safety, & security

▶ Distribute to and train all employees

▶ Include in the plan:

- Roles and responsibilities
- Procedures for reporting emergencies
- Emergency phone numbers
- Procedures for specific emergencies

Emergency Planning

Have an evacuation map for all buildings and areas and

POST IT
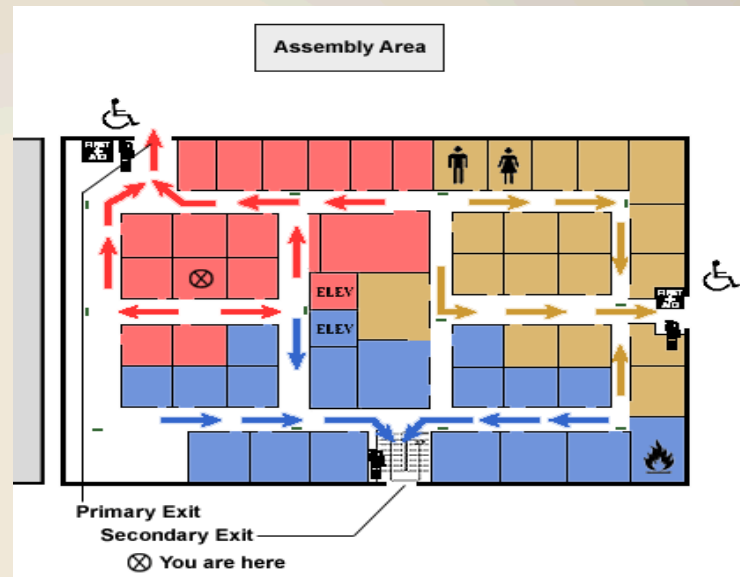
Emergency Planning

Post each area with:

• Emergency phone numbers

• After hours phone numbers

• Person(s) to be contacted

• Alternate person(s)

• Unique hazards & procedures

Location	
Hazards Within:	
Primary Contact:	
Second Contact:	
Building Monitor/Safety:	
Department Head:	
Fire/Police/Ambulance:	911
Envir. Health & Safety (or RSO, if needed):	646-3327

Planning

Develop Response Procedures

- Evacuate or shelter in place?
- Respond?
- Who will respond?
    - On-site HAZMAT team?
        - Require training
    - Community fire department?
        - Establish memorandum of understanding
- Medical support
    - In-house?
    - When to call for outside assistance
- Emergency shutdown procedures
- Decontamination procedure

Planning

Detection & Mitigation Equipment

Alarms, smoke & heat detectors, sprinklers, emergency lighting and fire extinguishers need to be properly located, maintained, and serviced regularly.
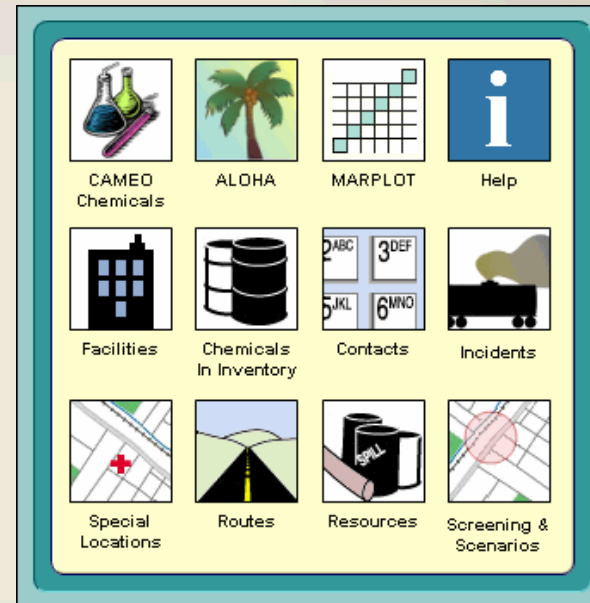
Planning

Response Equipment

▸ Initial hazard assessment

▸ Place in accessible locations

  ◦ Fire extinguishers

  ◦ Spill control kits

  ◦ PPE

  ◦ Respirators

  ◦ DECON showers

▸ Schedule routine maintenance and inspection of all response equipment
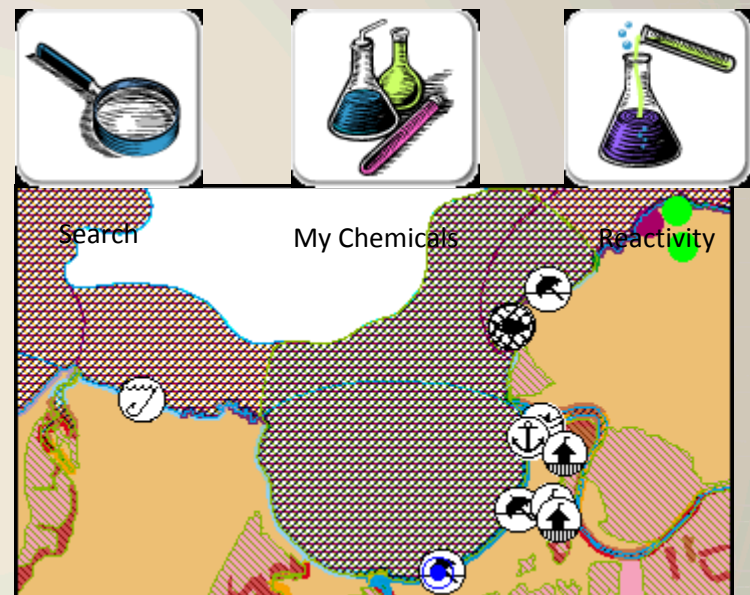
Planning

Software Applications

- Assist first responders with accessible and accurate response information
  - Interactive *Cameo* software modules
  - *Cameo Data Management*
    - Location of chemicals
    - Chemical quantities
   - Storage conditions

Planning

- Cameo Chemicals
    - Supplies information on the substance released and safe response actions
    - Outputs *chemical response datasheets*
    - http://cameochemicals.noaa.gov

- Mapping applications
    - *MARPLOT*
    - Can overlay a contaminated area over a map
    - Displays threat zones

Search   My Chemicals   Reactivity

Planning

- Atmospheric dispersion models
- *Aloha* software
- Estimates threat zones associated with chemical releases, including toxic gas clouds, fires, and explosions
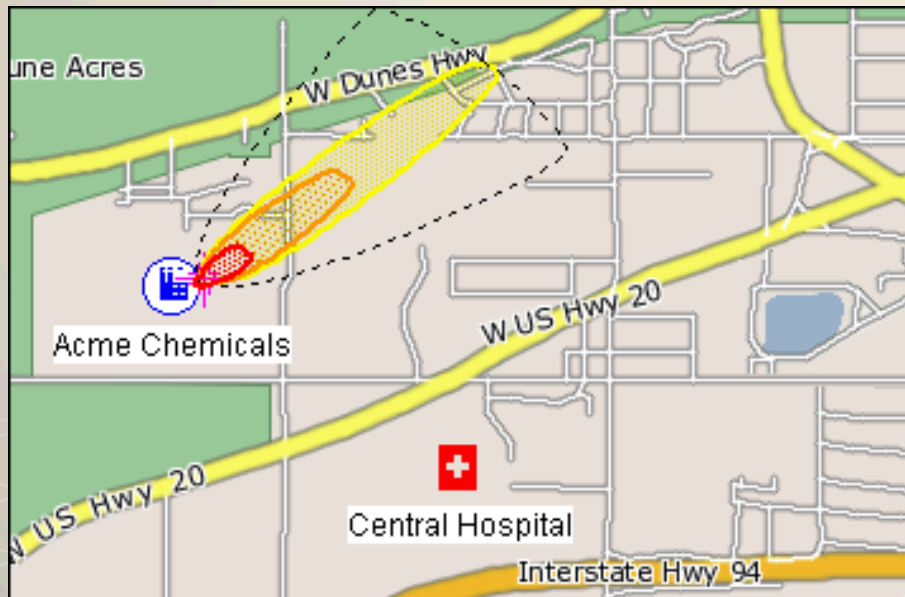
Planning

Aloha Software:

▶ Example of Inputs

- Enter date, time, location
- Choose a chemical (Aloha library)
- Enter atmospheric information
- Choose a source:
  - direct, puddle, pipeline, or tank
- Enter source information
  - Release amount, chemical fire
- Specify the Levels of Concern (LOCs)
- Choose the type of hazard
  - Toxic vapor cloud or a vapor cloud explosion

Planning

Unity of Effort:

- Success in managing an emergency depends on clear roles and responsibilities and a clear chain of command.

Incident Command System

- Use of an <u>Incident Command System (ICS)</u> allows coordination among different jurisdictions and functional responsibilities to interact effectively on the scene.

Planning

Incident Command System:

- Developed to resolve:
  - Ineffective communication
  - Lack of common command structure
  - Lack of accountability
  - Inability to coordinate resources
- Based on basic business management
  - Plan
  - Direct
  - Organize
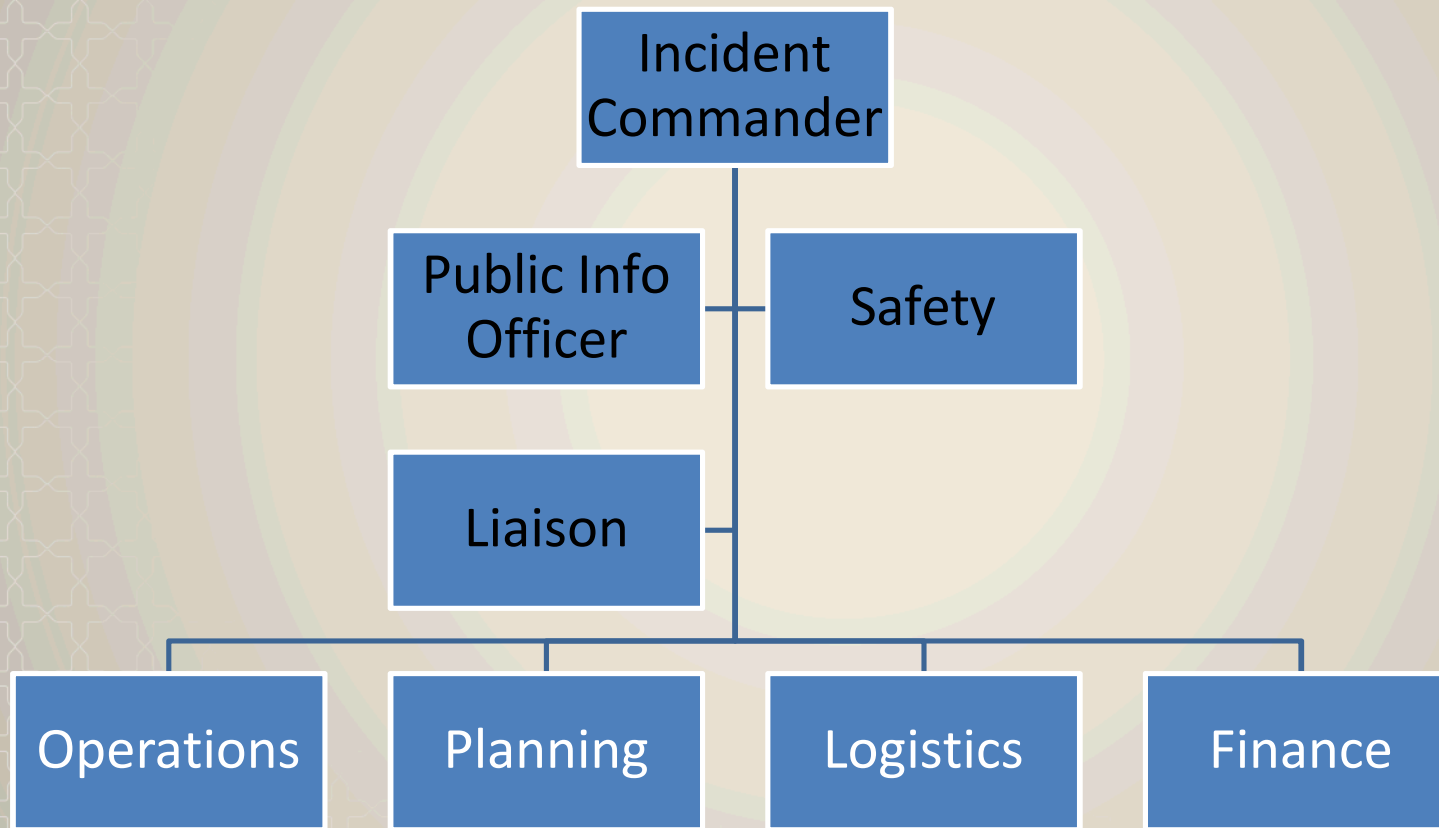 - Communicate
  - Delegate
  - Evaluate

Photo credit:
http://www.savelives.com

Incident Management System

Planning

Community Involvement

- Prepare for emergencies involving local communities
  - Communicate!
  - Develop an emergency planning committee
  - Select notification method to community
  - Inform community of hazardous materials at your plant
    - Safety data sheets
    - TOXNET

http://toxnet.nlm.nih.gov/index.html

Response to Hazardous Materials Incidents

<u>**What**</u> <u>makes hazardous materials incidents so dangerous</u>?

- Material characteristics may be unknown

- Chemical, physical hazards, biological (?) hazards
  - Toxic
  - Corrosive
  - Flammable
  - Reactive

- Conditions may be confusing
- Limited time to respond to the incident

Who Will Respond?

- Employees?
- Local police and fire department?
- Local ambulance, hospital?
- Military?
- Local HAZMAT team?
- Plant HAZMAT team?

OR, ALL OF THE ABOVE

Emergency Response Decision Making

DECIDE Process

- Detect hazmat presence
- Estimate likely harm
  - Material properties
  - Containment
  - Weather
  - Modeling data
- Decide on objectives
- Identify action options
- Do best option
- Evaluate progress

Benner, L. (1978) DECIDE for Hazardous Materials Emergencies, Presented Papers.

Emergency Response Decision Making

Detect Hazmat Presence

- Worker reports incident/spill/injury
- Odors, smoke, flames, reactions
- Response team detection
  - Instrumentation must be calibrated!
  - Direct reading instruments
    - LEL, oxygen monitors
    - Photoionization detectors
    - Gas detectors-methane, NH_3, CO, Cl_2, H_2S
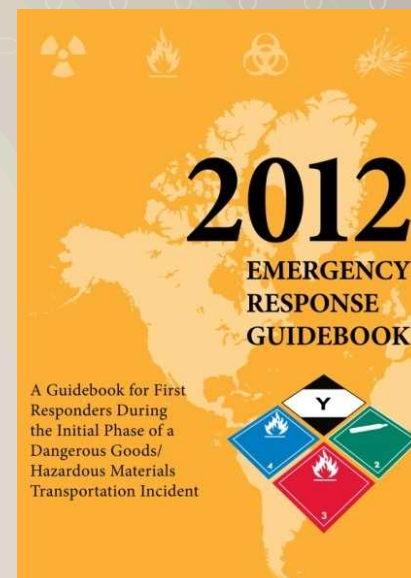 - Personal sampling and analysis

Emergency Response
Estimate Likely Harm

– Material properties

- Safety data sheets
- Emergency Response Guidebook
- ERPGs

– Site conditions

- Size of spill / release
- Weather
- Models
    – Cameo software

Emergency Response
Estimate Likely Harm

<u>Evaluate chemical(s) released:</u>

▶ **By quantity**

◦ **Greater than 500 grams ? (40 CFR 302 & 355)**

▶ **Toxicity**

◦ **$LC_{50} \leq$ 200 ppm or 20mg/liter**

▶ **Dispensability**

◦ **Boiling point $\leq$ 100º C, $\leq$ 10 microns particle size**

▶ **Flammability/Reactivity**

◦ **Flashpoint < 60º C**

▶ **Dispersion Modeling**

◦ **Example: AIHA ERPG 1 at 30 meters**

(ERPG–1: 2 ppm; ERPG–2: 50 ppm; ERPG–3: 170 ppm)

Emergency Response
Decide on Objectives

Priorities

1. Persons
   - Responders
   - Workers
   - Community

2. Property
   - At the site
   - Protecting community

3. Environment
   - Air, ground and surface water, soil, wildlife

Emergency Response

Initiate the Incident Command System:
- Incident Commander
  - Establishes the strategy and tactics
  - Has ultimate responsibility for incident outcome
  - The position is established for every incident
  - May establish a command post
- Command Staff positions
  - Safety officer
  - Liaison officer
  - Information officer

Identify Action Options-
Size of event may dictate response

Emergency Response
Identify Action Options

Large Catastrophic Incidents

▶ Perform a risk analysis of response options

   ◦ Should be a continuous process during an event

▶ Response options are dependent on plant capabilities and approach

   ◦ Mode of response-defensive or offensive?

   ◦ Training levels of responders (HAZMAT trained?)

   ◦ Technical resources

   ◦ External support available?

      • Local fire department or HAZMAT

      • Military

Defensive or Offensive Approach?

Identify Action Options
Defensive Options Large Event

- Persons
  - Evacuate if possible
  - Shut off air intakes
  - Shelter-in-place/safe rooms
- Property/Equipment
  - Emergency shut offs
  - Emergency ventilation
  - Purging hazardous gas systems
- Environment
  - Diking water sources

http://earthbagbuilding.wordpress.com/
http://www.sb.fsu.edu/~xray/emergency.html
http://www.lpgventures.com/compliance/page2.html

Identify Action Options
Offensive Options Large Event

▶ Written Standard Operating Procedures

   ◦ For each hazardous material or process on-site

▶ Select action from alternative strategies

▶ Select PPE/equipment for responders

   ◦ http://osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9767

   ◦ Ensure compatibility of PPE with hazards

▶ Safe approach is to select the highest PPE level

▶ Then, reduce the level when sufficient information on the hazard

Offensive Options-Small Spills

- Spills of < 4 liters

- Must have appropriate PPE, spill equipment and training

- Do not clean up small spills of :
    - Acutely toxic (Low LD_{50}) chemicals

    - Carcinogens

    - Flammable liquids or metals

    - Chemicals of unknown toxicity or hazards

Offensive Options Small Spills

- Perform a risk assessment of potential spills
- Have a written procedure
    - Who responds to spill?
    - Identify all chemicals and their hazards
    - Identify and purchase appropriate PPE and emergency equipment
    - Describe procedures for:
        - Emergency shutoffs, circuit breakers, valves
        - Injuries and exposures
        - When and how to evacuate

Offensive Options Small Spills

Minimal equipment:

- Plastic pail/bucket(s) with lids (large enough to contain spill and cleanup material)

- Plastic dust pan

- Broom or brush

- Plastic bags

- Sealing tape

- pH paper

- Sign(s):

"Danger Chemical Spill"

"Keep Out"

Offensive Options Small Spills

Maintain complete Spill Kits

- Absorbent material
  - Absorbent pillows or powders
  - Activated carbon for organic solvents
- Neutralizing agents
  - Acid Neutralizers –e.g., sodium bicarbonate ($NaHCO_3$) powder
  - Base Neutralizers-e.g., citric acid powder
  - Solvent Spills-activated carbon

Emergency Response Restoring Processes
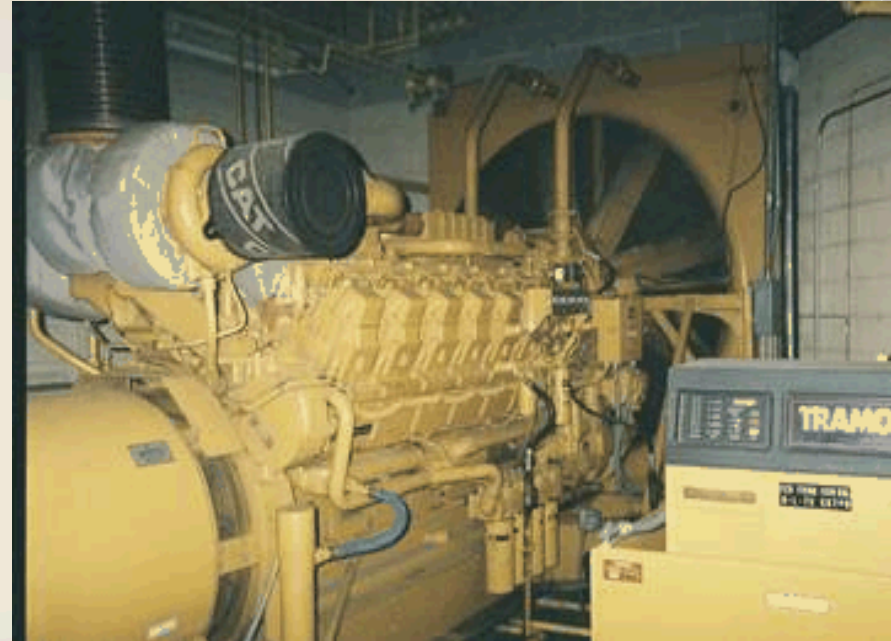
Backup power

Does power switch-over automatically?

How long will it run?

How much fuel do you have?

What areas will it support?

How often is it tested and maintained?

Post-Incident Follow-up

- Debriefing
- Post-incident investigation
  – Prepare a report of the incident
  – Revise response plans/lessons learned
  – Share lessons learned
  – Keep all records
  – Correct response deficiencies
  – Mitigate identified hazards

Draft Framework Development

- Using the time provided and information from other course activities work as a group to develop a general framework for response to biological incidents
  - It may be helpful to break the framework into actions and responsibilities
    - Before an event
    - During an event
    - After an event