

Industrial Disasters and Management

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Outline

- Introduction
- Disaster and its Impact
- Emergency Preparedness & Response
 - Risk Assessment (RA)
 - Developing EP&R
 - Elements
 - Tiered Response
 - Regional Response Team (RRT)
- Conclusion

Introduction

- Emergencies can happen in any organization at any time
- Anticipation & recognition of risks, planning, and practice before an emergency occurs can determine how serious the impact will be
- Preparedness is the most important aspect of assuring that an unplanned event or emergency has minimal impact on the organization, its workers, environment, and surrounding community
- Emergency Preparedness & Response Plan in most countries is driven by the local regulations, e.g. Occupational Safety & Health Act (OSHA), 1994 - *Control of Industrial Major Accident Hazards Regulations 1996; Part IV Act 18, 19, 20 & 21*

Major Incidents/Disasters

Some of the major industrial incidents/
disasters ...

International

- Bhopal, India
- Chernobyl, USSR
- Piper Alpha, North Sea, UK

Local

- Bright Sparklers, Sg Buloh
- Gas Processing Plant, Kerteh
- Middle Distillate Plant, Bintulu

Bhopal Incident

- Dec 7, 1984
- Methyl isocyanate (MIC) gas leaked and released into the air
- Immediate effects: killed ~2,000-2,500; injured ~50,000-100,000
- Death toll ~14,410
- 600,000 people filed claims for compensation

Chernobyl Incident

- Uncontrolled chain reaction in nuclear power plant led to an explosion releasing clouds of deadly radioactive material into the air
- Immediate effect: 30 killed, 137 treated for acute radiation syndrome
- Caused >2,500 deaths (Ukraine Radiological Institute)
- Cost to USSR ~\$12.8 billion
- Long-term health effects:
 - Thyroid cancer in children
 - Other cancers
 - Psychological disorders

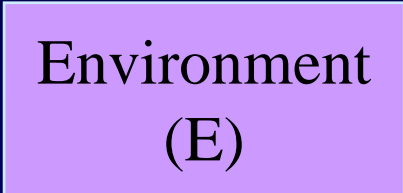
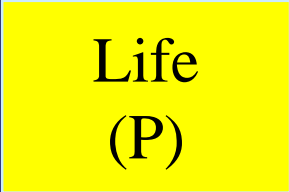
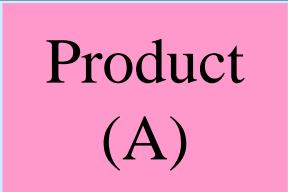
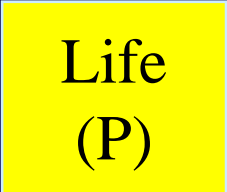
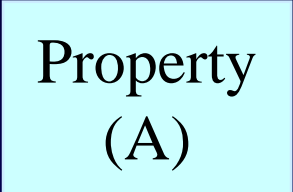
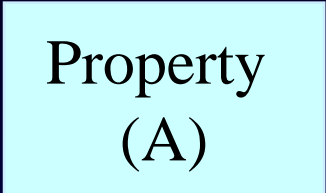
Disaster: Impact on PEAR

- People
- Environment
- Asset
- Reputation

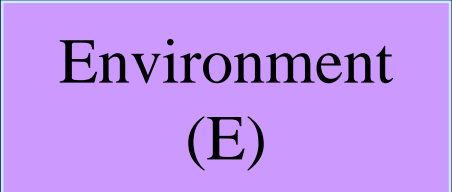


COMMUNITY

ONSITE
INCIDENT



INDUSTRY



OFFSITE
INCIDENT

Disaster: At What Cost?



3%

97%

Insured Costs

- Combined liability (employers, product & public)
- All risks (property, material damage & business interruption)

Uninsured Costs

- Property, material & equipment damage
- Legal costs
- Expenses on emergency supplies
- Overtime & temporary labor
- Investigation time
- Loss of expertise/experience

Fines

Category of Disasters/Incidents

Natural Disasters	Human Error	Process Error	Equipment Failure
Adverse weather	Vehicle impact	Process overheat	Essential utility failure due to natural disaster
Floods	Confined space entry	Process overflow	Valve leaks
Earthquakes	Aircraft crashes	Vapour release	Chemical spills
Avalanches	Packaging failures	Explosions	Fires
Volcanic eruptions	Public/Civil disturbances	Community noise	Radiation accidents

Note: *In reviewing the examples, realize that any of these events may cause personal injuries and illness. Fires, explosions, radiation exposures, and chemical spills or releases are obvious hazards with high risk potential in some business.*

Emergency Preparedness

- Identification & assessment of risk associated with potential emergencies (scenario-based risk assessment)
- Emergency Preparedness & Response (EP&R) Plan:
 - Procedures
 - Resources
 - Emergency medical equipment
 - Internal & external contacts & support
 - Management of injury & triage
 - Evacuation plan

Emergency Preparedness ... Cont'd

- EP&R Plan: ... (Cont'd)
 - Training for those who would be involved or affected, including simulated & desktop drills
 - Teams which include damage control team & first-aiders
 - Local facilities like Bomba, police & emergency medical services
 - Provide knowledge to everyone affected so that they may react & respond quickly & safely

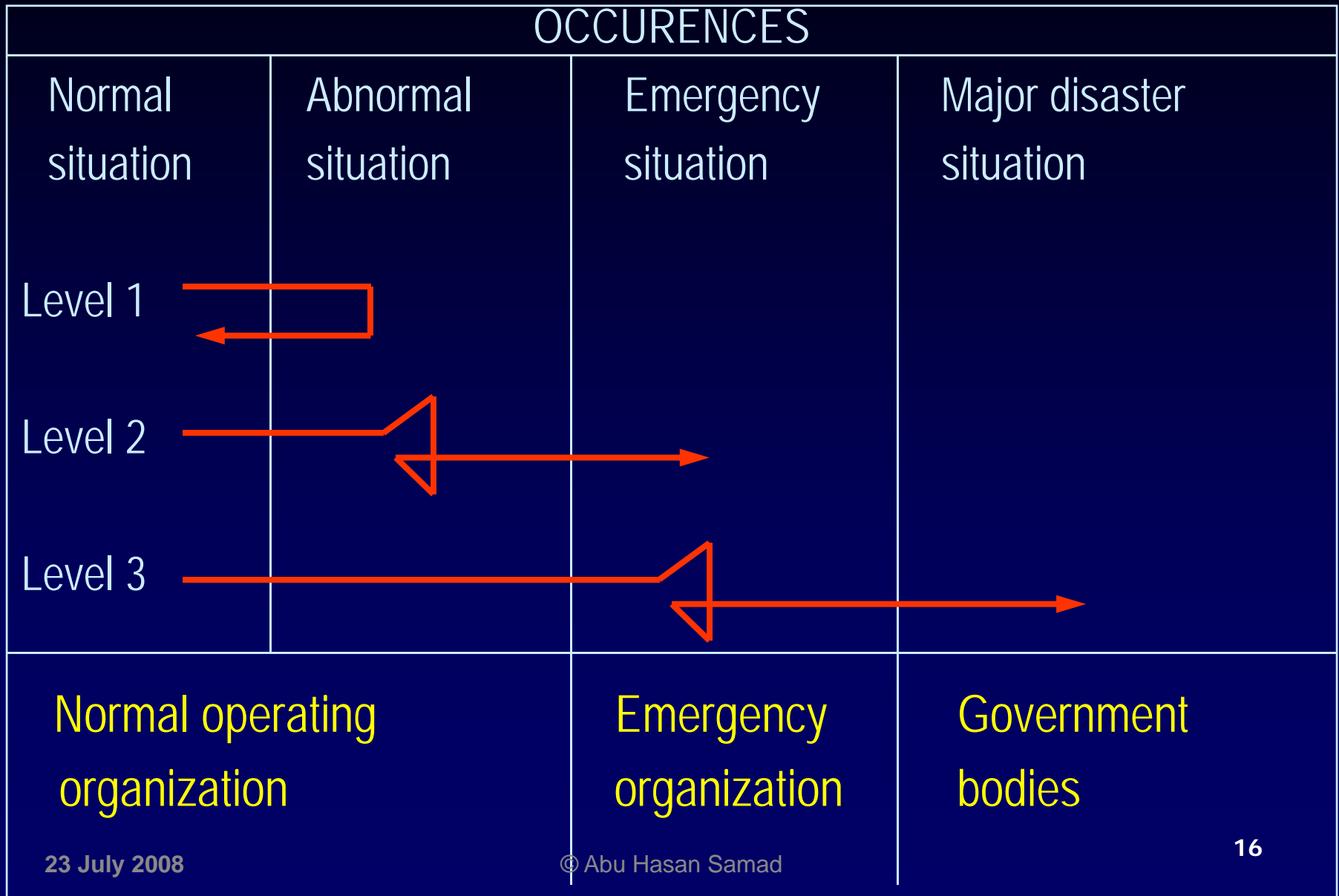
Risk Assessment (RA) for EP&R

- Business/Facility type
 - Nature & location of business will determine extent of emergency which might affect the customer & community, e.g. hazardous chemicals, radiation source, infectious agents, high energy or high temperature equipment
- Assessment should focus on identification of potential site-specific emergencies because of unique nature of the business & its location
- Planning also takes into consideration of:
 - Hazards identified by Industrial Hygienist/CHRA Assessor
 - Possibility of transportation incident & customer emergencies
 - Worst case & likely scenario

Developing the EP&R

- Involvement of all operating areas of the business & local facilities
- EP&R is well understood & known by all at worksite
- RA provides the basis for developing EP&R
- Site security is an additional concern
- Emergency control/command center
- Communication means, e.g. phone/fax & cell phone
- Human resources
- Building/site plan
- Training & refresher
- Regular simulated drills & preparedness
- Assessment/audit

Emergency Response vs Situation



Elements of EP&R

1. Evacuation plan
2. Area custodian/damage control team
 - Contain or control exposures to employee, general public & environment
3. Bomba
 - Industry in remote areas or with special fire hazard
4. Emergency medical facility
 - First Aid box
 - First Aid personnel
 - First Aid facility
 - Industrial nurse
 - Medical doctor

Evacuation Plan

- Who authorizes evacuation ?
- Media/Channel of instruction?
- Who else to notify?
- Responsibility of ensuring evacuation?
- Where do evacuees go?
- How to determine all employees out?

Evacuation Plan ... Cont'd

- Have all personnel, and visitors been evacuated?
- What medical facilities are needed?
- Will electricity and gas be shut down?
- Manufacturing process that needs to be shut down?
- Who will do shut down?

Headcount & Checklist

- Work site should ensure that all personnel and visitors are accounted for & the list available during emergency for headcount
- Checklist is available for systematic shutdown of the site/plant during emergency
- Checklist must also have the contact number of key personnel involved in the emergency
- Checklist should also provide guide on what medical facilities are needed

EP&R Plan

EMERGENCY

Equipment

Fire/Hazmat trucks

Fire extinguishers

Decontamination

Ambulance

Treatment Room

Hospital

Medication

Plans

Personnel

Fire professionals

ERT Members

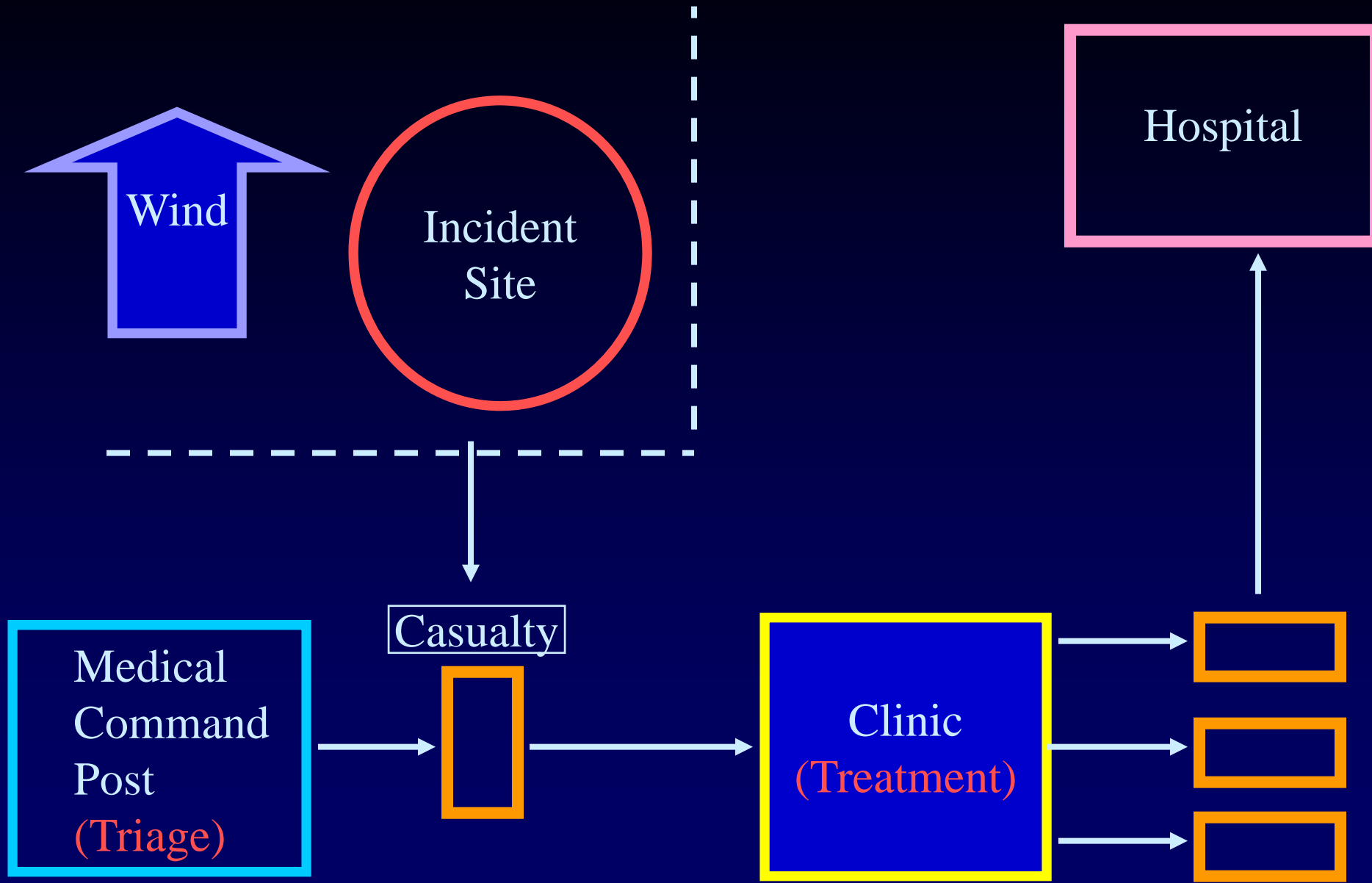
Doctor, Paramedics

First Responders

Management

Police, BOMBA

District Officer



Emergency System

- Alarm systems & air horns
- Fire detection & alarm
- Automatic gas detector
- Heat and smoke detection
- Fire fighting system
- Assembly points
- Messaging Network System
- Resources



Training

- Training Method
- Training Session
- Drills
- In-house
- Joint emergency
- *Exercise*
 - *Desktop*
 - *Small scale*
 - *Full scale*



Some lessons from the drill

- Rescue teams too slow to arrive in with full gear
- OSC (On-Scene Commander) too near to the scene
- No air/gas monitoring of surrounding area
- Wrong alarm was activated
- Decontamination procedure was not performed
- Medical team not informed of victim exposure
- No medical post, triage/treatment area
- No request for medical help/back up
- No "SAFE" zone established

EP&R Flowchart

EMERGENCY

Sound alarm/phone; fax; radio/notify

- Control room
- Area custodian/Damage Control Team (DCT) Leader
- On-scene commander (OSC)
- COMCEN Commander

EMERGENCY
LEVEL 2 & 3

OSC

- Assume incident controller position
- Update COMCEN commander
- Control emergency situation

COMCEN Commander

- Man COMCEN
- Formulate overall emergency action strategy
- Coordinate ERP team leader's activities
- Decide on outside assistance/evacuation
- Coordinate Public Affairs handling of press & public
- Keep CEO informed/make recommendations
- Announce end of emergency

Area Custodian/DCT Leader

- Assess situation
- Initiate preplanned emergency actions
- Notify OSC

EMERGENCY
LEVEL 1

Area Custodian/DCT Leader/OSC

- DCT use initial stage response manpower
- Initiate preplanned emergency actions
- Assess damage & report to OSC as required
- OSC coordinate DCT activities
- OSC announce end of emergency

EP&R Philosophy

To minimize impact of an emergency on people, environment, and the Corporation, we will always be prepared to act

- ✓ Respond rapidly to life threatening situations
- ✓ If responsible, react rapidly and effectively
- ✓ If responsibility unclear, be prepared to act
- ✓ If not responsible, provide technical or advisory assistance with appropriate legal safeguards

EP&R Principles

- ✓ Highest priority is safety of people and protection of the environment
- ✓ Impacted business line is accountable to direct the response
- ✓ Senior business unit manager directs the response and communicates concerns with other impacted business units and senior management
- ✓ Response management is at lowest appropriate operational level

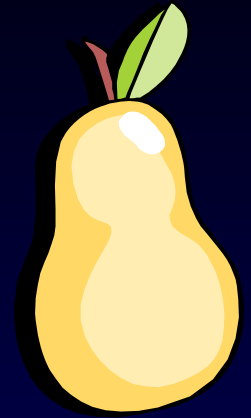
EP&R Strategic Objectives

- ✓ Safeguard **P**eople
- ✓ Protect the **E**nvironment
- ✓ Protect **A**ssets
- ✓ Protect company..... **R**eputation

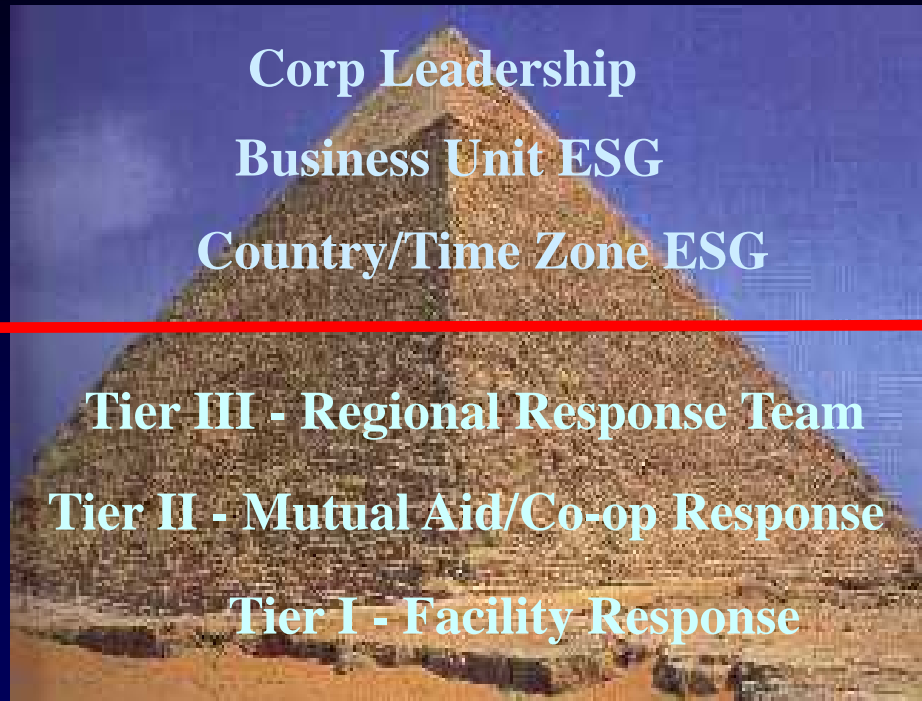


Objectives - Strategic Considerations

- **People**
 - Humanitarian assistance
 - Employee/Labor impacts
- **Environment**
 - Air, Water, Soil & Ecosystem impacts
 - Waste management
- **Assets**
 - Business operation disruptions
 - Business Continuity
 - Business Plan impact
 - Financial impact
- **Reputation**
 - Reputation
 - Responsibility
 - Communication strategies
 - Corporate oversight / notification
 - Government relations
 - Customer/Supplier impacts
 - Insurance coverage
 - Civil/Criminal liabilities



EP&R Tiered Response



**Country/HQ
Response
Issues Management**

**Field Response
Incident Management**

Tier I

Small & under control
On Company/Customer
property
Managed by Site/Vessel
Site equipment sufficient
Local media/Public
attention

Tier II

Larger but still under control
Extends beyond Company/
Customer Property
Managed by Site/Vessel
Mutual-aid/Co-ops activated
Additional equipment mobilised
National media attention

Tier III

Very large & difficult to control
Significant Government interest
Human welfare and Env. impact
Disruption to commerce
Partial/Full RRT involvement
Global attention

COMMUNITY

ONSITE
INCIDENT

EP&R

Threat

Property
(A)

Property

Life
(P)

Product
(A)

Life

Threat

INDUSTRY

Environment
(E)

Environment

OFFSITE
INCIDENT

23 July 2008

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