

Training to Save Lives

Challenges from Chemical Fires, Explosions and Toxic Incidents

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Las Vegas, NV

March 30, 2007

Leading Questions

Why did this happen?

What could have prevented it?

How could I use it to train for prevention?

Texas City, TX

April 16, 1947



Key Facts

- 570+ killed; 3500 injured
- extensive damage to other facilities, homes and schools
- NH_4NO_3 ship explosions
- emergency response planning, staffing, equipment, awareness



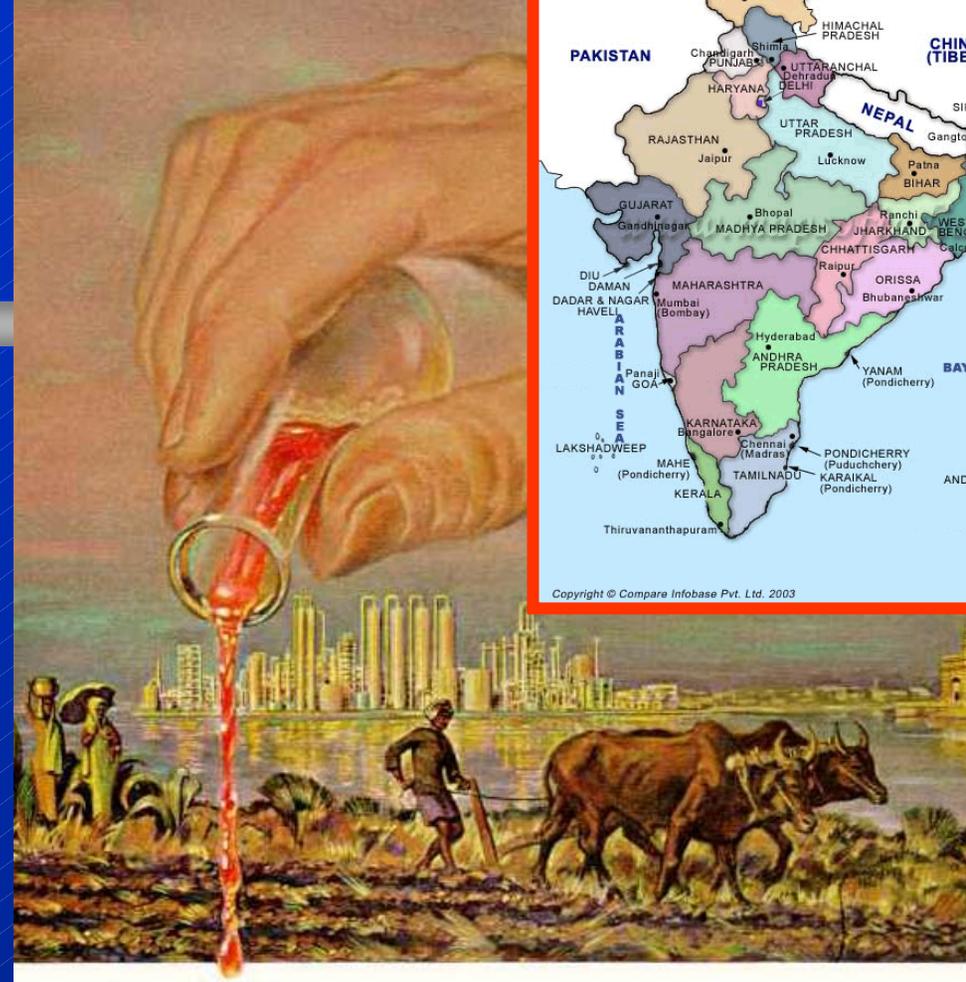
Grande Camp Explosion

Bhopal Disaster

December 2-3, 1984

Key Facts

- Runaway chemical reaction
- 6-20,000 killed
- 300,000+ injured
- facility staffing, training, hazard awareness, empowerment
- community emergency response



Science helps build a new India

Oxen working the fields . . . the eternal river Ganges . . . jeweled elephants on parade. Today these symbols of ancient India exist side by side with a new sight—modern industry. India has developed bold new plans to build its economy and bring the promise of a bright future to its more than 400,000,000 people. ► But India needs the technical knowledge of the western world. For example, working with Indian engineers and technicians, Union Carbide recently made available its vast scientific resources to help build a major chemicals and plastics plant near Bombay. ► Throughout the free world, Union Carbide has been actively engaged in building plants for the manufacture of chemicals, plastics, carbons, gases, and metals. The people of Union Carbide welcome the opportunity to use their knowledge and skills in partnership with the citizens of so many great countries.

A HAND IN THINGS TO COME

UNION
CARBIDE



Paper Mill Toxic Exposure Incident (2 deaths, 14 injured)

KEY ISSUES

Reactive hazards

Hazardous waste
disposal

Safety of
emergency
response



Georgia-Pacific

Pennington, AL (01/23/2002)



Fiberglass Manway

Hazard awareness

**Contractor training
and preparedness**

**Emergency responder
training and
awareness**





Hazardous Waste Disposal Incident

KEY ISSUES

Reactive hazards

Hazard recognition
and
communication



**Kaltech
Industries
Group**

**Manhattan,
NYC
(04/25/2002)**

36 injured; 14 public members; 6 Firefighters; Post 9/11



Hazardous Waste Disposal Incident

**Multilingual
workplace**

Fire inspections

**Siting and Fire
Codes**





Chemical Repackaging and Distribution

KEY ISSUES

Emergency
Shutdown

Emergency
Response

Public Notification
and preparedness

Future security
warning



DPC Enterprises, Festus, MO (08/14/2002)



Start-Up Specialty Chemical Manufacturer (5 dead, 14 injured)



KEY ISSUES

Hazard Recognition

Process Hazard
Evaluation

Facility Permitting

Future security
warning

Tom Volk, *The Morning Call*

Concept Sciences, Inc. Allentown, PA (2/19/99)



BP Oil Refinery Vapor Cloud Explosion (15 dead, 180 injured)



BP Texas City, TX (3/23/2005)

KEY ISSUES

Corporate Culture

Cost cutting

Risk blindness

Facility design

Maintenance

Safety equipment

Human Factors

Training

Prevention Through Training

Trainers and Training Centers prevent disasters by building:

Awareness,

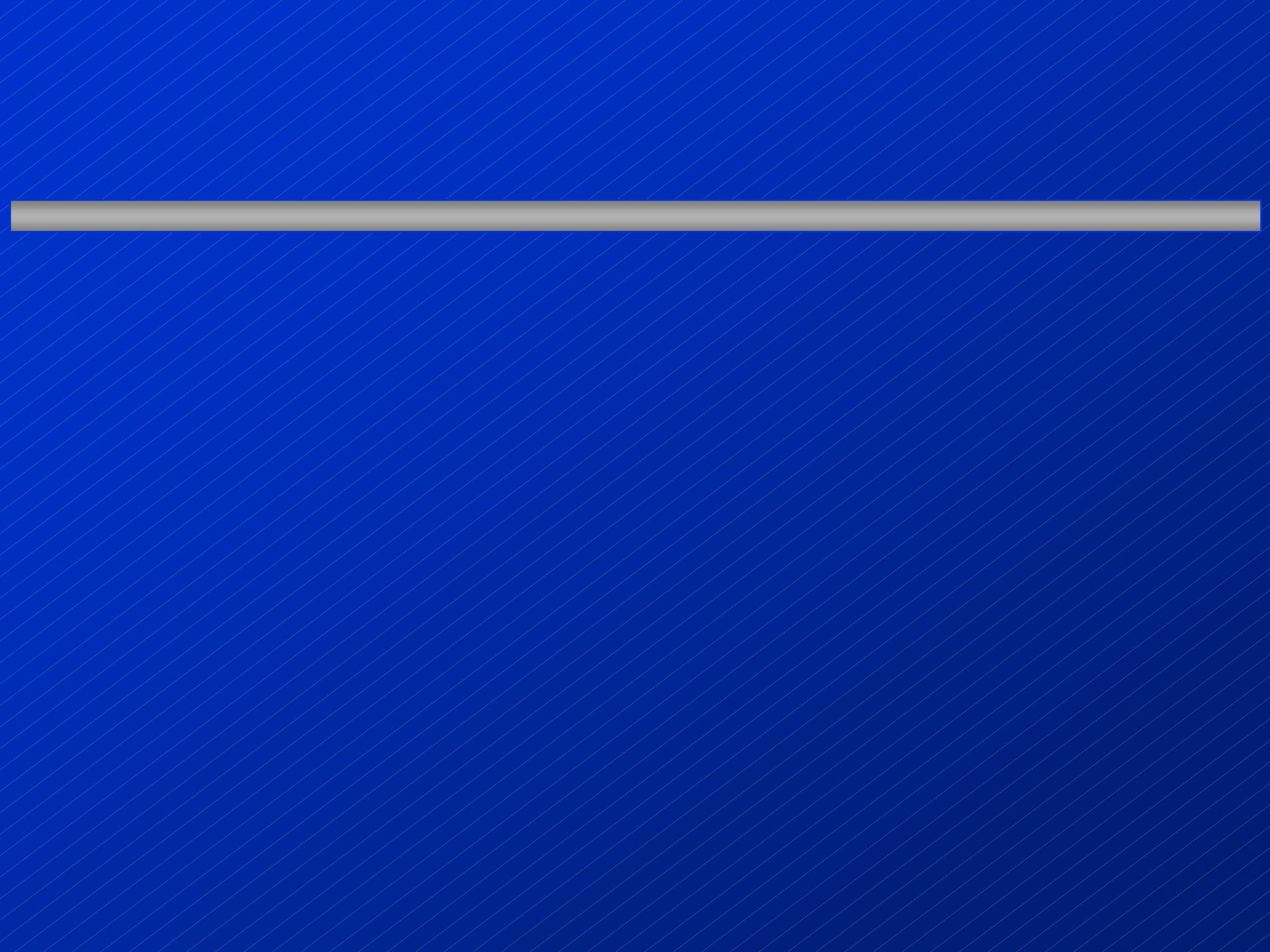
Access,

Attitude,

Attention

Trainers and Centers must evaluate and improve prevention training effectiveness

None of this should be left to chance.



Toulouse, France

September 21, 2001



Key Facts

- NH_4NO_3 explosion (20-40 Ton TNT equivalence)
- 30 killed (some public), 800+ hospitalized, 2242 injured
- 3.4 on the Richter scale, 65x54x7 meter crater
- 27,000 housing units and 74 schools damaged; 1.5B Euros
- Releases and damages at other facilities; 1300 companies
- Broad land use policy impact



AZF Agrochem Facility, Toulouse, FR

TotalFinaElf Group



Chemical Processing Incident (minor injuries)



KEY ISSUES

Reactive hazards

Siting of Buildings

Community Notification



First Chemical

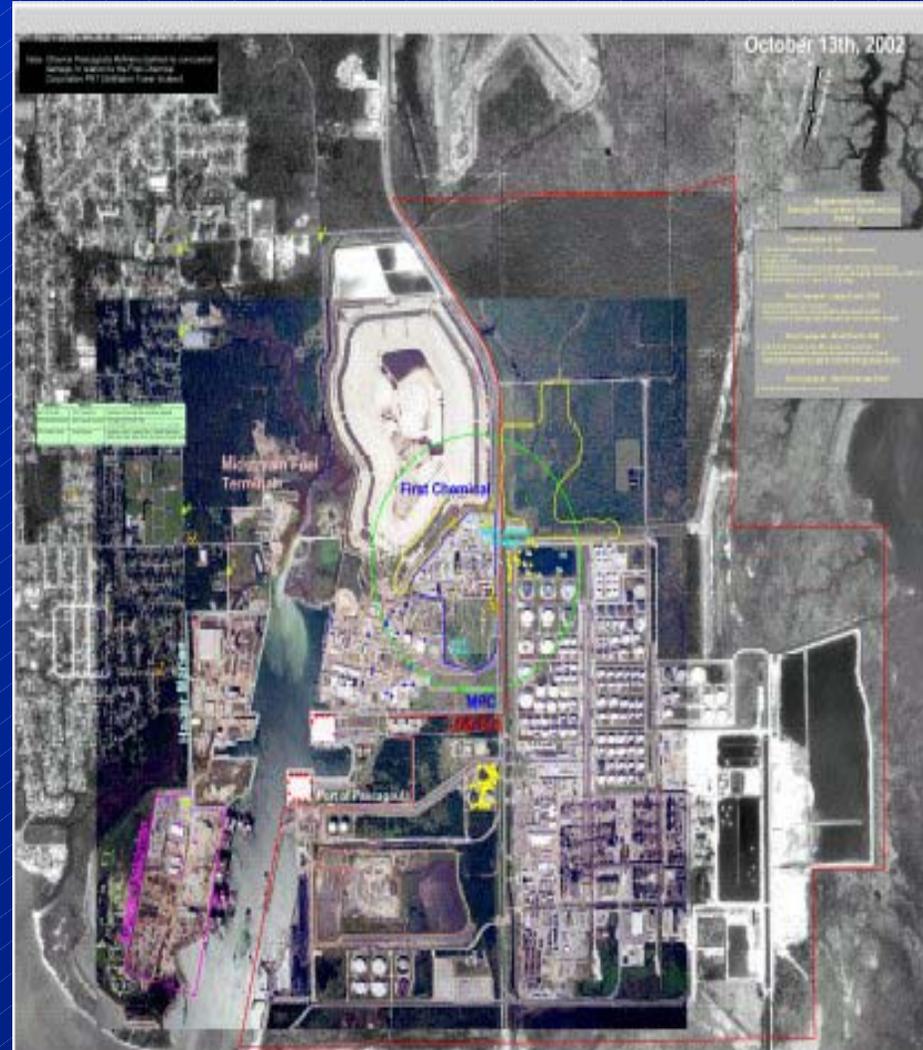
Pascagoula, MS (10/13/2002)



Chemical Processing Incident (minor injuries)

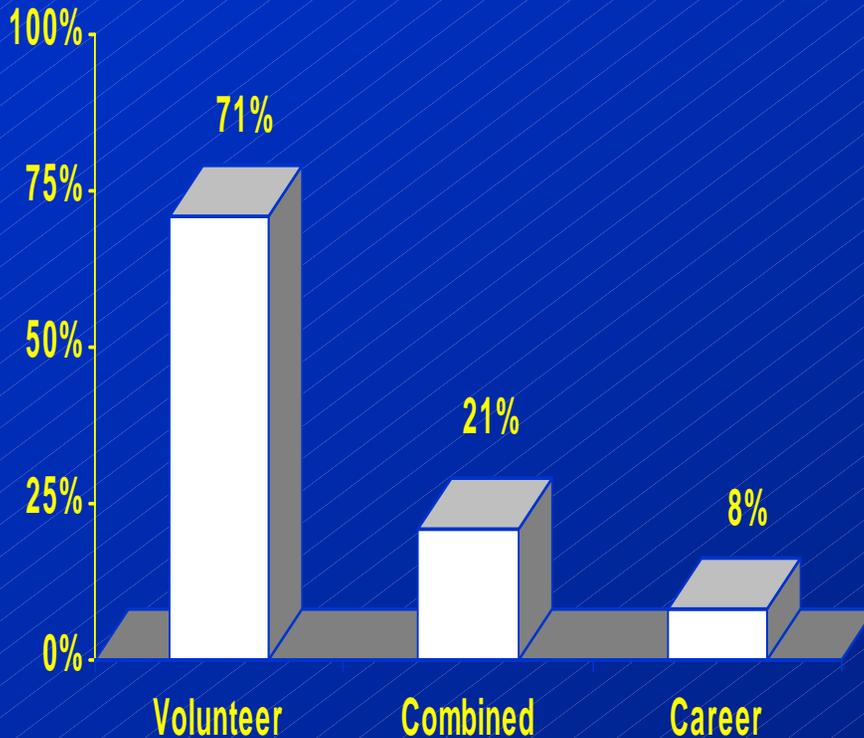


First Chemical





National Census Fire Departments



- **22,250 Fire Depts. Responded (~ 75 % of Fire Depts.)**
- **40,800 Fire Stations**
- **1,036,000 Employees**
- **15.7 % With HAZMAT Teams**

National Census

Fire Departments 2005 Actions

- **Fires – 1,600,000 (3.3% increase)**
- **Hazmat – 375,000 (5.9% increase)**
- **Mutual Aid - 1,091,000 (10.9% increase)**