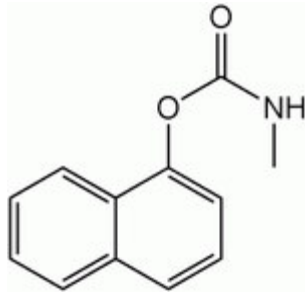


Bhopal Gas Tragedy

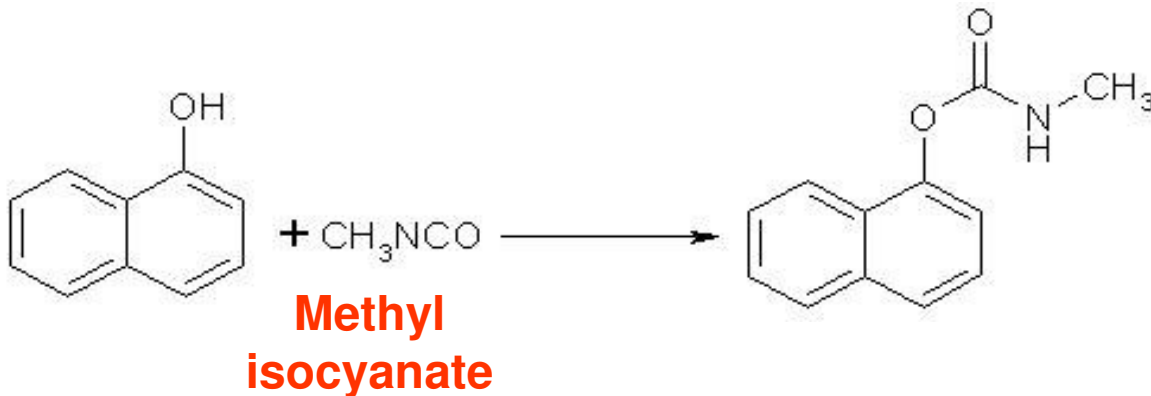
Product



Carbaryl

- Brand name Sevin (Union Carbide)
- Third most used insecticide in US
- Not fatal to people
- Does not cause cancer

Chemistry



TLV = 0.02 ppm

Methyl Isocyanate (MIC)

Clear, colourless, b.p. 39°C, odour threshold 2.1 ppm

Effects of 0.4 ppm

- Coughing
- Chest pain
- Breathing pain (dyspnea)
- Asthma
- Eye irritation
- Nose, throat, skin damage

Effects of 21 ppm

- Lung oedema
- Emphysema (damage of lung tissue)
- hemorrhaging
- bronchial pneumonia
- death

If you smell it, there is too much!

40,000 kg were released in Bhopal on 3rd December 1984.

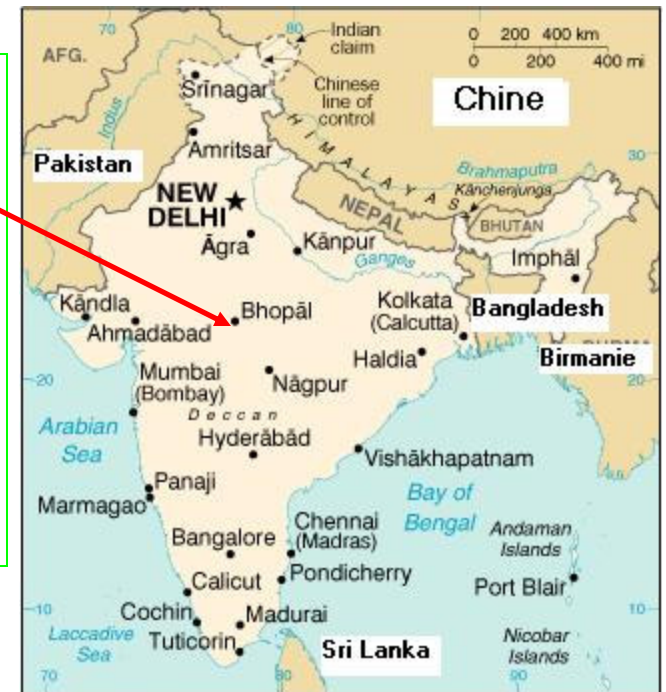
Background

1970s

- Indian Government invites UCC to set up Sevin plant
- Plant built in Bhopal to central location and transport infrastructure
- Indian Government has 22% stake in UCIL (UCC's India Subsidiary)
- Plant initially approved for formulation only (built in area zoned for light industrial use)

Late 1970s and early 1980s

- Competition forces “backward integration”. MIC manufactured at Bhopal site.
- 10 times the daily use amount of MIC stored in plant
- Drought causes drop in market demand for Sevin – safety and maintenance lax
- 6 minor accidents involving MIC between 1981 and 1984
- Plant conformed to much laxer standards than sister plant US



The Disaster (3rd Dec 1984)

Flare tower

Designed to burn off gas, but a connecting pipe had been removed for maintenance.

Vent gas scrubber

Leaking gas could have been detoxified, but the scrubber was turned off.

6 safety systems failed!

Water curtain

Not high enough to reach gas.

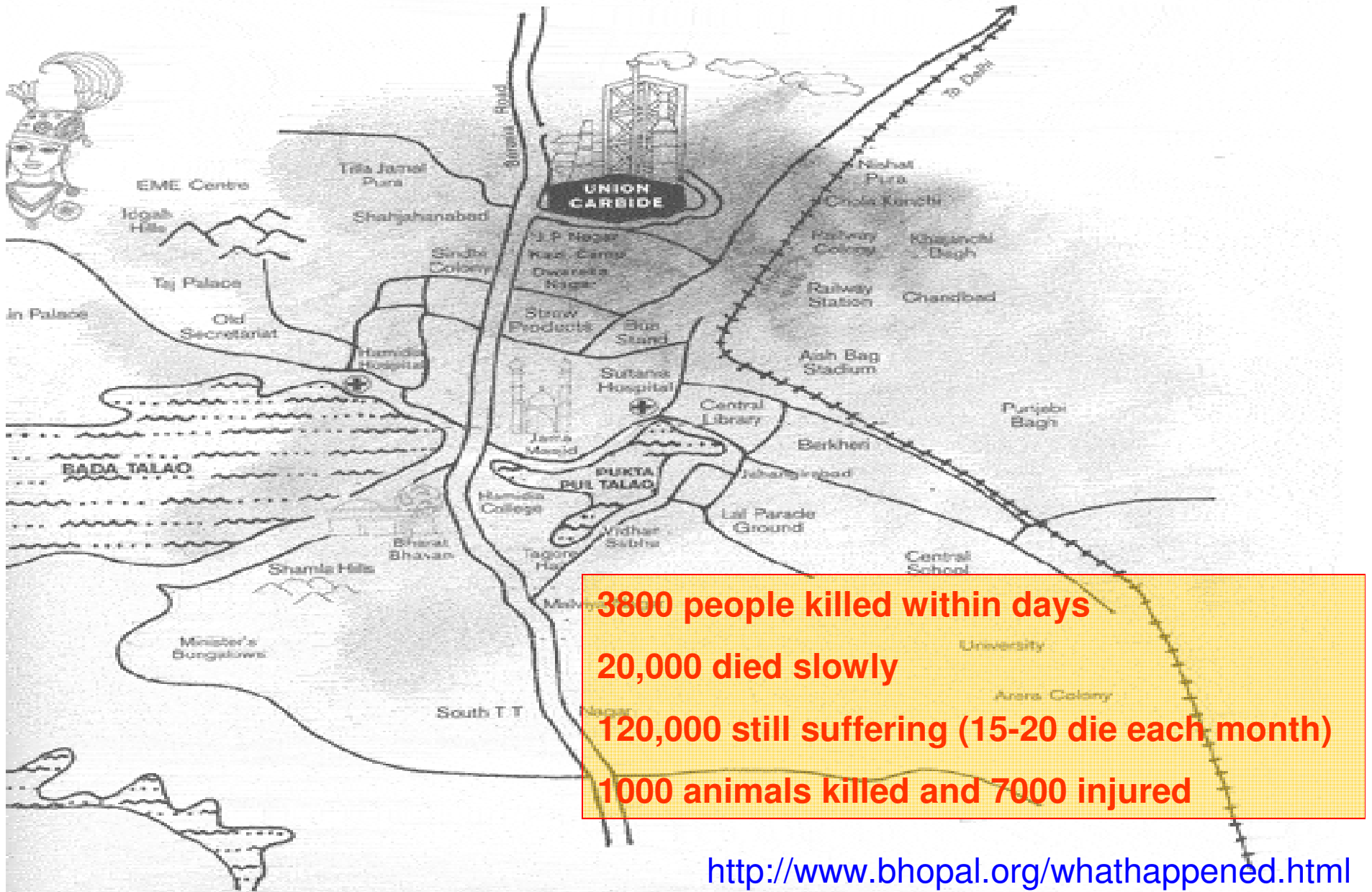
MIC storage tanks

40 tons in E610, 15 tons in E611, E619 was empty. Water leaked into E610 causing runaway heat-producing reaction

Refrigeration system

Freon system to cool liquid MIC was shut down in June 1984 to save money and Freon shipped to other plants.

The Disaster



Aftermath

Immediate – one view

- UCC tries to shift blame on UCIL, sabotage etc
- UCC refuses to provide chemical composition of gas or suggest proper medical treatment
- Multi-billion dollar lawsuit filed in US courts by American attorneys (Dec 7)

1985

- Bhopal Gas Leak Disaster Act – GOI set up as sole representative of Bhopal victims
- All cases transferred from US courts to Indian

1989

- UCC accepts moral responsibility and settles out of court for \$470 million (of the original \$3 billion)
- UCC share rises \$2 (i.e. up 7%)

Role of UCC in Aftermath

- UCC provides \$2 million for immediate relief
- UCC provides immediate and continuous medical personnel and equipment
- Provides technical expertise to aid analysis of disaster

- Settlement amount of \$470 million more than normally payable under Indian Law (Supreme Court of India)
- Provides \$2.2 million grant for vocational training centre (with ASU) in Bhopal – later razed by GOI
- Provides \$5 million to American Red Cross
- Set up charitable hospital for \$20 million with additional \$90 million following sale of UCIL in 1994

The 1989 Settlement

- Supreme Court of India requires GOI to make up any shortfall in the settlement
- Supreme Court tells both sides to start with a “clean slate”
- U.S. Supreme court denies right of Bhopal victims for file further suits
- Madhya Pradesh State Govt assumes responsibility for remediation (1998)

1991 Supreme Court Judgment

- *Bhopal victims file suit to overturn the 1989 settlement*
- *Supreme Court rules 1989 settlement final*
- *Reinstates criminal cases against UCC, its CEO Warren Anderson, and other officials.*

Situation Now

- UCC shrunk to 1/6th its size since the disaster
- Restructuring places large portions of its assets out of legal reach of Bhopal victims (sold Bhopal plant in 1994)
- Still operates as subsidiary of Dow Chemicals
- Believes that the Bhopal disaster was a result of sabotage (Arthur D. Little report)

- UCIL Bhopal site not remediated
- Plant still leaks toxic chemicals
- 1999 analysis of groundwater shows
 - 20,000 times permissible amount of mercury
 - 50 times permissible amount of trichloroethane
- 2002 tests show chlorinated organics, lead and mercury in breast milk of nursing mothers

Questions – prevention of disaster

- What was wrong with the Bhopal Plant?
- Was the plant properly sited?
- Was the Bhopal area ready for such a plant?
- Could the Bhopal area local bodies deal with a disaster of this magnitude?

Questions – responsibility and penalty

- Should UCC's assets be seized and sold off to compensate Bhopal victims?
- In such cases, should there be such a thing as limited liability?
- What more can UCC or Dow Chemicals do?
- Should the Indian Government bear a substantial portion of the responsibility?
- Should criminal cases be brought against local Government officials as well as Warren Anderson?

Responsible Care

- Direct Result of Bhopal Tragedy
- All major chemical companies signed on
- Objective to make the chemical industry serve society better

Responsible Care (Dow)

- Our industry creates products and services that make life better for people around the world - both today and tomorrow.
- The benefits of our industry are accompanied by **enduring commitments** to Responsible Care in the management of chemicals worldwide.
- We will make continuous progress toward the vision of **no accidents, injuries or harm to the environment** and will **publicly report** our global health, safety and environmental performance.
- We will lead our companies in **ethical ways** that increasingly benefit society, the economy and the environment while adhering to the following principles:

Responsible care (cont.)

- To seek and incorporate **public input** regarding our products and operations.
- To provide **chemicals** that can be manufactured, transported, used and disposed of **safely**.
- To make health, safety, the environment and resource conservation **critical considerations** for all new and existing products and processes.
- To **provide information** on health or environmental risks and pursue protective measures for employees, the public and other key stakeholders.
- To **operate** our facilities in a manner that **protects** the environment and the health and safety of our employees and the public.

Responsible care (cont.)

- To work with customers, carriers, suppliers, distributors and contractors to foster the **safe use, transport and disposal** of chemicals.
- To support **education and research** on the health, safety and environmental effects of our products and processes to foster the safe use, transport and disposal of chemicals.
- To work with others to resolve problems associated with **past** handling and disposal practices.
- To **lead** in the development of **responsible laws**, regulations and standards that safeguard the community, workplace and environment.
- To practice Responsible Care by **encouraging and assisting others** to adhere to these principles and practices.