

The Bhopal Gas Disaster 1984 – Children's Acute and Chronic Exposure to Toxic Substances

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Bhopal

Bhopal is the capital of Madhya Pradesh, and a railway junction.

In 1984, it had 700,000 inhabitants.

Today, there are about 1.2 millions.



1969: UCIL plant, Bhopal

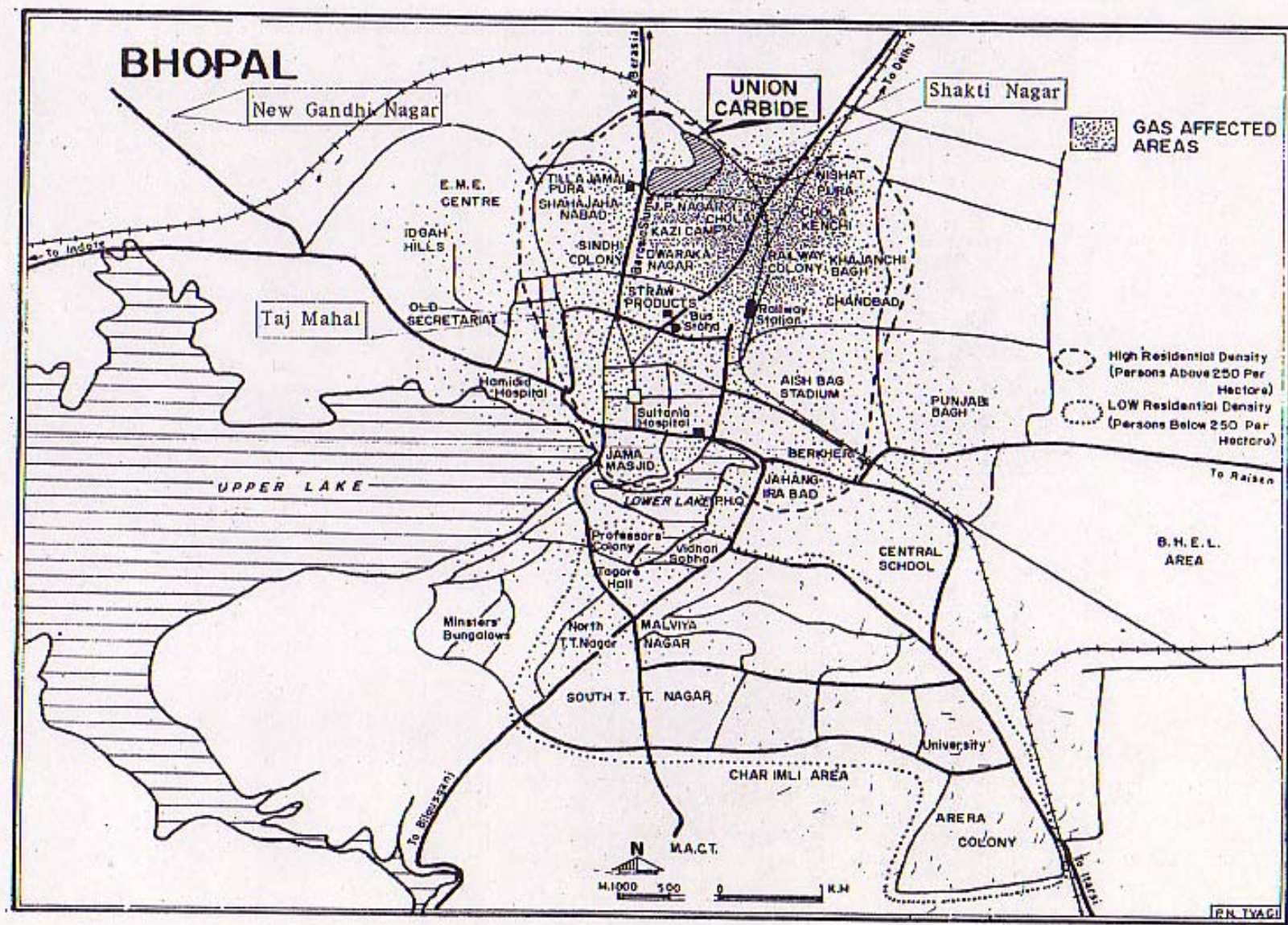


At midnight
Dec 3, 1984
water entered
the tank 610,
containing 43
tonnes of
methyl
isocyanate
(MIC).

A run away
reaction
started.



Photo - Courtesy : Pablo Bartholomew
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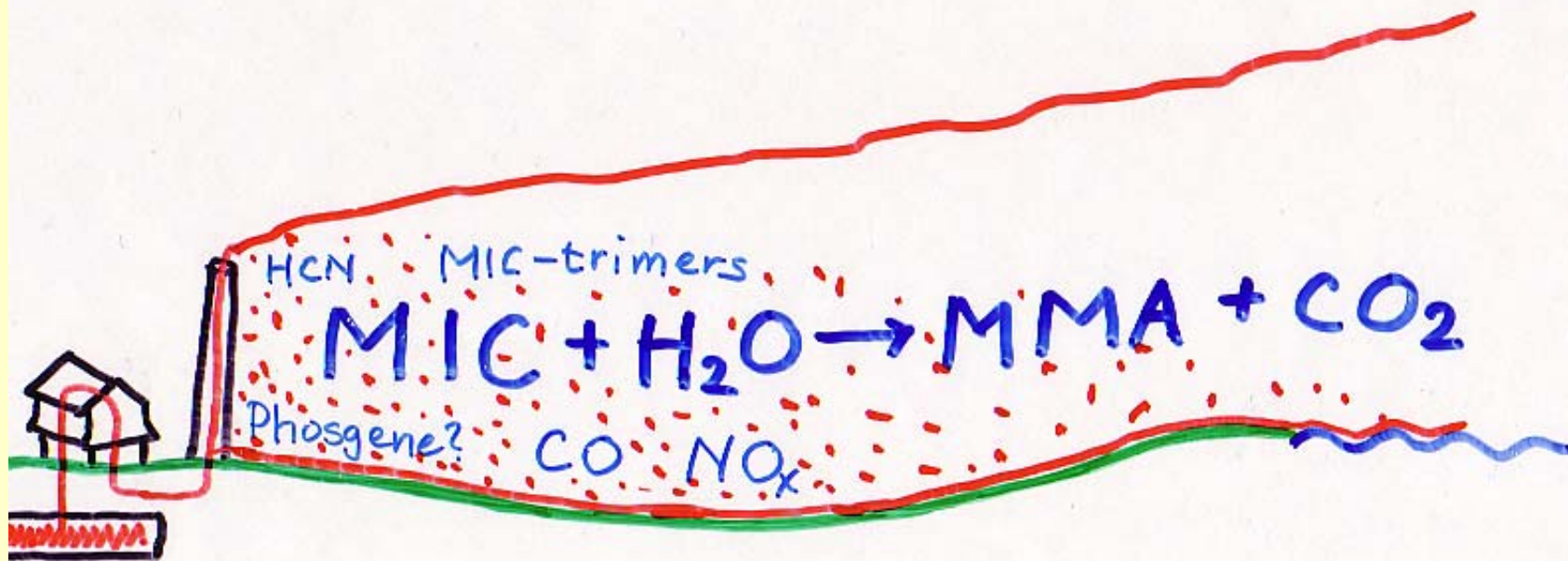


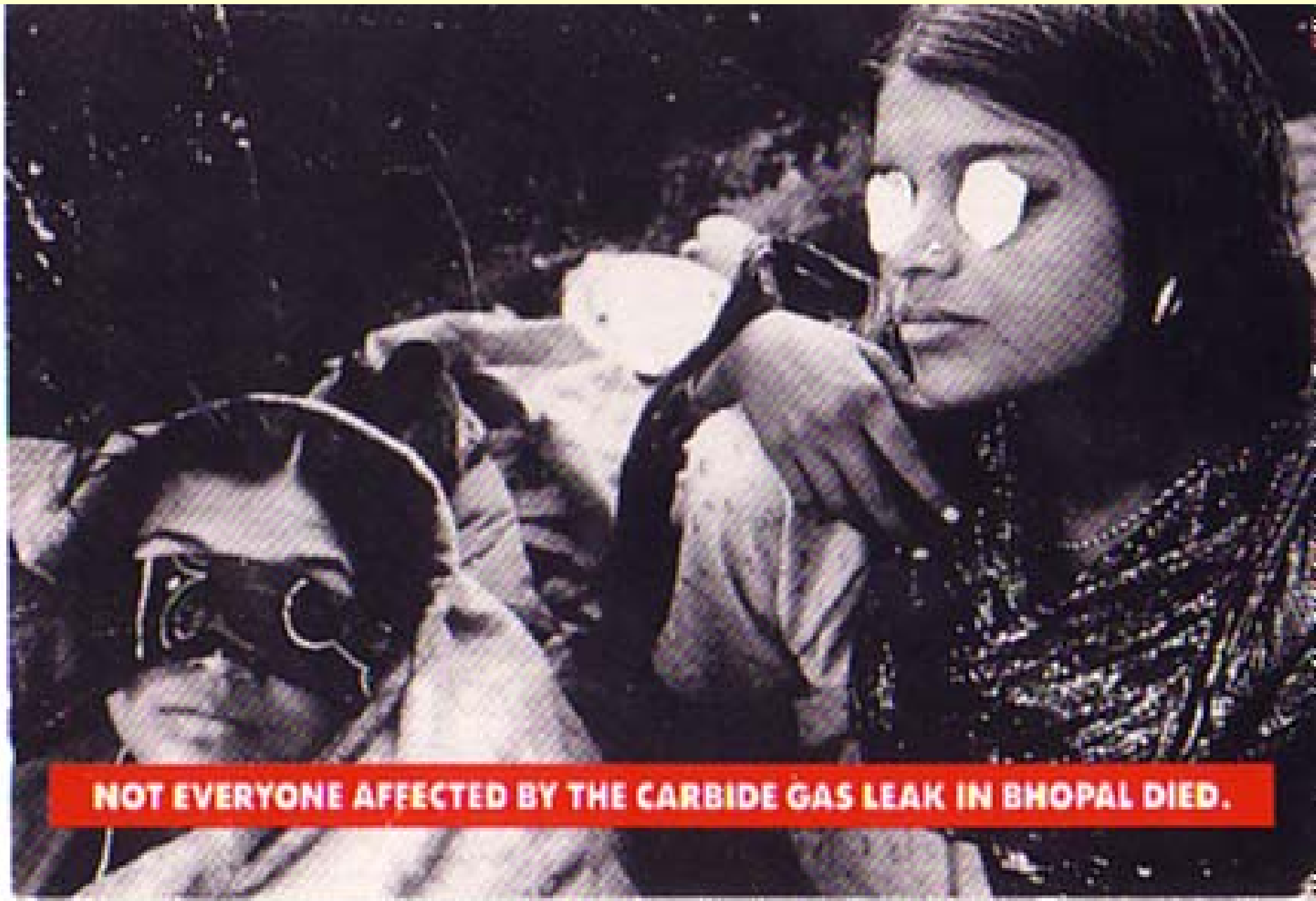


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NOT EVERYONE AFFECTED BY THE CARBIDE GAS LEAK IN BHOPAL DIED.

Magnitude of the disaster

Exposed:

- 520,000
- > 200,000 were below 15 years of age
- > 3,000 were pregnant women

Dead:

- > 8,000 (16,000?) during first weeks
- > 3,000 below 15 years
- 8,000 (?) died since

Permanent injuries:

- 100,000 – 200,000

Affected

- The poorest, who lived closest to the plant, were hit hardest.
- The shortest (the children) were hit hardest.

Reported acute health effects

- **Eyes**

Intense irritation, blepharospasm, eyelid oedema, corneal ulcerations.

- **Respiratory tract**

Rhinitis, pharyngitis, coughing, respiratory distress, breathlessness, choking, pulmonary oedema, pneumothorax, emphysema, fistulas, secondary infections etc.

- **Neurological system**

Cerebral oedema, partial paralysis

- **Kidneys**

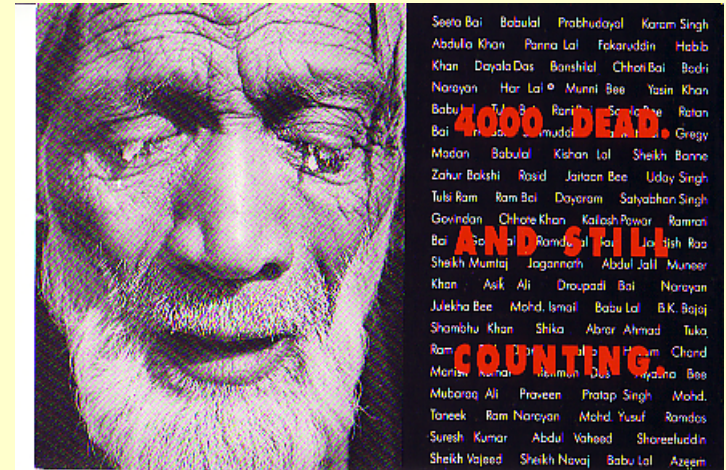
Tubular necrosis

- **Liver**

Fatty degeneration

- **Gastro-intestinal tract**

Necrotising enteritis



Acute health effects on children

- Same as for adults
- Stillbirth rate increased by 300 %
- Peri- and neonatal mortality 200 %
- Spontaneous abortions 300-400 %
- Congenital malformations



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Dispute 1994: Long term health effects?

- UCC, Gol and GoMP denied
- International Medical Commission on Bhopal (IMCB) was established
- Result: Long term health effects were generally accepted

Studied and reported long term effects on health

- **Eyes**

Chronic conjunctivitis, scars on cornea, corneal opacities, early cataracts

- **Respiratory tract**

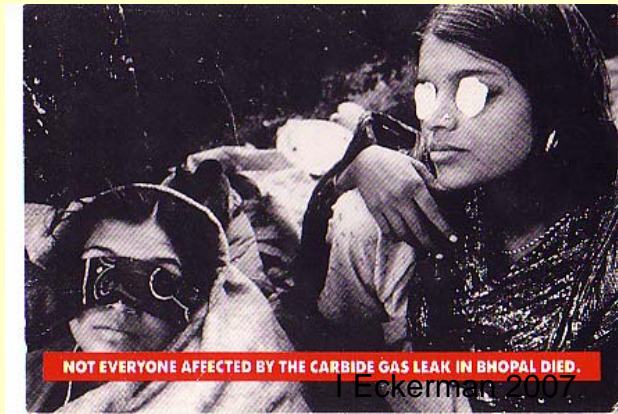
Obstructive and/or restrictive disease, pulmonary fibrosis, aggravation of TB and chronic bronchitis

- **Neurological system**

Impairment of memory, finer motor skills, numbness etc.

- **Psychological problems**

PTSD



Long Term Health Effects on Children

- In 1989, the still-birth rate, the crude birth rate, the perinatal death rate, the neonatal death rate and the infant mortality rate were still high in severely affected areas
- Higher incidence of psychiatric illnesses, febrile illnesses, acute respiratory infections, gastrointestinal infections, superficial infections of the skin, eyes and ears
- Intellectual impairment and epilepsy
- Failure-to-grow, delay in gross motor and language sector development in children born a considerable time after their mothers' gas exposure

Missing fields

- Female reproduction
- Chromosomal aberrations
- Immune deficiency
- Neurological sequelae
- Post traumatic stress disorder (PTSD)
- Children born after disaster

Late cases that might never be highlighted

- Respiratory insufficiency
- Cardiac insufficiency (cor pulmonale)
- Cancer
- Tuberculosis

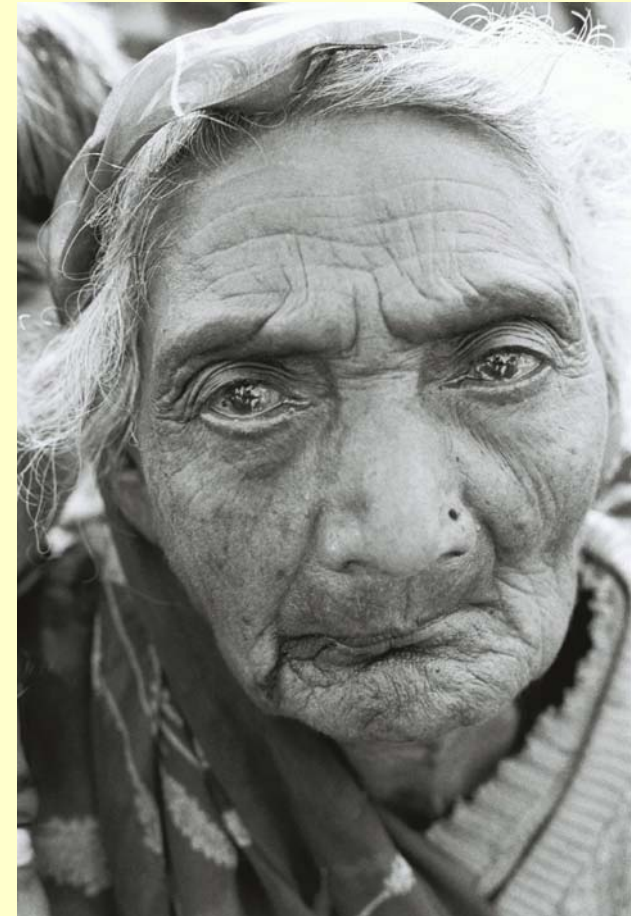


Photo: Christian Saltas

Conclusions

- Although the quality of the epidemiological and clinical research varies, the different reports support each others.
- The findings are also supported by animal experiments.
- Thus, the gas exposure has caused permanent health effects.





Dispute 2010: Contaminated Groundwater?

- Centre for Science and Environment 2009:
Contamination of UCC chemicals that must come from the UCC area
- Gandhi Medical College 2008:
UCC chemicals not present in ground-water.
No toxic substances in toxic doses.

Dispute 2010: Health Effects of Groundwater?

- Sambhavna Trust:
Definitely increased
rate of congenital
malformations
- Gandhi Medical
College 2008:
Higher self reported
morbidity among
under 24
- Dr Susan Katz:
Lead poisoning?
- No cause relationship
with water
contamination.

My questions:

- Which substances can be expected in the groundwater?
- What are the effects on foetus and child of a chemical cocktail of "non toxic doses"?
- Effect of cousin marriages in muslim society?



References:

www.en.wikipedia.org

"Bhopal disaster"

The Bhopal Saga – Causes and Consequences of the World's Largest Industrial Disaster

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