

# **INDUSTRIAL ACCIDENTS TO HUMAN-MADE DISASTERS: BHOPAL**

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# DEALING WITH RISK AND ACCIDENTS

Science and Technology is like any knowledge system

Living in an industrial era of manufacturing - recognition of 'risk', 'occupational injuries', 'industrial accidents', 'work-place stress', 'occupational disease', 'industrial pollution', 'industrial safety'

- Qu is how do we organize our production sites?
- Recognition of 'communities can and are at risk'
- Several industrial cities with factories and working class residences around them - Bhilai, Bokaro, Bombay, Ahmedabad, and so on
- Industrial hubs and SEZ are more recent



# LOOKING INTO THE FROZEN EYE

War images....

1995 Award winning  
photo  
of P. Bartholomew on  
a Bhopal child's burial  
— this death mask is  
used extensively in the  
campaign for justice



International  
Campaign for  
Justice in Bhopal



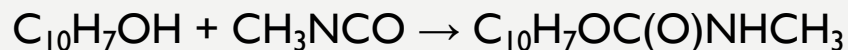
# GASSED TO DEATH@BHOPAL

- Bhopal is the 16th largest city of India [<https://en.wikipedia.org/wiki/Bhopal>, 26 Feb 2023]
- Capital city located in state of Madhya Pradesh & known as the city of lakes (natural and artificial)
- On midnight of 2/12/1984 and early hours of 3/12/1984, Bhopal became a gas chamber of genocide when approximately 40-42 tons of MIC (Methyl Isocyanate) was released from Tank No 610C in an industrial complex owned by Union Carbide (India) Limited – UCIL (a subsidiary of an American Company Union Carbide – Now Dow Chemicals [see: <https://www.unioncarbide.com/>]) that used to manufacture Carbaryl and other chemical fertilizers and pesticides.
- Union Carbide plant was set-up in 1968 & Carbaryl manufacture was started in 1979.
- Locality is densely populated, lacks proper roads for emergency evacuation, poor communication and informal settlements and encroachments
- About an area of 20 sq kms was severely affected
- It exposed more than 65% of Bhopal's 900,000 population in December 1984.



# CARBARYL

- MIC is used to manufacture Carbaryl (a pesticide), fertilizers, plastics, pharmaceuticals, polyurethane foams etc.
- Carbaryl (1-naphthyl methylcarbamate)
- Carbaryl is often inexpensively produced by direct reaction of Methyl Isocyanate with 1-Naphthol



- Discovered by Union Carbide in 1958 - Carbaryl was the third-most-used insecticide in the United States for home gardens, commercial agriculture, and forestry and rangeland protection
- Carbaryl is a cholinesterase inhibitor and is toxic to humans. It is classified as a likely human carcinogen by the United States Environmental Protection Agency (EPA)
- Marketed under the label Sevine

# WHAT HAPPENED THAT NIGHT?

Read extracts from

T.R. Chouhan (ex-MIC plant operator) provides us with a vivid narrative about what actually happened on that fateful night in the plant: MIC storage tank 610.

And

Puri and Bisariya (DIG of Bhopal and Ex-Mayor of Bhopal)

Reading – 3 pages published in 2005



# A HUMAN CARNAGE...

- Roused from sleep, blind and breathless, thousands suffered a painful death after inhaling a poisonous gas...many died instantly while thousands others choked to a painful death within a few days of inhaling the poisonous gas, and still thousands of others died a slow painful death while an entire generation now copes with the after-effects...
- Symptoms – irritation in the eye leading to loss of sight, acute burning in the chest, severe headaches, joint pains, skin disorders, reproductive malfunctioning (abortions, stillborn fetuses, early menses)



# **FROM ACCIDENT TO DISASTER**

**3 DECEMBER 1984, BHOPAL,  
INDIA  
HOW? WHAT? WHY?**

# SAFETY...RISK....DISASTER

The plant did not have permission to store MIC over a prolonged period; “The catastrophe happened because the essential safety systems either failed or were inoperable and the safety procedures were not strictly complied with” [Bisariya and Puri 2005]

- Chouhan: The Bhopal plants safety record prior to 1984 was not good – warning signals had been there. This disaster was not merely an accident!
- There had been other accidents earlier and recorded for Dec 1981, Feb 1982, and Dec 1982 leading into an enquiry about the safety of the plant. The enquiry committee declared the plant to be safe!
- Industrial secrecy and IPR were used to maintain secrecy about information

# SAFETY MECHANISMS

- Chouhan: There were four kinds of safety equipment for the MIC storage:
  1. vent gas scrubber [not operational on that night];
  2. flare tower [under maintenance that night];
  3. refrigeration system [system had been shut down in May 1984 to save power costs – very dangerous to keep MIC at ambient temperature of 11°-26°] and alarm system on tank was not working either;
  4. water spray [could not reach the height of 30m where gas was released]
- Danger alarm was switched off after the release after 5 minutes as per company policy. None of the plant personnel died due to this.
- Economy measures overrode safety concerns and spares were not available
- Plant engineers and operating personnel left while public got exposed!
- Evacuation plan was in place for the plant personnel and not for the community living adjoining to the industrial factory

# CONTESTED EXPLANATIONS

On the website of UCC we have an explanation given about the midnight incident of 2 December 1984, when a gas leak at a plant at Bhopal, India was caused by an act of sabotage, resulted in tragic loss of life (cf. Jasanoff 2007: 345). A US based consultant was cited as responsible for this narrative.

- The GOI nor the citizens of Bhopal ever accepted this sabotage theory.
- Puri and Bisariya's narrative emphasizes the lack of preparedness and complete ignorance to deal with the situation [p. 211]

# FROM ACCIDENT TO DISASTER

- No information about storage and handling of hazardous and dangerous material was adequately available nor were any safety drill ever conducted – lack of preparedness
- All warning and safety mechanisms inside the factory & its storage facilities failed
- The company denied any wrongdoing and did not share vital toxicological information about the chemical released.
- Lack of coordination between factory, administrative set-up and health personnel

# DENIAL CULMINATES IN A CATASTROPHE

- The medical team [Dr H. Chandra] responding to the patients were misled by the company doctor [Dr L.S. Loya] employed by the UCIL that MIC was not a serious toxin and not dangerous (cf. Muralidharan 2004: 5196)
- L.S. Loya: Give them atropine drops ...victims might get irritated eyes and skin...but were not liable to die.
- Doctors did not initially even know what they were treating and were not able to cope with the scale of the industrial accident. Post-mortem studies indicated symptoms of cyanide-like poisoning.



# MACABRE MOMENT

- Even 30 years after 3/12, the calculus of the death and injured remains incomplete....
- “the disastrous state of preparedness in both the city and the company running the lethal factory was one hint of the many dimensions that the tragedy would acquire over the years. And to this day there has not been any enforcement of accountability on either the corporation for its crimes of culpability nor the regulatory authorities for their gross neglect of the potential hazards involved in the pesticide factory” [Muralidharan 2004: 5196]

# DENIAL OF TOXICITY

- Dr HH Trivedy, “we still do not know what could we have done that day to save lives; we are still not aware of what could we have done in the months and years since” [cf. Muralidharan 2004: 5197]
- The death toll could have been much lesser – however, the recommended antidote of cyanide poisoning namely sodium thiosulphate was not administered by medico’s in a timely manner as this would have constituted conclusive proof of industrial poisoning & attributed to criminal culpability of Union Carbide.

# ASSESSING THE MAGNITUDE

- Magnitude: ascertaining the extent of damage and fatalities has become a bureaucratic wrangle and controversial.
- Around 3,000 died within a week and 20,000 until 1992 when officials stopped counting (CSE 2006: 308).
- The Greenpeace organization cites a total casualty figure of 20,000 as its own estimate.
- 1989 SC judgment estimated number of fatal cases was 3000 persons and those suffering from serious injuries was estimated to be 30000.
- Review petition filed against this ruling resulted in a later 1991 judgment escalating the fatalities to 4000 persons and tens of thousands as those suffering from serious injuries....
- By 2004, about 6000 death claims have been settled while the number of persons claims settled exceeded 550000.
- MP govt report stated the death toll to be 15248 in 2004 while the Amnesty International report (2004) declared 20000 persons as dead.

# STATE COMPLICITY AND SUPPRESSION OF EVIDENCE

- Sir Dorabji trust funded the first comprehensive house-to-house survey that was undertaken by faculty and students of TISS between January and February 1985 covering 25259 households in Bhopal.
- MP government did not share these findings....
- Victims were not given the requisite medical care
- ICMR conducted a clinical study on efficacy of Sodium Thiosulphate as an antidote to poisoning and recommending its administration to improve the condition of the affected people. But due to opposition from medical lobby controlled by the company, it did not push for this and government was also wavering.

# VICTIMIZATION

- Estimated that about 50,000 people are suffering from respiratory distress, cancers, psychiatric problems, & cardiovascular diseases in Bhopal.
- Bhopal has the highest incidence of pulmonary fibrosis and lung cancer yet the govt turns a blind eye attributing it to other causes – urgent need for a healthcare strategy.
- Official silence is a complete denial of any responsibility towards the silent impoverished sufferers who do not even manage to get decent employment and wages as their productivity is low.
- Major portion of the sufferer's earnings in Bhopal are being spent on expensive medical treatment, which should have been borne and compensated by Union Carbide.



# NOTABLE EVENTS

Legal deliberations [1) criminal case; 12) civil case for compensation; 3) civil case for medical relief and rehabilitation]

1985: Union Govt of India was declared to be the sole legal representative of all Bhopal Gas Victims by an Act of Parliament in March 1985. The Indian govt files a claim of \$3.3 Billion in New York, USA in April.

1986: in May, UOI plea is dismissed and Union Carbide persuades the US court to send the case back to India where compensation liability would be lower for the company

Govt of India files cases in Bhopal's district courts - interim relief demanded.

1989: Review petitions are filed in the Supreme Court. An out-of-court settlement is reached with compensation brought down to merely \$470 million. This action of GOI puts an end to all outstanding claims against Union Carbide resulting from the gas leak and also led to closure of official enquiry into the leak.

Was this compensation given and how was it utilized?



# Compensation

Supreme Court ordered compensation as follows

Families of the dead – Rs 1-3 Lakhs;

Fully or permanently disabled to receive Rs 50,000-Rs 2 Lakh

Partially injured about Rs 25,000-Rs One Lakh.

- Originally the no. of claims filed was 2 Lakh that has now risen to 1.29 million in 2003.
- Actual amount was very less.
- Indian Lives are cheap (Oil spill affected wildlife such as Otters recd. \$40000 each in Alaska in 1989!)
- Many animals died also...

# COMPENSATION

- Claims settlement was not based on any scientific understanding of nature of injuries or the number of injured.
- The data was never placed on record in the court...victims were never provided with health booklets to document their deteriorating health.
- Hence, there were nation-wide protests at this arbitrary decision and figures.
- Victims realized the complicity of the government and initiated litigation on their own in 1989 to seek legal remedy.
- ICMR studies showed effects of the exposure to be multi-systemic, irreversible, and progressive on humans. The exposure had impacted the immune system and grave dangers of mutagenic changes were documented in the exposed population. Previously there had been no studies done on impact of MIC.

# TURNING POINTS

1994: Indian Govt allows UCIL to sell all of its assets

1999: Bhopal victims file suit in New York citing violation of human rights, environmental law and international criminal law.

2001: Union Carbide and Dow merge to form the largest chemical company.

2002: the Madhya Pradesh govt urges the central govt to press Union Carbide to clean up the contaminated soil and water at the factory site.

# EVENTS...CONTD.

2002: Study by People's Science Institute (Dehradun) confirms the presence of toxic mercury in drinking water – people have been drinking since 1984!

CBI and other organizations submit documents incriminating Union Carbide of using unproven technology in their plant. People march peacefully demanding justice and flood Dow with emails and petitions

2003: Some US senators ask Dow to take responsibility and cooperate with the Bhopal victims

2014 – W. Anderson dies in the USA

# NEW VICTIMS OF THE BHOPAL GAS TRAGEDY

- Environmental contamination in Bhopal means that the new generation is also suffering.
- Studies have established how indiscriminate dumping of hazardous waste and lack of cleanup within factory has led to a deterioration of groundwater and contamination of drinking water in 14 colonies of Bhopal.
- Toxins presence led to hand pumps being painted red and dangerous by the municipal corporation.
- 2004 SC intervened...

# **CLEAN DRINKING WATER AS LUXURY**

4 May 2004

Supreme Court ordered the provision of clean drinking water to people in Bhopal – yet nothing has been done (red water pumps of contaminated ground water are still being used for drinking by people)

# TOXIC BODIES

- NGOs and citizens groups have been very active in the whole process of revealing the nature, extent, and agony of victims. They have forced govt to share data.
- Studies reveal that tankers are unreliable and do not provide adequate water for people's needs.
- The survivors drink poison everyday.
- Toxic chemicals have now entered the food chain as breast-milk was found to contain lead! "In Bhopal, cancer takes the easiest and shortest route to inflict children: breast milk"



# ONGOING...UNRESOLVED

- Residents report chronic health problems such as psychological and neurological disabilities, blindness, skin, vision and breathing disorders and the newborn children still suffer from serious birth defects, even after generations.
- The Indian Council of Medical research (ICMR) has classified this cluster of diseases as the 'Bhopal Toxic Gas Disease' in 2004.
- 2005: in response to a Public Interest Litigation the MP High Court directed a cleanup/removal of toxic waste from the factory premises – in three phases by 2007.



# **COURTS AND SCIENCE**

**JUSTICE DELAYED AND JUSTICE  
DENIED**

# **BHOPAL GAS LEAK DISASTER (PROCESSING OF CLAIMS) ACT OF 1985 IS PASSED**

- Reserves the right of the Union government and grants it exclusive right to litigate on behalf of victims in its capacity as *parens patriae* (parent of the country).
- Implication - the victims have no right to file private cases/represent themselves in the courts.
- The government of India hence would file a *class* action suit on behalf of the victims who lacked the means to fight the case.
- State also had a responsibility to look after the victims through their protracted and taxing judicial process in India and in the US.

# ANDERSON, CEO

- How could GOI allow Warren Anderson to be released on bail and not impress on Govt of US to extradite Anderson back to India?
- As the UCC CEO, Anderson was charged with manslaughter by Indian authorities. He flew to India and was promptly placed in custody by Indian authorities. Anderson posted bail, returned to the US, and refused to return to India. He was declared a fugitive from justice by the Chief Judicial Magistrate of Bhopal on February 1, 1992, for failing to appear at the court hearings in a culpable homicide case in which he was named the chief defendant.
- The chief judicial magistrate of Bhopal, Prakash Mohan Tiwari, issued an arrest warrant for Anderson on July 31, 2009. The United States has declined to extradite him citing a lack of evidence. In August 2009, a UCC spokesperson said Union Carbide had no role in operating the plant at the time as the factory was owned, managed and operated by employees of Union Carbide India Limited.
- Eight former senior employees of the subsidiary were found guilty on June 7, 2010. After these convictions, a UCC spokesperson said, "All the appropriate people from UCIL – officers and those who actually ran the plant on a daily basis – have appeared to face charges."

Warren Anderson dies on September 29, 2014.

Sourced from [http://en.wikipedia.org/wiki/Warren\\_Anderson\\_\(American\\_businessman\)](http://en.wikipedia.org/wiki/Warren_Anderson_(American_businessman))

# ROLE AND RULE OF LAW

- Law became complex with issues of jurisdiction – UCC was an American Company, UCIL was a partnership with 49% held by Indians [the Indian govt was also an investor] while all the victims were Indian citizens.
- American and Indian legal systems got entangled with their culturally specific laws and conceptions of human rights and justice.
- Compensation and claims settlement were different in both the jurisdictions.
- Bigger question also of idea of monetary compensation of loss – is this sufficient and used as a benchmark for violation and negligence
- Indian legal system had no provision to deal with hazardous industrial chemicals and an industrial accident of this magnitude. Nor did Indian lawyers have the necessary legal competence to deal with this kind of disaster (Jasanoff 2007: 346).
- Shift of case from the US to Indian context was disastrous from the point of view of compensation and rehabilitation of victims.

# SHROUDED EVIDENCE

- Administrative inefficiencies and corruption were endemic in identifying victims and sufferers – the extent of damage, the magnitude was unclear and statistics were fuzzy.
- No treatment protocols were established and shared about how to deal with the affected population even until 1994. Only symptomatic treatment was done in an ad hoc manner.
- The GOI had set up a Scientific Commission for Continuing Studies on effects of Bhopal Gas Leakage on Life Systems and it was headed by the Former Director of Indian Institute of Toxicology Research and they submitted a report in 1987 [1000+ pages] but this was not submitted in courts or shared with public.

# (IR)RESPONSIBLE SCIENTISTS

- ICMR initiated 24 research projects in 1985 but withheld the research results – all of these projects were terminated in 1994 excepting one on cancer among the gas victims.
- The other epidemiological studies being done by ICMR were abruptly discontinued. The MIC Gas is not present in the air so why conduct studies, explained Sameer Kare, the Director of Dept of Bhopal Gas relief and rehabilitation (cf. CSE 2006:315) – this decision was not based on any researcher's advice but was purely an administrative decision.
- No long term studies were publicly shared and a technical report was released by ICMR in 2004.
- **Don't we need studies with half a million sufferers?**



# WHO IS RESPONSIBLE?

Company....yes, nonetheless...others as well

Responsibility lies not merely with Union Carbide but also the state and national government who had not undertaken any necessary steps to rehabilitate (issues of medical, infrastructural, economic nature) the gas affected victims or the people living/residing in the factory area.

Govt covered the damning medical evidence in secrecy...a ban was imposed on doctors on their sharing of relevant information....

Clearly, sections of bureaucracy were colluding with the company!!!!

# LACK OF ACCOUNTING & ACCOUNTABILITY

- Law suits demands evidence....
- No one knows how many people died at Bhopal or were affected after the MIC leak – what we find is chaos and mismanagement. On one hand the legal demand for scientific proof, and on the other hand the silenced narratives of the sufferers and victim's families.
- How do we fix responsibility?
- Who are complicit?
- Lack of Official Records & Statistics about the Death toll
- Lack of Documentary Evidence and Conclusive Medical Proof for the suffering victims

# REDRESS THROUGH LAW, SCIENCE AS EVIDENCE

- Major portion of the sufferer's earnings in Bhopal are or have been being spent on expensive medical treatment, which should have been borne and compensated by Union Carbide.
- Bhopal's story is not merely about its victims struggle to deal with the aftermath of an industrial disaster but more than anything else a story of how powerful institutions, multinational corporations, medical personnel, and complicit bureaucracy **screen and mediate knowledge**.
- For Jasanoff, Bhopal's trials illustrate "the incapacity of law and science to restore order when radically different cultures of knowledge and justice come together in an unplanned confrontation" (2007: 344).
- ***Bhopal tragedy represents both the failure of law and of science. The betrayal of promise of progress through corporatization of science ...***



# LESSONS LEARNT

IMPLICATIONS AND AFTERMATH

# IMPACT ON FORMULATION OF LAWS

- 1989 – The Environment (Protection) Act
- 1987 – The Factories Act of 1948 was amended to introduce provisions relating to hazardous industrial processes
- 1989 – The Manufacture, Storage, and Import of Hazardous Chemical (Amendment) Rules passed – it deals with industrial accidents in the chemical industrial complexes.
- 1991 – The Public Liability Insurance Act – provides immediate relief to the affected public
- 1999 - Environment (Siting of Industrial Projects) Rules
- 2003 – Hazardous Wastes (Management and Handling) Amendment rules

# **LARGER IMPACT – PUBLIC POLICY**

- Large Industries and many other development projects need to conduct an Environment Impact Assessment before seeking any clearance from the MOEF.
- Lead to the relocation of many industries (dealing with chemicals or leading to toxic wastes) from thickly inhabited areas such as urban cities etc.

# IMPACT OF BHOPAL IN USA

The Tomas Mac Sheoin report of 1989 on the Union Carbide noted: “it is a bitter irony that the major reformist effect of Bhopal were felt in Union Carbide’s home country.”

In 1986 – US introduced the Toxic Release Inventory System whereby every hazardous substance is accounted by the regulator & the user company.

Stricter monitoring mechanisms were introduced with many compounds reviewed for safety standards – About 70 chemical compounds were relocated by end-1980s.







# SURVIVING BHOPAL...

- 9/8/2012 saw the culmination of an extended litigation by survivor groups and their support organizations in the Supreme Court seeking medical relief and rehabilitation.
- The writ petition No 50 of 1998 directed Govt of Madhya Pradesh and ICMR to ensure continuation of medical research, prepare standardized protocols for treatment and diagnosis, and recording of patient history of treatment.
- Why did the ICMR abdicate its responsibility and its role as a medical scientific body by discontinuing their studies?

## **U.S. COURT OF APPEALS UPHOLDS 2012 JUDGMENT OF DISTRICT COURT IN BHOPAL CASE; UNION CARBIDE NOT RESPONSIBLE FOR POLLUTION RELATED, PERSONAL INJURY CLAIMS**

On June 27, 2013, the federal Second Circuit Court of Appeals unambiguously concluded that Union Carbide Corporation (UCC) was not liable for any environmental remediation or pollution-related personal injury claims made by residents near the Bhopal plant site in India, which was formerly owned and operated by Union Carbide India Limited.

The lawsuit was filed in 2004 in a U.S. court as a proposed class action by Indian citizens who claimed that their drinking water in India was tainted by pollution from the Bhopal plant site. They sued only UCC, an American company, and its former chairman.

In its written decision, the Court of Appeals agreed, noting: "...many others living near the Bhopal [India] plant may well have suffered terrible and lasting injuries from a wholly preventable disaster for which someone is responsible. After nine years of contentious litigation and discovery, however, all that the evidence in this case demonstrates is that UCC is not that entity."

In its decision, the U.S. Court of Appeals re-affirmed U.S. District Court Judge John F. Keenan's comprehensive decision of June 2012, which rejected all of the class action Indian plaintiffs' arguments seeking to extend liability to UCC and, instead, dismissed all claims against UCC and its former Chairman Warren Anderson.

<http://www.bhopal.com/court-of-appeals-upholds-2012-judgment>

# TOXIC BHOPAL & NEW BHOPAL

- The story of Bhopal is one of seriously botched litigation and a sequence of bureaucratic bungling. It is also one of denial of information by the company and the state to affected people.
- Living in Bhopal today is still an ‘unaccepted’ risk factor – as the govt and the UCIL have not failed to clean up either the area and check the contamination of the groundwater – the closed factory is a hazardous poisonous dump with chemicals leeching into the ground – posing a severe health and life risk to the people living in the surrounding area.

# LEARNING FROM BHOPAL

- India has the 2<sup>nd</sup> largest Chemical Industry in the world
- An accident like Bhopal exemplifies our inability to recognize and deal with risk. It also exemplifies our inability to manage this risk and the problems that modern industrial development brings in its wake. Bhopal is a reminder of what can happen if we do not account for safety in the modern system. But Bhopal is also a reminder of what will happen if medical system is not capable of managing these risks (CSE 2006: 308).

# HOW DO WE UNDERSTAND?

- ✓ Unscientific use
- ✓ Corporate Negligence
- ✓ Industrial Hazard & Disasters
- ✓ Response transformed it into the greatest industrial tragedy of 20 Century
- ✓ Environmental Rehabilitation is near impossible
- ✓ Legal issues

Video – BBC and National Geographic:

- ✓ [https://www.youtube.com/watch?v=rJgl9VW8x\\_Ls](https://www.youtube.com/watch?v=rJgl9VW8x_Ls), accessed on 26 Feb 2023
- ✓ <https://www.youtube.com/watch?v=HsuUQzhP2Ds>, accessed on 26 Feb 2023