Media Briefing

Action Plan

Environmental Remediation in and around UCIL, Bhopal

Round Table Meeting, April 25-26, 2013

DELIBERATIONS IN THE EXPERT ROUNDTABLE

Centre for Science and Environment

Expert Participants (1/2)

Name	Designation	Organisation
CSIR Institutes		
Tapan Chakrabarti	Emeritus Scientist, CSIR & Former Director	NEERI, Nagpur
J K Bassin	Scientist 'F' and Head	NEERI, Delhi
A Krishna Reddy	Retd. Scientist 'F'	IICT, Hyderabad
H S Simha	Principal Scientist, Design Engineering	
R C Murthy	Head, Analytical Chemistry Section	IITR, Lucknow
S S Cameotra	Sr. Principal Scientist & Deputy Director	IMTECH, Chandigarh
Indian Institute of Technology		
T I Eldho	Prof., Dept. of Civil Engineering	IIT Bombay
Pinaki Sar	Associate Prof., Dept. of Biotechnology	IIT Kharagpur
Indumathi M Nambi	Assistant Prof., Dept. of Civil Engineering	IIT Madras
D C Singhal	Retd. Prof. & Head, Dept. of Hydrology	IIT Roorkee
Industry		
Masood Mallick	Managing Director	ERM India
Ram N Agnihotri	VP & Head, Hazardous Waste Operations	Ramky Enviro Engineers
G Sivaramakrishnan	Business Development, IWM	Limited
D B Boralkar	Environmental Management Counsel	Freelance
Juergen Porst	Director	DR Porst International

Expert Participants (2/2)

Name	Designation	Organisation
Regulators		
J S Kamyotra	Member Secretary	Central Pollution Control Board
B Vinod Babu	Incharge, Hazardous Waste Management	
Survivor Groups in Bhopal		
Abdul Jabbar	Convenor	Bhopal Gas Peedit Mahila Udyog Sangathan
Balkrishna Namdeo	President	Bhopal Gas Peedit Nirashrit Pension Bhogi Sangharsh Morcha
N D Jayaprakash	Coordinator	Bhopal Gas Peedit Sangharsh Sahyog Samiti
Nawab Khan	President	Bhopal Gas Peedit Mahila Purush Sangharsh Morcha
Rashida Bee	President	Bhopal Gas Peedit Mahila Stationery Karmchari Sangh
Rachna Dhingra	Member	Bhopal Group for Information and Action
Satinath Sarangi		
Former UCIL Employee		
T R Chauhan	Former Plant Operator	UCIL
CSE		
Sunita Narain	Director General	CSE
Chandra Bhushan	Deputy Director General	CSE
D D Basu	Advisor	CSE

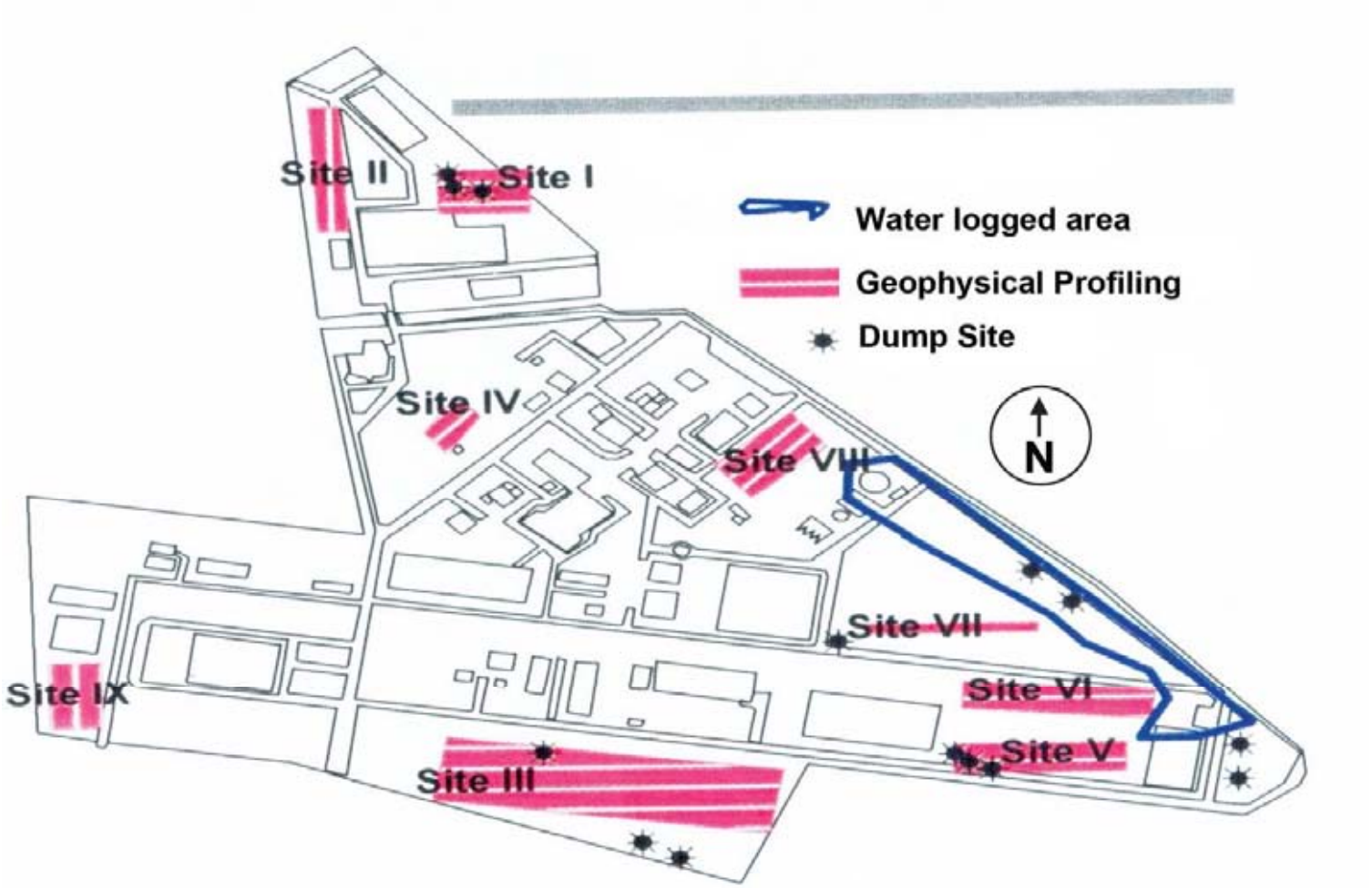
Four Core Issues

1. Contamination and remediation of soil
2. Contamination and remediation of groundwater
3. Toxic waste stored at the UCIL site
4. Plant, machinery and fate of the UCIL site

Contamination and Remediation of Soil

- Experts' agreed on uncertainty on the volume of soil to be remediated due to:
  - Additional dumpsites: Large part of site is under vegetation and waterlogged and not investigated
  - More unexcavated waste at the identified dumpsites: incomplete excavation by M/s Ramky Ltd. in 2005
  - Limited clarity on depth of contamination at the UCIL site: Average two meters as reported by NEERI-NGRI?
  - Nature and volume of contaminated soil in the SEP area
- **Selection of remediation technology is linked to the volume of the contaminated soil**

Suspected Dump Locations at UCIL



Source: Assessment and Remediation of Hazardous Waste Contaminated Areas in and around M/s Union Carbide India Limited, Bhopal, NEERI-NGRI, 2010

Contamination and Remediation of Groundwater

- Expert group was divided on:
  - Reported very low levels of permeability of black and yellow silty clay and its role in preventing groundwater contamination
  - Surface runoff as the only source of contamination
- However, most agreed that:
  - Groundwater in general flows towards north-east, where most of the contamination is reported. A hump may be leading to its flow in other directions
  - Waste at the SEP area is not satisfactorily investigated as a possible source of groundwater contamination
  - Transportation flow of contaminants is not understood

Toxic Waste Stored at the UCIL Site

- After much deliberation on the waste excavated, packed and kept at the UCIL site in 2005 by M/s Ramky Ltd., it was agreed:
  - To be about 350 MTs and its reported segregation of constituents varies
  - Characterisation, particularly of the excavated soil (~164 MTs) needs to be known before incineration
  - Incinerable waste to incinerated after the performance of Pithampur incinerator is stabilised
  - 350 MTs is a just a part of the total waste that is still dumped at the site and the SEP area

Waste Packed at UCIL, Since 2005

Waste Bags and Drums

Contents of Packed Waste at UCIL

Contents	Amount (MT)
Sevin residue + Naphthol residue	95
Reactor residue	30
Semi processed pesticides (HCH isomers mainly)	56
Excavated soil	**164**

Source: Minutes of ninth meeting of task force held on October 16, 2006

Trial Results at Pithampur TSDF

	Prescribed standards	July, 2010	Nov, 2010	April, 2012	June, 2012	Dec, 2012	Jan, 2013
Particulate matter (m/Nm^3)	**50**	168.9	465.4	134.8	16.09	41.85	39.89
CO (m/Nm^3)	**100**	188.9	125.6	3994.7	10.63	12.08	23.21
CO_2 (%)	**7**	7.9	2.4	8.2	7.95	7.2	7.8
Dioxins and furans (Teq*/Nm^3)	**0.1**	16.32	11.60	26.72	6.8	4.87	0.08
Heavy metals (Sb, As, Pb, Cr, Cu, Mn, Ni, V) (mg/Nm^3)	**0.5**	17.93	0.79	3.83	0.92	0.4	0.48

* Teq - Toxic equivalents; Source: Affidavit filed in Supreme Court by Ministry of Environment and Forests

- Trials conducted by CPCB with waste from Paint and Pharmaceutical Industry at Ramky's Incinerator at Pithampur
- Five out of six trials have largely failed to comply with emission standards. Further trails are to be conducted with 10 MTs of similar waste from Hindustan Insecticide Limited, Kerala

Plant, Machinery and Fate of UCIL Site

- The expert group agreed upon:
  - Decontamination, dismantling and decommissioning of the plant as suggested by IICT
  - Conversion of the site to a ‘memorial’ and a ‘center of excellence’ for industrial disaster management and/or hazardous waste management
  - Preserving MIC plant including the vent, vent scrubber including the vent, storage tanks, and control room