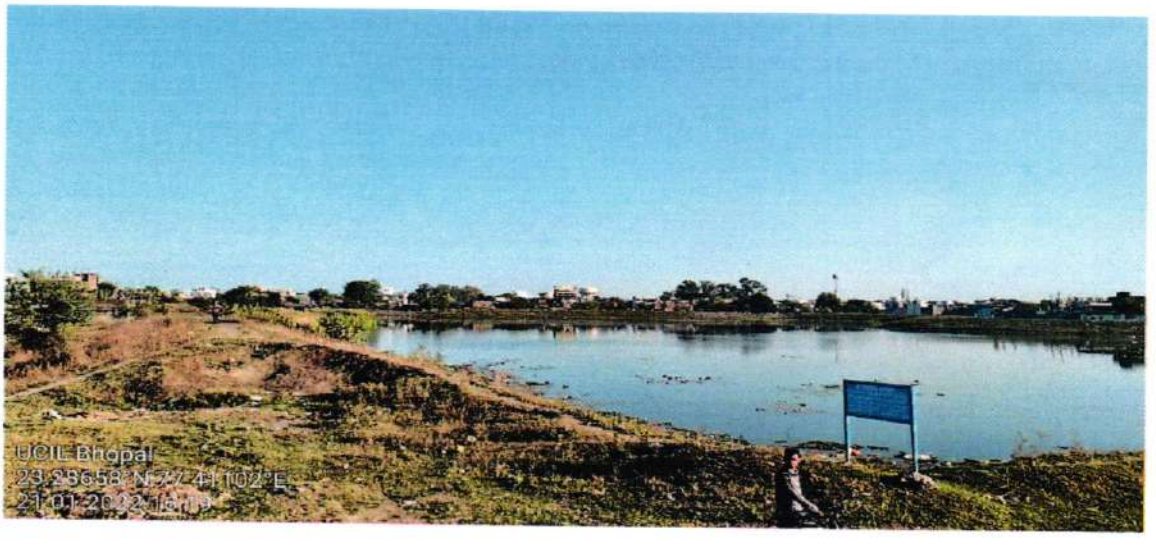
REPORT OF JOINT COMMITTEE VISIT TO UNION CARBIDE , BHOPAL

In compliance of Hon National Green Tribunal [PB] Delhi on OA No 362/2021

[R.K.Gupta Vs State of Madhya Pradesh]

Directions dated 22/10/2021



Prepared by Joint committee constituted by Hon National Green Tribunal [PB] Delhi in a matter of OA 362/2021

JOINT COMMITTEE REPORT
BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH
In

Original application No. 362 of 2021 (PB)
R K Gupta Vs States of Madhya Pradesh

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Joint Committee Report in the matter of Hon'ble NGT (PB) OA No. 362 of 2021 (R K Gupta Vs State of Madhya Pradesh) in compliance to the Hon'ble NGT order dated 22.12.2021

A. The application has been made in the Hon'ble National Green Tribunal in the matter related to the media report published in The Hindustan Times dated 30/03/2017 on "**A toxic neglect in Bhopal**" and dated 08/12/2018 on **"No closure for victims of Bhopal gas tragedy"** highlighting the issue of huge hazardous waste still lying the defunct Union Carbide factory of Bhopal, posing continuous hazard to the environment and public health.

The said matter OA No. 362 of 2021 was listed before Hon'ble NGT on 22.12.2021 and operative part of the Order is:

> " *2. Having regard to the seriousness of the allegation, it appears necessary to ascertain the factual position in the matter through a joint Committee of the CPCB, State PCB and the District Magistrate, Bhopal. The State PCB will be the nodal agency for coordination and compliance. The joint Committee may meet within two weeks and undertake site visit. Factual and action taken report may be furnished within two months by e-mail at judicial-ngt@gov.in preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF.*"

The copy of order dated 22.12.2021 passed by Hon'ble NGT is enclosed as **Annexure- 1**.

In compliance of the order passed by Hon'ble NGT, dated 22.12.2021 in OA No. 362/ 2021, following officers were nominated by the concerned departments as committee members to visit the site and submit a factual and action taken report before the Hon'ble NGT:

1. Shri Avinash Lavaniya, District Magistrate , Bhopal
2. Dr. Y.K. Saxena, Scientist-C, Regional Directorate (Central), Central Pollution Control Board, Bhopal
3. Dr. Ranu Chouksey Verma, Scientist-B, Regional Directorate (Central), Central Pollution Control Board, Bhopal
4. Dr. Alok Saxena, Chief Chemist, Madhya Pradesh Pollution Control Board, Bhopal

The members of the Joint committee held a meeting in the Office of District Magistrate on 18.01.2022 to discuss on the facts related to OA No. 362/2021 and deliberations were made to finalize the TOR of the inspection.

In pursuance of the above order, the joint committee members from CPCB, RD Bhopal, MPPCB, Bhopal and the Collector, Bhopal visited the site of UCIL, Bhopal on 21.01.2022 at 4:00 PM along with other local authorities including representatives from the occupier of the

UCIL factory premises- Bhopal Gas Tragedy Relief & Rehabilitation Dept. (BGTRRD), Govt. of MP; Municipal Corporation Bhopal and Capital Project Authority (CPA) officials.

The issue raised in the media report is mainly focused on the disposal of waste stored in the premises, remediation of contaminated area and contaminated ground water around the Union Carbide site, Bhopal.

During the visit the Joint committee members inspected the complete premises of M/s Union Carbide India Ltd. Bhopal including the area where 337 MT hazardous wastes is stored, Solar Evaporation Pond areas and the probable dump areas within Union Carbide premises identified by NEERI & NGRI in their report submitted in 2010.

The joint committee has also directed MPPCB for sampling and monitoring of ground water quality in nearby localities around Union Carbide premises and wastewater from Solar Evaporation Pond.

B. Background information of Union Carbide, Bhopal:

M/s. Union Carbide India Ltd., (UCIL) was manufacturing carbamate type pesticides and the associated intermediate chemicals between 1969 and 1984 at their Bhopal plant. The plant was closed down since December 1984 due to accident of leakage of Methyl Iso-Cyanate (M.I.C.) gas. UCIL was occupier of the premises till 09.07.1998. The total 87.74 acre area of M/s. Union Carbide Ltd. was taken over by M.P. Govt. from M/s. Union Carbide India Ltd. on 09.07.1998. Presently, Bhopal Gas Tragedy Relief and Rehabilitation Department, M.P. Govt. is the occupier of the said premises.

The major issues related to the Union Carbide Factory premises after the MIC gas disaster are

1. Safe disposal of the waste stored in union carbide premises, Bhopal
2. Decontamination of contaminated areas and ground water in and around the union carbide premises
3. Decommissioning of remaining Plant structure.

C. Activities performed by Joint committee during the visit of Union Carbide

1. The joint committee members visited the premises of Union Carbide, Bhopal and taken the total overview of the site including the remaining structure, plant and machinery and area of Solar Evaporation Pond (SEP). It was observed that the area of Solar Evaporation Pond found unguarded and accessible to nearby residents, some stray animals were also found within the premises.

2. The joint committee inspected the area within Union Carbide premises where 337MT hazardous waste is stored. The waste was found stored inside the covered shed under lock and key. The waste was put inside jumbo bags, metal trays & drums over a concrete platform.

3. The joint committee members also visited the probable dump areas within Union Carbide premises identified by NEERI in its study report submitted in 2010. The areas identified in

NEERI report were found covered with trees and bushes and was not identifiable physically.

4. The joint committee also directed MPPCB to perform sampling and monitoring of groundwater in nearby localities around Union Carbide premises and from water collected in Solar Evaporation Pond. The monitoring was later carried out on 24/1/2022.

D. Factual Status of the issues raised in media report appended with Hon'ble NGT directions

<table>
<tr><th>S. No.</th><th>Issue raised</th><th>Factual Status</th><th>Remark</th></tr>
<tr><td>1.</td><td>Toxic waste store in Union Carbide premises</td><td>1. As per the available records the details of waste stored within the Union Carbide premises in covered shed on RCC platform is as follows:
<table>
<tr><th>Name of waste</th><th>Quantity (approx.)</th></tr>
<tr><td>Contaminated soil (Excavated waste)</td><td>162MT</td></tr>
<tr><td>Sevin and Naphthol residues</td><td>Together-92 MT</td></tr>
<tr><td>Semi processed pesticides</td><td>54MT</td></tr>
<tr><td>Reactor residues</td><td>29MT</td></tr>
<tr><td>Total</td><td>337 MT</td></tr>
</table>
2. Disposal of lime sludge in CTSDF, Pithampur

Earlier, in addition to the waste specified in point number 1, lime sludge was also stored within Union Carbide premises.

As per Hon'ble High Court Order dated 10.01.2008, the occupier of the Union Carbide premises i.e. Bhopal Gas Tragedy, Relief and Rehabilitation Dept., Govt. of M.P. (BGTRRD) called tenders for the transportation of the waste to Pithampur and Ankleshwar respectively.

BGTRRD informed to MPPCB Vide letter No. 1698 dated 28.06.2008 (along with</td><td>The occupier of the premises i.e. Bhopal Gas Tragedy Relief and Rehabilitation Dept. (BGTRRD), Govt. of M.P. has already taken initiatives for the disposal of remaining 337 MT waste stored in Union Carbide premises.
Information received from BGTTRD vides letter no. 87 dated 12.01.2022 and letter no. 07/73/UCIL/2022/291 dated 07.02.2022, which stated the action taken by BGTRRD w.r.t disposal of 337 MT stored waste , remediation of union carbide premises and status of supply of potable water to gas affected colonies around the union carbide letter appended as Annexure-2a&b.</td></tr>
</table>

		form 9 –Hazardous Waste Manifest) that total 33.31 tons of lime sludge were transported in three Trucks/ Container of M/s Kataria Transport Co., Gujarat on 27.06.2008 to CTSDF, Pithampur (Dhar) and the same was treated and disposed off in a Secured Land Fill on 30.06.2008 . Copy of Hon'ble HC order dated 10.01.2008 & Intimation letter from MPPCB, RO (Dhar) vide letter no. 3260/RO/MPPCB/HW/2008 dated 04.10.2008 is enclosed as **Annexure- 3**. 3. W.r.t Hon'ble SC SLP (Civil) No. - 9874/2012 (Sh. Alok Pratap Singh Vs Union of India & Ors.) filed on 22.03.2012 for the disposal of the waste stored in Union Carbide Bhopal, in a trial run at CTSDF, Pithampur between 13- 18/082015 total 10 MT of stored HW was successfully incinerated. The case was disposed off on 18/7/2018. The copy of the trial run report is attached as **Annexure- 4.** 4. Process for the disposal of remaining 337 MT waste stored in Union Carbide premises is being carried out by the occupier BGTRRD, Govt. of M.P.	
2	Contamination of soil in and around the Union Carbide premises including three Solar Evaporation Ponds (SEP) and groundwater contamination	1. In the Year 2010, National Environmental Engineering Research Institute (NEERI) Nagpur along with National Geophysical Research Institute (NGRI) Hyderabad submitted its study report to BGTRR entitled *"Assessment and Remediation of Hazardous Waste Contaminated Areas in and around M/s Union Carbide India Ltd., Bhopal"*. Highlights of the report pertaining to contaminated area and groundwater contamination are as follows: **<u>Contaminated area:</u>** ➢ The report reveals that approximately 9 sites within Union Carbide premises indicated possibilities of dumps. Out of this, 3 sites indicated possibilities of contamination. Area of contamination is about 16 hectares	1. As per the directions of Hon'ble Supreme Court of India on WP No. 657/1995 [Research Foundation for Science Vs Union of India & Ors.] 42 colonies in the vicinity of Union Carbide premises supplied with potable water by Bhopal Municipal Corporation. Report of tap water samples analysed by MPPCB in the year 2014 is enclosed as **Annexure- 7.**

		with an average depth of contamination 2 m. The total volume of contaminated soil to be remediated from Union Carbide premises was estimated about 3, 20,000 m^3. ➢ Solar Evaporation Pond located outside the premises cover an area of around 14 hectare. This area also needs to be remediated (total volume to be remediated was estimated about 2, 80,000 m^3). The copy of Executive Summary of the NEERI Report is enclosed as **Annexure -5.** **<u>Ground water contamination</u>** ➢ The report reveals that NGRI, Hyderabad has collected 05 bore-well samples within Union Carbide premises and 30 samples around the union carbide premises (up to 5 km from Union Carbide site). The results showed that "*Ground water in general is not contaminated due to seepage of contaminants from UCIL dumps. However isolated contamination in terms of pesticides was observed in 5 wells near union carbide premises. The sources of contamination of these wells attributed to surface runoff from the dumps*". ➢ The study also indicated the possibility of contamination of soil and groundwater with *BHC, Aldicarb, Carbaryl, α-naphthol and Mercury.* 2. M.P. Pollution Control Board (MPPCB) also carried out monitoring of ground water of about 13 localities around Union Carbide, Bhopal from year 1996 to 2012. Contamination W.r.t metals and pesticides like alpha-	Minutes of Meeting of Supreme Court Monitoring Committee dated 07.06.2012 w.r.t supply of potable water to localities around Union Carbide, Bhopal and Commissioner, Bhopal Division w.r.t stoppage of water supply from tube wells of that area and supply of potable water to gas affected colonies located around the Union Carbide are enclosed as **Annexure-8.**

		BHC, Lindane, Aldrin, Dialdrin, Endrin, DDT, Endosulphan, BHC, Methoxychlor, methyl parathion, Melathion, Phorate, Heptachlor were not evident since year 2006. Later on Bhopal Municipal Corporation, as per directions dated 07.06.2012 of Hon'ble Supreme Court Monitoring Committee started supplying potable water in the localities around the Union Carbide premises and also closed the bore wells. Summary of groundwater quality monitoring carried out by MPPCB is appended as **Annexure- 6**.	

As per the instructions of Joint Committee, MPPCB has collected groundwater samples through bore wells available in the vicinity of Union Carbide premises and from Solar Evaporation Pond (SEP) on 24.01.2022 and analysed at Central Laboratory, MPPCB Bhopal. The details of sampling locations are tabulated in **Table- 1** and Google map of the sampling locations is given at **Figure-1**.

Table 1: Details of Sampling Locations (24.01.2022)

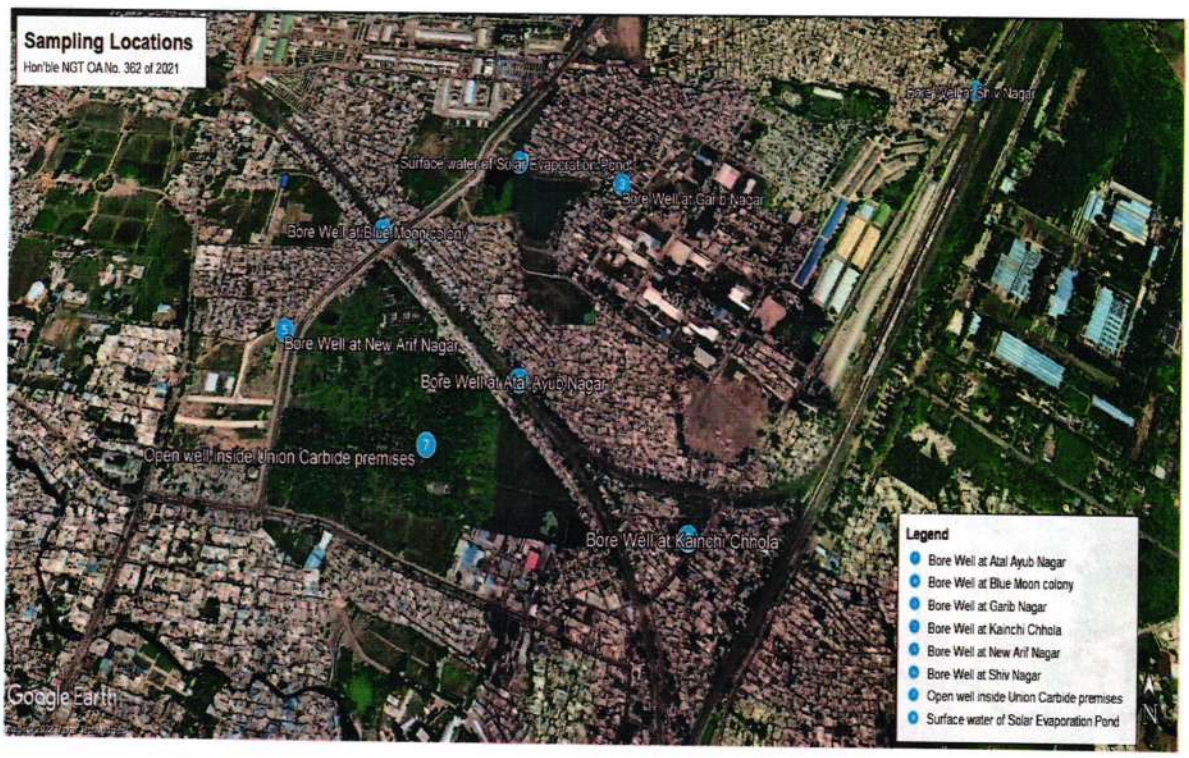
S. No.	Sampling Location	Co-ordinates
1.	Bore Well at Atal Ayub Nagar	23.28095 77.41219
2.	Bore Well at Kainchi Chhola	23.27790 77.41624
3.	Bore Well at Garib Nagar	23.28561 77.41479
4.	Bore Well at Blue Moon colony	23.28436 77.40834
5.	Bore Well at New Arif Nagar	23.28199 77.40618
6.	Bore Well at Shiv Nagar	23.28828 77.42519
7.	Open well inside Union Carbide premises	23.27963 77.41004
8.	Surface water of Solar Evaporation Pond	23.28618 77.41192

Results reveal that some of the Physico-chemical parameters like Color, Chloride, Total Hardness, Calcium and Magnesium ions and Heavy Metals like Manganese and Nickel in bore well water of some locations exceeding the acceptable limits of IS 10500[2012]. However, Pesticides are not detected in any of the collected samples.

The copy of the analysis results are is enclosed at **Annexure- 9**.

The relevant photographs of the site visit taken by the Joint Committee are enclosed at **Annexure- 10**.

Figure 1: Google map showing the sampling locations (24.01.2022)



Action taken and proposed by the Joint Committee:

1. Bhopal Gas Tragedy Relief and Rehabilitation Department, Government of M.P being occupier of Union Carbide, Bhopal may be directed to speed up the process of disposal of waste on priority and remediation of contaminated area in and around the premises of Union Carbide, Bhopal. Letter No. 419/CL/MPPCB/Bhopal dated 03/02/2022 issued to BGTRRD from Dist. Magistrate, Bhopal in this regard.

   The copy of the issued letter is enclosed as **Annexure- 11**.

2. Letter No. 418/CL/MPPCB/Bhopal dated 03/02/2022 issued to Bhopal Municipal Corporation from Dist. Magistrate, Bhopal to not allow any digging of bore wells around the Union Carbide premises to protect the exposure of consumers to any contamination of water and also immediate closure of hand pumps/ bore wells (if any) located in nearby localities around the Union Carbide premises till restoration of site.

   The copy of the issued letter is enclosed at **Annexure- 12.**

3. Area of Union Carbide premises is covered and protected, however the area of Solar Evaporation Pond is unprotected and accessible to nearby residents. Rain water collected in Solar Evaporation Ponds. Solar Evaporation Pond should be dismantled. Till then solar pond area shall be guarded & protected to restrict the unauthorized entry and for human protection from possible contaminants. Action to be taken by the occupier of the Union Carbide premises i.e. Bhopal Gas Tragedy Relief and Rehabilitation Department, Government of M.P.

4. A time-bound Action Plan for the disposal of stored waste, dismantling of solar ponds' area and remediation of the contaminated sites shall be prepared by the occupier of the Union Carbide premises i.e. Bhopal Gas Tragedy Relief and Rehabilitation Department, Government of M.P. and the same should be submitted before Hon'ble NGT for the timely execution of the work without any delay. [Disposal of waste and remediation of site is being performed by BGTRRD is as per directions of Hon Supreme court].

5. MoEF& CC has already issued a guidance document for assessment and remediation of contaminated sites in India in Dec., 2015 under National Program for Rehabilitation of Polluted Sites in India, available at that may be referred- (https://cpcb.nic.in/uploads/hwmd/MoEFCC_guidelines_contaminatedsites.pdf)

(Dr. Alok Saxena)	**(Dr. Ranu C. Verma)**	**(Dr. Y K Saxena)**	**(Avinash Lavaniya)**
Chief chemist	Scientist- B	Scientist- C	District Magistrate
MP Pollution Control Board	CPCB, RD-Bhopal	CPCB, RD- Bhopal	Bhopal
Bhopal			DISTRICT MAGISTRATE BHOPAL (M.P.)

Item No. 03

(Court No. 1)

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

(By Video Conferencing)

Original Application No. 362/2021

R. K. Gupta

Versus

Applicant

State of Madhya Pradesh

Respondent

Date of hearing: 22.12.2021

CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE SUDHIR AGARWAL, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

Application is registered based on a complaint received by email

ORDER

1. This complaint has been filed on the basis of media report dated 30.03.2017 highlighting that huge hazardous waste is still lying at the defunct Union Carbide factory of Bhopal, posing continuous hazard to the environment and public health.

2. Having regard to the seriousness of the allegation, it appears necessary to ascertain the factual position in the matter through a joint Committee of the CPCB, State PCB and the District Magistrate, Bhopal. The State PCB will be the nodal agency for coordination and compliance. The joint Committee may meet within two weeks and undertake site visit. Factual and action taken report may be furnished within two months by e-mail at judicial-ngt@gov.in preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF.

List for further consideration on 09.03.2022.

A copy of this order along with the copy of the media report be forwarded to the CPCB, State PCB and the District Magistrate, Bhopal by email for compliance.

Adarsh Kumar Goel, CP

Sudhir Agarwal, JM

Dr. Nagin Nanda, EM

December 22, 2021
Original Application No. 362/2021
AB

12

Observations of Research Coordinator as per Rule 9, Form 4 of NGT Act, 2010
Letter Petition (Regn No.4265/LP/2021)
Diary No. 4256to 4265/LP/2021
Dated 15.11.2021

S. no.	Issue raised	Significance	Suggested solutions
1	The Hindustan Times Clipping on A Toxic neglect in Bhopal dated 30.3.2017. Technology is available if the authorities really want to deal with hazardous waste. 386 tonnes of hazardous waste are still piled up at the site of Bhopal's defunct Union Carbide factory. No funds have been sought or any allocation made to dispose of the dangerous material. There are three ponds where waste has been systematically dumped as well as several sites within the factory premises where the was buried. This underscores the need to frame a national policy to deal with contaminated sites.	Although,the matter does not fall in the jurisdiction of the Tribunal being purely a policy matter. Tribunal do not find any reason to entertain such application under section 14 of the NGT Act, 2010 as in case of Environment Management Plan required in Original Application No. 251/2020 (I.A. No. 366/2020) dated 11.11.2020 for Union of India. However, following matters pertaining to remediation of contaminated sites in India has been taken up for consideration by Tribunal. 1. Original Application No. 985/2019 (With reports of Oversight Committee dated 23.12.2020 & State PCB dated 29.01.2021) In Re : Water Pollution by Tanneries at Jajmau, Kanpur, Uttar Pradesh With Original Application No. 986/2019 In Re : Water Pollution at Rania, Kanpur Dehat&RakhiMandi, Kanpur Nagar, Uttar Pradesh dated: 08.02.2021.This order is in continuation of order dated 16.07.2020. This matter involves two issues. First issue relates to scientific disposal of Chromium dumps at Rania, Kanpur Dehat and RakhiMandi, Kanpur Nagar which have been **in existence since 1976 and have inter-alia resulted in contamination of ground water adversely affecting the health and depriving the inhabitants of access to drinking water.** Second issue relates to continuing water	Application maybe considered in view of seriousness of the issue and direction of Tribunal on the similar matter as referred.

Rahul
12.11.2021

			pollution by tanneries discharging untreated industrial effluents, containing toxic Chromium into the irrigation canal through inadequately functioning CETP at Jajmau, UP. 2. Original Application No. 669/2018 dated 29.01.2021,Gujarat.The issue for consideration is the remedial action for contamination of ground water and soil on account of storage of Gypsum by M/s Ashapura Group of Companies, Village Ler, Taluka Bhuj, District Kutch, Gujarat, in violation of environmental norms. 2. The matter has been considered by this Tribunal in the last about three years from time to time in light of the earlier proceedings and reports of the State Pollution Control Board, including the reports dated 18.11.2019, 21.05.2020, 06.04.2020, 28.07.2020. Several deficiencies were noticed including contamination of the ground water and soil and though some remedial measures were taken, further remediation and restoration measures were required.	

Ratima

PratimaAkolkar
Research Co-ordinator (NGT)
16.11.2021

The Hindustan Times
ESTABLISHED IN 1924

A toxic neglect in Bhopal

Technology is available if the authorities really want to deal with hazardous waste

ourtake

It is nothing short of criminal that 33 years after what was one of the world's worst industrial disasters, 336 tonnes of hazardous waste are still piled up at the site of Bhopal's defunct Union Carbide factory. The minister for environment quite nonchalantly informed Parliament that no funds have been sought or any allocation made to dispose of the dangerous material. The government has identified technology with which it has dealt with 10 tonnes of waste, which seems far too little far too late. Till today, there has been unusual apathy towards dealing with the fallout of the disaster and the compensation for those who died and those who survived with grievous injuries and disabilities.

There has been very little attempt so far to conduct an assessment of the groundwater around the area to examine how deep the chemicals may have gone and what effect this will have on the current generation and those to come. Studies show that the rate of cancer among the victims is 10 times higher than in the normal population. Surely, this cannot have escaped the authorities over such a long period of time. Chemical contamination of groundwater has affected thousands of people for several kilometres around the factory, yet nothing has been done to tackle this. In short, the factory, which once spewed out 42 tonnes of lethal methyl isocyanate all those years ago, is still killing and maiming people. The 336 tonnes of toxic waste are not the only danger. There are three ponds where waste has been systematically dumped as well as several sites within the factory premises where waste was buried. This underscores the need to frame a national policy to deal with contaminated sites.

The Bhopal case, which made international headlines and outlined how flimsy safety measures were in the factory and how easily those culpable were able to get away with minimum charges, should have been an eye-opener for successive governments and should have occasioned much stricter environmental laws to govern hazardous waste and industries that create these. There is no dearth of technology available across the world if the authorities really wanted to deal with this problem. The lack of safeguards is a problem in many hazardous industries, many of them in the unorganised sector. Until the issue of toxic waste, rehabilitation and continuing contamination of the surroundings and its effect on communities are addressed, the victims who live with crippling morbidities will have no closure.

No closure for victims of Bhopal gas tragedy

If the multinational has failed to do its bit, so have successive Indian governments

The Bhopal Gas tragedy is not one big tragedy any longer. It has become a medley of successive tragedies, which continues even today, 34 years after 3,787 people died according to official estimates (the unofficial estimate is around 8,000 immediately and 8,000 over the years) when methyl isocyanate, a deadly chemical, spewed from Union Carbide India Ltd's (UCIL's) pesticide factory. Despite years of protests against the MNC, there has been no closure for the victims [illegible] of two reasons (which are now actually big enough to [illegible] tragedies in their own right). One, the legal tragedy [illegible] government is still struggling to establish the li[illegible] parent company, Union Carbide Corporation [illegible] now, Dow Chemical. The case has become even [illegible] following the merger of Dow Chemical and [illegible]. The merger will result in the disappear[illegible] legal entity, adversely affecting the claim of [illegible] sation from Dow Chemical-owned UCC. [illegible] inability to tackle the issue firmly is [illegible] embolden many other companies that [illegible] comes to investing in safety protocols. Sec[illegible] and health tragedies of the disaster are [illegible] fatalities, claim victims, show that deaths [illegible] due to gases. The site has never been prop[illegible] one in Bhopal.

[illegible] dicated ownership [illegible] factory site now, it [illegible] manage the [illegible] still present in the [illegible] pay for the plant site's remediation. If [illegible] its bit for the victims [illegible] Indian State [illegible] at was in its hands, mani[illegible] the effects [illegible] across generations.

[illegible] No. DL(ND)-11/6052/2018-19-20 Licensed to post without prepayment [illegible]

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संचालनालय गैस राहत एवं पुनर्वास

01,शिवाजी नगर, भोपाल

क्रमांक एफ 07/73/UCIL/2022/87 भोपाल, दिनांक 12/01/2022

प्रति,

डॉ अलोक सक्सेना
मुख्य रसायनज्ञ, केन्द्री प्रयोगशाला (केस ओ आई सी)
मध्यप्रदेश प्रदूषण नियंत्रण बोर्ड
ई-5, पर्यावरण परीसर, अरेरा कॉलोनी भोपाल

विषयः-माननीय राष्ट्रीय हरित अधिकरण की प्रिंसिपल बैंच, नई दिल्ली मे प्रचलित प्रकरण क्रमांक 362/2021 (श्री आर के गुप्ता विरूद्ध स्टेट ऑफ मध्यप्रदेश) मे पारित आदेश दिनांक 22.12.2021 के परिपालन के संबंध में।

संदर्भः- मध्यप्रदेश प्रदूषण नियंत्रण बोर्ड अरेरा कॉलोनी भोपाल का पत्र पृष्ठांकन क्रमांक 379/केन्द्रीय प्रयोगशाला / प्र न बो/भोपाल/2022 दिनांक 07.01.2022।

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कृपया उपरोक्त विषयांतर्गत उक्त संदर्भित पृष्ठांकित प्रति(छायाप्रति संलग्न) का अवलोकन करने का कष्ट करें। उक्त संदर्भित पृष्ठांकित प्रति के माध्यम से माननीय राष्ट्रीय हरित अधिकरण की प्रिंसिपल बैंच, नई दिल्ली मे प्रचलित प्रकरण क्रमांक 362/2021 (श्री आर के गुप्ता विरूद्ध स्टेट ऑफ मध्यप्रदेश) मे पारित आदेश दिनांक 22.12.2021 का उल्लेख करते हुए लेख किया गया है कि, यूनियन कार्बाइड भोपाल से संबंधित पारित आदेश दिनांक 22.12.2021 के अनुसार विषय की वास्तविक स्थिति के आकलन हेतु एक संयुक्त कमेठी का गठन किया गया है, जो 2 सप्ताह मे साईड विजिट संपादित कर अद्यतन स्थिति एवं एक्शन रिपोर्ट 2 माह में माननीय राष्ट्रीय हरित अधिकरण को प्रस्तुत करेगी। उक्त प्रकरण पर अद्यतन जानकारी उपलब्ध कराने का अनुरोध किया गया है।

उपरोक्त के संबंध में लेख है, कि यूनियन कार्बाइड परिसर मे रखे रासायनिक कचरे के निष्पादन की कार्यवाही प्रचलन में है।

संलग्न-उपरोक्तानुसार।

संचालक द्वारा अनुमोदित।

सहायक संचालक
गैस राहत एवं पुनर्वास, भोपाल

पृ.क्रमांक एफ 07/73/UCIL/2022/ भोपाल, दिनांक /01/2022

प्रतिलिपी :-सूचनार्थ एवं आवश्यक कार्यवाही हेतु सादर प्रेषित।

1. उप सचिव, मध्यप्रदेश शासन, भोपाल गैस त्रासदी राहत एवं पुनर्वास विभाग, मंत्रालय वल्लभ भवन, भोपाल।
2. डिस्ट्रिक्ट मेजिस्ट्रेट, भोपाल।
3. आंचलिक अधिकारी, केन्द्रीय प्रदूषण नियंत्रण मण्डल, पर्यावरण परिसर, ई-5 अरेरा कॉलोनी, भोपाल।
4. संयुक्त कलेक्टर, कार्यालय कलेक्टर, गैस राहत भोपाल।
5. कार्यपालन यंत्री, (सदस्य सचिव) राजधानी परियोजना प्रशासन गैस राहत संभाग-1, भोपाल।

सहायक संचालक
गैस राहत एवं पुनर्वास, भोपाल

डॉ. आलोक सक्सेना
मुख्य
केन्द्रीय प्रया
म.प्र. प्रदूषण नियंत्रण बो

(15) Annexure-2
78

संचालनालय गैस राहत एवं पुनर्वास

01,शिवाजी नगर, भोपाल

क्रमांक एफ 07/73/UCIL/2022/291 भोपाल, दिनांक 07/02/2022

प्रति,

कलेक्टर,
जिला–भोपाल

विषयः–माननीय राष्ट्रीय हरित प्राधिकरण की प्रिंसिपल बैंच, नई दिल्ली मे प्रचलित प्रकरण क्रमांक 362/2021 (श्री आर के गुप्ता विरूद्ध स्टेट ऑफ मध्यप्रदेश) मे पारित आदेश दिनांक 22.12.2021 के परिपालन के संबंध में।

संदर्भः– कार्यालय जिला–भोपाल का पत्र क्रमांक 419/टीएल/एमपीपीसीबी/भोपाल दिनांक 03.02.2022।

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कृपया उपरोक्त विषयांतर्गत उक्त संदर्भित पत्र (परिशिष्ट–1) का अवलोकन करने का कष्ट करें। उक्त संदर्भित पत्र के माध्यम से कार्यालय कलेक्टर जिला–भोपाल द्वारा लेख किया गया है कि माननीय राष्ट्रीय हरित प्राधिकरण की प्रिंसिपल बैंच, नई दिल्ली मे प्रचलित प्रकरण क्रमांक 362/2021 (श्री आर के गुप्ता विरूद्ध स्टेट ऑफ मध्यप्रदेश) मे पारित आदेश के परिपालन में माननीय ट्रिब्यूनल द्वारा गठित समिति द्वारा दिनांक 21.01.2022 को यूनियन कार्बाइड परिसर का निरीक्षण किया गया है। उक्त पत्र के माध्यम से यूनियन कार्बाइड परिसर मे संग्रहित 337 मैट्रीक टन अपशिष्ट के निष्पादन, परिसर के कॉन्टामिनटेड साईट एवं भू–जल के रेमिडिएशन पर की गयी कार्यवाही से कमेंटी को अवगत कराये जाने बावत् अनुरोध किया गया है कि ताकि माननीय राष्ट्रीय हरित अधिकरण के परिपालन में अद्यतन स्थिति से अधिकरण को अवगत कराया जा सकें।

उपरोक्त के संबंध में जानकारी निम्नानुसार है :–

1. मध्यप्रदेश शासन, भोपाल गैस त्रासदी राहत एवं पुनर्वास विभाग द्वारा यूनियन कार्बाइड परिसर भोपाल मे संग्रहित 337 मीट्रिक टन रासायनिक अपशिष्ट पदार्थो के विनिष्टिकरण के संबंध में खुली निविदा आमंत्रित की गयी। राज्य शासन द्वारा गठित तकनीकी समिति द्वारा परीक्षणोपरांत आमंत्रित निविदा में प्रस्तुत निविदाकारों मे सफल निविदाकार के प्रस्ताव पर अनुशंसा की गयी है। मध्यप्रदेश शासन द्वारा 337 मैट्रीक टन रासायनिक अपशिष्ट पदार्थो के विनिष्टिकरण की कार्यवाही समय–सीमा मे संपादित किये जाने हेतु प्रशासकीय विभाग द्वारा भारत सरकार, रसायन एवं उर्वरक मंत्रालय, रसायन एवं पेट्रोरसायन विभाग, नई दिल्ली से अनुरोध किया गया है।

2. यूनियन कार्बाइड परिसर भोपाल मे संग्रहित 346 अपशिष्ट पदार्थो के विनिष्टिकरण से संबंधित माननीय सर्वोच्च न्यायालय में प्रचलित एसएलपी 9874/12 में पारित आदेश दिनांक 17.04.2014 अनुसार 10 मैट्रीक टन वेस्ट ट्रायल रन हेतु पीथमपुर (धार), मध्यप्रदेश ले जाया गया एवं अगस्त–2015 मे उसका ट्रॉयल रन सफलता पूर्वक संपन्न हो चुका है।(परिशिष्ट– 2)

3. केन्द्रीय प्रदूषण नियंत्रण बोर्ड द्वारा ट्रॉयल रन की रिपोर्ट माननीय सर्वोच्च न्यायालय मे जनवरी–2016 में प्रस्तुत की जा चुकी है। (परिशिष्ट–3)

4. यूनियन कार्बाइड परिसर में रखे अपशिष्ट पदार्थो के विनिष्टिकरण हेतु उपरोक्त बिन्दु क्रमांक–1 के अनुसार कार्यवाही प्रचलन में है। यूनियन कार्बाइड परिसर के site development including remediation and factory conservation का कार्य अपशिष्ट पदार्थो के विनिष्टीकरण के निष्पादन के पश्चात संपादित की जायेगी।

निरंतर.....2

डी. आर. सक्सेना

केन्द्रीय [illegible]
म.प्र. प्रदूषण नियंत्रण बोर्ड, भोपाल

5. यूनियन कार्बाइड परिसर में युनियन कार्बाइड क्षेत्र के 70 एकड़ क्षेत्र को विकसित कर स्मारक निर्माण हेतु मध्यप्रदेश शासन, भोपाल गैस त्रासदी राहत एवं पुनर्वास विभाग द्वारा निर्णय लिया गया था। स्मारक निर्माण कार्य का रूपांकन तैयार करने हेतु एप्को को शासन द्वारा अधिकृत किया गया है। एप्को द्वारा वास्तुविद सेवाओ के लिये राष्ट्रीय स्तर पर निविदाएं आमंत्रित कर मेसर्स स्पेस मेटर्स, नई दिल्ली को वास्तुविद नियुक्त किया गया है।

6. माननीय उच्चतम न्यायालय के निर्देशो के पालन में यूनियन कार्बाइड के आस-पास की गैस प्रभावित बस्तीयो में शुद्ध पेय जल प्रदाय कराने हेतु राशि रूपये 50 करोड़ मध्यप्रदेश शासन, भोपाल गैस त्रासदी राहत एवं पुनर्वास विभाग द्वारा नगर निगम भोपाल को उपलब्ध कराई गयी थी। उक्त राशि से गैस प्रभावित क्षेत्रो मे 10 टंकियो का निर्माण कार्य कराया जाकर जल प्रदाय किया जा रहा है। गैस प्रभावित क्षेत्रो मे नगर निगम भोपाल द्वारा 364.93 किलोमीटर पाईप लाईन बिछायी गयी है। गैस प्रभावित 22 बस्तीयों में कुल 10124 निःशुल्क नल कनेक्शन किये गये है। इसके अतिरिक्त गैस प्रभावित विभिन्न वार्डो में 29391 घरेलू नल कनेक्शन दिये गये है, इस प्रकार कुल 39515 घरेलू नल कनेक्शन किये गये है।(परिशिष्ट- 4)

अतः उक्तानुसार जानकारी सादर प्रेषित है।

संलग्न-उपरोक्तानुसार।
संचालक द्वारा अनुमोदित।

सहायक संचालक
गैस राहत एवं पुनर्वास, भोपाल

डॉ. आलोक सक्सेना
मुख्य कार्यपालन अधिकारी
म.प्र. प्रदूषण नियंत्रण बोर्ड, भोपाल

ORDER SHEET

CASE No. 200 188

..... Vs. .....

DATE OF THE ORDER	ORDER

Writ Petition No. 2802/2004

10.1.2008

Heard Mr. Naman Nagrath, learned counsel for the petitioner, Mr. Shekhar Sharma, learned counsel for the Union of India, Mr. R. N. Singh, learned Advocate General, with Mr. V. K. Shukla, learned Deputy Advocate General, for the State of Madhya Pradesh, Mr. V. S. Shroti, learned senior counsel, with Mr. A. P. Shroti, counsel for the Madhya Pradesh State Pollution Control Board, Mr. Kishore Shrivastava, learned senior counsel, with Mr. Ankur Shrivastava, counsel for the DOW Chemical Company, and Mr. Manoj Sharma, learned counsel for the intervener.

Mr. R. N. Singh, learned Advocate General, and Mr. V K. Shukla, learned Deputy Advocate General, appearing for the State of Madhya Pradesh, submitted that the sole tender for transportation of the stored toxic wastes from Bhopal to Ankleshwar (Gujrat) and remaining waste, lime sludge, to CTSDF Pithampur, District Dhar, is not acceptable to the Madhya Pradesh State Pollution Control Board because the sole tenderer does not have the expertise and experience of transporation of toxic wastes.

Mr. R. N. Singh, learned Advocate General, submitted that the State Government proposes to get the list of transporters who have expertise and experience in transporting the toxic wastes from the Central Pollution Control Board and finalise the transporters.

Mr. Manoj Sharma, appearing for the intervener, states that the Centre for Environment and Forests has a list of

HIGH COURT OF MADHYA PRADESH

ORDER SHEET

CASE No ..... 200 .....

..... Vs. .....

DATE OF THE ORDER	ORDER
	The State Government may take the list of such transporters having expertise and experience in transporting the toxic wastes from the Central Pollution Control Board as well as the Centre for Environment and Forests and thereafter finalize the transporters for transportation of the toxic wastes from Bhopal to Ankleshwar (Gujarat) and CTSDF Pithampur, District Dhar. For the aforesaid purpose, we grant two months time. List this matter on 13.3.2008. Certified copy as per rules. (A. K. PATNAIK) CHIEF JUSTICE (AJIT SINGH) JUDGE DS

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REGIONAL OFFICE, M. P. POLLUTION CONTROL BOARD (DHAR)
Sc. No. 78, Plot No. 1, Vijay Nagar, Indore (MP)

No. 3260 /R.O /MPPCB/H.W./2008 Indore, date 4/10/08.

To.

Dr. Reeta Kori.
Senior Scientific Officer.
M.P.Pollution Control Board.
Bhopal (MP)

Sub :- Regarding CTSDF Pithampur .

Ref :- Your Fax No. 481 dtd. 30-09-2008.

This is to informed you that the desired information is as follows :-

(I) Hazardous waste of M/S UCIL received from Director, gas relief and rehabilation department Bhopal regarding disposal of hazardous (schedule -1 cat. 29.2 i.e. lime sludge) 33.31 MT. has been disposed off by CTSDF Pithampur secured land fill on dated 30.6.2008. .

(2) During disposal of the hazardous waste Ambient air Quality monitoring was carried out by Regional Laboratory, M.P.P.C.B.Indore and also water sample from monitoring borewells of the CTSDF and near by villages borewells / dugwells, has been Collected the analysis do not indicate any adverse effect (Report enclosed as Ann.1) .

(3) Ambient air Quality monitoring is being carried out regularly by Regional Laboratory M.P.P.C.B. Indore and also water sample from monitoring borewells of the CTSDF is being Collected analysis do not indicate any adverse effect and also after disposal of above reffered waste no public complaints received regarding any adverse effect from Pithampur area till now.(Report enclosed as Ann.2).

Regional Officer

डॉ. आलोक सक्सेना
मुख्य [illegible]
केन्द्रीय प्रयोगशाला
[illegible] प्रदूषण नियंत्रण बोर्ड, भोपाल
6/10/08

19 Annexure-1

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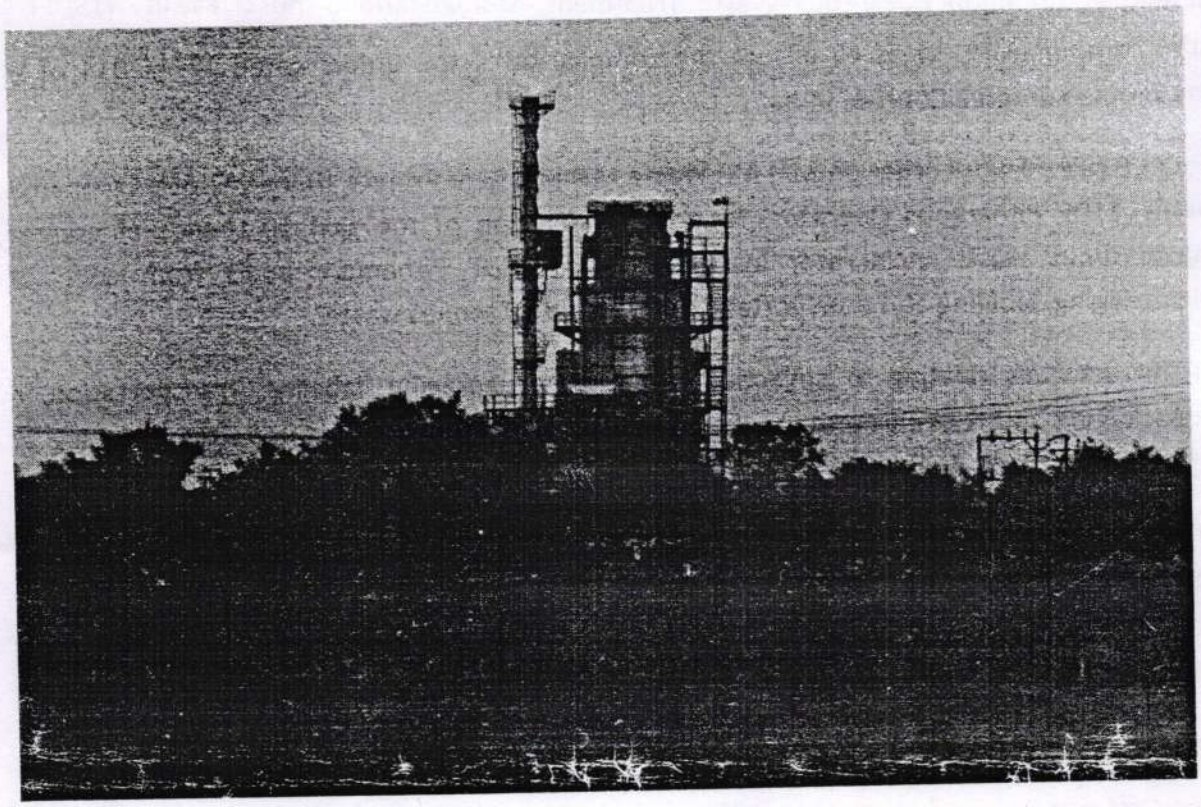
Report on Trial Incineration of UCIL Waste at TSDF Pithampur



August 13 - 18, 2015

cpcb

डॉ. आलोक सक्सेना
मुख्य रसायनज्ञ
केन्द्रीय प्रयोगशाला
म.प्र. प्रदूषण नियंत्रण बोर्ड,

Central Pollution Control Board
(Ministry of Environment, Forest & Climate Change, Government of India)
'Parivesh Bhawan', East Arjun Nagar,
Shahdara, Delhi – 110032

1. Background:

In the matter of Petitions(s) for Special Leave to Appeal (Civil) No. 9874 of 2012; Union of India Versus Alok Pratap Singh and others, the Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India, commissioned Central Pollution Control Board (CPCB) vide letter no. 11-7(161)/2004-HSMD-Part-X dated 01/5/2014 to undertake trial incineration of 10 tonnes of hazardous waste of erstwhile M/s Union Carbide India Limited, Bhopal, at Common Hazardous Waste Treatment, Storage and Disposal Facility (TSDF), Pithampur (MP), so as to ensure the compliance of the orders dated 17/4/2014 of the Hon'ble Supreme Court of India.

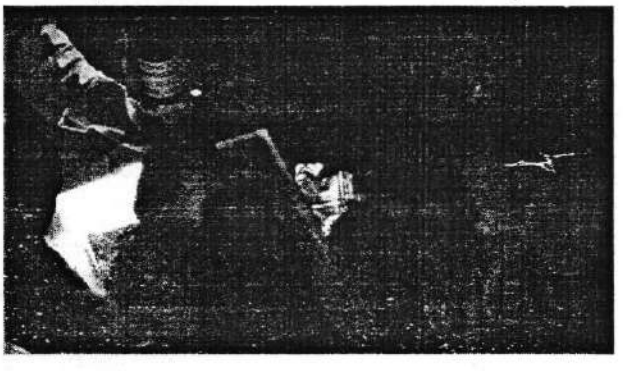
CPCB placed work order on M/s MP Waste Management Project, (Ramky Group Company) – the TSDF Pithampur Operator, for trial incineration of the said 10 tonnes at common hazardous waste incinerator installed at the TSDF Pithampur apart from collection, packaging, labeling and transportation of the said 10 tonnes waste.

The activities relating to collection of samples, packaging, labeling, transportation, re-packaging and trial incineration of about 10MT of UCIL waste was undertaken during 25th July, 2015 to 21, August, 2015.

Officials of MoEF&CC, CPCB, BGTRR, MPPCB and M/s Ramky Enviro Engineers Ltd. were present during the aforesaid operation. List of the officials associated in the aforesaid activities is given at Annexure-I. Security for entire operations both at Bhopal and Pithampur, Dhar were provided by the Govt. of Madhya Pradesh.

Sampling, Collection, Packaging and Transportation of the 10 tonnes of UCIL Waste

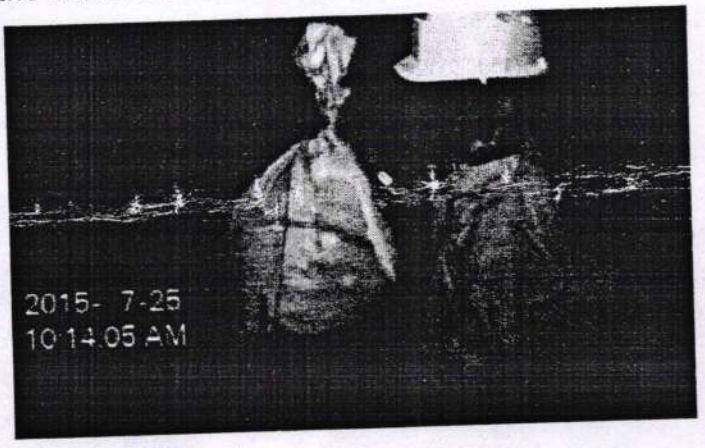
i. Samples were collected by CPCB and also the operator of the facility on 10th July, 2015 in the presence of officials from CPCB, BGTRR and MPPCB. One sample was collected each from 5 segregated wastes i.e. Semi Processed Residue, Napthol Waste Residue, Sevin Residue, Excavated Waste and Reactor Residue. The Samples were analyzed for relevant parameters by the laboratories of CPCB, facility operator and private labs.The analysis report of the waste is given at Annexure-2.



Collection of UCIL waste samples

ii. It was observed that Loss on Ignition (LoI) value ranges between 23 to 54% indicating substantial fraction of organic compounds in UCIL waste.

iii. The waste was having calorific value in the range of 1150 – 6140 Kcal/Kg. The product i.e. sevin (carbaryl) in the waste was found only at trace levels between 0.6 to 59 mg/Kg. Major constituents of the waste were organo chlorine compounds, alpha napthol, semi volatile organic compounds, and heavy metals.

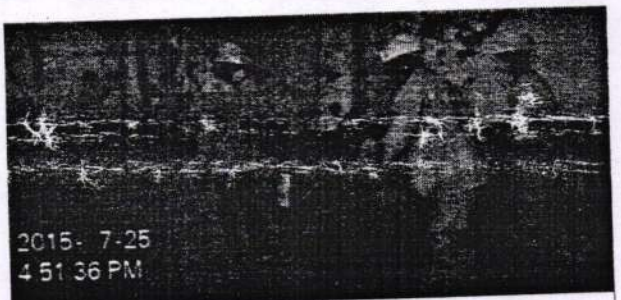


Collection of UCIL waste

iv. Collection of about 10 tonnes of hazardous waste from UCIL premises was initiated in the wee hours on 25.7.2015. Five types of the segregated wastes lying in the premises were collected in a proportion according to their quantities available at the site viz. Semi Processed Residue (1652Kg), Napthol Waste Residue (1389.85Kg), Sevin Residue (1373.5Kg), Excavated Waste (4857.4Kg) and Reactor Residue (884.8Kg). Net weight of the collected wastes was 10.157 tonnes.

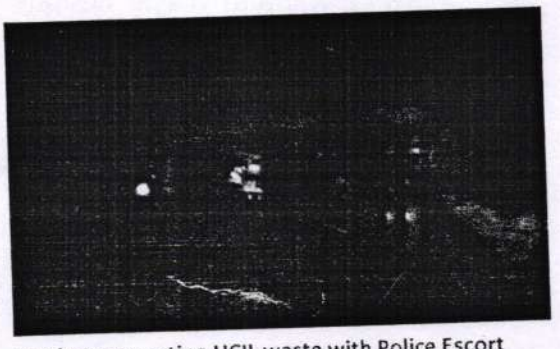
v. Each category of the aforesaid five categories of wastes were collected and packaged separately in 56 nos. of HDPE and 08 nos. of MS drums each of 200litres capacity. All HDPE drums were sealed with mechanical clamp.

vi. The sealed drums were labeled and weighed before loading on the four authorized trucks covered with waterproof sheets. Sheets were also laid on the floor of the trucks. Officials of CPCB, BGTRR and MPPCB were present during the time of collection, Packaging, labeling and loading on the trucks. The trucks left from UCIL premises, Bhopal at about 11:30 PM on 25th July 2015 for transfer to TSDF facility operated by M/s MPWMP, Pithampur.



Collection of drums containing UCIL waste


Trucks used for Transportation of UCIL Waste


Trucks transporting UCIL waste with Police Escort

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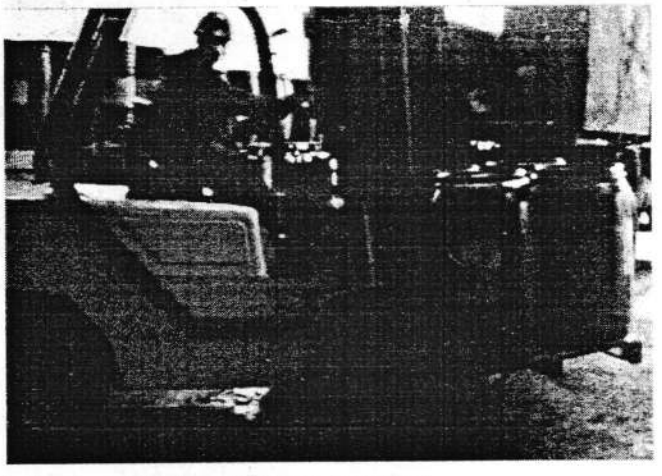
vii. The wastes were received at M/s MPWMP, Pithampur on26/07/2015 at about 05:30 AM. Throughout the transportation route to TSDF Pithampur, official of CPCB and MPWMP were present and was escorted by Madhya Pradesh Police.

Weighing on arrival at TSDF



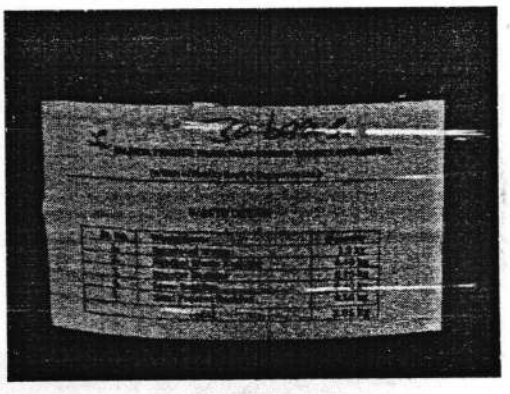
Unloading of UCIL waste into storage shed

viii. The UCIL waste was unloaded using fork-lifter cars into incinerable hazardous waste storage shed.

ix. All the operations of sampling, collection, packaging, labeling, transportation, unloading and storage of the wastes have been video graphed.

2. Re-packaging of the transported 10 tonnes wastes at TSDF Pithampur

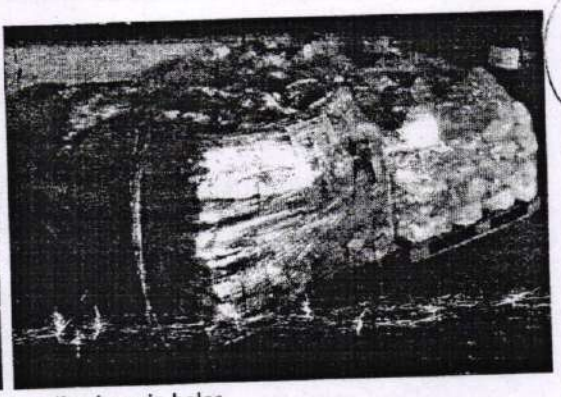
i. The received UCIL waste was re-packaged as per the feed menu. HDPE feeding bags containing 5 separate poly-ethylene packets for each type of waste, with net weight of about 3 Kg were prepared. The quantity of waste in each packet was proportional to waste collected viz. Semi Processed Residue (0.5 Kg), Napthol Waste Residue (0.40 Kg), Sevin Residue (0.40 Kg), Excavated Waste (1.5 Kg) and Reactor Residue (0.25 Kg).



Details of material re-packagedin feeding bags

ii. About 30 nos. of above mentioned HDPE feeding bags were packed into 200 Litre HDPE drums and also baled with polythene sheets and these drums/bales were further transferred to waste feeding area of incinerator.

Re-packing of UCIL waste



Feeding bags in bales

iii. The workers involved in re-packaging were wearing PPEs i.e gloves, gum boots, apron, safety goggles, masks etc.

iv. Re-packaging was undertaken in presence of officials of CPCB and MPPCB. The event was also video graphed.

3.0 Trial Incineration

i. Feed rate for trial incineration was fixed at 90 Kg/hour as was done in case of trial incineration of HIL waste. Along with waste, lime was also fed in equal proportion to maintain better flow and discharge of residues through kiln and also to maintain alkaline conditions during incineration. Feeding of UCIL waste started after blank run so as to demonstrate consistent operation of the incineration system with attainment of requisite temperatures in the rotary kiln and secondary chamber and other operation parameters of air pollution control system as well as to remove the impact of earlier residuals present, if any, in the incineration system.

Feeding of UCIL waste into feeder bucket

ii. HDPE bags containing 3 Kg of UCIL waste along with a bag of lime of 3 Kg were fed into the rotary kiln of the incinerator through feeder bucket which was set to operate automatically at an interval of 2 minutes thus maintaining feed of 90 Kg/hour of UCIL waste.

iii. The incinerator has flue gas treatment systems namely spray drier (quencher), multi cyclone dust collectors, dry powder chemical adsorption system, filter bag house, alkali scrubber with mist eliminator and ID fan followed by chimney of 35metres height.

iv. The following additional measures are taken to address the issue of mercury in the UCIL waste.

(a) Solution of sodium sulphide mixed with water at 1 % was used as spray drying medium in the spray drier.

(b) Sulphur powder was injected into flue gases along with activated carbon and lime for adsorption/fixing of mercury along with other VOCs and heavy metals.

Dry mixture of reagent chemicals i.e. lime, activated carbon and sulphur were prepared in a ratio of 150:75:1 which was fed prior to bag filters at a rate of about 226 Kg/hr for adsorption of Dioxins and Furans, Mercury, metals and VOCs.

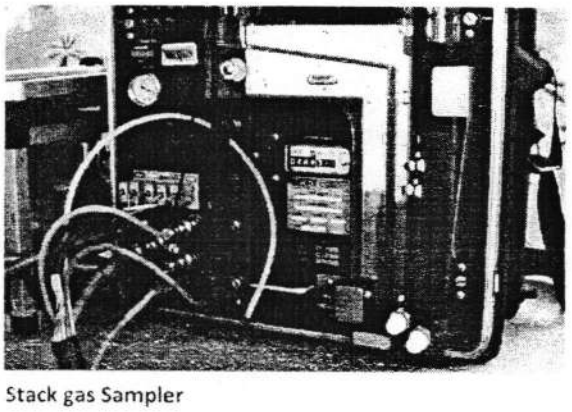
v. Incinerator was operated on blank run for 30 hours_i.e.00:00_Hours till 12:00 Hours on 12/8/2015 and from 18:00 Hours on 12/8/2015 till 12:12 Hours of 13/8/2015. The blank run was halted for about six hours in between due to replacement of disc atomizer. Rest of the operation of incinerator was uninterrupted and free from any such break-down.

View of incinerator during trial incineration

vi. The trial incineration of UCIL waste started from 12:12 Hours of 13/8/2015 with waste feeding rate of 90 Kg/hour and continued till 06:30 Hours of 18/8/2015.

vii. Operation of incinerator was monitored from control room in SCADA system.

viii. Temperature in secondary combustion chamber was continuously maintained above 1100°C (1100-1200°C). Temperature in the primary combustion chamber was maintained above 800°C in compliance with CPCB guidelines.



Stack gas Sampler

ix. The emissions from incinerator during trial incineration of UCIL waste were measured for the prescribed parameters of common hazardous waste incinerator as notified vide notification No GSR 481(E), dated 26.6.2008 under Schedule-I of the Environment (Protection) Rules, 1986:

<u>Stack Emission</u>

1. Carbon-dioxide
2. Carbon Monoxide
3. Particulate Matter (PM)
4. Sulphur dioxide

5. Oxides of Nitrogen
6. Hydrogen fluoride gas/mist
7. Hydrogen Chloride gas/mist
8. Cadmium and its compounds (as Cd)
9. Mercury and its compounds (as Hg)
10. Heavy Metals and its compounds (as Sb+As+Pb+Co+Cr+Cu+Mn+Ni+V)
11. Dioxins and Furans
12. Total Organic Compound (TOC)

Kiln's slag and bottom ash

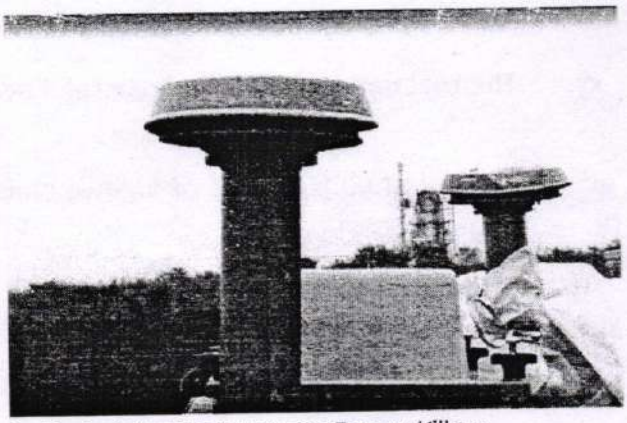
13. Loss on Ignition
14. Total Organic Carbon

Combustion Temperatures

15. Temperatures in primary and secondary combustion chambers

x. The samples were analysed at CPCB's laboratory in Delhi and also by engaging external laboratories for some parameters since Air Laboratory of CPCB was under renovation. Parameters namely Nitrogen Dioxide, Hydrogen Chloride, Hydrogen Fluoride, and Total organic Carbon in the stack emission were measured by an external laboratory.

xi. Apart from the aforesaid stack emission samples, ambient air quality was also monitored by CPCB at 3 locations in and around the facility, including a station representing Tarpura village in the vicinity of incinerator. The parameters monitored are PM_{10}, Sulphur Dioxide and Nitrogen Dioxide and heavy metals. Further, Benzene was also monitored by engaging an external laboratory. The aforesaid ambient air quality monitoring by CPCB at 03 locations was carried out during 10/8/2015 to 19/8/2015. The locations of the stations are shown in map at Annexure-3.



Ambient Air Quality station near Tarpura Village

xii. About 22 KL of bleed liquor from alkali scrubber was collected into separate tank for subsequent treatment in Multi Effect Evaporator (MEE).

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xiii. After the last feed of the UCIL waste at about 0630 Hours on 18/8/2015, the incinerator was operated on blank run for about ten hours till 1630 hours on 18/8/2015 to flush out residuals from kiln and Air Pollution Control Devices.

xiv. The quantities of residues generated during the during the trial incineration are as below:

Sl. No.	Residues	Quantity Generated	Mode of Disposal
1.	Drums used for transporting wastes in trucks	64 nos of 200 litres size each (56 of HDPE and 08 of MS make)	The mutilated drums have been disposed in secured landfill.
2.	Bottom ash of combustion chambers	8892 Kg	Kiln ash/residue has been disposed secured landfill
3.	Residues from Spray drier, multi cyclone dust collectors and filter bag house	38471 Kg	APCD residue has been disposed in the secured landfill.
4.	Bleed liquor from alkali scrubber	22 KL	Disposed through MEE during 18/8/2015 -22/8/2015
5.	Residue from MEE	573 kg	The residue has been disposed in secured landfill.

xv. The trial run operation was recorded by videography/CCTV.

xvi. There was no incidence of fugitive emissions from the incinerator at kiln during the trial incineration.

xvii. There were sporadic rains during the period of trial incineration resulting in wet conditions of the soil and surrounding environment.

xviii. Data pertaining to wind direction and velocity were recorded with wind anemometer. The prominent wind direction during the period of monitoring was from SE to SSE, which shifted gradually to south-east after 16/8/2015. The wind speed was between more than 0.3m/s for 89% of the monitoring period. Clam wind was prevailed for about 11% of the period.

.0 Results of trial incineration:

i. The analysis results of the aforesaid Stack Emission Monitoring conducted during trial incineration of UCIL Waste (August 13-18, 2015) are given in Table 1 below :

Table 1- Stack emissions during trial incineration

S.No	Parameters (1)	Prescribed Standards (2)	Sampling Date (3)	Measured Emission values (4)
1.	Particulate Matter (PM) in mg/ Nm3	50	13/08/2015	2.7
			15/08/2015	5.1
			17/08/2015	4.0 &3.8
2.	Hydrogen Chloride (HCl) in mg/Nm3	50	13/08/2015	<1
			15/08/2015	<1
			16/08/2015	<1
			17/08/2015	<1
			18/08/2015	<1
3.	Sulphur dioxide (SO2) IN Mg/Nm3	200	13/08/2015	<1
			15/08/2015	<1
			17/08/2015	<1
4.	Carbon monoxide (CO) in mg/Nm3	100	13/08/2015	35.70
			15/08/2015	24.36
			17/08/2015	32.99
5.	Total organic Carbon in mg/Nm3	20	13/08/2015	8.6
			15/08/2015	8.9
			16/08/2015	5.0
			17/08/2015	6.9
			18/08/2015	8.5
6.	Carbon Dioxide (CO2) in %	> 7	13/08/2015	8.1
			15/08/2015	8.0
			17/08/2015	8.0
7.	Hydrogen Fluoride (HF) in mg/Nm3	4	13/08/2015	<1.0
			15/08/2015	<1.0
			16/08/2015	<1.0
			17/08/2015	<1.0
			18/08/2015	<1.0
8.	Oxides of Nitrogen (as NO2) in mg/Nm3	400	13/08/2015	38.3
			15/08/2015	38.4
			17/08/2015	66.5
9.	Dioxins & Furans in TEQ/Nm3	0.10	14/08/2015	0.041
			16/08/2015	0.012
			17/08/2015	0.031

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10.	Cd + Tl + their compounds in mg/Nm3	0.05	13/08/2015	BDL
			15/08/2015	0.011
			17/08/2015	0.007
11.	Mercury (Hg) and its compounds in mg/Nm3	0.05	13/08/2015	0.007
			15/08/2015	0.010
			17/08/2015	0.024
12.	Sb+As+Pb+Co+Cr+Cu+Mn+Ni+V+their compounds in mg/Nm3	0.50	13/08/2015	BDL
			15/08/2015	0.495
			17/08/2015	0.254
13.	Loss on ignition in slag and bottom ash in %	Less than 5	14/08/2015	0.72
			16/08/2015	1.0
			17/08/2015	1.77
			18/08/2015	1.5
14.	TOC of slag and bottom ash in %	Less than 3	14/08/2015	0.01
			16/08/2015	0.04
			17/08/2015	0.058
			18/08/2015	0.03

ii. The analysis results of the aforesaid Ambient Air Quality Monitoring conducted around incinerator prior to and during trial incineration of UCIL waste (August 10-18, 2015) are given in Table 2 below:

Table 2- Ambient Air Quality around incinerator prior to and during trial incineration

S.No	Parameters	Standards	Date of Sampling	Near Incinerator Area (Station 1)	Near Weigh Bridge area (Station 2)	Tarapur Village (Station 3)
1.	PM10 ($\mu g/m^3$)	100	10-11/08/2015	32.0	45.0	38.0
			11-12/08/2015	18.0	24.0	11.0
			12-13/08/2015	14.5	20.5	14
			13-14/08/2015	24.7	16	19.7
			14-15/08/2015	19.0	31.0	28.0
			15-16/08/2015	34.0	51.0	18.0
			16-17/08/2015	23.0	35.0	29.0
			17-18/08/2015	17.3	7.7	10.5
			18-19/08/2015	45.0	46.0	36.0
2.	SO_2 ($\mu g/m^3$)	80	10-11/08/2015	4.75	4.40	5.04
			11-12/08/2015	3.56	2.38	2.87
			12-13/08/2015	5.16	4.36	3.43
			13-14/08/2015	1.69	2.23	2.20
			14-15/08/2015	3.31	2.37	3.80
			15-16/08/2015	1.62	2.51	4.23
			16-17/08/2015	2.78	3.38	2.97
			17-18/05/2015	2.29	3.42	2.64
			18-19/08/2015	2.09	2.98	1.68
3.	NO_2	80	10-11/08/2015	12.68	8.57	17.55

S.No	Parameters	Standards	Date of Sampling	Near Incinerator Area (Station 1)	Near Weigh Bridge area (Station 2)	Tarapur Village (Station 3)
	($\mu g/m^3$)		11-12/08/2015	18.03	8.84	12.99
			12-13/08/2015	16.12	12.19	13.52
			13-14/08/2015	12.71	6.75	13.27
			14-15/08/2015	09.71	5.89	09.68
			15-16/08/2015	12.50	11.33	14.52
			16-17/08/2015	12.78	10.68	12.33
			17-18/05/2015	14.59	11.29	10.07
			18-19/08/2015	12.56	11.93	10.26
4.	Arsenic (ng/m^3)	6.0	10-11/08/2015	BDL	BDL	BDL
			12-13/08/2015	BDL	BDL	BDL
			13-14/08/2015	BDL	BDL	BDL
			14-15/08/2015	BDL	BDL	BDL
			15-16/08/2015	BDL	BDL	BDL
			16-17/08/2015	BDL	BDL	BDL
			17-18/08/2015	BDL	BDL	BDL
			18-19/08/2015	1.9	BDL	BDL
5.	Nickel (ng/m^3)	20	10-11/08/2015	**519**	**22**	BDL
			12-13/08/2015	**57**	BDL	BDL
			13-14/08/2015	**289**	BDL	BDL
			14-15/08/2015	BDL	BDL	BDL
			15-16/08/2015	**928**	BDL	BDL
			16-17/08/2015	**84**	BDL	BDL
			17-18/08/2015	BDL	BDL	BDL
			18-19/08/2015	17	**165**	BDL
6.	Lead ($\mu g/m^3$)	1.0	10-11/08/2015	0.050	0.047	0.090
			12-13/08/2015	0.033	0.072	0.099
			13-14/08/2015	0.041	0.047	0.046
			14-15/08/2015	0.059	0.054	0.063
			15-16/08/2015	0.059	0.045	0.044
			16-17/08/2015	0.079	0.056	0.034
			17-18/08/2015	0.133	0.067	0.035
			18-19/08/2015	0.049	0.055	0.055
7.	Benzene($\mu g/m^3$)	5.0	12-13/08/2015	<0.01	<0.01	<0.01
			16-17/08/2015	<0.01	<0.01	<0.01
			17-18/08/2015	<0.01	<0.01	<0.01
			18-19/08/2015	<0.01	<0.01	<0.01

iii. The combustion efficiency of the incinerator has been assessed and given in table below :

S.No	Parameter	Prescribed Standard	Sampling Date	Measured Efficiency
1.	Combustion Efficiency %	99.9%	13/08/2015	99.96%
			15/08/2015	99.97%
			17/08/2015	99.96%

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5.0 Conclusions and Recommendations

i. The results of trial incineration monitoring reveal that all the monitored parameters were complying with the prescribed parameters of common hazardous waste incinerator as prescribed vide notification no. GSR 481(E), dated 26.6.2008 under Schedule-I of the Environment (Protection) Rules, 1986 notified under the Environment (Protection) Act, 1986.

ii. Ambient air quality around incinerator was within the National Ambient Air Quality standards for monitored parameters namely PM_{10}, SO_x, NO_x, arsenic, lead and benzene. Nickel in ambient air was also complied except in samples collected in TSDF premises; however, this exceedance could not be attributed to trial incineration of UCIL waste since Nickel was not present in detectable limits in the emission from stack.

iii. In view of the compliance demonstrated during the trial incineration of 10 MT of UCIL waste, the existing Common hazardous incinerator at Pithampur can be utilized for disposal of the remaining quantity of UCIL waste lying at UCIL, Bhopal premises, under the supervision of Govt. of Madhya Pradesh and Madhya Pradesh Pollution Control Board.

iv. The trial study was conducted at a feed rate of 90kg/hr maintaining the same feed rate to that of earlier trial study with HIL waste whereas there may be scope of increasing feed rate. At this rate of 90Kg/hr, incineration of the remaining waste (about 336 tons) lying at UCIL premise may take about 160 days if operated continuously. In view of the results obtained from trial study there is a need to optimise waste feed rate into the incinerator to reduce duration of incineration, incineration cost, and material consumption thereof while disposal of the remaining waste.

v. For incineration of the remaining UCIL waste, it is required to install a mechanised mixing unit with silos, feeding hoppers, mixer, etc. which shall mix the waste proportionally followed transfer of the mixed waste into feeding bags/ containers. Alternatively, a separate mechanised system such as screw conveying system may be installed for feeding the mixed waste directly into the kiln at specified rate instead of feeding through bags/containers. .

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Annexure-1

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List of the Officials present during various activities of trial incineration of about 10tonnes of UCIL waste

MoEF&CC, Government of India

1.	Sh. R.N. J indal	Director	MoEF&CC, Delhi	Incineration

List of Official from MP Government

1.	Sh. K.K. Dubey	Deputy Secretary	BGTRR, Bhopal	Sampling & packaging
2.	Sh. Abhishek Singh	Director	BGTRR, Bhopal	Sampling & packaging
3.	Sh. B.S. Jamod	ADM	Bhopal	Sampling & packaging
4.	Sh. Rajesh Gupta	SDM	Govindpura	Sampling & packaging
5.	Sh. Neeraj Pande	EE, CPA	BGTRR, Bhopal	Sampling & packaging
6.	Sh. C.P. Nigam	SDM	Bairagarh	Sampling & packaging

List of Official from CPCB

1.	Sh. R.S. Kori	Zonal Officer	CPCB, Bhopal	Incineration
2.	Sh. B. Vinod Babu	Scientist E & I/C HWMD	CPCB, Delhi	Sampling, Re-packaging, Incineration & coordination
3.	Sh. Bharat K. Sharma	Scientist 'E'	CPCB, Delhi	Incineration & coordination of activities
4.	Ms. Deepti Kapil	Scientist 'C'	CPCB, Delhi	Incineration
5.	Dr. R.P. Mishra	Scientist 'C' & Lab I/C	CPCB, Bhopal	Sampling, packaging, Transportation, Re- packaging, Incineration, residue disposal & local coordination
6.	Sh. P. Krishnamurthy	Scientist 'C'	CPCB, Delhi	Sampling
7.	Sh. B. Kumar	Scientist 'C'	CPCB, Delhi	Sampling
8.	Sh. Rajeev Sharma	Senior Technician	CPCB, Bhopal	Sampling, packaging, Incineration
9.	Dr. Anoop Chaturvedi	SSA	CPCB, Bhopal	Incineration
10.	Sh. Rameshwar Bandewar	SLA	CPCB, Bhopal	Sampling, packaging, Incineration
11.	Sh. Sanjay Kumar Mukati	JSA	CPCB, Bhopal	Incineration
12.	Sh. Suneel Kolhtkar	JLA	CPCB, Bhopal	Incineration

List of Official from MPPCB

1.	Sh. H.K. Sharma	CE-Director (Env.)	MPPCB, Indore	Incineration
2.	Sh. Alok Singhai	R.O. Dhar	MPPCB, Indore	Incineration
3.	Sh. P.S.Bundela	R.O. Bhopal	MPPCB, Bhopal	Sampling & packaging
4.	Dr. L. Trivedi	S.R.O. Pithampur	MPPCB, Indore	Incineration
5.	Dr. D.K. Wagela	CC & Lab Head	MPPCB, Indore	Incineration
6.	Sh. S.N. Patil	CC	MPPCB, Bhopal	Sampling & packaging
7.	Sh. Alok Saxena	CC	MPPCB, Bhopal	Sampling & packaging
8.	Sh. Atul Kotia	Scientist	MPPCB, Indore	Incineration

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Annexure-2

UCIL Waste Characteristics

Sr. No.	Name of sample	Unit	Excavated Waste	Reactor Residue	Sevin residue	Napthol residue	Semi process residue
1.	Physical State	-	Solid	Solid	Solid	Solid	Solid
2.	Color	-	Grey	Dark Grey	Grey	Dark Grey	Grey
3.	Texture	-	Powder& Lumps	Powder & Lumps	Powder & Lumps	Powder & Lumps	Powder & Lumps
4.	Calorific Value	Cal/g	1274.13	1150.06	1705.95	6139.85	3030.94
5.	Flash Point	^{0}C	>60	>60	>60	>60	>60
6.	LOD @ 105°C	%	1.98	1.96	1.75	1.62	2.87
7.	LOI @ 550°C	%	27.92	23.08	25.4	42.07	54.13
9.	Chloride as Cl^-	Mg/kg	2444	9338	36892	1643	5760
10.	Fluorides as F^-	Mg/kg	126	105	137	170	160
11.	Bromide as Br^-	Mg/Kg	<0.1	<0.1	<0.1	<0.1	<0.1
12.	Organic Halogens	Mg/kg	BDL	BDL	BDL	3790.95	10714.1
13.	Carbon	%	18.53	30.69	12.57	58.27	45.24
14.	Hydrogen	%	0.43	0.52	0.98	1.02	3.01
15.	Nitrogen	%	0.24	1.03	0.32	0.04	1.12
16.	Sulphur	%	1.01	0.92	1.04	1.39	1.62
17.	Copper as Cu- Total	Mg/kg	34.12	38.55	33.41	54.62	38.3
18.	Total Chromium as Cr-Total	Mg/kg	92.81	81.77	65.99	24.14	89.33
19.	Lead as Pb - Total	Mg/kg	33.43	28.75	49.45	15.12	38.83
20.	Manganese as Mn - Total	Mg/kg	224.2	224.2	241.5	356.8	95.5
21.	Nickel as Ni- Total	Mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
22.	Zinc as Zn – Total	Mg/kg	87.41	68.25	79.71	32.51	93.09
23.	Cadmium as Cd- Total	Mg/kg	<0.5	<0.5	<0.5	<0.5	10.0
24.	Mercury as Hg	Mg/kg	152-754	261-615	241.66-45.22	151.68-201	162.02-904
25.	Chloroform (Total)	Mg/kg	0.83	6.05	2.09	2.52	4.17
26	Carbon Tetrachloride (Total)	Mg/kg	BDL	0.02	0.64	1.15	BDL
27.	Aldicarb	Mg/kg	BDL(DL:0.1)	BDL(DL:0.1)	BDL(DL:0.1)	BDL(DL:0.1)	BDL(DL;0.1)
28.	Alpha-Napthol	Mg/kg	26188	7475	7103	35746	14901
29.	Toluene	Mg/kg	3.25	2.15	3.24	3.07	2.97
30.	Carbary (1-naphthyl methylcarbamate)	Mg/Kg	59.73	<0.1	0.74	1.28	0.57
31.	Beta-Napthol	Mg/kg	782	<0.1	<0.1	3047	2113
32.	Chlorotoluene	Mg/Kg	<0.1	<0.1	<0.1	<0.1	<0.1
33.	Dichlorotoluene	Mg/Kg	<0.1	<0.1	<0.1	<0.1	<0.1
34.	1,4-Napthollnodionc	Mg/Kg	<0.1	<0.1	0.33	0.39	0.91
35.	1,1'-Oxybis	Mg/Kg	<0.1	<0.1	<0.1	<0.1	<0.1
36.	Trichlorobenzene	Mg/Kg	<0.1	2.18	20.4	<0.1	<0.1
37.	Benzene (Total)	Mg/kg	BDL	BDL	0.01	BDL	BDL

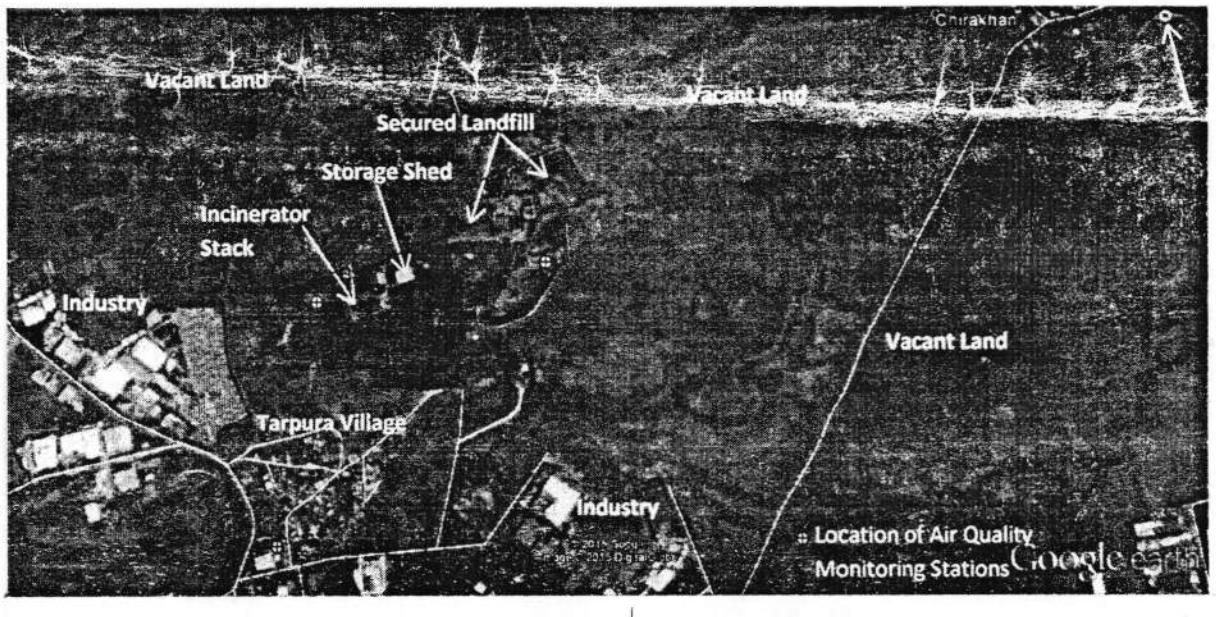
38.	2-Naphthol (Total)	Mg/kg	BDL	0.16	0.37	BDL	BDL
39.	1,2,3,4- Tetra Hydro Naphthol (Total)	Mg/kg	0.01	0.01	0.14	0.21	0.04
40.	Ethyl Benzene (Total)	Mg/kg	BDL	BDL	BDL	0.46	BDL
41.	Trichloroethylene (Total)	Mg/kg	0.07	0.04	BDL	BDL	0.07
42.	1,2,4,- Trichlorobenzene(Total)	Mg/kg	0.05	BDL	4.66	BDL	1.03
43.	1,2- Dichlorobenzene (Total)	Mg/kg	BDL	0.04	BDL	BDL	0.01
44.	1,4- Dichlorobenzene (Total)	Mg/kg	BDL	0.04	BDL	0.02	0.01
45.	Tetrachloro Ethylene (Total)	Mg/kg	BDL	1.49	BDL	BDL	0.64
46.	1, 1 – Dichloroethylene (Total)	Mg/kg	BDL	BDL	29.99	28.6	BDL
47.	Lindane (Total)	Mg/kg	BDL	0.08	BDL	BDL	0.03
48.	Total PAH	Mg/kg	100563.9	373668.8	42088.6	496166.2	248900.8
49.	Total BHC	Mg/Kg	2.3	0.9	3.0	1.8	4.3
50.	Aldrin	Mg/Kg	NT	NT	NT	NT	NT
51.	Total Edosulphan	Mg/Kg	0.02	0.02	0.03	NT	NT
52.	Dieldrin	Mg/Kg	NT	0.02	NT	NT	0.12
53.	DDT	Mg/Kg	0.02	0.02	0.05	0.09	1.42

Note: Maximum value reported in case of multiple samples/analysis

NT: Not traceable ; BDL: below detection level

Annexure-3

Location of Incinerator and Monitoring Stations

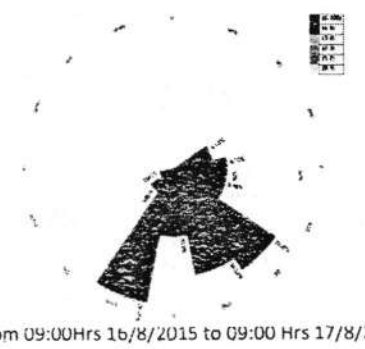


Wind Direction

From 09:00Hrs 11/8/2015 to 09:00 Hrs 12/8/2015

From 09:00Hrs 12/8/2015 to 09:00 Hrs 13/8/2015

From 09:00Hrs 15/8/2015 to 09:00 Hrs 12/8/2015



From 09:00Hrs 16/8/2015 to 09:00 Hrs 17/8/2015

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Final Report

Assessment and Remediation of Hazardous Waste Contaminated Areas in and around M/s Union Carbide India Ltd., Bhopal

Sponsor

Bhopal Gas Tragedy Relief and Rehabilitation Department
Govt. of Madhya Pradesh, Bhopal

By

NEERI National Environmental Engineering Research Institute
Nehru Marg, Nagpur - 440020
(www.neeri.res.in)

June 2010

डॉ. आलोक सक्सेना

Foreword

M/s. Union Carbide India Ltd., manufactured carbamate pesticides and the associated intermediate chemicals at their Bhopal unit during 1969 and 1984. The solid, liquid and tarry wastes generated during the manufacture of pesticides and associated chemicals were dumped by UCIL within their premises. The unit was closed down in December 1984 as a result of the accident of leakage of methyl iso-cyanate gas. Since, a considerable time has elapsed and no remedial actions have been taken in the past, the present status of soil and groundwater contamination in and around UCIL premises needed to be assessed so as to delineate suitable strategies for their remediation.

Based on the directives of the Task Force constituted by Hon'ble High Court of Madhya Pradesh, Bhopal Gas Tragedy Relief and Rehabilitation Department (BGTRRD), Govt. of Madhya Pradesh requested National Environmental Engineering Research Institute (NEERI), Nagpur and National Geophysical Research Institute (NGRI), Hyderabad to undertake a study on assessment of contamination and delineation of suitable strategies for the remediation of contaminated areas in and around the UCIL site. The study was awarded by BGTRRD in March 2009.

The studies were carried out by NEERI and NGRI which involved reconnaissance survey of the UCIL premises, geophysical and hydrogeological investigation, sampling and analysis of soil and groundwater in and around the UCIL. Based on these studies it was established that soil mostly within UCIL premises and solar evaporation pond area is contaminated and needed appropriate remediation with respect to isomers of hexachlorocyclohexane and mercury on the basis of USEPA standards for groundwater protection. It was also established that the groundwater in general inside the plant area is not contaminated. However, isolated contamination was observed in few wells possibly due to surface runoff from waste dumps or mismanagement of SEP and landfill. Considering the extent of contamination and present site conditions, immediate as well as long term remediation measures are delineated in the report.

(T. Chakrabarti)
Acting Director

June 26, 2010

Executive Summary

- M/s. Union Carbide India Ltd., manufactured carbamate pesticides and the associated intermediate chemicals at their Bhopal unit during 1969 and 1984. The solid, liquid and tarry wastes generated during the production of these chemicals were dumped by UCIL within their premises, resulting in contamination of soil and groundwater wihin and outside UCIL premises. The unit was closed down in December 1984 as a result of the accident of leakage of methyl iso-cyanate gas.

- Based on the directives of the Task Force constituted by Hon'ble High Court of Madhya Pradesh, the BGTRRD sponsored a joint study in March 2009 to National Environmental Engineering Research Institute (NEERI), Nagpur and National Geophysical Research Institute (NGRI), Hyderabad for assessment of contamination and delineation of suitable strategies for the remediation of contaminated areas in and around the UCIL site.

- Considering the past studies carried out by NEERI as well as apprehensions/issues raised by various agencies/organizations, field studies were carried out by NEERI and NGRI which involved reconnaissance survey of the UCIL premises, geophysical and hydrogeological investigation, sampling and analysis of soil and groundwater in and around the UCIL.

- The reconnaissance survey of the site revealed that most of the plant, machineries and buildings within UCIL premises are in dilapidated conditions and appeared to be contaminated. The reconnaissance survey of the UCIL premises also revealed existence of a number of dumps especially in disposal area I and disposal area II. The existence of dumps within UCIL premises indicated that the excavation and recovery of wastes carried out by Madhya Pradesh Pollution Control Board (MPPCB) through M/s Ramkey Ltd. was incomplete.

- The boundary wall of the UCIL premises was found to be broken at many places which provided an easy access to the people living around the premises.

- The reconnaissance survey of the SEP area outside the UCIL premises revealed existence of one SEP and an abandoned landfill which were found to be damaged.

- The field studies for assessment of contamination comprised of detailed hydrogeological investigations (geophysical investigations, borehole drilling, development of monitoring wells etc.), followed by collection and analysis of existing field samples (dumpsite, subsurface soil, and groundwater). The hydrogeological investigations were carried out by NGRI whereas sampling and characterization of soil and groundwater were carried out by NEERI.

- The geophysical investigations carried out by NGRI indicated possibility of contamination at three sites (Site I, Site III and Site V) out of nine sites. The depth of

contamination at these sites is limited to about 2 m, except at one dump (Site III) that could be deeper (4-8m). These dumps were isolated form each other.

- The lithology of the area as determined through drilling of borewells by NGRI revealed existence of black and yellow silty clay up to a depth of 22 to 25 m below ground level. The groundwater in the area exists under confined below a depth of about 25 m from the ground surface. The general groundwater flow direction is towards east.

- Sampling and analysis of subsurface soil (collected during drilling of borewells) indicated contamination of soil up to a depth of about 2 m. Major contaminants detected at the site include: BHC, aldicarb, carbaryl, α-naphthol and mercury. The sampling and analysis of soil from possible dump areas (other than drilling areas) also indicated contamination of soil in terms of above mentioned contaminants. The soil in and around SEPs area located outside UCIL premises was also found to be contaminated.

- The total volume of soil (within and outside UCIL premises) amounts to 6,50,000 m^3 which is equivalent to about 11,00,000 MT.

- Monitoring of groundwater from the borewells constructed by NGRI within UCIL premises and the existing wells around UCIL premises indicated that groundwater in general is not contaminated due to seepage of contaminants from the UCIL dumps. However, isolated contamination in terms of pesticides and/or dichlorobenzene was observed in 5 well in the immediate vicinity of UCIL premises in the north-east and east direction. The source of contamination of these wells was, attributed to surface runoff from the dumps. The quantum of contaminated groundwater could not be estimated due to isolated nature of contamination.

- Considering the extent of contamination and various site conditions, immediate and well as long term remedial measures were recommended.

- Under immediate measures following recommendations were made:

  - Proper fencing and security to UCIL premises and SEP area for preventing unauthorized access and use of these areas by public.
  - Immediate sealing of five contaminated wells so as to prevent use of water from these wells for any purpose by the residents.
  - Excavation and recovery of dumps materials. The incinerable wastes should be disposed off in TSDF at Pithampur. The non-incinerable wastes to be disposed off in an on-site secured landfill facility to be constructed at UCIL.
  - Decontamination and decommissioning of plant, machineries and buildings prior to remediation of contaminated soil and groundwater.

- Under long-term measures, remediation of contaminated soil and groundwater was recommended. For remediation of contaminated soil, an on-site secured landfill facility was recommended. For contaminated groundwater, pump-and-treat system was recommended.

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(3)

- The cost of soil remediation through secured landfill is estimated to be in the range of Rs 78 crore to 117 crore (average Rs. 100 crore). The capital cost for pump and treat unit shall be in the range of 25 to 30 lakhs. The operating and maintenance cost of such unit is in the rage of Rs. 10 to 15 lakhs per annum including cost of activated carbon and its disposal.
- It is recommended that, BGTRRD should engage competent professional contractors for detailed engineering, and execution of various remedial measures recommended by NEERI.

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SUMMARY OF GROUND WATER MONITORING CARRIED OUT BY MPPCB IN COLONIES AROUND UNION CARBIDE, BHOPAL

S.No.	Date of monitoring	Parameters	Analysis results in brief	Locations
	22/10/1996	**Physico-chemical-** pH,Conductivity, Turbidity, Chloride, Hardness, Alkalinity, COD, Nitrite, Nitrate, Phosphate, solids, Flouride **Metals:** Chromium, Zinc, Iron, Nickel, Cadmium, Copper, Manganese, Lead, Mercury. **Halogenated Hydrocarbon:** DCB, TCB **Pesticides:** Aldrin,BHC, DDT, Dieldrin, Endrin, Endosulphan, Heptachlor, Methoxychlor, Malathion, Methyl parathion, Phorate, Sevin	Except Mn , Mg, turbidity, hardness & coliforms most of the parameters falls within the permissible limits of drinking water. Organic compounds like sevin, di & tri-chlorobenzene , napthalene & PAH were not observed in the samples.	20
	26/6/1998			
	10/7/1998			
	15/4/1999			
	10/12/2001		Cr, Cu, Pb, Ni, Co & Cd - Not detected. Zn, Fe & Mn were observed in some locations but there concentrations were within the permissible limits as specified by BIS-10500 (1991)	10
	4/5/2002		Cr, Cu, Pb, Zn, Fe & Mn - within limit. DCB,TCB exceeds limits in few locations	16
	3/10/2002		Hg, Zn, Fe, Mn detected in some locations. DCB, TCB exceeds limits at some locations	6
	23/10/2002		Hg, TCB exceeds at one location	5
	18/2/2003		colour, turbidity & chlorides of some samples exceeds the desirable limits. DCB, TCB, lindane, 4,4 DDT, aldrin,endrin,endosulfan-I, methoxychlor were detected in some of the samples	15
	24/4/2003		colour, turbidity & chlorides exceeds in some locations. Lindane, endosulphan, Aldrine detected in some locations	13
	3/7/2003		colour, turbidity & chlorides exceeds at some locations. Lindane , endosulfan detected some locations	13
	7/10/2003		Pesticides like- lindane, Endosulfan I- II , heptachlor, aldrin, dialdrin, BHC, endrin & 4,4,DDT were detected in some of the samples.	13

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			Halogenated hydrocarbon viz., 1,2,3 TCB is detected in some of the ground water samples.	
	20/1/04		chlorides& flouride of some samples exceeds at some l;ocations	13
	19/5/2004		turbidity, chloride, T.hardness, alkalinity & dissolved solids exceeds at some locations	13
	14/10/2004		turbidity, chlorides, hardness alkalinity and dissolved solids exceeds at some locations	16
	18&23/11/2004		chloride, T. hardness, alkalinity, TDS, Cr, were exceeding at some locations	14
	8/2/2005		T.hardness and alkalinity exceeds the limits in all locations. Pesticides viz., BHC, Lindane, aldrin, endosulphan, dieldrin, endrin and Methoxychlor were detected in some locations whereas halogenated hydrocarbons viz., 1,2 DCB and 1,2,3 TCB were detected in one location	13
	18/5/2005		turbidity, total hardness and chlorides ,Cr and Zn were exceeding the desirable limits at some locations. BHC, Lindane, aldrin, linadane detected	14
	9/8/05		turbidity and chlorides exceeds at some locations	13
	21/11/05		turbidity , chloride, Fe , Mn exceeds at some locations	16
	24/2/05		turbidity and chlorides exceeds at some locations. DDT, Dieldrin, Endosulfan,Heptachlor and Aldrin detected	13
	29/5/06		turbidity and chlorides exceeds at some locations. Pesticides such as 4,4 DDT, Dieldrin, Endosulfan, Heptachlor, Sevin and Aldrin detected	11
	27/10/2006		pH, turbidity and chlorides, Fe, Mn, Zn exceeds at some locations. Pesticides were not detected.	12
	23/1/2007		---do--	13

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	29/3/2007		pH, turbidity and chlorides, ,Zn exceeds at some locations. . Pesticides were not detected.	11
	18/7/2007		Chlorides, total hardness, TDS, alkalinity exceeds at some locations. . Pesticides were not detected.	11
	3/11/2007		turbidity, total hardness, TDS, alkalinity, iron exceeds at some locations. . Pesticides were not detected.	12
	19/3/2008		turbidity, total hardness, TDS, alkalinity, iron & manganese exceeds at some locations. . Pesticides were not detected	12
	23/8/2008		turbidity, total hardness, TDS, alkalinity, copper, iron & manganese exceeds at some locations. . Pesticides were not detected	12
	9/3/2009		turbidity,chloride, total hardness, TDS, alkalinity & manganese exceeds at some locations. . g-BHC detected at B/W at vidisha road	11
	18/8/2009		turbidity, total hardness, TDS, alkalinity, copper, iron & manganese exceeds at some locations. . Pesticides were not detected	12
	24/12/2009		turbidity,chloride, total hardness, TDS, alkalinity , iron & manganese exceeds at some locations. . Pesticides were not detected	12
	23/6/2010		turbidity,chloride, total hardness, TDS, alkalinity , iron & manganese exceeds at some locations. . Pesticides were not detected	18
	9/11/2010		chloride, total hardness, TDS, alkalinity , iron exceeds at some locations. . Pesticides were not detected	15
	16/5/2011		chloride, total hardness, TDS, alkalinity ,	6

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			manganese exceeds at some locations. . Pesticides were not detected	
	16/1/2012		chloride, total hardness, TDS,iron, manganese exceeds at some locations. . Pesticides were not detected	8
	16/5/2012		chloride, total hardness, TDS,alkalinity, iron, manganese exceeds at some locations. . Pesticides were not carried out due to malfunction of instt	8

Details of colonies covered for ground water monitoring:- Kanchi chola, near dussera maidan, gareeb nagar, chandbadi, near ujjain railway cabin, berasia road, atal ayub nagar, new arif nagar, arif nagar, annu nagar, blue moon colony, Shankar nagar, preet nagar,
JP nagar etc.,

As per the report submitted by BMC dated 7/6/2012 to Supreme Court Monitoring Committee that ground water sources in gas affected area around UCIL premises has been closed, the aforesaid monitoring could not be performed thereof.

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[illegible] रोड, भोपाल

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Ground water monitoring around UCIL, Bhopal **Ref: 315/1-8**

Date of collection- 30/06/2014

Date of Recieved- 01/07/2014

Date of Analysis- 01/07/2014

S.No.	Parameters Analysed	Unit	1	2	3	4	5	6	7	8
1	pH	pH unit	8.13	8.01	8.03	8.39	8.02	8.03	8.05	8.07
2	Total Solids	mg/l	196	173	200	199	204	199	207	202
3	Total Dissolved Solids	mg/l	189	163	195	191	193	191	203	192
4	Suspended Solids	mg/l	7	10	5	8	11	8	4	10
5	Chloride	mg/l	18.32	25.07	26.99	21.21	23.14	20.24	22.17	19.28
6	BOD	mg/l	*	*	*	*	*	*	*	*
7	COD	mg/l	10	10	10	10	10	10	10	10
8	Turbidity	µ Mhos	2	3	1	2	3	2	1	3
9	Conductivity	mg/l	363	354	369	365	371	369	373	371
10	Nitrite Nitrogen	mg/l	0.02	0.02	0.01	0.01	0.02	0.02	0.01	0.01
11	Nitrate Nitrogen	mg/l	1.9	1.75	2.5	2.55	1.9	2	2.05	2.1
12	Phoshphate	mg/l	1.386	0.264	0.825	0.99	1.287	0.726	0.627	0.858
13	Alkalinity	mg/l	164	160	168	160	166	156	176	160
14	Total Hardness	mg/l	178	158	154	166	164	174	160	156
15	Calcium Hardness	mg/l	94	98	100	98	96	88	100	90
16	Magnesium Hardness	mg/l	84	60	54	68	68	86	60	66
17	Sulphate	mg/l	10.5	13.75	21.5	15	10.5	9.75	25	3.75
18	Calcium	mg/l	37.64	39.24	40.04	39.28	38.44	35.24	40.04	36.04
19	Magnesium	mg/l	20.39	14.57	13.11	16.51	16.51	20.88	14.57	16.02
20	Coliform	MPN/100ml	<2	<2	<2	<2	2	<2	6	<2

1. Tape Water from H.No.3 Smt. Sitabai Ram nagar Colony New Villa, Kanchi cholla
2. Tape Water from Mr. Mukesh Gupta H.No. 1156 New Villa Colony Kanchi Cholla
3. Tape Water from Mr.Sundarlal H.No.170 Udiya Basti
4. Tape Water from Mr.Banshi Kujbaniya H.No.1732 Chandbadi
5. Tape Water from Mr.Mohan H.No.275 Ward No.66, Preet Nagar
6. Tape Water from Mr.Vishal Ahirwar H.No.135 Gali No.12, Shivshakti Nagar
7. Tape Water from Mr. Pappu Verma H.No. 73, ward no.66, Gareebnagar
8. Tape Water from Smt. Kallo Kushwaha H.No.180 Ward No.66 Kalyan Nagar

Remark- * Instrument is out of order

(Dr. Reeta Kori)
Chief Scientific Officer

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Ground water monitoring around UCIL, Bhopal **Ref: 315/9-16**

Date of collection- 30/06/2014

Date of Recieved- 01/07/2014

Date of Analysis- 01/07/2014

S.No.	Parameters Analysed	Unit	9	10	11	12	13	14	15	16
1	pH	pH unit	7.98	8.12	8.04	7.63	8.18	8.08	8.10	8.10
2	Total Solids	mg/l	214	208	207	224	207	204	204	202
3	Total Dissolved Solids	mg/l	203	192	198	209	197	195	195	194
4	Suspended Solids	mg/l	11	16	9	15	10	9	9	8
5	Chloride	mg/l	17	14	15	19	16	16	17	14
6	BOD	mg/l	*	*	*	*	*	*	*	*
7	COD	mg/l	10	10	10	10	10	10	10	10
8	Turbidity	µ Mhos	4	4	4	5	3	3	3	2
9	Conductivity	mg/l	368	369	371	410	365	367	369	364
10	Nitrite Nitrogen	mg/l	0.025	0.02	0.015	0.015	0.02	0.025	0.025	0.015
11	Nitrate Nitrogen	mg/l	1.75	2	1.6	2.15	2.15	2	1.85	2
12	Phoshphate	mg/l	0.297	0.363	0.462	0.363	0.33	0.363	0.396	0.33
13	Alkalinity	mg/l	164	158	154	166	156	156	154	154
14	Total Hardness	mg/l	168	166	168	164	170	162	162	160
15	Calcium Hardness	mg/l	94	96	86	90	86	80	84	78
16	Magnesium Hardness	mg/l	74	70	82	74	84	82	78	82
17	Sulphate	mg/l	11	12.5	10	13	10	12.5	14.25	11.75
18	Calcium	mg/l	37.64	38.44	34.44	36.04	34.44	32.03	33.64	31.23
19	Magnesium	mg/l	17.96	16.99	20.88	17.96	20.39	19.91	18.94	19.91
20	Coliform	MPN/100ml	≤2	≤2	≤2	≤2	≤2	≤2	≤2	≤2

9. Tape Water from Smt. Hajra Bee H.No.101 Ward No. 66, Annu Nagar

10. Tape Water from Mr. Shahzad Bhai H.No. 174, ward no. 66, Nawab Colony

11. Tape Water from Mr. Ajhar H.No.24 ward no. 69, Bluemoon Colony

12. Tape Water from Mr. Anwar Khan H.No.2 Ward No.69 Sundar Nagar

13. Tape Water from Mr. Harendra Singh Tower H.No. 410 ward No. 70, Premnagar

14. Tape Water from Mr.Ramesh Ahirwar , Shriram Nagar

15. Tape Water from Mr.Lekhraj Kushwaha H.No. 30/3 ward no. 70, Navjeevan Colony

16. Tape Water from Mr.Dalchand Narwariya H.No. 429 ward No. 69 Timber Market

Remark: * Instrument is out of order

(Dr. Reeta Kori)
Chief Scientific Officer

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Ground water monitoring around UCIL, Bhopal

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Ref: 322/1-5

Date of collection- 01/07/2014

Date of Recieved- 01/07/2014

Date of Analysis- 01/07/2014

S.No.	Parameters Analysed	Unit	1	2	3	4	5
1	pH	pH unit	7.40	7.70	7.8	7.78	8.07
2	Total Solids	mg/l	371	171	173	172	199
3	Total Dissolved Solids	mg/l	361	167	170	169	196
4	Suspended Solids	mg/l	10	4	3	3	3
5	Chloride	mg/l	52.98	9.99	9.99	9.99	11.99
6	BOD	mg/l	*	*	*	*	*
7	COD	mg/l	9.88	9.88	9.88	9.88	9.88
8	Turbidity	µ Mhos	3	2	2	2	3
9	Conductivity	mg/l	744	317	318	317	378
10	Nitrite Nitrogen	mg/l	BDL	BDL	BDL	BDL	BDL
11	Nitrate Nitrogen	mg/l	6.95	1.85	2.5	2.3	2.3
12	Phoshphate	mg/l	0.132	BDL	0.528	0.528	BDL
13	Alkalinity	mg/l	268	144	148	146	164
14	Total Hardness	mg/l	240	154	140	140	142
15	Calcium Hardness	mg/l	176	100	96	96	96
16	Magnesium Hardness	mg/l	64	54	44	44	46
17	Sulphate	mg/l	16	4.75	5	4	4
18	Sodium	mg/l	31.45	3.58	3.55	3.71	6.99
19	Potassium	mg/l	1.53	1.01	1.09	1.02	1.45
20	Calcium	mg/l	70.48	40.04	38.44	38.44	38.44
21	Magnesium	mg/l	15.54	13.11	10.68	10.68	11.17
22	Coliform	MPN/100ml	9	<2	<2	<2	<2

1.Tape Water from infront of Tanki Mr. Lalbhai Ward No. 14, Arifnagar

2. Tape Water from Faredabee H.No. 1469 Ward No. 15, Masjid Wali Gali Atal Ayub Nagar

3.Tape Water from Jyoti Singh H.No. 138 ward no. 16, Shaktinagar

4. Tape Water from Mr. Suresh Sahu H.No.52, Ward No.14, Kareem Bakht Colony

5.Tape Water from Smt.Vrandawan H.No. 1480 Ward No. 66, Shiv Nagar

Remark- * Instrument is out of order

BDL- Below Detectable Limit. ,

(Dr. Reeta Kori)
Chief Scientific Officer

डॉ. आलोक खरे
सहा. रसायनज्ञ
केन्द्रीय प्रयोगशाला
म.प्र. प्रदूषण नियंत्रण बोर्ड, भोपाल

Ground water monitoring around UCIL, Bhopal 39 **Ref: 326/1-3**

Date of collection- 02/07/2014

Date of Recieved- 03/07/2014

Date of Analysis- 03/07/2014

S.No.	Parameters Analysed	Unit	1	2	3
1	pH	pH unit	8.18	7.85	7.9
2	Total Solids	mg/l	200	198	194
3	Total Dissolved Solids	mg/l	188	188	186
4	Suspended Solids	mg/l	12	10	8
5	Chloride	mg/l	14.99	9.99	9.99
6	BOD	mg/l	*	*	*
7	COD	mg/l	9.8	9.8	9.8
8	Turbidity	μ Mhos	4	3	2
9	Conductivity	mg/l	398	326	321
10	Nitrite Nitrogen	mg/l	BDL	BDL	BDL
11	Nitrate Nitrogen	mg/l	2.6	1.9	2.6
12	Phoshphate	mg/l	BDL	0.462	0.759
13	Alkalinity	mg/l	170	144	152
14	Total Hardness	mg/l	172	180	148
15	Calcium Hardness	mg/l	96	94	90
16	Magnesium Hardness	mg/l	76	86	58
17	Sulphate	mg/l	3.25	3.75	4.5
18	Sodium	mg/l	11.59	5.67	5.66
19	Potassium	mg/l	1.58	1.07	1.04
20	Calcium	mg/l	38.44	37.64	36.04
21	Magnesium	mg/l	18.45	13.59	14.08
22	Coliform	MPN/100ml	<2	<2	<2

1. Tape Water from Mr. Manik Lal Raikwar H.No. 192, Ward No. 69 Shankar Nagar

2. Tape Water from Mr. Babukhan H.No.310, Ward No.13, J.P.Nagar

3.Tape Water from Mr.Shaikh H.No. 954 Ward No. 14, New Arif Nagar

Remark- * Instrument is out of order

BDL- Below Detectable Limit. ,

(Dr. Reeta Kori)
Chief Scientific Officer

डॉ. आलोक श्रीवास्तव
समन्वय पर्यावरणविद्
केन्द्रीय प्रयोगशाला
म.प्र. प्रदूषण नियंत्रण बोर्ड, भोपाल

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BHOPAL GAS VICTIMS DRINKING WATER PROBLEMS

MINUTES OF MONITORING COMMITTEE MEETING AND DIRECTIONS - DATED 7TH JUNE,2012

A meeting of members of Monitoring Committee and Shri Praveen Garg,, Commissioner, Bhopal; Shri Nikunj Shrivastava, Collector,Bhopal; Shri Abhay Singh, S.P., Bhopal; Shri J.S. Shrivastava, Contractor, I.H.P.; Shri S.P.S. Bhadoria, Contractor, I.H.P.; Shri Sudhir Kalra, Project Manager, JMMURM; Ku. Rachna Dhingra and Shri Satinath Sarangi, Members Bhopal Group for Information; Shri Abdul Jabbar, Smt. Nasrin, Smt. Rasidabi, Members, Gas Pidit Sangthan, Bhopal and Smt. Sadhna K. Pradhan, Ward Member,Nagar Nigam was held at 11.30 A.M in V.I.P. Guest House, Bhopal under Chairmanship of ***Hon. Shri Justice K.K. Lahoti, Administrative Judge, M.P. High Court.***

Committee and Members present after long discussion over problems of drinking water supply to 18 affected areas have resolved to direct the Government and Nagar Nigam Officers as follows:-

1. *It is directed to Nagar Nigam Bhopal to separate water pipeline and sewer line immediately to check the contamination of drinking water.*

2. *It is directed to Nagar Nigam to repair the damaged main pipe line and plug all the leakages of water to maintain the pressure .*

3. *It is found that in 14 Localities where Nagar Nigam has completed the water supply work, there are leakages in main supply line and this line is found damaged in many places. The individual Tap Connections are given by installing PVC pipe line in every house which are found broken /missing at present. Therefore Nagar Nigam is directed to replace all PVC pipe line by G.I. pipe line for individual connections.*

4. *It is directed that individual Tap connections will be installed or provided inside the house of occupant. Thereafter he will be responsible for any damage in future.*

5. *If there is no adequate place available for Tap connection inside the house, then Nager Nigam will provide public Tap facility in nearby area.*

6. *For the execution of aforesaid work, the Nagar Nigam, Bhopal shall*

seek special permission and sanction from Govt. Such work may be go completed by the contractors, who have been previously assigned this work by providing extension in their previous contracts.

7. The Nagar Nigam, Bhopal shall prepare a proposal for construction of complete drainage system of all 18 affected localities and submit the same to Commissioner, Bhopal Division within 15 days from this meeting. Thereafter Commissioner, Bhopal Division and Commissioner, Bhopal Gas Trasdi Relief and Rehabilitation will take proper action and intimate to this committee.

8. After hearing the suggestions of public representatives, this committee directs that an Asstt. Engineer, Nagar Nigam, Bhopal will listen the complaints of residents regarding water supply on every Tuesday from 11.00 A.M. To 1.00 P.M. at the Blue Moon Water Reservoir Campus. These complaints will be registered and be attended to within a week's time. Any such complaints which can not be solved within a week, may be made before SDM of the area for action.

9. It has been complained by Nagar Nigam, Bhopal that there are regular encroachments being made in 18 affected localities and number of houses constructed on theses encroachments are increasing day by day. Therefore, it has to be finally decided as to for how many houses Nagar Nigam has to provide individual Tap connection .

In this regard, it is directed that Nagar Nigam has to provide individual Tap connection to all the houses which are built till 3rd May, 2012 within 18 affected localities. It is directed that the Nagar Nigam Officials will prepare a list of houses with consultation of ward member on the basis of Electoral Roll. Each house may be given a number. After installing individual Tap connection in a particular house, a certificate of completion of work be obtained from house owner with his photographs showing Tap connection. This certificate will also be signed by ward member and Nagar Nigam Officials.

10. To maintain the quality of water supply, it is to be tested Regularly in lab-in every week. It is directed that this work will be managed by Member Secretary, Water Pollution Board. A separate Register be maintained entering the water sample report of 18 localities.

11. It is directed that Nagar Nigam shall revise the contracts of water supply in 18 affected localities so that the entire work could be completed within stipulated time limit given by Hon. Supreme Court.

म.प्र. प्रदूषण नियंत्रण बोर्ड भोपाल

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12. It is directed that Nagar Nigam will furnish a progress report of work undertaken by it in respect of water supply to the committee on every Tuesday of week.

(**ANURAG SHRIVASTAVA**)
Member- Secretary
M.P.State Legal Service Authority

Bhopal
Date 07.06.2012

डॉ. आलोक सक्सेना
मुख्य परामर्शदाता
केन्द्रीय प्रयोगशाला
म.प्र. प्रदूषण नियंत्रण बोर्ड, भोपाल

आयुक्त, भोपाल संभाग, भोपाल की अध्यक्षता में दिनांक 10 अक्टूबर, 2012 को गैस पीड़ित विधवाओं को पेंशन वितरण एवं यूनियन कार्बाइड के आस–पास की 14 बस्तियों में जल प्रदाय व्यवस्था के संबंध में बैठक का पालन प्रतिवेदन

क.	दिये गये निर्देशों के पालन के संबंध में दिनांक 10 अक्टूबर 2012 को की गई चर्चा।	आयुक्त द्वारा दिये गये निर्देश	पालन प्रतिवेदन
1.	गैस प्रभावित 18 बस्तियों के सभी ट्यूब वेल पूर्व बैठक दिनांक 4 सितम्बर 2012 के पूर्व बन्द किये जा चुके थे। तदानुसार जानकारी उक्त बैठक में दी गइ थी। बैठक में निर्देशित किया गया था कि यदि कोई ट्यूबवेल चालू हो तो इसकी सूचना नगर निगम के अधिकारियों को ईमेल या अन्य माध्यम से दी जावे। आज दिनांक तक कोई सूचना प्राप्त नहीं हुई है, और न ही कोई ट्यूबवेल चालू है। निर्देशानुसार पेयजल का प्रदाय एवं कामन पाइन्ट बनाकर पेयजल का वितरण किया जा रहा है। मुख्य पाइप लाइन बिछायी जा चुकी है। दिनांक 08.10.2012 की स्थिति में नल कनेक्शनों की बस्ती वार अद्यतन स्थिति प्रपत्र–1 मे संलग्न है।	गैस पीडित बस्तियों में टयूबवेल से पेयजल की सप्लाई पूरी तरह प्रतिबंधित रहेगी तथा पानी की सप्लाई व्यवस्था सही ढंग से जारी रहना चाहिये। पानी सप्लाई में कोई कमी न हो। इसके लिये कामन पाईट बनाकर पानी की सप्लाई की जाये। पेयजल वितरण करने वाली एजेंसी इस बात की लगातार जांच करती रहे कि लोगों को पेयजल शुद्ध मिले। संभागायुक्त द्वारा अधिकारियों को इन क्षेत्रों में अंडर ग्राउंड वाटर को शुद्ध करने के बारे में भी काम करने को कहा। फैक्ट्री के बाहर पड़े यूनियन काबाईड के कचरे को हटाने के संबंध में प्लान बनाने के निर्देश भी अधिकारियों को दिये। गैस राहत से जुड़े सभी कार्य लोक सेवा गांरटी योजना की तर्ज पर किये जाये जिससे समय सीमा में पूर्ण हो सके और उनमें देरी होने का कारण भी पता चले।	गैस प्रभावित पेय जल प्रदूषित 18 बस्तियों में टूयबवेल से पेयजल की सप्लाई पूरी तही प्रतिबंधित है। सभी गैस प्रभावित 18 बस्तियों में 7000 से अधिक नल कनेक्शन कर नर्मदा जल का प्रदाय किया जा रहा है, एवं जल की गुणबत्ता की जांच की जा ही है, बस्तीवार नल कनेक्शन की सूची संलग्न है। शेष इस कार्यालय से संबंधित नही है।
2.	शिकायतों का पंजीयन एवं निराकरण की कार्यवाही निरन्तर जारी है।	लंबित शिकायतों का निराकरण शीघ्र किया जाये। इस सिलसिले में कार्यवाही निरंतर जारी रहे।	लंबित शिकायतों का निराकरण शीघ्र किया जा रहा है, एवं कार्यावाही निरंतर जारी है।

डॉ. आलोक [illegible]
मुख्य [illegible]
क्षेत्रीय [illegible]
म.प्र. प्रदूषण नियंत्रण बोर्ड, भोपाल

3.	इस संबंध में अपर कलेक्टर की अध्यक्षता में गठित समिति द्वारा जांच प्रतिवेदन प्रस्तुत किया है।	गैस प्रभावित क्षेत्रों में सीवेज लाईन और पाइन लाइन डालने के कार्यों के संबंध में प्रस्तुत जांच प्रतिवेदन का परीक्षण किया जावे साथ ही यह भी देखा जावे कि तत्समय कार्ययोजना क्या बनाई गई थी एवं कार्य के गैस प्रभावित क्षेत्र से अयंत्र तो नहीं हुआ है।	
4.	वर्तमान तक कुल 1256 पेंशन खाते खोलने की कार्यवाही की जा चुकी है शेष प्रकरणों में खाता खोलने एवं नवीन प्रकरणों के चिन्हांकन की कार्यवाही प्रगति पर है। 1. स्थानीय समाचार पत्रों में भोपाल गैस पीड़ित विधिवा महिलाओं को पेंशन उपलबध कराने बावत् विस्तृत सामाचार प्रकाशित कराया गया है। 2. कल्याण आयुक्त कार्यालय भोपाल गैस दावा न्यायालय शाहजहांनाबाद संचालनालय गैस राहत एवं पुनर्वास, संचालक कमला नेहरू चिकित्सालय भोपाल एवं कलेक्टर कार्यालय भोपाल में विधिवा पेंशन के प्रचार प्रसार हेतु विस्तृत जानकारी प्रदर्शित की गई है जिससे इस कार्य की ओर गति मिल सकें। 3. इस कार्य में सहभागिता हेतु संबंधित स्वयंसवी संस्थाओं से भी सहयोग लिया जा रहा है।	कार्य में प्रगति पर संतोष व्यक्त किया तथा गैस पीड़ित विधवा महिलाओं को चिन्हांकन एव उनके पेंशन प्रकरण तत्काल बनाने के लिये निर्देश दिये।	वर्तमान तक कुल 1641 पेंशन खाते खालने की कार्यवाही की जा चुकी है शेष प्रकरणों में खाता खोलने एवं नवीन प्रकरणों के चिन्हांकन की कार्यवाही प्रगति पर है। 1. स्थानीय समाचार पत्रों में भोपाल गैस पीड़ित विधिवा महिलाओं को पेंशन उपलबध कराने बावत विस्तृत सामाचार प्रकाशित कराया गया है। 2. कल्याण आयुक्त कार्यालय भोपाल गैस दावा न्यायालय शाहजहांनाबाद संचालनालय गैस राहत एवं पुनर्वास, संचालक कमला नेहरू चिकित्सालय भोपाल एवं कलेक्टर कार्यालय भोपाल में विधिवा पेंशन के प्रचार प्रसार हेतु विस्तृत जानकारी प्रदर्शित की गई है जिससे इस कार्य की ओर गति मिल सकें। 3. इस कार्य में सहभागिता हेतु संबंधित स्वयंसवी संस्थाओं से भी सहयोग लिया जा रहा है।

डॉ. आलोक सक्सेना
मुख्य कार्यपालन
केन्द्रीय कार्यालय
म.प्र. प्रदूषण नियंत्रण बोर्ड, भोपाल

अधिकारीगण :–

1.	श्री मुक्तेश वार्ष्णेय, आयुक्त–सह–संचालक, गैस राहत एवं पुनर्वास
2	श्री रजनीश श्रीवास्तव, आयुक्त नगर निगम
3	श्रीमती उर्मिला शुक्ला उपायुक्त राजस्व भोपाल
4	श्री किशोर कल्याल अपर आयुक्त नगर निगम
5	श्री के. के. दुबे, उप सचिव, गैस राहत, भोपाल
6	श्री मनोज शर्मा अ.वि.अ. गैस राहत
7	श्री एच.टी. निहालनी अ.वि.अ. राजधानी परियोजना भोपाल
7	श्री नीरज पाण्डेय, कार्यपालन यंत्री राजधानी परियोजना गैस भोपाल
8	श्री सुबोध जैन, कार्यपालन यंत्री, नगर पालिक निगम, भोपाल
9	श्री जी.एस. सलूजा कार्यपालन यंत्री, नगर पालिक निगम, भोपाल

अशासकीय संगठन के पदाधिकारीगण :

1.	श्री अब्दुल जब्बार, संयोजक, भोपाल गैस पीड़ित महिला उद्योग संगठन
2.	श्रीमती रचना ढींगरा, भोपाल ग्रुप फॉर इन्फॉर्मेशन एण्ड एक्शन
3.	श्रीमती साधना कार्णिक प्रधान, संयोजक, भोपाल गैस पीड़ित संघर्ष सहयोग समिति
4.	श्री नबाव खां, सदस्य, भोपाल गैस पीड़ित समिति

Central laboratory

M.P.Pollution Control Board, Bhopal

Test Report

Date of monitoring 24/01/2022

S.No	Parameters	Unit	Open well inside Union carbide premises	Surface water of Solar Evaporation Pond
	Physico-chemical parameters			
1	Appearance		slight turbid	slight turbid
2	odour		odourless	odourless
3	Color	Hazen	30	40
4	pH	pH units	7.93	8.07
5	TDS	mg/l	346	594
6	COD	mg/l	19.6	49
7	Conductivity	µMho/cm	483.1	831.4
8	Fluoride	mg/l	0.17	BDL
9	Chloride	mg/l	39.13	180.02
10	Nitrate	mg/l	9.46	4.66
11	Sulphate	mg/l	27.64	25.95
12	Phosphate	mg/l	0.2	0.18
13	Total Hardness	mg/l	212	300
14	Calcium (as Ca)	mg/l	70.48	83.29
15	Magnesium (as Mg)	mg/l	8.74	22.34
	Metals			
16	Arsenic	mg/l	ND	ND
17	Total Chromium	mg/l	BDL	BDL
18	Chromium VI	mg/l	0.02	0.08
19	Copper*	mg/l	0.006	0.097
20	Cobalt*	mg/l	ND	ND
21	Cadmium	mg/l	BDL	BDL
22	Iron*	mg/l	ND	0.346
23	Lead*	mg/l	BDL	BDL
24	Manganese*	mg/l	BDL	0.18
25	Mercury	mg/l	ND	ND
26	Nickel*	mg/l	0.01	0.03
27	Zinc*	mg/l	BDL	0.01
	Pesticides			
28	Alfa HCH	ug/l	ND	ND
29	Beta HCH	ug/l	ND	ND
30	Heptachlor	ug/l	ND	ND
31	Lindane	ug/l	ND	ND
32	Endosulphan 1&2	ug/l	ND	ND
33	Malathion	ug/l	ND	ND
34	Methoxychlor	ug/l	ND	ND
35	Methyl parathion	ug/l	ND	ND
36	Phorate	ug/l	ND	ND
37	Aldrin	ug/l	ND	ND
38	Dieldrin	ug/l	ND	ND

Halogenated Hydrocarbons				
39	DDT	ug/l	ND	ND
40	DDE	ug/l	ND	ND
41	TCB	ug/l	ND	ND

Remark: BDL Below Detection Limit ND Not Detected

* Parameters not covered in ISO/IEC 17025 (NABL)

Cu - Detection Limit - 0.015 ppm, Zn - Detection Limit - 0.015 ppm, Pb - Detection Limit – 0.015 ppm

Fe - Detection Limit – 0.005 ppm, Mn - Detection Limit – 0.015 ppm, Ni - Detection Limit – 0.006 ppm

Co - Detection Limit – 0.009 ppm, Cr - Detection Limit – 0.003 ppm

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Central laboratory,
M.P.Pollution Control Board, E-5, Arera Colony , Bhopal

Test Report

S.No	Parameters	Unit	Bore well at Atal Ayub Nagar Bhopal	Bore well at Kanchi chola Bhopal	Bore well at Garib Nagar Bhopal	Bore well at Blue moon colony Nawab Nagar Bhopal	Borewell at New Arif Nagar Bhopal	Borewell at Shiv Nagar Bhopal	IS 10500 (2012) [Acceptable limits]
Physico-chemical parameters									
1	Appearance		colourless	colourless	colourless	colourless	colourless	colourless	
2	Odour		odourless	odourless	odourless	odourless	odourless	odourless	
3	Color	Hazen	10	20	20	10	10	10	5
4	pH	pH units	7.01	7.1	7.38	7.35	7.68	7.33	6.5-8.5
5	TDS	mg/l	1114	1228	662	1340	888	842	500
6	COD	mg/l	39.2	39.2	9.8	39.2	39.2	29.4	
7	Conductivity	µMho/cm	1643	1451	1030	1570	1300	1174	
8	Fluoride	mg/l	0.51	BDL	BDL	0.41	BDL	0.14	1
9	Chloride	mg/l	223.07	197.64	136.97	291.56	162.41	166.33	250
10	Nitrate	mg/l	17.62	36.5	11.18	24	26.05	31.2	45
11	Sulphate	mg/l	73.92	95.65	24.22	61.74	40.56	60.22	200
12	Phosphate	mg/l	0.02	0.01	0.03	0.09	0.05	0.08	
13	Total Hardness	mg/l	596	596	340	528	344	556	200
14	Calcium (as Ca)	mg/l	125.75	235.48	72.08	126.55	68.88	185.82	75
15	Magnesium (as Mg)	mg/l	68.47	1.94	38.85	51.48	41.76	22.34	30
	Metals								
16	Arsenic	mg/l	ND	ND	ND	ND	ND	ND	0.01
17	Total Chromium	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	0.05
18	Chromium VI	mg/l	0.02	BDL	0.03	BDL	0.03	0.04	
19	Copper	mg/l	0.007	0.086	0.006	0.009	0.009	0.01	0.05
20	Cobalt	mg/l	ND	ND	ND	ND	ND	ND	
21	Cadmium	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	0.003
22	Iron	mg/l	ND	1.017	ND	ND	0.006	ND	0.3
23	Lead	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	0.01
24	Manganese	mg/l	0.02	0.2	BDL	BDL	BDL	BDL	0.1
25	Mercury	mg/l	ND	ND	ND	ND	ND	ND	0.001
26	Nickel	mg/l	0.01	0.04	0.02	BDL	0.03	BDL	0.02
27	Zinc	mg/l	BDL	0.03	BDL	BDL	BDL	0.27	5
	Pesticides								
28	Alfa HCH	ug/l	ND	ND	ND	ND	ND	ND	0.01
29	Beta HCH	ug/l	ND	ND	ND	ND	ND	ND	0.04
30	Heptachlor	ug/l	ND	ND	ND	ND	ND	ND	
31	Lindane	ug/l	ND	ND	ND	ND	ND	ND	
32	Endosulphan 1&2	ug/l	ND	ND	ND	ND	ND	ND	0.04
33	Malathion	ug/l	ND	ND	ND	ND	ND	ND	190
34	Methoxychlor	ug/l	ND	ND	ND	ND	ND	ND	
35	Methyl parathion	ug/l	ND	ND	ND	ND	ND	ND	0.3
36	Phorate	ug/l	ND	ND	ND	ND	ND	ND	2
37	Aldrin	ug/l	ND	ND	ND	ND	ND	ND	0.03
38	Dieldrin	ug/l	ND	ND	ND	ND	ND	ND	0.03
	Halogenated Hydrocarbons								
39	DDT	ug/l	ND	ND	ND	ND	ND	ND	1
40	DDE	ug/l	ND	ND	ND	ND	ND	ND	1
41	TCB	ug/l	ND	ND	ND	ND	ND	ND	1

Remark: BDL Below Detection Limit ND Not Detected

Cu - Detection Limit - 0.015 ppm, Zn - Detection Limit - 0.015 ppm, Pb - Detection Limit – 0.015 ppm

Fe - Detection Limit – 0.005 ppm, Mn - Detection Limit – 0.015 ppm, Ni - Detection Limit – 0.006 ppm

Co - Detection Limit – 0.009 ppm, Cr - Detection Limit – 0.003 ppm

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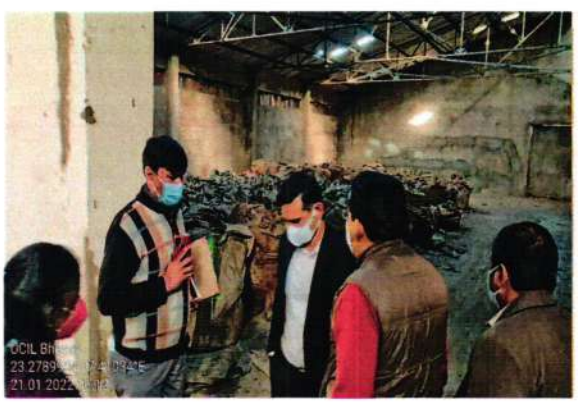
Photographs of Site visit by Joint Committee dated 21.01.2022 **Annexure- 10**



Committee members inspecting storage area

Storage of 337 MT of waste inside covered shed

Plant and Machinery View

Committee visiting solar evaporation ponds area

Sampling done by MPPCB, Bhopal on 24.01.2022

कार्यालय , कलेक्टर, भोपाल

क्रमांक 419/CL/MDDCB/Bhopal दिनांक 3/2/2022.

प्रति ,
संचालक ,
गैस राहत एवं पुनर्वास ,
संचालनालय ,
०१, शिवाजी नगर ,भोपाल

विषय :- माननीय राष्ट्रीय हरित अधिकरण की प्रिंसिपल बेंच , नई दिल्ली में प्रचलित प्रकरण क्रमांक ३६२/२०२१ (श्री आर के गुप्ता विरद्ध स्टेट ऑफ़ मध्य प्रदेश) में पारित आदेश दिनांक २२/१२/२०२१ के परिपालन के संबंध में /

विषयान्तर्गत लेख है की माननीय राष्ट्रीय हरित अधिकरण की प्रिंसिपल बेंच , नई दिल्ली में प्रचलित प्रकरण क्रमांक ३६२/२०२१ (श्री आर के गुप्ता विरद्ध स्टेट ऑफ़ मध्य प्रदेश) में पारित आदेश दिनांक २२/१२/२०२१ के परिपालन माननीय ट्रिब्यूनल द्वारा गठित समिति द्वारा दिनांक २१/१/२०२२ को यूनियन कार्बाइड परिसर का निरिक्षण किया गया/

इस सम्बन्ध में ,कृपया यूनियन कार्बाइड परिसर में संगृहीत ३३७ मीट्रिक टन अपशिस्ट के निष्पादन , परिसर के कॉन्टैमिनटेड साइट एवं भूजल के रमीडिएशन पर की गयी कार्यवाही से कमेटी को अवगत कराये ताकि माननीय राष्ट्रीय हरित अधिकरण के आदेश के परिपालन में अधतन स्थिति से अधिकरण को अवगद कराया जा सके/

सलग्न :-

१ माननीय राष्ट्रीय हरित अधिकरण की प्रिंसिपल बेंच , नई दिल्ली में प्रचलित प्रकरण क्रमांक ३६२/२०२१ (श्री आर के गुप्ता विरद्ध स्टेट ऑफ़ मध्य प्रदेश) में पारित आदेश दिनांक २२/१२/२०२१ की प्रति/
2 नीरी नागपुर से प्राप्त रिपोर्ट वर्ष २०१० की समरी

कलेक्टर,
जिला भोपाल

डॉ. ... सेना
...
म.प्र. प्रदूषण ...

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कार्यालय , कलेक्टर, भोपाल

क्रमांक 418 / cc / MPPCB / Bhopal दिनांक 3/2/2022.

प्रति ,
कमिश्नर ,नगर निगम
भोपाल

विषय :- माननीय राष्ट्रीय हरित अधिकरण की प्रिंसिपल बेंच , नई दिल्ली में प्रचलित प्रकरण क्रमांक ३६२/२०२१ (श्री आर के गुप्ता विरद्ध स्टेट ऑफ़ मध्य प्रदेश) में पारित आदेश दिनांक २२/१२/२०२१ के परिपालन के संबंध में /

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नीरी नागपुर से प्राप्त रिपोर्ट , वर्ष ,२०१० के अनुसार यूनियन कार्बाइड परिसर की मृदा कई स्थानों पर कंटामिनटेड पायी गयी है जिससे आसपास के भूजल प्रदूषित होने की सम्भावना है / परिसर के रमीडिएशन के कार्य पर कारवाही परिसर के अधिष्ठाता, गैस राहत एवं पुनर्वास , संचालनालय , भोपाल द्वारा सम्पादित की जा रही है / अतः यूनियन कार्बाइड परिसर के चारो और स्थित कॉलोनी में स्थापित बोरवेल तत्काल प्रभाव से बंद किये जावे तथा नवीन बोरवेल के उत्खनन ,यूनियन कार्बाइड परिसर के रेमेडिएशन तक प्रतिबंधित किया जावे /

सलग्न :-

१ माननीय राष्ट्रीय हरित अधिकरण की प्रिंसिपल बेंच , नई दिल्ली में प्रचलित प्रकरण क्रमांक ३६२/२०२१ (श्री आर के गुप्ता विरद्ध स्टेट ऑफ़ मध्य प्रदेश) में पारित आदेश दिनांक २२/१२/२०२१ की प्रति/
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