Item No. 03

BEFORE THE NATIONAL GREEN TRIBUNAL
CENTRAL ZONE BENCH, BHOPAL
(Through Video Conferencing)

Original Application No. 03/2024(CZ)
(O. A. No. 732/2023 - PB)

Suo moto case In re: News item appearing in The Hindu dated 03.12.2023 titled “Battling water woes in land of tragedy

Date of Hearing: **20.03.2024**

CORAM: HON’BLE MR. JUSTICE SHEO KUMAR SINGH, JUDICIAL MEMBER
HON'BLE DR. A. SENTHIL VEL, EXPERT MEMBER

For Applicant (s): None.

For Respondent(s): Mr. Gigi C. Georg, Adv.
Mr. mehul Bhardwaj, Adv.
Mr. Prashant M. Harne, Adv.

ORDER

1. The City of Lake Bhopal, witnessed and faced the most phathetic human tragedy and environmental degradation of history, ever seen in the year 1984.
2. In 1984, a tragic gas leak at the Union Carbide factory in Bhopal resulted in loss of lives, environmental damage, and adverse effects on flora and fauna. Despite challenges in quantifying the losses, various institutions have studied the immediate and long-term effect. In 2011, the Central Ground Water Board found saline groundwater due to geogenic mineral dissolution Recently “The Hindu”, a newspaper article highlighted groundwater contamination risks from poorly managed toxic waste at the UCIL premises. Prompted by this, the National Green Tribunal took Suo Motu action, summoning relevant CGWA and MP PCB The CGWA initiated a new investigation w.r.t heavy metal contamination in groundwater near UCIL.

3. The Methyl Isocyanate (MIC) leak from the Union Carbide Factory in Bhopal, occurred on 02.12.1984 led to the loss of human and animal lives, environmental damage, and a decline in the quality of flora and fauna in the affected area. The Central Groundwater Board conducted a study in 2011 to assess the groundwater quality in the vicinity with a primary objective to examine the potential groundwater contamination, if any, resulted from the gas leak, the results were as follows:-

   i. The majority of water samples (approximately 90%) fell into the hard or very hard classes for household use, with hardness values ranging from 195 to 940 mg/l and an average of 518 mg/l. Out of 12 locations around UCIL, nitrate (NO3) concentrations exceeded the BIS desirable limit of 45 mg/l in 10 locations, sulphate concentrations exceeded the BIS desirable limit of 200 mg/l in 1 location. Calcium content in water samples from four locations exceeded the BIS maximum permissible limit of 200 mg/l.

   ii. Result indicated partial chloride contamination in the study area, with 25% of examined points exceeding the BIS desirable limit (250 mg/l) but remaining below the permissible limit (1000mg/l). approximately 33.33% of locations had magnesium concentrations exceeding the BIS desirable limit of 30mg/l.

   iii. As BIS did not provide specific limits for sodium, WHO standards were applied, revealing two locations with sodium concentrations exceeding the WHO limit, averaging 99.5 mg/l. Similarly for potassium, three locations recorded potassium concentrations above the WHO limit of 10 mg/l.

4. The Hindu news item published on 03.12.2023, highlighted the water crisis in the land of tragedy that is Bhopal and further contamination of groundwater, spreading and on account of shortage of piped water at some

places of the place's residents was taken cognizance by the Principal Bench of this Tribunal in O.A. No. 732/2023 and the authorities concerned were directed to submit the factual and action taken report and later on the matter was transferred to this bench.

5. The Regional Director, Department of Water Resources, River Development, Ganga Rejuvenation, Bhopal vide letter dated 15.01.2024 communicated that the heavy metals contamination and basic water quality parameters around Union Carbide India Limited, Bhopal, was examined by a team consisting Expert Members and results are as follows:-

   i. The study found groundwaters in and around the UCIL area to be free from carbonate (CO) ions, However, fluctuations in bicarbonate (HCO) concentrations were considered for calculating Total Alkalinity (ALKT), which ranged from 164.96 to 559.88 (average 318.3) None of the locations had ALKT values exceeding the BIS permissible limit of 600 mg/l (Tables 1 & 3).

   ii. Results indicated partial chloride contamination in the study area, with 19.44% of examined locations nemained below the permissible limit (1000 mg/l) Chloride concentrations vaned from 40 (HP, Lalghat) to 465 (BW, Geetanjali College) mgen samples cowrig triane close to CIL (Tables 1 & 3).

   And the conclusions are as follows :-

   “In a concise summary, the study observed that the pH values of the groundwater were within acceptable limits, and the Electrical Conductivity of Water (ECw) remained below the permissible limits set by the Bureau of Indian Standards (BIS). Additionally, carbonate ions were found to be absent. The investigation covered various parameters, including chloride, nitrate, sulphate, fluoride, phosphate, and silica.

The nitrate concentrations (NO3) exceeding the BIS approved limit of 45 mg, were found in seven out of 36 locations surrounding UCIL Of these, four were associated with shallow aquifers, and three were connected to deep aquifers. Nitrate is acknowledged as a well-established environmental contaminant originating from diverse human activities. Human-induced contributors encompass the production and utilization of nitrate fertilizers, the combustion of fossil fuels, and the discharge of domestic sewage (Gutierrez et. al. 2018; Ward, M. et al., 2018 and Torres-Martinez, J. A. et al, 2020).

Three locations namely HP. shallow Aquifer, BW. Deep Aquifer, and HP shallow Aquifer showed the hardness greater than BIS permissible limit (600 mg) respectively as 827,683 and 634 mg/l.

Furthermore, the study highlighted into the concentrations of eighteen heavy metals, revealing elevated levels of iron and manganese in certain locations. Notably, strontium concentrations, which are not regulated by BIS, ranged from 0.198 to 2.223 mg/l, with an average of 0.833 mg/l.

In eleven out of thirty-six locations, iron concentrations exceeded the BIS allowable limit of 1.0 mg/l. Among these 11 sites, 7 were connected to shallow aquifers (all through hand pumps), while 4 were affiliated with deeper aquifers (all accessed through bore wells), Iron naturally exists in the aquifer, however, concentrations in groundwater can be elevated due to the dissolution of components from ferrous boreholes and hand pumps. This refers to the gradual breakdown or disintegration of

materials, specifically components from ferrous boreholes and hand pumps, which introduces additional iron into the groundwater.

The area surrounding Union Carbide India Limited (UCIL) is affected with partially manganese pollution as 8.33% of locations (3 out of 36) recorded manganese concentration more than BIS's permissible limit of 0.3 mg/l. These three locations were associated with deeper aquifers Examinations revealed that within the study are, there is no evidence of arsenic pollution, as nearly all locations recorded arsenic concentrations below the permissible guideline set by the Bureau of Indian Standards (BIS) of 0.01 mg/l The sole exception is the DW, location (Golghar Museum), where the arsenic concentration was slightly elevated at 0.012 mg/l (Tables 2 & 3).

The application of the Gibbs diagram in the analysis suggested that rock weathering played a pivoter role as the primary source influencing groundwater chemistry. This profess, in tum contributed to the presence of saline groundwaters in the study area."

6. The result indicates as follows :-

a) The nitrate concentrations (NO3) exceeding the BIS approved limit of 45 mg/l, were found in seven out of 36 locations and it is well *established environmental contaminant.*

b) In some of the places the water quality showed the hardness greater than BIS permissible limit.

c) The study highlighted the concentration of 18 heavy metals.

d) In 11 out of 36 locations iron concentration exceeded the BIS allowable limit.

e) The area surrounding Union Carbide India Limited is affected with partially manganese pollution more than the permissible limit

f) At Golghar Museum location (DW3) the arsenic concentration was found slightly elevated.

7. A report was called from the State Pollution Control Board and vide report dated 16t.01.2024 the MPPCB submitted the issues and factual status as follows:-

Sr	***ISSUE RAISED IN THE HINDU DATED 03/12/2023***	***FACTUAL STATUS***	***REMARKS/ ANNEXURE***
1	*The Government has recommended funds only for disposal of 337T of waste, collected 18 years ago and stored in shed in the factory*	*Matter is related to Bhopal Gas Tragedy Relief And Rehabilitation Department, Govt of MP. Recently Board has received letter No 3326 dated 5/12/2023 w.r.t disposal of stored waste in union carbide premises.*	*Annex 1*
2.	*Mr Khan area is not a part of the 42 areas around the factory where a supreme court appointed monitoring committee is looking into the drinking water supply after ground water contamination was found*	*1. Matter is related to Bhopal Municipal Corporation, for supply of piped [pot water] to colonies around UCIL premises.* *2. 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.*	*Summary of monitoring of piped water/ Borewell water/tube well water collected by MPPCB from year 2012 to 2022 Annex-2* *[page 2 to 6]*

		3. *MPPCB was also involved in monitoring of piped water as per the directions of Supreme court monitoring committee on WP 657/1995. Summary of monitoring of piped water/ Borewell water /tube well water collected by MPPCB from year 2012 to 2022 is appended as Annexure- 3.*	
3	*Devki nagar started getting piped water from the Narmada about a decade ago , but when they run out , they draw water from a bore well nearby. "We still use borewell water for bathing, washing utensils, cleaning ,and all other purposes. The piped water comes once a day and that too only for 20 minutes. In summer, there are many days without piped water ," Mr Khan said adding that they are forced to drink water from the borewell when they run out of piped water.* *With activist complaining to the supreme court of groundwater contamination spreading the MP govt has , over the last 15 years, increased the number of areas around the factory that they provide safe drinking water to, from 14 to 18 to 22 to 42, following court orders and* *studies. The government has also sealed hand pumps and the tube wells*		

	so that residents do not have access to contaminated water.		
4		***Contamination spreading*** *Prof indumathi M Nambi , in the civil engineering deptt at IIT Madras, was appointed by the supreme court to check the water contamination in the area . She tested 20 samples of water outside the factory premises in 2018 and told the court in affidavit:* *"The ongoing contamination of soil and ground water in Bhopal is a technologically challenging problem that calls for immediate attention . The problem involves contamination by an array of highly toxic chemicals and heavy metals that over several decades have seeped to great depths over a wide area She told the Hindu that the groundwater contamination is most likely to spread , as long as the toxic waste in the factory premises is not removed. A few government studies though, have not found any groundwater contamination outside the factory.*	*Matter is related to Bhopal Gas Tragedy Relief And Rehabilitation Department, Govt of MP.*

8. It is to be noted that the Hon'ble Supreme Court of India vide order dated 03.05.2012 took the cognizance of the matter in W.P. (C) 657 of 1995 vide I.A. No. 23,40 of 1995 and directed as follows:-

   i. Affidavit of Bhopal Municipal Corporation for taking steps in the 40 localities for supplying drinking water by overground pipeline.
   ii. The court directed the authorities to expedite the work.
   iii. Hon'ble the court further directed that entire exercise should be completed within three months from the date of the order.

9. Most surprising thing (which is also injurious to the society of the Bhopal) is that the chemical waste which was approximately 337 metric ton which were collected during the time of incident was required to be disposed of according to the rules within a timeframe but the same has not been done till yet.

10. The letter by Director Gas Relief and Rehabilitation dated 05.12.2023 reveals that process of tender, auction, engagement of contractor are going on. It is known fact that the chemical waste where it is accumulated is creating leachate and further contaminating the surface water, underground water and in the rainy seasons by flow to the other places and water of the river bodies are also being contaminated by this chemical waste.

11. The matter was not taken seriously by the authorities concerned. The Director, Gas Relief and Rehabilitation is sitting with the files and not assessing the environmental harm to the environment and the persons residing there and all those persons which are being affected by the underground water or surface water or water which is being used through rivers by the civilians.

12. Accordingly, the actions are required to be taken immediately by higher authorities. It is to be noted that Hon'ble the Supreme Court of India in the above quoted case has already constituted a committee to monitor all the things and thus, we direct the committee to further process the matter so that the persons residing there should not be heavily affected by the use of contaminated water or through reaction of the chemical waste which is more than 337 metric ton laying there.

13. In view of the technicality of the things we require the technical assistance of the following two persons :-

    i. Expert nominated by Director, CPCB, Bhopal, M.P.
    ii. Mr. Alok Saxena, Scientist, MPPCB.

14. In view of the above facts immediate actions are required to be taken by the authorities concerned on following points :-

    i. Disposal of chemical waste which is approximately 337 metric tons and is lying in the Union Carbide Campus.
    ii. Contamination of the ground water.
    iii. Shortage of the piped water.
    iv. Status of the nitrate (NO3) concentrations exceeding the maximum permissible limits and remedial measures required to be taken.
    v. Status of chloride contamination in comparison to reports submitted in 2011 and the present study and the present status. Sodium and Potassium concentrations exceeding the WHO limits.
    vi. Iron concentrations exceeding the BIS permissible limit in 7 places.
    vii. The Union Carbide India Limited surrounding area is affected with partially Manganese pollution.

15. In view of the above report, Secretary (Environment) and Member Secretary, State Pollution Control Board is directed to take further necessary actions. The Principal Secretary may call a report from competent expert body for remedial actions and to take necessary action according to rules and submit the factual and action taken report within three weeks.

List it on **09th July, 2024.**

Sheo Kumar Singh, JM

Dr. A. Senthil Vel, EM

20th March, 2024
O.A No. 03/2024(CZ)
PN