

BEFORE THE NATIONAL GREEN TRIBUNAL, PRINCIPAL BENCH,

NEW DELHI

O.A. NO. 607 OF 2022

IN THE MATTER OF

In re: News item published in NDTV dated 06.08.2022 titled “High Volume uranium in groundwater in Bihar Leaves Authorities Worried: Report”

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FACTUAL AND ACTION TAKEN REPORT ON BEHALF OF JOINT COMMITTEE CONSTITUTED VIDE ORDER DATED 23.08.2022 PASSED IN O.A. NO. 607 OF 2022.

I, S. Chandrasekar, aged about 44 years, Son of Mr. S. Subramani, residing at B-202, Amarkunj Apartment, Vivekanand Marg-Patna-800013, do hereby solemnly affirm and state as follows: -

1. That I am posted as Member Secretary, Bihar State Pollution Control Board, Patna and as such I am well aware of the facts and circumstances of the present matter. I am competent and duly authorized to swear the present affidavit.
2. That the instant matter has been registered as an original Application in light of the media report to the effect that uranium is found in the drinking water in certain Districts of Bihar.

3. That the instant matter was heard on 23.08.2022 when the Hon'ble Tribunal was pleased to constitute a five member joint committee of CPCB, State PCB, CGWA, Secretary Water Resources & Secretary Health Department, Bihar to look into the matter and furnish a factual and action taken report in the matter. The State PCB was made nodal agency for coordination and compliance.
4. That pursuant to passing of the order the State PCB vide its letter no. 2947, dated 09.09.2022, requested the members of the committee to participate in the meeting and fixed 20.09.2022 as the day of the meeting. Further, the State PCB vide its letter no. 2948, dated 09.09.2022 also requested Bhabha Atomic Research Centre to participate in the said meeting and to provide necessary assistance.
5. That on 20.09.2022 the representative of CGWB, Bihar informed that in May, 2019, CGWB carried out uranium sampling in the State of Bihar and collected 608 ground water samples covering all districts of Bihar after following accepted protocols. The collected samples were analyzed using ICP-MS at CGWB, Lucknow Chemical Lab. As per the reports uranium concentration more than permissible limit of 30 ppb were found in 11 samples out of 608 samples.

Also, Mahavir Cancer Sansthan (MCS) Patna, conducted a study on uranium concentration in groundwater resources of Bihar and collected 237 ground water samples covering all districts of Bihar. According to this

study, 12 districts where Uranium exceeded BIS guidelines in at least one sample were Bhagalpur, Gopalganj, Katihar, Munger, Muzaffarpur, Nalanda, Nawada, Patna, Saran, Siwan, Supaul and Vaishali.

Public Health Engineering department (PHED), Govt. of Bihar, has taken initiative on the outcome of study conducted by MCS, Patna and collected 272 ground water samples from the surrounding villages/panchayat of the Uranium hotspot marked by the MCS, Patna. These ground water samples were analyzed by CGWA, Patna, using ICP-MS. The concentration of Uranium greater than 30 ppb was found in 19 samples/locations falling in 11 blocks.

All the aforesaid study clubbed together following observations can be made:-

- (i) Uranium more than permissible limit is sporadic in occurrence and localized in nature;
- (ii) Out of 30 locations, 17 locations are having uranium concentration between 30 to 35 ppb;
- (iii) 5 locations have uranium concentration between 35 to 40 ppb;
- (iv) 8 location have uranium > 40 ppb, these locations are in alluvial areas;
- (v) 3 location have uranium > 70 ppb.

A copy of the note provided CGWB is annexed and marked as Annexure-1.

6. That on the day of meeting (20.09.2022) the representative of BARC informed that BARC has also earlier carried studies in 16 Districts of Bihar and only in Gaya and Nawada few collected samples showed marginally higher values of uranium as compared to the AERB limit of 60 ppb for drinking water.

A copy of note on the status of uranium in ground water in Bihar submitted by BARC is annexed and marked as Annexure-2.

7. That from the above stated facts it is humbly submitted that in holistic terms the uranium concentration range found in ground water sources in Bihar are within the normal natural variation.

A copy of the minutes of the meeting is annexed and marked as Annexure-3.

8. That I have read the contents of the report and have understood the same.

DEPONENT

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DEPONENT
(S. CHANDRASEKAR)

Annexure-1

Brief Note on Uranium Concentration in Bihar

To assess the Uranium concentration and distribution in the ground water, Central Ground Water Board (CGWB) had decided to carry out Uranium sampling of its National Hydrograph Network Stations (NHNS) in the entire country during Pre-monsoon monitoring (May), 2019. CGWB, Patna had carried out uranium sampling in the state of Bihar and collected 608 Ground water samples covering all districts after following the accepted protocols. These samples were analysed using ICP-MS at CGWB, Lucknow Chemical lab. Uranium concentration more than permissible limit of 30 ppb (As per BIS 2012, 10500, Amendment No. 3/ February 2021) have been found in 11 samples/ locations. These locations are falling in 11 blocks of 09 districts.

In the year 2020, Mahavir Cancer Sansthan (MCS), Patna also conducted a study on Uranium concentration in groundwater resources of Bihar. They had collected 273 ground water samples covering all districts of Bihar. According to this study, 12 districts where U exceeded BIS guidelines ($U > 30$ ppb) in at least one sample are Bhagalpur, Gopalganj, Katihar, Munger, Muzaffarpur, Nalanda, Nawada, Patna, Saran, Siwan, Supaul and Vaishali.

Public Health Engineering Department (PHED), Government of Bihar, Patna has taken initiative on the outcome of study conducted by MCS, Patna and collected 272 ground water samples from the surrounding villages/ Panchayat of the Uranium hotspot marked by the MCS, Patna. These GW samples were analysed by CGWB, Patna using ICP-MS. The concentration of Uranium > 30 ppb is found in 19 samples/ locations falling in 11 blocks (10 districts).

These studies are clubbed together to arrive at a better picture of Uranium concentration (> 30 ppb) in ground water of Bihar. 30 locations (Figure 1) are showing Uranium concentration more than permissible limit of 30 ppb (BIS), falling in 17 blocks (15 districts).

From the above, following observations have been inferred:

- i) Uranium more than permissible limit is sporadic in occurrence and localised in nature.
- ii) Out of 30 locations, 17 locations are having uranium concentration between 30 to 35 ppb.
- iii) 05 locations having U concentration between 35 to 40 ppb.

- iv) Only 08 locations are having $U > 40$ ppb. Most of these locations are found in alluvial areas.
- v) Only 03 locations have $U > 70$ ppb.

From the above data, it may be inferred that report published in News Media do not represent the true picture about the concentration of uranium in ground water of Bihar.

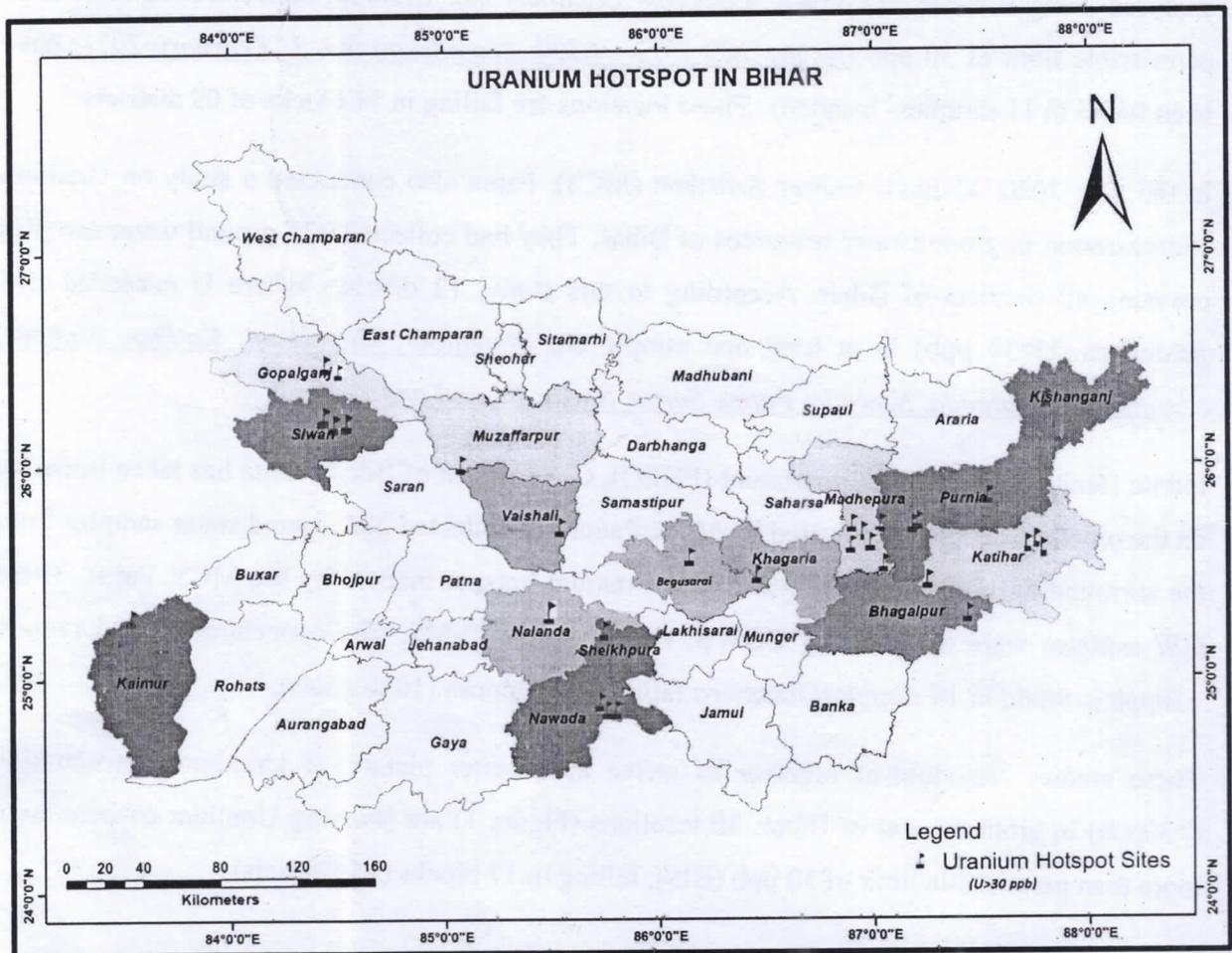


Figure 1: Uranium Hotspot in Bihar

डॉ. एम. एस. कुलकर्णी
Dr. M.S. KULKARNI



भारत सरकार
Government of India

अध्यक्ष, स्वास्थ्य भौतिकी प्रभाग
Head, Health Physics Division

Ref: BARC/HPD/2022/1005

October 31, 2022

Sub: Note on the status of uranium in groundwater in Bihar. Your letter no. 2327, dated 14.10. 2022

Ref: 1. Order of the Hon'ble NGT dated-23.08.2022 in O.A. No. 607/2022.
2. Virtual meeting of the Joint Committee constituted in compliance with the order of the Hon'ble NGT through VC dated-20.09.2022

As per the order of Hon'ble National Green Tribunal Principal Bench New Delhi Para 2, Secretary Bihar SPCB invited BARC experts to attend an online SPCB meeting scheduled on 20th September 2022 to discuss the media report on "High volume of uranium in groundwater in Bihar leaved authorities worried: Report". Following officers from Health Physics Division, BARC, Mumbai participated in the meeting.

- 1) Dr. M. S. Kulkarni, Head, Health physics Division (HPD), BARC
- 2) Dr. S. K. Jha, Head, RPS(NF), HPD, BARC.

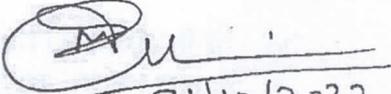
Following facts about the uranium in ground water in different parts of Bihar were brought to the notice of the committee and discussed during the meeting.

- Uranium is a naturally occurring heavy element found in every compartment of the environment since the inception of the Earth. Globally, it is present in rocks in the range of 2 – 10 milligram per kilogram (2 – 10 parts per million or ppm) while in groundwater it ranges from 0.2 – 5 microgram per liter (0.2 – 5 parts per billion or ppb).
- Uranium concentration varies widely in the groundwater based on the terrestrial environment and prevailing hydrogeochemical conditions.
- Studies have been carried out by BARC in 16 districts of Bihar, namely, Aurangabad, Banka, Bhagalpur, Bhojpur, Buxar, Gaya, Jamui, Jahanabad, Kaimur, Lakhisarai, Munger, Nalanda, Nawada, Patna, Rohtas and Shiekhpora. Only in Gaya and Nawada district few collected water samples showed marginally higher values of uranium as compared to the AERB limit of 60 ppb for drinking water.



- Globally, considering their socio-economic conditions each country has adopted different limits for uranium in drinking water, viz. Bulgaria-60 ppb, Finland-100 ppb, Czech Republic-964ppb, etc.

In holistic terms the uranium concentration range found in groundwater sources in Bihar are within the normal natural variation and is not a cause of worry. It is desired to restrain from interpreting the finding published in the literature based on the limited information.


31/10/2022
(M.S. Kulkarni)

To,
S. Chandrasekar, IFS,
Member Secretary,
Bihar State Pollution control Board
Parivesh Bhawan, Patliputra Industrial Area,
P.O. Sadakat Ashram,
Patna-800010

- Cc: 1. Director, BARC, Mumbai
2. Director, HS&EG, BARC, Mumbai.

Proceedings of the meeting dated-20.09.2022 of the Joint Committee constituted in compliance with the order of the Hon'ble NGT dated-23.08.2022 in O.A. No. 607/2022.

The meeting of the Joint Committee constituted in compliance with the order of the Hon'ble NGT dated-23.08.2022 in O.A. No. 607/2022 was held on 20.09.2022. The Chairman, Bihar State Pollution Control Board welcomed the members of the committee and explained the background of the meeting. He informed that the Hon'ble NGT, Principal Bench, New Delhi has registered O.A. No. 607/2022 on the basis of News item published in NDTV dated-06.08.2022 titled "High volume of Uranium in Groundwater in Bihar leaves Authorities Worried: Report". In compliance with the order of the Hon'ble NGT dated-23.08.2022 in O.A. No. 607/2022, the committee discussed the issues in details and concluded as hereunder:-

1. Uranium (U) is a naturally occurring heavy element in low concentrations in nature (soil, rock and water). Globally, it is present in rocks in the range of 2-10 mg/Kg (2-10 ppm) while in groundwater it ranges from 0.2-5 µg/Liter (0.2-5 ppb). Uranium concentration varies widely in groundwater based on the terrestrial environment and prevailing hydrogeochemical conditions.

Uranium has three isotopes i.e. ${}_{92}\text{U}^{238}$, ${}_{92}\text{U}^{235}$ and ${}_{92}\text{U}^{234}$. Natural uranium contains ${}_{92}\text{U}^{238}$ concentration of 99.27% & ${}_{92}\text{U}^{235}$ concentration of 0.71% and very little concentration of ${}_{92}\text{U}^{234}$. Uranium is now used in nuclear reactors to produce electricity and to produce isotopes used for medical, industrial and defense purposes around the world.

2. The Central Ground Water Board (CGWB) conducted analysis of uranium in shallow groundwater in India during 2019-20, after collecting groundwater samples from 14377 shallow wells. CGWB collected a total of 634 groundwater samples during post monsoon season (November, 2019) from groundwater observation stations falling in different hydro-geological settings of the State (Bihar).
3. World Health Organization (WHO) has set up guideline for uranium concentration in drinking water at 30µg/Liter (30 ppb). Atomic

Energy Regulatory Board (AERB), India has prescribed the maximum limit of uranium in drinking water at 60µg/Liter (60 ppb). Bureau of Indian Standards (BIS) has not specified the standard for uranium level in drinking water so far.

Globally, considering their socio-economic conditions each country has adopted different limits for uranium in drinking water viz. Bulgaria-60 ppb, Finland-100 ppb, Czech-964 ppb, Brazil, Switzerland and USA-30 ppb.

4. CGWB observed that uranium concentration within the permissible limit of 30 µg/Liter (30 ppb) in all the samples collected from groundwater monitoring wells except 11 samples collected from 11 blocks of 09 district of the State viz. Saran, Bhabhua, Khagaria, Madhepura, Nawada Sheikhpura, Purnea, Kishanganj and Begusarai. The details of the districts and concerned block, location and related observed concentration of uranium are hereunder:-

Sl.No.	District	Block	Location	U(ppb)
1.	Saran	Barharia	Tarwara	34
2.	Bhabhua	Nuwan	Nuwan	32
3.	Khagaria	Khagaria	Durgapur	31
4.	Madhepura	Chausa	Abhaiyatola	33
5.	Madhepura	Bihariganj	Udakishanganj	31
6.	Nawada	Kauakol	Rupau	40
7.	Sheikhpura	Berbiga	Koeribigha	31
8.	Purnea	Kasba	Kasba	32
9.	Purnea	Rupaul	Tikapatti	31
10.	Kishanganj	Bahadurganj	Bahadurganj B	57
11.	Begusarai	Bakhri	Manjaul	32

The uranium was found to be in the range of Not Detectable (ND) to 57µg/Liter. In Bihar, only 1.7% of the groundwater samples found to have uranium concentration more than 30µg/Liter (30 ppb) prescribed by WHO. But, as far as the prescribed limit of Atomic Energy Regulatory Board (AERB), India is concerned, the concentration of uranium in all samples were within the prescribed limit.

5. The Mahavir Cancer Sansthan (MCS), Patna has also conducted a study on uranium concentration in groundwater resources in Bihar. They have collected 273 groundwater samples from existing private and govt. wells covering all districts of Bihar. According to their report, groundwater uranium concentration range from <1 to 80 µg/Liter with 7% samples exceeding the WHO provisional guidelines (30µg/Liter (30 ppb). Out of 273 samples, concentration of uranium in only 23 samples was observed >30µg/Liter (30 ppb) and out of 23 samples, only in 03 samples the concentration of uranium was observed >60µg/Liter (60 ppb), the prescribed limit of uranium in drinking water by Atomic Energy Regulatory Board (AERB). A total of 12 districts where uranium exceeded WHO provisional guidelines in at least one samples were Bhagalpur, Gopalganj, Katihar, Munger, Muzaffarpur, Nalanda, Nawada, Patna, Saran, Siwan, Supaul and Vaishali.
6. Studies also have been carried out by Bhabha Atomic Research Centre (BARC) in 16 districts of Bihar, namely, Aurangabad, Banka, Bhagalpur, Bhojpur, Buxar, Gaya, Jamui, Jehanabad, Kaimur, Lakhisarai, Munger, Nalanda, Nawada, Patna, Rohtas and Sheikhpura.

Only in Gaya and Nawada Districts few collected water samples showed marginally higher value of uranium as compared to the Atomic Energy Regulatory Board (AERB) limit of 60 ppb for drinking water.

7. The Public Health Engineering Department (PHED), Govt. of Bihar has taken initiatives on the outcome of study conducted by MCS, Patna and collected 272 groundwater samples from the surrounding villages/ panchayat of the uranium hot-spot marked by the MCS, Patna. These groundwater samples were analyzed by CGWB, Patna using Inductively Coupled Plasma-Mass Spectrometry (ICP-MS). The concentration of uranium greater than 30 µg/Liter (30 ppb) was found in 19 samples falling in 11 blocks of 10 districts of the Bihar.

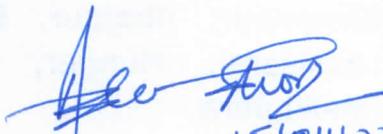
In view of the above facts, it may be concluded that:-

- a. The uranium concentration in groundwater of Bihar observed by CGWB, under reference News item published***

in NDTV, were found within the prescribed limit of Atomic Energy Regulatory Board (AERB)-60 µg/Liter (60 ppb) and marginally high compare to WHO guidelines for uranium concentration in drinking water (30 µg/Liter (30 ppb) in only 11 samples out of 634 samples.

b. The studies clubbed together conclude that in holistic terms the uranium concentration range found in groundwater sources in Bihar are within the normal natural variation.

c. Further extensive analysis of uranium in groundwater of hot-spot districts of Bihar may be carried out for assessment of uranium concentration in groundwater of Bihar.


15/11/22
(Ashok Kumar Ghosh)
Chairman