BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,
Principal Bench, New Delhi

In

O.A. No. 773/2022

Rajesh Pareek — Applicant

Vs.

State of Uttar Pradesh — Respondent

	out by CPCB.	
10.	**Annexure-IX:** Photographs taken by CPCB team during inspection of STPs in Mathura and Delhi.	

(Vishal Gandhi)
Scientist E
Central Pollution Control Board
Delhi-110032

Date: 04.10.2023
Place: Delhi

REPORT FILED BY CENTRAL POLLUTION CONTROL BOARD IN THE MATTER OF OA NO. 773 OF 2022 TITLED RAJESH PAREEK VS STATE OF UTTAR PRADESH

1.0 BACKGROUND

The Hon'ble NGT in the matter of Rajesh Prateek Vs State of Uttar Pradesh (in OA No 773 of 2022) in its order dated 11/4/2023 directed the following:

> *Para 6: ……In the course of chlorination for disinfection, density of chlorine with corresponding BOD values need proper standardization so as to control formation of tri-halomethane (THM). CPCB may specifically examine this aspect. Phyto-remediation is claimed to have been undertaken without showing its results which may be merely an excuse to waste public money which needs to be checked by the statutory regulators including CPCB. CPCB may file its report within three months.*

A copy of NGT order dated in enclosed as **Annexure-I.**

2.0 ACTION TAKEN BY CPCB AS PER THE DIRECTIONS OF HON'BLE NGT ORDER DATED 11.04.2023

In compliance to the directions of Hon'ble NGT, following actions initiated by CPCB for compliance of directions:

[A] Assessment of Phyto-remediation projects carried out on drains

In-Situ bioremediation techniques involve treatment at the site using aquatic plants and/or microbial remediation methods. *In-Situ* treatment systems like phyto-remediation, bio-remediation, etc. can be commissioned in shorter time duration (few months only) compared to conventional systems, are easy to operate, and requires less energy as compared to conventional treatment technologies. *In-situ* treatment, depending on effluent characteristics, site conditions, and type of treatment systems, may either provide desired quality of

treated effluent or act as supplementary to conventional treatment technologies. In any case, wherever feasible, it can be used as an interim remedial measure and help in reducing pollution load or polishing of treated effluent from Sewage Treatment Plants. The common *in-situ* treatment systems are Microbial Bioremediation, Phytoremediation, Constructed Wetland System and Root Zone Treatment. Adequate space and appropriate flow are general requirements for adoption of these technologies. Details of above mentioned *In-situ* bio-remediation techniques indicating methodology, parameters for the feasibility assessment, existing experiences, etc. are as follow:

Phytoremediation

Phytoremediation is a bioremediation process that uses various types of plants to remove, transfer, stabilize, and/or destroy contaminants in the soil and groundwater. Phytoremediation involves the removal of organic compounds and nutrients from wastewater through bio-sorption/uptake by pollution-tolerant aquatic plants (such as algae, water hyacinth, duckweeds, etc.) growing in the wastewater. Quite often such plants grow along the littoral zones on either side of the drain.

i. Performance assessment of Phyto-remediation projects

In Mathura, an In-situ remediation/Phyto-remediation project is deployed on drains. Noida Authority has also installed Phytoremediation projects in Noida drain.

CPCB vide letters dated 21/08/2023 & 12-09-2023 (**Annexure II & III**), requested SPCBs/PCCs/RDs and NMCG for providing findings of case studies being performed on assessment of "Phyto-remediation projects carried out on drains". In response, 08 SPCBs/UTs namely Assam, Himachal Pradesh, Lakshadweep, Puducherry, Telangana, Mizoram, Kerala and Tamil Nadu have informed that they have no phyto-remediation projects in their States. In Kerala, Alappuzha at

Chathanadu, a decentralized waste management project named DEWATS system has been established for treatment of wastewater generated from Chathanadu colony, which consists of a septic tank, an aerobic baffle reactor and a planted gravel filter. System was found to be effective in waste management and tackling pollution.

CPCB has carried assessment of drains having in-situ Phytoremediation remediation in the catchment of River Ganga. The details of both studies are as under:

a. **Constructed Wetland in Noida Drain carried out of NOIDA Authority:** One number of in-situ constructed wetland installed in Noida Drain near Sector-50 and 02 in-situ constructed wetland are in process. The constructed wetland comprises of 03 ponds and Constructed wetland having 5-10 furrows of 1 to 4 m width separated by ridges of 1 m high, 0.5 m wide and composed of river bed pebbles of 80-50 mm size. Samples of Noida drain were collected at to assess the performance of In-situ constructed wetland. The results are depicted in Table 1.

Table 1: Analytical results of Constructed wetland installed at Noida Drain

S. No.	Sampling Location	pH	COD (mg/L)	BOD (mg/L)	TSS (mg/L)	PO_4-P (mg/L)	NH_3-N (mg/L)
1.	Before Remediation	7.3	274	104	122	4.52	29
2.	After Remediation	7.2	257	84	87	7.53	26

The analytical results revealed that concentration at inlet and outlet of constructed wetland with respect to BOD, COD and TSS was same and no substantial improvement observed.

b. Post-monsoon monitoring of drains: CPCB carried out monitoring of drains in the catchment of river Ganga and tributaries, wherein phytoremediation is deployed. To assess the phytoremediation effect, CPCB has carried out monitoring of 07 drains (06 drains in Kanpur and 01 in Moradabad) and water quality data is presented in Table 2.

Table 2: Water Quality of phytoremediation projects of drains at Bithoor, Kanpur and Moradabad.

Name of Drains	Capacity	Town / Catchment	Sample Collected	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)
Laxman Ghat Drain	-	Bithoor, Kanpur	Before Remediation	7.6	25	19.1	65.3	7.1
			After Remediation	7.4	15	10.3	39.2	4.8
Brahamawat Ghat Drain	80 KLD	Bithoor, Kanpur	Before Remediation	7.4	30	79.2	197	187
			After Remediation	7.5	25	11.3	34.3	6.4
Kalwari Ghat Drain	270 KLD	Bithoor, Kanpur	Before Remediation	7.7	20.1	84	178	32.8
			After Remediation	7.6	75	68.2	126	26.5
Peashwa Nala	100 KLD	Bithoor, Kanpur	Before Remediation	7.7	40	43	130	8.33
			After Remediation	7.5	30	16.9	72.4	6.5
Bhannu Nala	600 KLD	Bithoor, Kanpur	Before Remediation	7.5	100	65	155	26.7
			After Remediation	7.5	100	65	155	26.7
Luv Kush Darin	220 KLD	Bithoor, Kanpur	Before Remediation	7.4	50	89.6	224	72.5
			After Remediation	7.4	100	59	168	37.2
Nawabpura Drain-2	-	Moradabad	Before Remediation	6.9	<05	578	1309	2951
			After Remediation	7.3	BDL	76	249	111

The analytical results of drain reveals that percentage reduction of BOD after phytoremediation ranges between 18.81% to 86.85% and BOD concentration, after remediation varies between 10.3 mg/L to 76 mg/L. Out of 7 drains, only 01 drain namely Brahamawat Ghat Drain having capacity of 80 KLD shows BOD reduction upto 85 %.

In view of above case studies and analytical results, depicts that there was no substantial reduction in organic load of wastewater in drains having higher hydraulic load.

The technology namely Decentralized Wastewater Treatment System (DEWATS) adopted principle of Phytoremediation has mentioned in manual on Sewerage and Sewage Treatment Systems during November, 2013 of Central Public Health and Environmental Engineering Organisation (CPHEEO). DEWATS can be adopted as ex-situ for treatment of domestic wastewater with low hydraulic load.

[B] Formation of standardization to control formation of THMs

Review of existing literature: Research papers were reviewed for needed assessment of prevailing practices, national & international scenario. Gist is as under:

Disinfection is the process designed to kill or inactivate most microorganisms in wastewater, including essentially all pathogenic organisms. Contrast this to sterilization, which is the removal and destruction of all living microorganisms, including pathogenic and saprophytic bacteria, vegetative forms and spores.

Chlorine is the most widely used disinfectant in drinking water treatment and wastewater treatment due to its availability, low cost, and broad spectrum antimicrobial efficacy. The principal chlorine compounds used at wastewater treatment plants are chlorine (Cl_2), sodium hypochlorite (NaOCl), calcium hypochlorite [$Ca(OCl_2)$] and chlorine dioxide (ClO_2).

Disinfection by Chlorination

As per the *Chapter 5 of CPHEEO Manual, 2013*, in case of the wastewater which comes from anaerobic processes like UASB, the provision of an aerobic polishing treatment is mandatory before chlorination. The usual dosage used is 10 mg/L and the flow through

detention time in the contact tank is 30 minutes based on average flow. Suitable baffles are provided in these tanks to maximize the contact. These tanks shall not be covered, because chlorine gas may be permeating into the concrete and corrode the concrete slab, due to which roof may be collapsed. Hence, open tanks and free wind movement must be allowed to blow across the tank. This will also help in detecting excess chlorination. The residual chlorine after the contact has been generally detected at 1 to 1.5 mg/L at the maximum and there are no offensive odours arising there from.

Breakpoint reaction with chlorine

The maintenance of a residual (combined or free) for the purpose of wastewater disinfection is complicated because free chlorine not only reacts with ammonia, as noted previously, but also is a strong oxidizing agent. The term "breakpoint chlorination" is the term applied to the process whereby enough chlorine is added to react with all oxidizable substances such that if additional chlorine is added it will remain as free chlorine. The main reason for adding enough chlorine to obtain a free chlorine residual is that effective disinfection can usually then be assured.

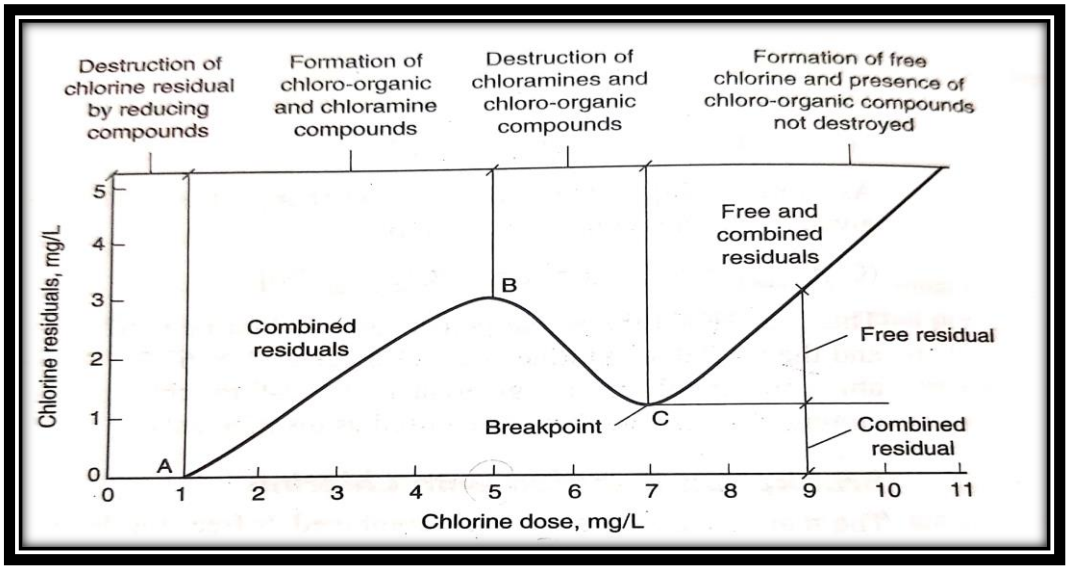


Fig 1: Generalized curve regarding breakpoint chlorination of wastewater

As chlorine is added, readily oxidizable substances such as Fe^{2+}, Mn^{2+}, H_2S and organic matter react with the chlorine and reduce most of the it to the chloride ion point A of Fig 1). After meeting this immediate demand, the added chlorine continues to react with the ammonia to form chloramines between point A & B. For mole ratios of chlorine to ammonia less than 1, monochloramine and dichloramine will be formed.

Untreated wastewater contains nitrogen in the form of ammonia and various combined organic forms. The effluent from most treatment plants also contains significant amounts of nitrogen in the form of ammonia or nitrate if the plant is designed to achieve nitrification. Because hypochlorous acid is a very active oxidizing agent, it will react readily with ammonia in the wastewater to form three types of chloramines in successive reactions:

(i) $NH_3 + HOCL \longrightarrow NH_2Cl$ (monochloramine) + H_2O

(ii) $NH_2Cl + HOCl \longrightarrow NHCl_2$ (dichlroramine) + H_2O

(iii) $NHCl_2 + HOCl \longrightarrow NCl_3$ (nitrogen trichloride) + H_2O

These reactions are dependent on the pH, temperature and contact time, and on the ratio of chlorine to ammonia. The two species that predominate in most cases are monochloramine and dichloramine. The chlorine in these compounds are called “combined available chlorine”. Chloramines also serve as disinfectants, although they are slow-reacting.

The distribution of these two forms is governed by their rates of formation, which are dependent on the pH and temperature. Between point B and breakpoint, point C, some chloramines will be converted to nitrogen trichloride, the remaining chloramines will be oxidized to nitrous oxide and nitrogen, and the chlorine will be reduced to the chloride ion. With continued addition, of chlorine, most of the

chloramines will be oxidized at the breakpoint. Continued addition of chloramine passed the breakpoint, will result in a directly proportional increase in the free available chlorine (unreacted hypochlorite).

Formation of Trihalomethanes (THMs)

THMs forms when free chlorine reacts with natural organic material present in water, over an extended contact time throughout water treatment processes, as occurs during conventional chlorination. The short-term (i.e., <10 min) formation of disinfection by-products (THMs) is relatively unknown for decentralized drinking water treatment applications, where treated water is often utilized immediately.

The relative efficiencies of disinfectants vs their by-products are long engaging the attention worldwide. Most of the reported works are only in respect of surface waters, ground water, surface run-off water etc. the *findings of these studies do not fully apply to disinfection of treated sewage.* The *USEPA-Design Manual on Municipal Wastewater Disinfection-EPA/625/1-86/021* observes that even otherwise, the issue of attention has been the disinfection by-products. Though it is contended that chlorination may result in by-products of Tri-halomethanes, **it needs to be realized that it is the case only when chlorination of humic substances takes place and a treated sewage from an aerobic STP does not have humic substances**. Moreover, the inherent alkalinity in sewage curtails on the THM formation potential because the alkalinity in sewage scavenges and hydroxyl free radicals.

THM is simply any single carbon atom containing any three halides. Halides are any elements from group VII of the periodic table. Common halides found in wastewater are chlorine, bromine and sometimes iodine. Hence, there can be many different THM's. However, 04 compounds that make up Trihalomethanes are i) Chloroform, ii) Dichlorobromomethane (DCBM), iii) Dibromochloromethane (DBCM) and iv) Bromoform.

Health effects of THM

The major exposure routes to THM include consumption of drinking water and dermal contact with chlorinated water. A less obvious way that people can be exposed to THM is breathing it in via water vapours. When we take hot showers or use steaming-hot water, we breathe-in the chemicals through the water vapour which further released into the air. The human health risks associated with THM are provided in following table.

Compound	**Reference dose (mg/kg.day)**	**Carcinogenicity***
Chloroform	0.01	Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals
Dibromochloromethane	0.02	Possible human carcinogen
Bromoform	0.02	Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals
*(*Data source : US EPA)*		

A less obvious way that people can be exposed to THM is breathing it in via water vapours. When we take hot showers or use steaming-hot water, we breathe-in the chemicals through the water vapour which further released into the air.

THMs impact on health are not immediately recognizable, but rather develop slowly over time. Long-term exposure to trihalomethanes has been linked to many serious illnesses, including:

- ✓ Increased risk for various cancers, including bladder and colon cancer.
- ✓ Pregnancy problems and birth defects in infant children.
- ✓ Damage to the heart, lungs, kidney, liver and central nervous system.

Control of THM's in Wastewater

The main precursor of THMs is the naturally occurring organic matter (NOM) in the water which can be represented in the form of dissolved organic carbon (DOC). A viable solution exists for wastewater treatment plants using sodium hypochlorite to decrease or eliminate the formation of THM's, without losing any disinfection potential. This is accomplished by controlling the amount of Ammonia-N in the effluent.

Review of National/International Standard for THM (BIS/USEPA/WHO)

a. BIS Drinking Water Specification (IS10500:2012)

THM Compounds	BIS Drinking Water Specification
Chloroform	0.2 mg/L
Bromodichloromethane	0.06 mg/L
Dibromochloromethane	0.1 mg/L
Bromoform	0.1 mg/L

b. USEPA Standards for disinfection by-products (DBPs)

Stage	Total THM standard	Halo-Acetic Acids (HAA) Standard
Initial	100 g/L	-
Stage 1	80 g/L	60 mg/L
Stage 2	40 g/L	30 mg/L

Note: Stages are not defined by USEPA

c. WHO Guideline Values for THM in Drinking Water (WHO, 1996)

THM Compounds	WHO Guideline Value
Chloroform	200 µg/L or 0.2 mg/L
Bromodichloromethane	60 µg/L or .06 mg/L
Dibromochloromethane	100 µg/L or 0 .1 mg/L
Bromoform	100 µg/L or 0 .1 mg/L

ii. Action taken by CPCB on the aspect of THM

Based on the literature review, it is found that there is no direct relation between dosing of chlorination with corresponding BOD to control formation of THM. It is also found that possibility of formation THMs arises only in case of dosing of chlorination beyond breakpoint i.e., 5 mg/L. However, the usual dosage of chlorine in STP in field practice is adopted as 5 mg/L.

In order to substance the above facts and to generate baseline data of THMs after chlorination and also to establish correlation between TOC/DOC/THM, CPCB has taken following initiatives/actions:

a. Shortlisting of STPs carried out to capture variation in strength of sewage w.r.t BOD & COD and plant design capacity, treated technology etc. Subsequently, Regional Directorates of CPCB were requested to shortlist 05 STPs having facility of Chlorination for required inspection and sampling based on sampling criteria.

b. Technical Working Group (TWG) is constituted to examine the subject matter and make recommendations on needed standardization so as to control formation of THMs and to discuss statistical correlation reviewing available data, international practices/norms to understand relevant chemistry. Subsequently, two meetings of the TWG was organized in this regard. Copy of office order regarding constitution of TWG and minutes of first meeting are attached as **Annexure IV & V.**

c. For practical authentication/data collection, (i) sampling protocol for required sampling & analysis (**Annexure VI**) and; (ii) a questionnaire format to obtain required information on operational parameters/functioning of Chlorination Unit in STPs (**Annexure VII**) are prepared.

d. **<u>Performance Evaluation of STPs of Mathura</u>**:

CPCB carried out monitoring of 06 STPs (03 in Mathura and 03 in Vrindavan) in Mathura on 22/8/2023, wherein chlorination facility is available. Out of 06 STPs, one STP was found non-operational i.e., Masani STP (6.8 MLD) in Vrindavan. Detailed report is enclosed as **Annexure VIII** and analytical results are depicted in Table 3.

Table 3: Analytical results of STPs in Mathura & Vrindavan

S. No.	STP location	Technology	Installed Capacity (MLD)	Source	Parameters					
					pH	COD (mg/L)	BOD (mg/L)	TSS (mg/L)	FC (MPN/100ml)	NH3-N (mg/L)
1.	Laxmi Nagar, Mathura	UASB	16	Inlet	7.3	410	164	260	-	25
				Outlet	8.5	124	21	91	78×10^4	18
2.	Laxmi Nagar, Mathura	Oxidation Pond	14.5	Inlet	7.0	331	90	497	-	22
				Outlet	7.6	149	41	123	45×10^4	14
3.	Masani, Mathura	SBR	30	Inlet	7.1	270	71	201	-	15
				Outlet	7.1	111	13	24	40×10^3	6
4.	Pagal Baba, Vrindavan	Oxidation Pond	4.0	Inlet	7.1	267	74	180	-	24
				Outlet	7.5	180	62	71	14×10^4	21
5.	Maant Road, Vrindavan	UASB	8.0	Inlet	6.9	306	108	114	-	32
				Outlet	7.6	249	91	46	27×10^3	30
6.	Masani Vrindavan	Oxidation Pond	6.8	Plant was found non-operational						

Based on the analytical results, major observations are summarized as under:

S. No.	STP location	Observation
1	Laxmi Nagar, Mathura (16 MLD)	▪ Chlorination facility was found at the point of outlet, and they are applying 3-8 ppm (Appx. 5 ppm avg.) chlorine at the outlet. ▪ Except fecal coliform, all the parameters were meeting with discharge standard norms.
2	Laxmi Nagar, Mathura (14.5 MLD)	▪ Chlorination facility was found at the point of outlet, & they are applying 3-8 ppm (Appx. 5 ppm avg.) chlorine at the outlet. ▪ Parameters were not meeting the discharge standard norms.
3	Masani, Mathura (30 MLD)	▪ Chlorination facility was found at the point of outlet, & they are applying 4-5 ppm chlorine at the outlet. ▪ Except fecal coliform, all the parameters were meeting with discharge standard norms.
4	Pagal Baba, Vrindavan (4 MLD)	▪ Chlorination facility was found at the point of outlet, & they are applying 4-5 ppm chlorine at the outlet. ▪ Except TSS, no parameters were meeting with discharge standard norms.
5	Maant Road, Vrindavan (8 MLD)	▪ Chlorination facility was found at the point of outlet, & they are applying 4-5 ppm chlorine at the outlet. ▪ Except TSS, no parameters were meeting with discharge standard norms.

ii. Statistics of THMs

To study statistics of THM in STPs, CPCB has carried out inspection and monitoring of 05 STPs in Mathura on 21/9/2023. THMs samples were taken as per sampling protocol with different dosing rates.

Analytical results **with respect to Physio-chemical parameters** and THMs are depicted in Table 4 and 5.

Table 4: Analytical results of STPs in Mathura with respect to Physio-chemical parameters

STP locations	Installed Capacity (MLD)	Source	Physio Chemical				
			pH (mg/L)	COD (mg/L)	BOD (mg/L)	TSS (mg/L)	DOC
Masani, Mathura	30	Pre-Chlorination	6.9	66	12	40	-
		Post Chlorination	7.0	67	13	40	22.34
Vrindavan	4	Before Chlorination	7.4	226	57	148	-
		Post Chlorination	7.2	143	44	92	59.61
Mantt Road, Mathura	8	Pre-Chlorination	7.0	263	92	148	-
		Post Chlorination	7.1	186	54	70	51.65
Laxmi Nagar, Mathura	16	Pre-Chlorination	7.2	298	119	179	-
		Post-Chlorination	7.1	142	41	96	-
Laxmi Nagar, Mathura	14.5	Pre-Chlorination	7.4	436	177	702	-
		Post-Chlorination	7.1	147	49	94	-

Table 5: Analytical results of STPs in Mathura with respect to THMs

Sl. No.	STP locations	Source (Post Chlornation)	Parameters				
			Bromoform	Dibromo-chloromethane	Bromodl-chloromethane	Chloroform	Chloroamines
1	Masani, Mathura	First Dose – 5ppm	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ LOQ-0.05)	BLQ (LOQ-0.05)
2		Second Dose -6ppm	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)
3	Vrindavan	First Dose – 5ppm	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)
4		Second Dose -6ppm	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)
5	Mantt Road, Mathura	First Dose – 5ppm	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)
6		Second Dose -6ppm	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)
7	Laxmi Nagar, Mathura (16 MLD)	First Dose – 5ppm	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)
8		Second Dose -6ppm	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)
9	Laxmi Nagar, Mathura (14.5 MLD)	First Dose – 5ppm	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)
		Second Dose -6ppm					
10		First Dose – 5ppm	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)	BLQ (LOQ-0.05)
Note: BLQ-Below Limit of Quantification, LOQ – Limit of Quantification							

Above results reveals that THMs formation is below limit of quantification at all STPs at chlorine dosing ranges between 05-06 ppm.

3.0 CONCLUSION & RECOMMENDATION

In view of above facts, following conclusion are made in respect of Phytoremediation projects and THMs formation in treated wastewater of STPs:

1. In respect of Phytoremediation projects, it is observed that technology deployed for drains having hydraulic load of less than 100 KLD shows reduction of organic loading upto 85 %. There was no substantial reduction in organic load of wastewater in drains having higher hydraulic load.
2. In respect of formation of standardisation to control formation of THMs, it is observed that there is no direct relation found between dosing of chlorination with corresponding BOD to control formation of THM. It is also found that possibility of formation THMs arises only in case of dosing of chlorination beyond breakpoint i.e., 5 mg/L. However, the usual dosage of chlorine in STP in field practice is adopted as 5 mg/L.
3. The results of STPs installed at Mathura and Vrindavan depicts that dosing of chlorination at rate of 5ppm do not form any THMs in wastewater.

In order to validate the above facts and desired correlation of chlorine dosing, BOD and THMs, CPCB has undertaken similar studies on more STPs spread across the Country.

The detailed study shall be completed by CPCB within two months and findings will be discussed in the Technical Working Group (TWG) constituted by CPCB and further recommendations / concluding remarks of TWG shall be covered in the report to be submitted in the similar matter of **O.A. No. 840 of 2022 titled Dr. Sanjay Kulshresthra Vs Government of U.P. & Others.**

Annexure-I

Item No. 05 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

(BY VIDEO CONFERENCING)

Original Application No. 773/2022

Rajesh Pareek Applicant

Versus

State of Uttar Pradesh Respondent

Date of hearing: 11.04.2023

CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE SUDHIR AGARWAL, JUDICIAL MEMBER
HON'BLE DR. A. SENTHIL VEL, EXPERT MEMBER
HON'BLE DR. AFROZ AHMAD, EXPERT MEMBER

Respondent: Mr. Pradeep Misra & Mr. Daleep Dhyani, Advocates for UPPCB

ORDER

1. Grievance in this application is against discharge of untreated sewage in Yamuna at Mathura. According to the applicant :-

"

1) At present sewage generation in Mathura- Vrindavan is 77.42mId.

2) There are 36 drains in Mathura- Vrindavan discharging sewage into river yamuna.

3) Water quality of Yamuna is unfit to sustain any life and contains fecal coliform, more than 68000 MPN/ 100 ml.

4) An access to water quality report for September 2022 on river yamuna, analysed at 9 locations by UP PCB, indicated BOD range from 8-10 mg/l and FC ranging 27000- 33000 MPN/ 100 ml, which is alarming to say the least.

5) On record, it is learnt that, out of 36 drains in Mathura-Vrindavan, 30 drains are tapped, while 6 of them remain untapped.

6) As per official claims 70 mld sewage is being treated in Mathura-VRINDAVAN. This claim, however, is truly fictitious, given the extremely polluted Yamuna water.

River Yamuna the daughter of Sun and the sister of Yamraj enjoyes a very exalted place in the Hindu mythology. Discharging sewage is not only detrimental to the ecosystem but is also hurtful to the religious sentiments of the Hindus, globally.

The ground reality is that in the name of 'treatment', the dysfunctional STPs are continually discharging, untreated sewage in the holy waters of Yamuna.

Under the circumstances it is imperative that the sewage water, whether treated or untreated should not be allowed to enter the river.

To this end bunching of the drains should be done and the sewage discharge from the twin cities should be guided in to oxidation ponds after the so called treatment.

This water could then be put to agricultural/ horticultural use depending upon its quality.

For this project to be successful, it would also be essential to have in place, an effective mechanism for solid waste removal and disposal."

2. The matter was considered vide order dated 19.10.2022. Reference was made to earlier orders dated 17.12.2021 in O.A. No. 102/2021, *Acharya Damodar Shastri & Anr. v. Union of India & Ors.*, dated 13.01.2015 in O.A. No. 06/2012 and O.A. 300 of 2012, *Manoj Misra v. Union of India* and also report dated 15.12.2021 to the effect that quality of water in the downstream of Mathura Vrindavan was poor showing that untreated pollution was being added. The Tribunal observed that the State Authorities failed to take remedial action and directed a joint Committee headed by Additional Chief Secretary, Urban Development, UP to furnish a factual and action taken report in the matter. Operative part of the order is reproduced below:-

"

2. We find from the record that vide order dated 17.12.2021 in O.A. No. 102/2021, Acharya Damodar Shastri & Anr. v. Union of

India & Ors., the Tribunal dealt with the grievance against failure of the State authorities in preventing discharge of untreated sewage and other waste in river Yamuna at Vrindavan and Kosi. It was noted that the STPs were inadequate to deal with the waste generated. There were violations of directions in the judgment of this Tribunal dated 13.01.2015 in O.A. No. 06/2012 and O.A. 300 of 2012, Manoj Misra v. Union of India, dealing with rejuvenation of Yamuna. The Tribunal considered a factual report by the Monitoring Committee constituted by this Tribunal dated 15.12.2021 to the effect that quality of water in the downstream of Mathura Vrindavan was poor showing that untreated pollution was being added. The Tribunal accordingly directed as follows:-

> *"5. From the above, it is seen that pollution is continuing and steps taken are inadequate to remedy the situation. The Committee has recommended further action to prevent* ***discharge of untreated sewage effluents in the drains connecting river Yamuna which is a cause of deteriorated water quality and treatment of plastic waste. The State authorities have to ensure availability of necessary funds. The Mathura Vrindavan Development Authority (MVDA) has to undertake plantation drive and also take steps to clear encroachments. Grievance of the applicant including about discharge in Akroor Drain needs to be looked into.***
>
> *6. Accordingly, we accept the report of the Oversight Committee and issue directions in terms of recommendations in the report. We further direct that suggestions of the applicant be duly considered.* ***There is also need to monitor performance of STPs with reference to fecal coliform and utilizing treated effluents for secondary purposes. Designed capacity of STPs including facility for septage treatment may also be duly utilized. NMCG may take decision on the projects referred to it by the State of UP as per applicable norms particularly on the subject of degraded river stretch downstream Agra. Compliance may be monitored by Chief Secretary, UP in coordination with other State Authorities which may also be overseen by the Monitoring Committee constituted by this Tribunal. MVDA may also take necessary measures, including preventing pollution, removal of encroachments and undertaking adequate plantation****."*

3. It appears that the State Authorities have failed to take remedial measures as directed vide order dated 17.12.2021.

4. In view of above, we direct Additional Chief Secretary/Principal Secretary, Urban Development, UP, Mathura Vrindavan Development Authority, UPPCB, District Magistrate, Mathura, NMCG, CPCB and Vice Chairman, Braj Teerth Vikash Parishad, Mathura to furnish a factual and action taken report in the matter. UP PCB will be nodal agency for coordination and compliance. The report may specify the extent of sewage generation, installed treatment capacity, actual utilization, performance of STPs and utilization of treated sewage for irrigation and other purposes.

5. ***The Committee may ascertain the gap in terms of disposal of treated/untreated sewage into river Yamuna through different drains and recommend compensation to be levied for remedial action on the pattern of recent order of this Tribunal inter-alia in OA No. 1002/2018, Abhisht Kusum Gupta vs. State of Uttar Pradesh & Ors. dated 3.8.2022.*** *The report may be furnished within one month 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."*

3. In response to above, a report has been filed by State PCB dated 09.12.2022 after undertaking site visit, acknowledging pollution of Yamuna at Mathura, as follows:-

"Based on the collected information, observations and analysis data, following report is compiled.

About Mathura:

Mathura is a well-known ancient and heritage city in the Uttar Pradesh state. The city of Mathura is situated along the western banks of the river Yamuna. Mathura city is an administrative center of Mathura district which falls under Agra division. City spatial extension falls at 27°35' North latitude and 78°12', East longitude at an average elevation of 174 meters (570 feet).

The 2011 census of India estimates the population of Mathura to be 441,894, a decadal growth rate of 22.53 per cent from 2001 census of India. The total area of Mathura District is 3340 sqr Km. (as per district Mathura NIC website https://mathura.nic.in/)

In Mathura city, effluent from septic tank, open sewage and storm water drain network collects the waste water and sent them to Sewerage Treatment Plants (STP) for treatment. As per the enclosed information given by UP Jal nigam (Rural), there are total 23 no, of drains in Mathura, 19 of them are tapped, 01 partially and 03 no. of drains are untapped at present. (annexure-) Total flow of all the drains of Mathura is 68.55 MLD. In continuation it is also informed that the untapped drains will be tapped by I & D and 60 MLD STP DPR for construction of Estimated cost Rs.292.56 Crore (including 0 & M for 15 years) NMCG,New Delhi on 17.08.2022 E.C. has been approved in the meeting of AA &ES NNMCG New Delhi vide letter no Pr 11013/3/2022-0/o Dir (T III) NMCG, dated 25.10.2022 has been released. Necessary action is being taken for inviting tenders which is Annexed as Annexure-2

Vrindavan is also a famous religious place on the bank of River Yamuna. The population of the Vrindavan is 63005 (approx.).

There are total 13 no. of drains in Vrindavan, 11 of them are tapped and 02 no. of drains are untapped at present. (annexure-) Total flow of all the drains of Vrindavan is 10.95 MLD.

As per the enclosed information given by Regional Office UPPCB Mathura, there are total 04 no. STPs in Mathura and 02 no. of STPs in Vrindavan are working at present. Total installed capacity of 06 no. STPs is 79.3 MLD, however as per details (last 06 months record) provided by UP Jal nigam (Rural) 75.3.8 MLD capacity of total 79.3 MLD capacity is being utilized. In continuation it is also informed that the untapped drains will be tapped by I & D and 13 MLD STP DPR for construction of Estimated cost Rs.77.70 Crore (including 0 & M for 15 years) NMCG,New Delhi on 17.08.2022 E.C. has been approved in the meeting of AA & ESNNMCG New Delhi vide letter no Pr 11013/3/20220/o Dir (T III) NMCG, dated 25.10.2022 has been released. Necessary action is being taken for inviting tenders which is Annexed as Annexure-3

Total flow of all the drains in Matura and Vrindavan is 79.50 MLD; however Total treatment capacity of all STPs is 79.3 MLD So there is a gap of 0.2 MLD in the treatment capacity of STPs in Matura and Vrindavan.

Observations made during field visit and analysis results are given as below:

1. Laxmi Nagar, Mathura (16.0 MLD):

This STP-I is working on UASB (Up flow Anaerobic Sludge Blanket) based technology.

This plant is operated by private agency M/s Triveny engineering & industries Ltd, Noida from July 2021 to till date. Its main pumping station is Dairy Farm Nala for input. At the time of inspection, the STP was found operational.

2. Laxmi Nagar, Mathura (14.5MLD):

It is working on Oxidation pond/waste stablisation pond technology. It is operated by private agency M/s Triveny engineering & industries Ltd, Noida from July 2021 to till date. Its main pumping station is Bangali Ghat for input. Plant was found operational at the time of inspection.

3. STP, Masani (30 MLD):

30 MLD STP of Masani is working on SBR technology. It was found operational during inspection. Main pumping station of this STP is Masani (approx. 5km from STP). It is also operated by private agency M/s Triveny engineering & industries Ltd. Noida from July 2021 to till date:

4. STP, Masani (6.8 MLD): 6-8

30 MLD STP of Masani is working on WSP technology. It was found operational during inspection.

5.Pagal Baba, Vrindaavan (4.0 MLD):

Pagal Baba STP (4.0 mld) is working on oxidation pond/waste stablisation pond technology. Main pumping station for input is Mukharji Park. It is operated by Private agency M/S Hindustan

engineering Ltd, Lucknow from Jan. 2019 to till date. At the time of Inspection, the STP was found operational.

6. Maant road, Vrindaavan(8.0 MLD)
It is based on UASB (Upflow Anaerobic Sludge Blanket) technology. STP is operated by Private agency M/S Vatavam Techno, Agra from July 2021 to till date. Main pumping station for input is Rukmani Vihar- 7MLD and Rajpur phatak-1 MLD. At the time of inspection, STP was found operational.

Analysis results of the STP samples are as below:

Parameters --		***pH***	***BOD, mg/I***	***SS, mg/I***	***COD, mg/I***	***Faecal*** ***Coliform***	***Compliance*** ***status***
STP	*Masani (30 MLD)*	*7.9*	*22*	*58*	*156*	*830*	*Yes*
	Masani (6.8 MLD)	*8.1*	*27*	*62*	*192*	*910*	*Yes*
	Laxmi Nagar, Mathura (16.0 MLD)	*8.5*	*25*	*68*	*176*	*780*	*Yes*
	Laxmi Nagar, Mathura (14.5 MLD)	*7.9*	*26*	***74***	***228***	*930*	*Yes*
	Pagal Baba, Vrindaavan (4.0 MLD):	***7.9***	***27***	*68*	*172*	*21000*	*No* *In point of Faecal Coliform only*
	Maant road, Vrindaavan(8.0 MLD)	*8.0*	*26*	*49*	*168*	*910*	*Yes*

Recommendations:

- *Adequate capacity of STP should install to cover the gap of sewage generation and treatment capacity at present, so that no untreated sewage will go to river Yamuna.*
- *Operation and maintenance should be upgraded so that all STPs should comply with the norms.*
- *Chemical treatment process, especially chlorine treatment before effluent discharge must improve so that Faecal coliform norm must comply.*
- *Treated sewage should discharge through covered drains towards river Yamuna. It should be responsibility of the concerned authority to check that no untreated sewage/effluent should meet in that drain.*
- *Treated sewage should reuse as much as possible for various purposes like irrigation, road dust suppression, gardening etc.*
- *Tertiary treatment capacity at present installed at Laxmi Nagar STP should be enhance so that demand of Mathura refinery (up to 20* ***MLD)*** *may full fill compared to present supply 8 MLD.*
- *Online monitoring system of effluent must link to central monitoring control system.*
- *Speed up the process for tapping of untapped drains, as soon as possible.*
- *No drains should be left untapped so that no untreated sewage should meet the river Yamuna in Mathura-Vrindavan region.*

- *Forests cover area should be increase and treated effluent can be used for irrigation /gardening purpose.*
- *Check the possibility for the construction of wet lands in both sides of river Yamuna for natural treatment of waste water."*

4. A supplementary report has been filed on 17.02.2023 to the effect that some further improvement has taken place as mentioned therein.

5. We have considered the matter and heard learned counsel appearing for the State PCB.

6. It is seen from the above report that still there are three un-tapped and are partially tapped drains at Mathura. In Vrindavan, out of 13 drains, two are still untapped. There is no time schedule for interception of such drains. There is no mention of utilisation of treated sewage laid ferti-irrigation plan instead of discharging waste water in river Yamuna. In the course of chlorination for disinfection, density of chlorine with corresponding BOD values need proper standardization so as to control formation of tri-halomethane (THM). CPCB may specifically examine this aspect**.** Phyto-remediation is claimed to have been undertaken without showing its results which may be merely an excuse to waste public money which needs to be checked by the statutory regulators including CPCB. CPCB may **file its report within three months.**

7. Further, polluted water is being discharged into the rivers which is supposed to carry potable water. The channel for sewage or other effluent treated or untreated should be separated and treated water used for non-contact purposes including agriculture, horticulture and industries. Supply of such water to Mathura refinery may also be explored. Action be taken against industries discharging effluents in violation of consent conditions and the Water (Prevention and Control of Pollution) Act, 1974.

8. In view of the fact that Mathura is a heritage city of great significance, visited by large number of persons, urgent measures are called for particularly by senior level officers since huge funds stand allocated for the purpose without adequate results on the ground. Accountability for past violation should be fixed in terms of compensation on 'Polluter Pays' principle and/or otherwise. Recommendations made by the Committee including tapping of untapped drains and preventing discharge of untreated sewage and effluents need to be complied at the earliest.

9. We have recently reviewed the issue of compliance of solid and liquid waste management status in U.P. in *O.A. No. 606 of 2018, Compliance of Municipal Solid Waste Management Rules, 2016 and other environmental issues,* in pursuance of orders of Hon'ble Supreme Court dated 02.09.2014 in *W.P. No. 888/ 1996, Almitra H. Patel vs. Union of India & Ors.* (in respect of solid waste management) and in *Paryavaran Suraksha vs. Union of India, (2017) 5 SCC 326* (in respect of liquid waste). In continuation of earlier proceedings, compliance status was reviewed vide order dated 23.03.2023 in the presence of Chief Secretary, U.P. along with other concerned officers. Data presented was as follows:

SUMMARY OF STATUS

A: Solid Waste Management			
Quantity of waste generation in the State (in TPD)	Waste Processed (in TPD)	**Gap in generation and Processing (in TPD)**	Quantity of Legacy waste in the State (Tonnes)
14,710 (734 ULBs) Rural: 11,959 TPD	Capacity: 10,117 Rural: 3,000 TPD	**4593 (based on capacity only)** **Rural: 8,959 TPD**	33.0 lakh MT plus 40 lakh in last 3 years as unprocessed waste (2020-2022)

B): Sewage Management					
Quantity of sewage generation in the State (in MLD)	Capacity (in MLD)	**Current Gap in treatment (in MLD)**	Utilization of treated sewage in		
			Agriculture/ Horticulture purpose	Industrial purpose	Any other purpose
5,500	Capacity: 3860	**1640 (based on capacity and not actually utilized)**	- Thermal Power Plants -		

10. The Tribunal, on detailed consideration of the matter, held that gaps in generation and treatment of solid and liquid waste are required to be addressed expeditiously considering timelines as per statutory Rules and Supreme Court judgement and officers responsible for failure were required to be made accountable. Progress report was to be filed after six months to this Tribunal.

11. In the light of the said order and observations in the present case, the **Chief Secretary, U.P, in coordination with other concerned authorities in the State, may ensure remedial action in the present case also for which a special meeting of concerned officers be convened preferably within one month to inter alia consider that untapped drains are intercepted and diverted to the identified STPs preferably within two months, treated sewage from each STP is provided to the identified command area for irrigation/agriculture and only during non-utilization period, treated sewage goes to river, performance of six STPs is evaluated and improved with defined mode of disposal, chlorination method and formation of THMs are studied in the light of protocol for chlorine dosing corresponding to BOD levels, treatment of effluent of industries individually or through CETP in terms of consented mode of disposal**. An action

taken report be filed within four 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 23.08.2023.

A copy of this order be forwarded to the Chief Secretary, U.P, CPCB, State PCB and District Magistrate, Mathura by email for compliance.

Adarsh Kumar Goel, CP

Sudhir Agarwal, JM

Dr. A. Senthil Vel, EM

Dr. Afroz Ahmad, EM

April 11, 2023
Original Application No. 773/2022
AB

Annexure-II

OFFICE COPY

F. No. A-14011/1/2023-WQM-I (OA No 773 of 2022) 3387-3428

21/8/2023

To

The Member Secretary
(All SPCBs/PCCs)

Subject: Hon'ble NGT order dated 11/4/2023 in OA No 773 of 2022 tiled Rajesh Prateek Vs State of Uttar Pradesh, regarding

Sir,

Enclosed please find a copy of the Hon'ble NGT order dated 11/4/2023 in OA No. 773 of 2022 in the matter of Rajesh Prateek Vs State of Uttar Pradesh, for your information. The tribunal has directed following:

Para 6: "Phyto-remediation is claimed to have been undertaken without showing its results which may be merely an excuse to waste public money which needs to be checked by the statutory regulators including CPCB"

In compliance to the above-said direction given by Hon'ble NGT, it is requested to provide requisite details & findings of case studies being performed in your jurisdiction on assessment of "Phyto-remediation projects carried out on drains". Early reply is requested latest by 30/8/2023 through email on eepkm.cpcb@nic.in & vishalgandhi.cpcb@nic.in .

This may please be treated as 'URGENT'.

Yours faithfully,

(P.K. Mishra)
o/c **Divisional Head, WQM-I**

Encl.: As above
Copy to:

1 All RDs, CPCB : For kind information and follow- up with the SPCBs/PCCs, please.

2 PS to MS, CPCB : For kind information of 'MS', please

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
निर्गत...KLSingh.....
दिनांक...22/08/2023

o/c (P.K. Mishra) 21/08/23

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार
MINISTRY OF ENVIRONMENT FOREST & CLIMATE CHANGE GOVT OF INDIA

Speed Post/E-mail

21/8/2023

F. No. A-14011/1/2023-WQM-I (OA No 773 of 2022) 3386

To

The Director General
National Mission for Clean Ganga (NMCG)
MoJS, DoWR,RD&GR
1st Floor, Major Dhyan Chand, National Stadium,
India Gate, New Delhi, Delhi 110002
E-mail: dg@nmcg.nic.in

Subject: Hon'ble NGT order dated 11/4/2023 in OA No 773 of 2022 tiled Rajesh Prateek Vs State of Uttar Pradesh regarding

Sir,

Enclosed please find a copy of the Hon'ble NGT order dated 11/4/2023 in OA No. 773 of 2022 in the matter of Rajesh Prateek Vs State of Uttar Pradesh, for your information. The tribunal has directed following:

Para 6: "Phyto-remediation is claimed to have been undertaken without showing its results which may be merely an excuse to waste public money which needs to be checked by the statutory regulators including CPCB"

In compliance to the above-said direction given by Hon'ble NGT, it is requested to provide requisite details & findings of case studies being performed in your jurisdiction on assessment of "Phyto-remediation projects carried out on drains".

Early reply preferably before 30/8/2023 is requested on our email eepkm.cpcb@nic.in & vishalgandhi.cpcb@nic.in .

This may please be treated as 'URGENT'.

Yours faithfully

(P.K. Mishra)
Divisional Head, WQM-I

Encl: As above

'परिवेश भवन' पर्वी अर्जुन नगर, दिल्ली-110032
Parivesh Bhawan, East Arjun Nagar, Delhi-110032
दूरभाष/Tel : 43102030, 22305792,वेबसाईट/Website : www.cpcb.nic.in

Annexure-III

OFFICE COPY
Court Matter

Reminder-I

F. No. A-14011/1/2023-WQM-I (OA No 773 of 2022)

12/9/2023

To

3968-4010

The Member Secretary
(All SPCBs/PCCs)

Sub: Hon'ble NGT order dated 11/4/2023 in OA No 773 of 2022 tiled Rajesh Prateek Vs State of Uttar Pradesh, regarding

Ref: CPCB letter No A-14011/1/2023-WQM-I (OA No 773 of 2022)/3387-3428 dated 21/8/2023

Sir,

Kindly refer to our office letter no A-14011/1/2023-WQM-I (OA No 773 of 2022)/3387-3428 dated 21/8/2023 (copy enclosed), wherein request was made to provide requisite details & findings of case studies being performed in your jurisdiction on assessment of "Phyto-remediation projects carried out on drains". Your reply is still awaited.

It is requested to provide requisite details latest by 25/9/2023 through email on eepkm.cpcb@nic.in & vishalgandhi.cpcb@nic.in .

The matter is listed on 5/10/2023.

This may be treated as 'MOST URGENT'.

Yours faithfully

(P.K. Mishra)
Divisional Head, WQM-I

Encl.: As above
Copy to:

1	All RDs, CPCB	:	For kind information and **follow- up with SPCBs/PCCs**, please.
2	PS to MS, CPCB	:	For kind information of 'MS', please

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
निर्गत....N.Singh.....
दिनांक...13/09/2023

12/09/2023
(P.K. Mishra)

Email **Pooja Tripathi**

Reminder: Hon'ble NGT order dated 11/4/2023 in OA No 773 of 2022 tiled Rajesh Prateek Vs State of Uttar Pradesh regarding

From : Pooja Tripathi <poojatripathi.cpcb@gov.in> Thu, Sep 21, 2023 03:03 PM

Subject : Reminder: Hon'ble NGT order dated 11/4/2023 in OA No 773 of 2022 tiled Rajesh Prateek Vs State of Uttar Pradesh regarding 2 attachments

To : G Asok Kumar <dg@nmcg.nic.in>

Cc : VISHAL GANDHI <vishalgandhi.cpcb@nic.in>

Sir,

With reference to the mail, wherein vide CPCB letter dated 21/8/2023, it was requested to provide requisite details & findings of case studies being performed on assessment of "Phyto-remediation projects carried out on drains". However, reply is still awaited.

In view of the above, I am hereby directed to request that kindly provide requisite details, please.

With Regards

From: "Pooja Tripathi" <poojatripathi.cpcb@gov.in>
To: "G Asok Kumar" <dg@nmcg.nic.in>
Cc: "P. K. Mishra" <eepkm.cpcb@nic.in>, "VISHAL GANDHI" <vishalgandhi.cpcb@nic.in>, "Alpana Narula" <alpananarula.cpcb@gov.in>
Sent: Tuesday, August 22, 2023 3:59:00 PM
Subject: Hon'ble NGT order dated 11/4/2023 in OA No 773 of 2022 tiled Rajesh Prateek Vs State of Uttar Pradesh regarding

Sir,

I am hereby directed to forward CPCB letter dated 21/8/2023 on the above captioned subject, for kind information please.

With Regards

डॉ पूजा त्रिपाठी
Research Associate-II
वॉटर क्वालिटी मैनेजमेंट (डबल्यू क्यू एम) –1 डिविजन,
नेशनल वॉटर क्वालिटी मोनिटरिंग प्रोग्राम (एन डबल्यू एम पी),
केन्द्रीय प्रदूषण नियंत्रण बोर्ड,
परिवेश भवन, सी बी डी ऑफिस कॉम्प्लेक्स,
ईस्ट अर्जुन नगर, शाहदरा,
दिल्ली – 110032

NGT oder dtd 11 Apr 2023.pdf
210 KB

CPCB letter to NMCG dated 21-8-23.pdf
263 KB

Annexure-IV

CENTRAL POLLUTION CONTROL BOARD
"Parivesh Bhawan", East Arjun Nagar, Delhi-110032
OFFICE ORDER

29/8/2023

F. No. A-14011/1/2023-WQM-I (OA No 773 of 2022) 610

Subject: Constitution of "Technical Working Group"- regarding.

Hon'ble NGT vide order dated 11/4/2023 in OA No 773 of 2022 titled Rajesh Pareek Vs State of Uttar Pradesh has directed CPCB, *'to examine the course of chlorination for disinfection, density of chlorine with corresponding BOD values need proper standardization so as to control bformation of tri-halomethane (THM)".*

In compliance to the directions of the Hon'ble NGT, a "Technical Working Group" is hereby constituted to examine the subject matter. The said working group consists of following members:

1 Sh. A.A. Kazmi, Professor, IIT Roorkee
2 Representative of BIS, Delhi
3 Representative of IIT, Delhi
4 Representative of NEERI, Nagpur
5 Representative of DJB, Delhi
6 Sh. Vishal Gandhi, Scientist E, WQM-I Division, CPCB
7 Sh. P.K. Mishra, DH, WQM-I Division, CPCB

Terms of Reference (ToR) of the Technical Working Group shall be as follows:

- To examine the subject matter and make recommendations on needed standardization so as to control formation of THMs.
- To discuss statistical correlation reviewing available data, international practices/ norms to understand relevant chemistry.
- The group, if needed will perform the required detailed inspection & testing.
- The group may invite suppliers of chlorine, leading STP operators etc, if needed
- The group will submit its report within three months from the date of constitution of the group.

This issues with the approval of the Competent Authority, Central Board.

(P.K. Mishra)
Divisional Head, WQM-I

To

1. Sh. A. A. Kazmi
   Professor, Environmental Engineering
   IIT, Delhi : For information & necessary action, please.
2. Additional Director General, BIS, Delhi : With a request to nominate suitable representative in the said Technical Working Group.
3. Director, IIT, Delhi : -do-
4. Director, NEERI, Nagpur : -do-
5. Chief Engineer, DJB, Delhi : -do-

Copy to:

1. PS to CCB, CPCB
2. PS to MS, CPCB : For information of 'MS', please

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
दिनांक 30/8/23

29/8/23

(P.K. Mishra)

O/C

Central Pollution Control Board
(Ministry of Environment, Forest & Climate Change, Govt. of India)
Parivesh Bhawan, East Arjun Nagar, Delhi – 110032
****

Minutes of the meeting of Technical Working Group (TWG) constituted to examine the course of chlorination for disinfection, in sewage treatment and make recommendations on needed standardization so as to control formation of Tri-Halo methane (THM)

The first meeting of Technical Working Group (TWG) to examine the course of Chlorination in STPs for disinfection and make recommendations on needed standardization so as to control formation of Tri-halomethanes (THMs) was held on 05.09.2023 at 11:30 AM through Video Conferencing. List of participants attended the meeting is given in **Annexure-I**.

Following is the record of discussions:

01) Sh. P. K. Mishra, Divisional Head, WQM-I Division, CPCB welcomed the participants and briefed about the direction under point 6 of Hon'ble NGT order dated 11/4/2023 in OA No 773 of 2022 for CPCB. He further pointed out terms of reference (TOR) of the TWG & stressed on importance of proper study/evaluation in STP w.r.t the given assignment and need for finalizing **(a)** criteria for shortlisting of STP for study **(b)** needed sampling & monitoring protocol & **(c)** questionnaire (operational parameters/functioning of chlorination Unit in STPs). He further asked Sh. Vishal Gandhi to make a brief presentation on standardization of Chlorination process for disinfection in sewage treatment.

02) Sh. Vishal Gandhi, Scientist E, CPCB made a presentation highlighting the directions of Hon'ble NGT, disinfection method by chlorination in STPs, break-point of chlorination and precursors for formation of THMs in STPs.

03) Prof. Kazmi, IIT - Roorkee suggested to include Total Organic Carbon (TOC) and Dissolved Organic Carbon (DOC) in the sampling protocol. He also suggested that

grab samples will be adequate for the present study and the outlet sample to be collected after 30 min. of chlorination.

04) Dr. A Ramesh Kumar, NEERI – Nagpur informed that USEPA method based on GC-MS for analysis of THMs may also be referred.

05) Ms. Shubhanjali Umrao, Sc B, BIS confirmed that at present BIS has no specific guideline for THM and further informed that APHA test method is prescribed for analysis of THMs in drinking water.

After in depth discussion, following recommendations were made:

1. Short-listing of STPs, where chlorination is performed shall be carried out based on plant capacity and treatment technology.
2. Sampling and Monitoring in identified STPs shall be performed as per following sampling and monitoring protocol for THMs:

(i) Sampling Location and Matrix

Samples shall be selected from STPs having facility of disinfection through chlorination only. Samples for analysis of various parameters shall be collected as per following details:

Sampling location	Parameters
After Secondary Treatment/ Before Chlorination	pH, BOD, COD, TOC, DOC TSS, All forms of Nitrogen - (Ammonical Nitrogen, Nitrate, TKN), TC, FC
After Chlorination / Outlet	pH, BOD, COD, TOC, DOC, TSS, All forms of Nitrogen - (Ammonical Nitrogen, Nitrate, TKN), TC, FC, THM & its components (chloroform, bromodichloromethane, dibromochloromethane, and bromoform)

(ii) Frequency of Sampling

Chlorine dosing at the inlet of chlorination tank shall be recorded. Samples as mentioned above shall be taken as per following frequency:

- Grab samples i) at the inlet and ii) outlet of chlorination tank after 30 minutes of chlorine dosing.
- Sampling to be done for consecutive 02 days.
- Each day at least two sets of samples at different possible dosing rate shall be collected.

(iii) Sampling Collection, Preservation and Analysis

Sampling collection, preservation and analysis for THMs and chloroamines shall be carry out as per prescribed standard methods. Details of sampling pre-requisite are as follows:

- Sample Quantity required- 1 Ltr.
- Sample should be preserved at 4 degree C
- Sample Bottle- PTFE White bottle/ Amber glass bottle

3. To obtain required information on Operational parameters/functioning of Chlorination Unit in STPs, as per prescribed format. A copy of questionnaire finalized during the meeting is attached (**Annexure II**).

4. To hold next meeting after completion of in depth field study and literature review.

The meeting ended with vote of thanks to the Chair.

Annexure-I

List of participants:

1. Prof. Kazmi, IIT - Roorkee
2. Sh. P. K. Mishra, Divisional Head, WQM-I Division, CPCB
3. Sh. Vishal Gandhi, Scientist E, WQM-I Division, CPCB
4. Dr. A Ramesh Kumar, NEERI- Nagpur
5. Ms. Shubhanjali UMrao, Sc – B, BIS
6. Sh. S. K. Singh, Chief Engineer, DJB
7. Sh. K.C. Meena, CE(ww)-I, DJB
8. Sh. P.K. Gupta, ACE, DJB
9. Sh. S.K. Bhardwaj, DJB
10. Sh. Sanjay Sharma, DJB

Annexure-II

CENTRAL POLLUTION CONTROL BOARD
Parivesh Bhawan, East Arjun Nagar, Delhi-110032

QUESTIONNAIRE

Operational parameters/functioning of Chlorination Unit in STPs

S.No.	Information on	Details
1	i) Name & address of the STP	
	ii) Contact person & contact number	
2	i) Installed treatment capacity of the plant (MLD) ii) Population served (Approx)	
3	Operational Capacity (in MLD)	
4	Observed flow of STP during monitoring	
5	Treatment technology (UASB, MBBR, SBR, ASP etc)	
6	Chlorination dosing (in ppm) a. Chlorination form (gas/liquid/solid) b. Pre-chlorination dose c. Pre-chlorination contact time d. Post-chlorination dose **e.** Post-chlorination contact time	
7	Design of chlorination contact chamber -Dimension of chlorination contact number	
8	Arrangement to control feeding (automatic/manual) (Y/N, if yes then details)	
9	Available sampling and analysis record with STP (enclose data of previous two months w.r.t flow, ClO_2 dosing rate, BOD, COD, THM, if done)	

CENTRAL POLLUTION CONTROL BOARD
Parivesh Bhawan, East Arjun Nagar, Delhi-110032

SAMPLING PROTOCOL FOR REQUIRED ANALYSIS

(Ref: In the matter of Hon'ble NGT order dated 11/4/2023 in OA No 773 of 2022 tiled Rajesh Prateek Vs State of Uttar Pradesh)

1.0 Sampling Location and Matrix

Samples shall be selected from STPs having facility of disinfection through chlorination only. Samples for analysis shall be taken as per following details:

Sampling location	Parameters
After Secondary Treatment/ Before Chlorination	pH, BOD, COD, TOC, DOC TSS, All forms of Nitrogen - (Ammonical Nitrogen, Nitrate, TKN), TC, FC
After Chlorination / Outlet	pH, BOD, COD, TOC, DOC, TSS, All forms of Nitrogen - (Ammonical Nitrogen, Nitrate, TKN), TC, FC, THM & its components (chloroform, bromodichloromethane, dibromochloromethane, and bromoform)

DOC: Dissolved Organic Carbon

2.0 Frequency of Sampling

Chlorine dosing at the inlet of chlorination tank shall be recorded. Samples as mentioned above shall be taken as per following frequency:

1. Grab samples i) at the inlet and ii) outlet of chlorination tank after 30 minutes of chlorine dosing.
2. Sampling to be done for consecutive 02 days.
3. Each day at least two sets of samples at different possible dosing rate shall be collected.

3.0 Sampling Collection, Preservation and Analysis

Sampling collection, preservation and analysis for THMs and chloroamines shall be carry out as per prescribed standard methods. Details of sampling pre-requisite are as follows:

1. Sample Quantity required- 1 Ltr.
2. Sample should be preserved at 4 degree C
3. Sample Bottle- PTFE White bottle/ Amber glass bottle

Annexure-VII

CENTRAL POLLUTION CONTROL BOARD
Parivesh Bhawan, East Arjun Nagar, Delhi-110032

QUESTIONNAIRE

Operational parameters/functioning of Chlorination Unit in STPs

S.No.	Information on	Details
1	i) Name & address of the STP	
	ii) Contact person & contact number	
2	i) Installed treatment capacity of the plant (MLD) ii) Population served (Approx)	
3	Operational Capacity (in MLD)	
4	Observed flow of STP during monitoring	
5	Treatment technology (UASB, MBBR, SBR, ASP etc)	
6	Chlorination dosing (in ppm) a. Chlorination form (gas/liquid/solid) b. Pre-chlorination dose c. Pre-chlorination contact time d. Post-chlorination dose e. Post-chlorination contact time	
7	Design of chlorination contact chamber -Dimension of chlorination contact number	
8	Arrangement to control feeding (automatic/manual) (Y/N, if yes then details)	
9	Available sampling and analysis record with STP (enclose data of previous two months w.r.t flow, ClO_2 dosing rate, BOD, COD, THM, if done)	

Final DRAFT

In compliance of the Hon'ble NGT Original Application No. 773/2022, Rajesh Pareek vs State of Uttar Pradesh. order Dated: 11.04.2022, inspection & status report of STPs in Mathura.

The Hon'ble National Green Tribunal (NGT) in the matter of Original Application No. 773/2022, Rajesh Pareek vs State of Uttar Pradesh. order Dated: 11.04.2022, directed as below:

"11. In the light of the said order and observations in the present case, the Chief Secretary, U.P, in coordination with other concerned authorities in the State, may ensure remedial action in the present case also for which a special meeting of concerned officers be convened preferably within one month to inter alia consider that untapped drains are intercepted and diverted to the identified STPs preferably within two months, treated sewage from each STP is provided to the identified command area for irrigation/agriculture and only during non-utilization period, treated sewage goes to river, performance of six STPs is evaluated and improved with defined mode of disposal, chlorination method and formation of THMs are studied in the light of protocol for chlorine dosing corresponding to BOD levels, treatment of effluent of industries individually or through CETP in terms of consented mode of disposal...."

In compliance of the above NGT order, CPCB PO team inspected STPs of Mathura-Vrindavan on 22.08.2023, collected samples along with related information, as per the direction of WQM-I, CPCB Delhi from the representative of the operating firms.

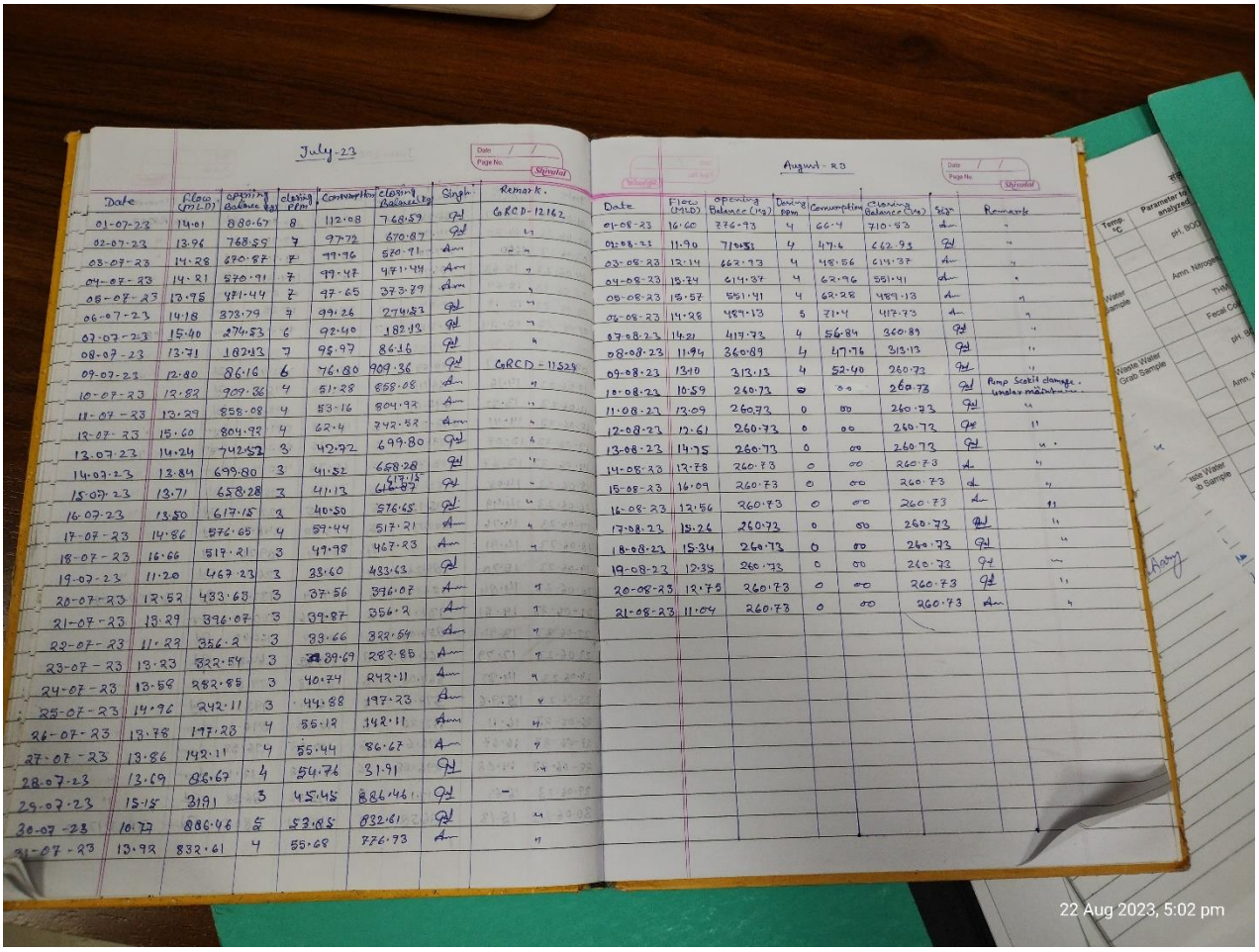
Observations made during field visit and analysis results are given as below:

1. Laxmi Nagar, Mathura (16.0 MLD):

This STP-I is working on UASB (Up flow Anaerobic Sludge Blanket) based technology. This plant is operated by private agency M/s Triveny engineering & industries Ltd, Noida from July 2021 to till date. Its main pumping station is Dairy Farm Nala for input. At the time of inspection, the STP was found operational.


Latitude: 27.505113
Longitude: 77.710694
Time: Aug 22, 2023 18:17
Note: Lakshmi Nagar
Powered by NoteCam


Latitude: 27.504973
Longitude: 77.710871
Time: Aug 22, 2023 18:19
Note: Lakshmi Nagar 16 mld outlet
Powered by NoteCam



Based on analysis report (annexure-1) received from waste water laboratory, HO Delhi results of samples collected from STP are as given below:

Table-1, Analysis results of Laxmi Nagar, Mathura (16MLD)

S No.	Parameters	Units	Inlet Effluent	Outlet Effluent	As per existing standards- 2017
1	**pH**	-	7.3	8.5	6.5 – 9.0
2	**COD**	mg/l	410	124	-
3	**BOD**	mg/l	164	21	30
4	**TSS**	mg/l	260	91	<100
5	**NH_3-N**	mg/l	25	18	-
6	**T-Coliform**	MPN/100ml	-	$49x10^5$	<1000
7	**F-Coliform**	MPN/100ml	-	$78x10^4$	-

Observation:

- Plant was found functional at the time of inspection.
- Chlorination facility was found at the point of outlet, representatives informed the team that they are applying 3-8 ppm (Appx. 5 ppm avg.) chlorine at the outlet.
- Online Continuous Effluent Monitoring System (OCEMS) was found installed.
- Tertiary treatment plant with the capacity of 20 MLD is installed in the STP premises which was found functional. Treated effluent is being treated from this Tertiary treatment plant through reverse osmosis and the treated water after this process is provided to IOCL Refinery Mathura as per their agreement. No any left over effluent was observed by the inspection at the time of inspection.
- Results of analysis shows that all the parameters of Laxmi Nagar, Mathura (16.0 MLD) is meeting the discharge standard norms, except only Fecal-Coliform which is need to be improve by the operating firm.

2. Laxmi Nagar, Mathura (14.5MLD):

It is working on Oxidation Pond/waste stabilisation pond technology. It is operated by private agency M/s Triveny engineering & industries Ltd, Noida from July 2021 to till date. Its main pumping station is Bangali Ghat for input. Plant was found operational at the time of inspection.

Based on analysis report (annexure-1) received from waste water laboratory, HO Delhi results of samples collected from STP are as given below:

Table-2, Analysis results of Laxmi Nagar, Mathura (16.0 MLD)					
S No.	**Parameters**	**Units**	**Inlet Effluent**	**Outlet Effluent**	**As per existing standards- 2017**
1	**pH**	-	7.0	7.6	6.5 – 9.0
2	**COD**	mg/l	331	149	-
3	**BOD**	mg/l	90	41	30
4	**TSS**	mg/l	497	123	<100
5	**NH_3-N**	mg/l	22	14	-
6	**T-Coliform**	MPN/100ml	-	$70x10^5$	<1000
7	**F-Coliform**	MPN/100ml	-	$45x10^4$	-

Observation:

- Plant was found functional at the time of inspection.
- Chlorination facility was found at the point of outlet, representatives informed the team that they are applying 3-8 ppm (Appx. 5 ppm avg.) chlorine at the outlet.
- Online Continuous Effluent Monitoring System (OCEMS) was found installed.

- There was no permanent structure/distribution network was found connected to the outlet of the STP for the use of treated effluent, however it was informed that nearby farmers are using partially, the treated sewage by putting temporary pipe arrangement; leftover treated effluent going to river Yamuna.
- Results of analysis shows that all the parameters of Laxmi Nagar, Mathura (14.5 MLD) are not meeting the discharge standard norms, which are need to be improve by the operating firm.

3. Masani STP (30 MLD):

30 MLD STP of Masani is working on SBR technology. It was found operational during inspection. Main pumping station of this STP is Masani (approx. 5km from STP). It is also operated by private agency M/s Triveny engineering & industries Ltd. Noida from July 2021 to till date.

Based on analysis report (annexure-1) received from waste water laboratory, HO Delhi results of samples collected from STP are as given below:

Table-3, Analysis results of STP, Masani (30 MLD)					
S No.	**Parameters**	**Units**	**Inlet Effluent**	**Outlet Effluent**	**As per existing standards- 2017**
1	**pH**	-	7.1	7.1	6.5 – 9.0
2	**COD**	mg/l	270	111	-
3	**BOD**	mg/l	71	13	30
4	**TSS**	mg/l	201	24	<100
5	**NH_3-N**	mg/l	15	06	-
6	**T-Coliform**	MPN/100ml	-	$92x10^4$	<1000
7	**F-Coliform**	MPN/100ml	-	$40x10^3$	-

Observation:

- Plant was found functional at the time of inspection.
- Chlorination facility was found at the point of outlet, representatives informed the team that they are applying 4-5 ppm chlorine at the outlet.
- Online Continuous Effluent Monitoring System (OCEMS) was found installed.
- There was no permanent structure/distribution network was found connected to the outlet of the STP for the utilization of treated sewage. Some amount of effluent is being utilized by the farmers but mostly treated sewage is going to river Yamuna.
- Results of analysis shows that all the parameters of Masani (30 MLD) meeting the discharge standard norms, except only Fecal-Coliform which is need to be improve by the operating firm.

4. Pagal Baba, Vrindaavan (4.0 MLD):

Pagal Baba STP (4.0 mld) is working on oxidation pond/waste stablisation pond technology. Main pumping station for input is Mukharji Park. It is operated by Private agency M/S Hindustan engineering Ltd, Lucknow from Jan. 2019 to till date. At the time of Inspection, the STP was found operational.


Latitude: 27.561227
Longitude: 77.684416
Time: Aug 22, 2023 15:13
Note: pagal Baba STP inlet
Powered by NoteCam


Latitude: 27.560807
Longitude: 77.683056
Time: Aug 22, 2023 15:32
Note: pagal Baba STP outlet chlorination
Powered by NoteCam

Based on analysis report (annexure-1) received from waste water laboratory, HO Delhi results of samples collected from STP are as given below:

Table-4, Analysis results of Pagal Baba, Vrindaavan (4.0 MLD)					
S No.	**Parameters**	**Units**	**Inlet Effluent**	**Outlet Effluent**	**As per existing standards- 2017**
1	**pH**	-	7.1	7.5	6.5 – 9.0
2	**COD**	mg/l	267	180	-
3	**BOD**	mg/l	74	62	30
4	**TSS**	mg/l	180	71	<100
5	**NH_3-N**	mg/l	24	21	-
6	**T-Coliform**	MPN/100ml	-	$11x10^5$	<1000
7	**F-Coliform**	MPN/100ml	-	$14x10^4$	-

Observation:

- Plant was found functional at the time of inspection.
- There is need to improve the housekeeping service inside the premises of the STP plant.
- Suspended matter was seen in the oxidation ponds.
- Chlorination facility was found at the point of outlet, representatives informed the team that they are applying 4-5 ppm chlorine at the outlet.
- Online Continuous Effluent Monitoring System (OCEMS) was found installed.
- There was no permanent structure/distribution network was found connected to the outlet of the STP for the utilization of treated sewage; all the treated sewage going to river Yamuna.
- Results of analysis shows that only TSS parameter is meeting the discharge standard norms, all other parameters are not meeting the norms. O & M need to be improve by the operating firm to comply the norms.

5. Maant road, Vrindavan (8.0 MLD)

It is based on UASB (Upflow Anaerobic Sludge Blanket) technology. STP is operated by Private agency M/S Vatavam Techno, Agra from July 2021 to till date. Main pumping

station for input is Rukmani Vihar- 7MLD and Rajpur phatak-1 MLD. At the time of inspection, STP was found operational.

Based on analysis report (annexure-1) received from waste water laboratory, HO Delhi results of samples collected from STP are as given below:

Table-5, Analysis results of Maant road, Vrindavan (8.0 MLD)					
S No.	**Parameters**	**Units**	**Inlet Effluent**	**Outlet Effluent**	**As per existing standards- 2017**
1	**pH**	-	6.9	7.6	6.5 – 9.0
2	**COD**	mg/l	306	249	-
3	**BOD**	mg/l	108	91	30
4	**TSS**	mg/l	114	46	<100
5	**NH_3-N**	mg/l	32	30	-
6	**T-Coliform**	MPN/100ml	-	$24x10^4$	<1000
7	**F-Coliform**	MPN/100ml	-	$27x10^3$	-

Observation:

- Plant was found functional at the time of inspection.
- There is need to improve the housekeeping service inside the premises of the STP plant.
- Chlorination facility was found at the point of outlet, representatives informed the team that they are applying 4-5 ppm chlorine at the outlet.
- Results of analysis shows that only TSS parameter is meeting the discharge standard norms, all other parameters are not meeting the norms. O & M need to be improved by the operating firm to comply the norms.
- Results of analysis shows that only TSS parameter is meeting the discharge standard norms, all other parameters are need to be improve by the operating firm.

6. Masani (6.8 MLD)

It is working on Oxidation Pond/waste stabilisation pond technology. It is operated by private agency M/s Triveny engineering & industries Ltd, Noida. Its main pumping station is Bangali Ghat for input. Plant was found non-operational at the time of inspection, so the samples were not collected.

Suggestions:

- Regular operation and maintenance of all STPs should be done by concerned agencies and monitoring of STPs should be ensured by concern agency, so that STPs should comply with the norms.
- No untreated sewage should be discharged into river Yamuna.
- Chlorine treatment facility need to improve in all STPs in such a way that Fecal coliform must comply with the norms.
- Treated sewage should be discharged in such a way that no untreated / contaminated effluent will meet with it before final disposal.
- All the untapped/partially tapped drains should be connected to the STPs.
- At present, only at one STP tertiary treatment capacity has installed in Mathura. For better utilization of treated sewage, there should be provision of tertiary treatment before final disposal in other STPs also.
- Treated effluent should be used for water sprinkling, irrigation, horticulture, gardening purpose and dust suppression activities to increase the greenery & forests cover areas.
- Housekeeping services need to improve in all STPs and all the records should be maintained properly.
- Proper infrastructure may be developed for the fully utilization of treated sewage.

Central Pollution Control Board केंद्रीय प्रदूषण नियंत्रण बोर्ड
Parivesh Bhawan, East Arjun Nagar, Delhi-110 032
परिवेश भवन, ईस्ट अर्जुन नगर, दिल्ली-110 032
Water Laboratory (Wastewater Section) जल प्रयोगशाला (अपशिष्ट जल अनुभाग)
Analysis Report विश्लेषण आख्या
NABL Accreditation: ISO/IEC 17025:2017, Certificate No: TC-7723

Report No.: आख्या सं : **WWL/AUG/138/2023**
Issue Date :जारी करने की तिथि : **15/09/2023**

Source of sample: Drain/STP/ETP/Other स्रोत :ड्रेन/एस टी पी/ई टी पी/अन्य : **S.T.P.**
Samples collected by नमूने एकत्रित करने वाले का नाम : **Dr. Vipul K. Singh & Team.**
Date & time of sample Collection नमूने एकत्रीकरण की तिथि एवं समय : **22/08/2023**
Date & time of sample receipt नमूने प्राप्ति की तिथि एवं समय : **23/08/2023.**
Period of sample analysis नमूने के विश्लेषण की अवधि : **23rd Aug to 11th Sept 23.**
Sample registration no. & date नमूने की पंजीकरण सं. एवं तिथि : **138/Water/WW-20/2023.**
Test method reference परीक्षण विधि का संदर्भ : **APHA/BIS.** एपीएचए/बीआईएस
Report sent to (Name & Division) आख्या जारी की गयी (नाम एवं प्रभाग) : **Project Office Agra**

S. No	Sample Code	Sample No.	pH	COD	BOD	TSS	NH_3-N
1.	MT-01+MT-03	1279	7.1	270	71	201	15
2.	MT-02+MT-04	1280	7.1	111	13	24	06
3.	MT/07+MT/09	1281	7.1	267	74	180	24
4.	MT/08+MT/10	1282	7.5	180	62	71	21
5.	MT/13+MT/15	1283	6.9	306	108	114	32
6.	MT/14+MT/16	1284	7.6	249	91	46	30
7.	MT/19+MT/21	1285	7.3	410	164	260	25
8.	MT/20+MT/22	1286	8.5	124	21	91	18
9.	MT/25+MT/27	1287	7.0	331	90	497	22
10.	MT/26+MT/28	1288	7.6	149	41	123	14

Note: All the concentrations are expressed in mg/l except pH. **नोट :** पीएच के अतिरिक्त सभी सांद्रता मिग्रा/ली. में व्यक्त की गई हैं ।

Statement:
कथन:

1. The results relate only to the samples tested. परिणाम केवल जांचे गए नमूनों से संबंधित है।
2. The report shall not be reproduced except in full without approval of the laboratory पूर्ण रिपोर्ट के अतिरिक्त प्रयोगशाला के अनुमोदन के बिना आख्या की प्रतिकृति नहीं की जायेगी।
3. BDL & Test methods are mentioned on back side of this report. बी डी एल एवं परीक्षण विधि आख्या के अंत में दिए गए हैं।
4. Samples will be retained only for one week after receipt of Report. संबंधित आख्या जारी होने के बाद नमूने केवल एक सप्ताह तक ही सुरक्षित रखे जाएंगे।

(Vinod Kumar)	(S.M.Bilal)	(Dr.K. Ranganathan) 15/9/23
Analyst & Authorized Signatory	Supervisor, Reviewer & Authorized Signatory	D.H. Water Lab

B. WATER LABORATORY					
S. No.	**Products/ Material of test**	**Specific Tests Performed**	**Test Method / Standard against which tests are performed**	**Range of Testing/ Limit of Detection**	**Uncertainty of Measurement**
b.	**Waste Water**	Conductivity	APHA 2510 – B, 23rdEd. 2017	1-40,000 µmhos/cm	1404 ± 18.17 µmhos/cm
		Total Suspended solids	APHA 2540 D, 23rdEd. 2017	10 – 15,000 mg/l	197 ± 18.76 mg/l
		Total Solids	APHA 2540 B, 23rdEd. 2017	10 – 20,000 mg/l	581 ± 9.22mg/l
		Total Dissolved Solids	APHA 2540 C, 23rdEd. 2017	10 -1,00,000 mg/l	762 ± 15 mg/l
		Chemical Oxygen Demand	APHA 5220 B, 23rd Ed. 2017.	05 – 90,000 mg/l	244.8 ± 9.5 mg/l
		Bio – chemical Oxygen Demand	APHA 5210 B, 23rdEd. 2017, 4500 OC, (5 days at 20^0C), IS-3025 part 44:1993, BOD (3 Days at 27^0C).	01 – 60,000 mg/l	166.8 ± 14.31 mg/l
		Oil & Grease	APHA 5520 B, 23rdEd. 2017	5 -200 mg/l	21.14 ± 5.28 mg/l
		Phosphate – P	APHA 4500 – PD, 23rdEd. 2017.	0.05 – 10 mg/l	0.209 ± 0.023 mg/l
		Chloride	APHA 4500 – Cl B, 23rd Ed. 2017.	5 - 2000 mg/l	100 ± 8.2 mg/l
		pH	APHA 4500 H^+ - B, 23rdEd. 2017	2 - 14	7.0± 0.1
		NH_3-N	APHA 4500 NH_3 – B&C, 23rdEd. 2017	1-100 mg/l	78.2 ± 3.9 mg/l
		Cr^{+6}	APHA 3500 Cr– B, 23rdEd. 2017	0.1- 10 mg/l	0.283 ± 0.03 mg/l

CPCB

CENTRAL POLLUTION CONTROL BOARD
केंद्रीय प्रदूषण नियंत्रण बोर्ड
Parivesh Bhawan, East Arjun Nagar, Delhi-110032
परिवेश भवन, पूर्वी अर्जुन नगर, दिल्ली-110032
BIO-SCIENCE LABORATORY/ जैव-विज्ञान प्रयोगशाला

Microbiological Analysis Report/ सूक्ष्म जैविक विश्लेषण रिपोर्ट

1. Report no. & issue date/ रिपोर्ट सं. एवं जारी करने की तिथि : Bio/Micro/63, 30.08.2023
2. Name of the project/ परियोजना का नाम : NGT OA No. 773/2022
3. Sample matrix/ नमूना मैट्रिक्स : STP
4. Date & time of sample collection/ नमूना संग्रहण करने की तिथि एवं समय : 22.08.2023; 02:00 PM – 06:30 PM
5. Samples collected by/ नमूना एकत्रित करने वाले का नाम : Dr. Vipul K. Singh and Mr. Himmat Singh
6. Date & time of sample receipt/ नमूना प्राप्ति की तिथि एवं समय : 23.08.2023; 03:00 PM
7. Date of sample analysis/ नमूना विश्लेषण की तिथि : 23.08.2023
8. Sample registration no. & date/ नमूना पंजीकरण सं. एवं तिथि : Bio/50/MB/05/2023, 23.08.2023
9. Test method reference/ संदर्भित जांच पद्धति : APHA 23rd Edition, 2017
10. Report sent to (Name & Address)/ रिपोर्ट प्रेषित किए जाने वाले का (नाम एवं पता) : P.O. Agra

S. No क्र.सं.	Sampling location नमूना स्थल	Lab Code लैब कोड	Analysis Results/ विश्लेषण परिणाम				
			Total Coliform MPN/100ml कुल कोलिफॉर्म एमपीएन/100एमएल	Fecal Coliform MPN/100ml फिकल कोलिफॉर्म एमपीएन/100एमएल	Fecal Streptococci MPN/100ml फिकल स्ट्रैप्टोकोकाई एमपीएन/100एमएल	Enterococcus MPN/100ml एन्ट्रोकोकस एमपीएन/100एमएल	*E. coli* MPN/100ml ई.कोलाई एमपीएन/100एमएल
1.	MT/06	MB-238	$92X10^4$ ✓	$40X10^3$ ✓	--	--	--
2.	MT/11	MB-239	$11X10^5$ ✓	$14X10^4$ ✓	--	--	--
3.	MT/17	MB-240	$24X10^4$ ✓	$27X10^3$ ✓	--	--	--
4.	MT/23	MB-241	$49X10^5$ ✓	$78X10^4$ ✓	--	--	--
5.	MT/29	MB-242	$70X10^5$ ✓	$45X10^4$ ✓	--	--	--

Statement/ विवरण:

1. The results relate only to the samples tested. / परिणाम केवल परीक्षण किए गए नमूनों से संबंधित है।
2. The report shall not be reproduced, without the written approval of laboratory. / प्रयोगशाला के लिखित अनुमोदन के बिना रिपोर्ट की प्रतिकृति नहीं की जाएगी।
3. <1.8 MPN/100 ml indicates that the probability of presence of coliform in the sample is zero. / <1.8 एमपीएन/100 मिलीलीटर इंगित करता है कि नमूने में कॉलिफॉर्म के होने की संभावना शून्य है।
4. The sample will be retained for one week from the date of issue of this test report. / इस रिपोर्ट के जारी होने की तिथि से एक सप्ताह तक नमूनों को संरक्षित रखा जाएगा।

680/28
30/8/23

SRaina 30/8/23
Analyst/ विश्लेषक
(Swati Raina)

यशपाल यादव 30/08/2023
Supervisor, Reviewer & Authorized Signatory
पर्यवेक्षक, पुनर्विलोकक एवं प्राधिकृत हस्ताक्षरकर्ता
(Dr. Yashpal Yadav)

30/8/2023
DH Bio-Science Lab
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(Dr. Z. Changsan)

DOC: CB/CL/QR/7.8/BL-1 डीओसी: सीबी/सीएल/क्यूआर/7.8/बीएल-1	Issue No.: 04 जारी सं. 04	Amendment No.: 05 संशोधन सं. 05	Issue Date: 27.03.2014 जारी तिथि 27.03.2014	Amendment Date: 20.05.2022 संशोधन तिथि 20.05.2022	Page 01 of 01 पृष्ठ सं. 01 का 01

Photographs taken by CPCB team during inspection of STPs in Mathura on 21/9/2023 in compliance to Hon'ble NGT Order dated 11/4/2023 in O.A No 773 of 2022 titled Rajesh Prateek Vs State of Uttar Pradesh

Photo 1. SBR based STP (30 MLD) in Masani, Mathura

Photo 2. Automatic Chlorine dosing in STP, Masani, Mathura

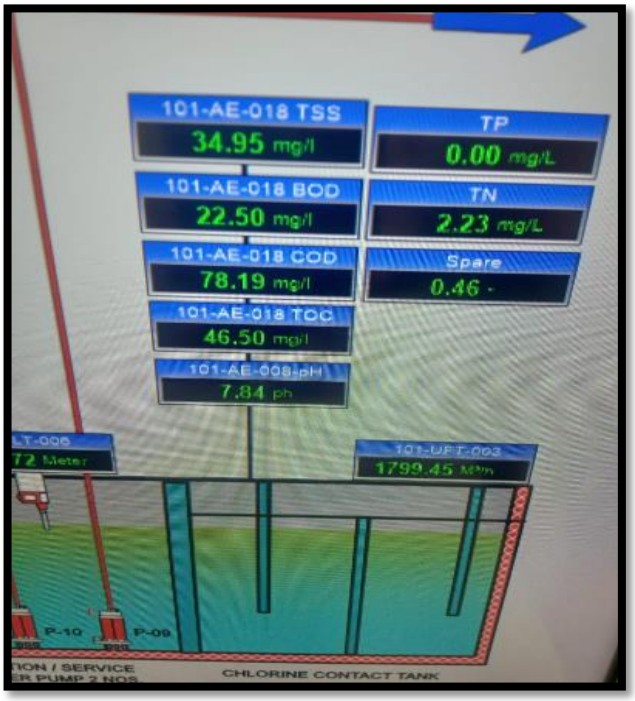

Photo 3. Real Time Water Quality monitoring, Masani, Mathura

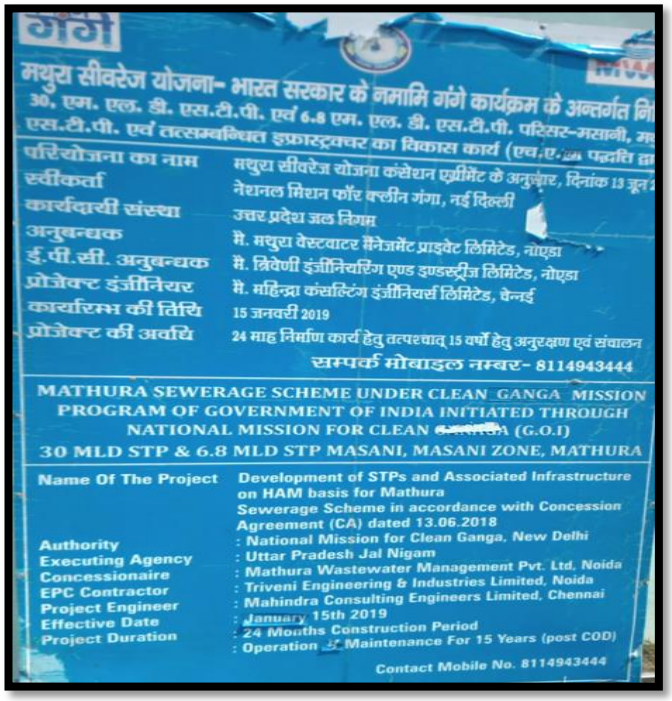

Photo 4. View of STP near entrance, Masani, Mathura

Photo 5. 8 MLD UASB based STP, Vrindavan, Dist Mathura

Photo 6. View of STP near inlet, Vrindavan, Dist Mathura

Photographs taken by CPCB team during inspection of STPs in Delhi on 25/9/2023 in compliance to Hon'ble NGT Order dated 11/4/2023 in O.A No 773 of 2022 titled Rajesh Prateek Vs State of Uttar Pradesh

Photo 1 Chlorine Room

Photo 2. Chlorine cartridges

Photo 3. Dosing at Chlorine Contact Tank

Photo 4. Chlorine Contact Tank