

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
ORIGINAL APPLICATION No. 426 OF 2018**

IN THE MATTER OF:

Mohammed Nayeem Pasha & Anr

....

Applicant(s)

Versus

The State of Telangana & Ors

....

Respondent(s)

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Place: Hyderabad

Date: 19-06-2020.

REPORT OF TELANGANA STATE POLLUTION CONTROL BOARD IN ORIGINAL APPLICATION NO. 426 OF 2018 FILED BY MOHAMMED NAYEEM PASHA & ANOTHER, R/O. HYDERABAD AS PER HON'BLE NGT, NEW DELHI ORDER DATED 29.11.2019 (UPLOADED ON 06.12.2019):

It is to submit that Mohammed Nayeem Pasha & another, R/o. Hyderabad has filed an Original Application before the Hon'ble NGT, New Delhi against the discharge of Sewage and Industrial Effluents into the River Musi in gross violation of the constitutional protection given to Rivers and causing Air, Soil and Water pollution problems in the surrounding areas thus resulting the ecological destruction of the River System.

It is to submit that the Respondent Board (R3) has filed a Reply on 19.09.2018 before the Hon'ble NGT, New Delhi.

The Hyderabad Metropolitan Water Supply & Sewerage Board (HMWS&SB) (R6) and Municipal Administration & Urban Development (MA&UD) Dept., (R2), Govt of Telangana have filed replies before the NGT on 06.09.2018 and 10.09.2018 respectively.

The Hon'ble NGT made the following orders on 6/12/2019:

"We have heard the matter along with O.A. No. 673/2018. While general directions to the extent relevant for the above case will govern the present matter as river Musi is one of the 351 polluted river stretches and for this purpose this matter need not be heard along with O.A. No. 673/2018 henceforth, the individual issue relating to Musi River raised in this application is being dealt with by this separate order without prejudice to the general order in O.A. No. 673/2018".

Relevant part of the directions in the said case is as follows:

- i) 100% treatment of sewage may be ensured as directed by this Tribunal vide order dated 28.08.2019 in O.A. No. 593/2017 by 31.03.2020 atleast to the extent of in-situ remediation and before the said date, commencement of setting up of STPs and the work of connecting all the drains and other sources of generation of sewage to the STPs must be ensured. If this is not done, the local bodies and the concerned departments of the States/UTs will be liable to pay compensation as already directed vide order dated 22.08.2019 in the case of river Ganga i.e. Rs. 5 lakhs per month per drain, for default in in-situ remediation and Rs. 5 lakhs per STP for default in commencement of setting up of the STP.
- ii) Timeline for completing all steps of action plans including completion of setting up STPs and their commissioning till 31.03.2021 in terms of order dated 08.04.2019 in the present case will remain as already directed. In default, compensation will be liable to be paid at the scale laid down in the order of this Tribunal dated 22.08.2019 in the case of river Ganga i.e. Rs. 10 lakhs per month per STP."

- iii) In view of status report of CPCB dated 28.06.2019, let necessary remedial steps be taken by the Urban Development Department, Telangana, Municipal Corporation, Hyderabad and the TSPCB. The nodal agency will be TSPCB for the purpose. The CPCB may itself validate the Right Biotic system for Quick Hygienic Survey of rivers by seeking opinion of experts on the subject rather than referring it to the Department of Science and Technology, Government of India for its adoption in the country.

The observations made by the CPCB are as follows:.

1. HMWSSB & HMDA shall enhance the existing treatment capacity to treat the 100 % of the sewage generated in the city.
2. HMWSSB & HMDA shall prepare an time hound action plan tor collection and treatment of 100% sewage generated in the city
3. Seventeen STPs shall obtain consent for operation from Telangana State pollution control hoard (TNPCB) immediately without any delay.
4. All STPs should ensure 100% treatment of designed capacity and operated scientifically to ensure compliance to discharge norms.
5. All STPs should install flow measuring devices at inlet and outlet and maintain the log records.
6. All STPs should install OCEMS in compliance to NGT order in the matter O.A. No. 593 of 2017 Paryavarana Suraksha Samiti Vs UoI.
7. HMWSSB shall prepare action plan for utilization of treated sewage and utilize the treated sewage to the maximum extent instead of discharging into River Musi.
8. Most of the STPs are operated by untrained officials. HMWSSB shall ensure capacity building programmes to all STP operators on scientific operation and maintenance of STPs.
9. Telangana State Pollution Control Board shall ensure the compliance of all STPs to operate with valid consents, installation of OCEMS and utilisation of treated sewage.

The compliance on the orders of the Hon'ble NGT are as follows:

Directions of the Hon'ble NGT	Compliance
Interim measures for In situ phyto-remediation / bio-remediation etc., for 100% sewage to reduce pollution load on recipient water	<p>There are 27 drains joining the main river stretch of Musi from starting point of Osmansagar and confluence at Wadepally. Out of 27 drains, the following 7 drains falling within the GHMC jurisdiction were identified to take up insitu remediation.</p> <ol style="list-style-type: none"> 1. Sirimallenagar 2. Baputghat 3. Miralam 4. Musinagar-Dhobigalli 5. Shastrinagar-Golnaka

Directions of the Hon'ble NGT	Compliance
bodies.	<p>6. Saroornagar 7. Gayatrinagar</p> <p>For its compliance, HMWSSB has engaged the services of NEERI to provide suitable technology for In-Situ Remediation of sewage for the drains joining river Musi for submission of Detailed Project Reports.</p> <p>Accordingly, the Director, NEERI, has made a detailed presentation and initially submitted budget estimate at Rs.45 Lakhs per MLD for implementation of the NEERI technology(RENEU).</p> <p>The Government was requested to provide budget for 100% In-situ Remediation of treatment of sewage (about 1174 MLD flowing through 185 drains to water bodies amounting Rs.528.30 Crores at Rs.45 Lakhs per MLD.</p> <p>Further after detailed survey, planning and design, NEERI has submitted the DPR for one drain on 16.03.2020 and work order was issued for In-situ remediation implementation at Kokapet Lake. But, work could not be taken up by NEERI due to Lockdown situation.</p> <p>Further, Efforts were also made for the technical support of IARI on the insitu remediation. The details submitted by IARI are as follows:</p> <ul style="list-style-type: none"> • The proposed waste water treatment technology has zero energy, zero chemical and a zero skilled manpower demand. • Unlike the conventional technologies the proposed technology can take care of multi pollutant and a pathogen loads, along with salt –remediation, specific economically important non-competitive, (Halophytic/non halo phytic) with microphytes planted in either solo or mixed culture design. • The technology is capable of reducing turbidity By 99%, Pathogen load by 99.9%, BOD by 87% and nutrients and heavy metals by 80 to 99%. • It has about 80 to 85% lower capital expenditure (CAPEX) demand than conventional waste water treatment technology as it requires just Rs.50 to 65 Lakhs per 1 MLD capacity in comparison to Rs.4.0Crore or more per MLD for the conventional waste water treatment technology • Extremely low i.e, maximum Rs.0.6 per kilolitre operational expenditure (OPEX) demand in comparison to the conventional

Directions of the Hon'ble NGT	Compliance
	<p>waste water treatment technologies with Rs.20 or more per kilo of operational expenditure</p> <ul style="list-style-type: none"> • The technology is at least 1500 times more sustainable and causes at least 33 times lesser environmental stress than any conventional sewage treatment technology <p>IARI informed that due to COVID pandemic they are not in a position for making a site visit in the next 3 to 4 months.</p> <p>In view of the above, it is humbly submitted that the insitu remediation will be taken up on restoration of the normal conditions (post COVID) followed by a technical visit to obtain proposals for execution.</p>
<p>Commencement of STPs shall be taken up by 31.03.2020 and commissioned by 31.03.2021</p>	<p>Existing STPs capacities:</p> <ul style="list-style-type: none"> ➤ GHMC- 24 STPs with 774.8 MLD. ➤ Miryalaguda (11.5 MLD - Commissioned and 5.45 MLD – Nearing Completion) <p>Compliance:</p> <ul style="list-style-type: none"> ➤ M/s.Shah Technical Consultants, Mumbai, were appointed for preparation of Comprehensive Sewerage Master Plan for Hyderabad City upto ORR. The consultants have carried out detailed planning, survey, investigation, designs, estimates and submitted the draft Sewerage Master Plan to HMWSSB. The consultants have proposed construction of STPs for year 2036 requirement, laying of lateral sewers, branch sewers and trunk sewers for 2051 requirement at a tentative cost of Rs.15,884 Crores with 65 numbers of STPs (2060 MLD). ➤ The Govt has submitted the Pre-feasibility Reports of Sewerage Master Plan costing Rs.15,884 Crores to NMCG / NRCD, GoI. ➤ The NMCG / NRCD, GoI, during appraisal advised to take up the 5 DPRs proposals under Hybrid Annuity Mode (HAM) Contract for implementation with 60% investment by the agency and 40% by State Government / ULB. The cost of 5 DPRs is Rs.4237 Crores and the bidders investment at 60% will be Rs.2542.20 Crores and Government share at 40% will be Rs.1694.80 Crores. ➤ As per suggestions of NMCG / NRCD, the following 5 Detailed Project Reports (DPRs) for priority segments at a cost of Rs.4237 Crores were submitted for financial assistance and technical appraisal: <ul style="list-style-type: none"> • DPR-1- STPs on North of Musi (354 MLD) with conveying

Directions of the Hon'ble NGT	Compliance
	<p>mains with a cost of Rs.995 Cr (4 STPs).</p> <ul style="list-style-type: none"> • DPR-2- STPs Project for South of Musi (381.5 MLD) with conveying mains of Rs.995 Cr (3 STPs). • DPR-3- STPs Project for H.S. Lake (Kukatpally) (257 MLD) with conveying mains of Rs.963 Cr (8 STPs). • DPR-4- STPs Project for H.S.Lake (Jeedimetla) (66 MLD) with conveying mains of Rs.297 Cr (5 STPs). • DPR-5- STPs Project for Nakkavagu catchment (River Manjera) (262 MLD) with conveying mains of Rs.987 Cr (8 STPs). <p>➤ The estimated cost for 28 STPs (1320.5 MLD) for priority segments is Rs.4237 Crores.</p> <p>➤ 72 Nos. of septage collection vehicles (gulpers) are empanelled by HMWS&SB and consultants M/s.ASCI, Hyderabad to collect the septage from septic tanks upto ORR and convey to the existing STPs at 4 locations for co-treatment.</p> <p>➤ The installation of co-treatment process at other existing 18 STPs is being undertaken in phased manner.</p> <p>Hyderabad City Comprehensive Sewerage Master Plan Details (Musi, Nakkavagu/Manjeera stretch) :</p> <p>➤ Project Area (upto ORR) - 1452 Sq. km.</p> <p>➤ Expected Sewage Generation –</p> <ul style="list-style-type: none"> • 2021 – 1975 MLD • 2036 – 2848 MLD • 2051 – 3759 MLD <p>➤ Project Planning:</p> <ul style="list-style-type: none"> • No. of STPs - 65 Nos • STPs capacities proposed - 2061 MLD (2036 year) <p>➤ Proposed STPs Locations:</p> <ul style="list-style-type: none"> • Along bank of river Musi - 7 Nos - Capacity 760 MLD • Near the Water Bodies (GHMC) - 30 Nos- Capacity 728 MLD • Near the Water Bodies (ORR Villages)- 28 Nos - Capacity 573 MLD <p>➤ Tentative Cost for Construction of STPs, Laying Sewer Network and O&M for 10 Years:</p> <ul style="list-style-type: none"> • For River Musi Catchment area components - Rs.13480 Crores • For Nakkavagu Catchment (River Manjeera) area components - Rs.2405 Crores

Directions of the Hon'ble NGT	Compliance
<p>In view of status report of CPCB dated 28.06.2019, let necessary remedial steps be taken by the Urban Development Department, Telangana, Municipal Corporation, Hyderabad and the TSPCB. The nodal agency will be TSPCB for the purpose</p>	<p>The details of the enhancement of the STPs to treat the total sewage generated in the catchment of the River Musi is submitted in the action plan prepared and submitted to CPCB in compliance to the Hon'ble NGT orders in OA No.673/2018.</p> <p>Further, directions on the functioning of the STPs, obtaining of consents, engaging technical manpower etc are under different stages of execution and are delayed due to COVID pandemic.</p> <p>An action plan for utilisation of the treated waste water from STPs was prepared by the Government for the total state and submitted to CPCB on 22nd January, 2020. The same is under implementation.</p>

Summary of the Sewage generation, existing STPs, gap and proposals to treat the remaining sewage with estimates.

Polluted River Stretch	Present Sewage Generation	Existing STPs Capacity	Gap of sewage to be treated for present generation	Projected sewage generation by 2029	Gap of sewage to be treated by the year 2029* (Approx.)	Proposed STPs (MLD)	Cost of proposed STPs (Rs. in Crores) including O&M (Revised)
Musi river	1,782 MLD (2018) (GHMC)	772 MLD (23 STPs)	1010 MLD	2,815 MLD*	2043 MLD*	65 STPs** 2,060 MLD	Rs.15884 Cr.

*Projected sewage generation for the year 2036.

**The estimated cost for 28 STPs (1320.5 MLD) which are proposed to be taken upon priority is Rs.4237 Crores.

Sd/-
MEMBER SECRETARY

// T.C.F.B.O //

Vesreddy
SENIOR ENVIRONMENTAL ENGINEER
LEGAL, TSPCB, HEAD OFFICE, HYD.

Item Nos. 03

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**Original Application No. 426/2018
(M.A. No. 986/2018)

(With Report dated 18.11.2019)

Mohammed Nayeem Pasha & Anr.

Applicant(s)

Versus

The State of Telangana & Ors.

Respondent(s)

Date of hearing: 29.11.2019

Date of uploading of order: 06.12.2019

CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE S.P WANGDI, JUDICIAL MEMBER
HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER
HON'BLE MR. SAIBAL DASGUPTA, EXPERT MEMBER

ORDER

1. The issue raised in this application relates to remedial action against pollution of river *Musi* at Hyderabad (Telangana) which is reported to be contaminated due to industrial and domestic sewage discharged into the river or into the drains connected thereto. The industries in the catchment areas are bulk drug and pharmaceutical units. Further allegation is that the flood plain zones are encroached and there is also dumping of Construction and Demolition (C&D) waste and solid waste. Water quality is not even fit for irrigation as per water quality criteria of CPCB as per reports of samples of water.
2. The proceedings were initiated by way of O.A. No. 426/2018 filed on 05.07.2018. Notice was issued on 06.07.2018. The Tribunal noted that as per water quality assessment report of the SPCB during 2014-

18, water was not fit even for irrigation (Class-E). The matter was then considered on 05.04.2019 in the light of pleadings on record. The Tribunal noted the stand of the Municipal Administration/Urban Development Department of the State that steps taken included construction of Sewage Treatment Plants (STPs) and laying of sewer lines but the existing capacity of the STPs was inadequate. There was plan to set up more STPs. Detailed Project Reports (DPRs) were being prepared for the purpose which will also cover control of pollution of 23 lakes in the area. The Telangana High Court has also dealt with the matter. The observations of this Tribunal are:

“With regard to sewage treatment and disposal which is the main cause of pollution of river Musi it is to be noted that total sewerage generated is about 1400 mld which is being discharged in the catchment area of Musi river from either of the banks through Nalas. Already 592 mld capacity sewerage treatment plant have been built along the river Musi. DPRs are also prepared at a cost of Rs. 1200 crores for creation of additional STPs at 10 locations, to treat total sewage so as to prevent pollution into river Musi. Since there is no regular sewer network system, the board is said to have undertaken a survey with a technical expertise and prepared the DPRs for sewerage system of the peripheral areas.

According to MAUD, HMWSSB has appointed Shah Technical consultant to prepare a detailed Project Report(DPR) for the master sewage plan, duly reviewing the available DPRs for integration covering the entire GHMC area up to ORR plus 4 IT hubs. The consultants are preparing DPRs for 27 STPs at 23 lakes in the GHMC area for the combined capacity of 450 mld under Phase-I, along the Musi river and further upgradation of the existing STPs will be taken up in Phase-III. The Phase-I STPs are planned to be taken up in 4 month's time, depending upon the funds availability and Phase-II in one year time. The upgradation of STPs from the secondary level to the tertiary level 3 in one year time including the policy on recycling of water for the usage for the purpose of non-drinking, construction activity, gardening, industrial etc. Due to financial constraint, the possibility of private investments through the transaction advisor under PPP mode is being explored. The HMWSSB is planning to implement the comprehensive sewage master plan within one and half year time.

In view of the aforesaid facts and circumstances, we order that as has been made clear in the order dated 19.12.2018 passed in OA no. 673/2018 BOD will not be the sole criteria to determine

whether a particular river stretch is a polluted one. Other parameters including Faecal Coliform (FC) bacteria will also be the criteria for classifying a stretch as polluted or otherwise. CPCB may devise within two weeks a mechanism for classification wherein two criteria pollutants that is BOD and FC shall henceforth be the basis of classification in priority classes.

Therefore, we direct CPCB and Telangana Pollution Control Board to carry out a quick hygienic survey of the River by engaging Professor Suman Kapur, Dean, International Programmes and Collaborations and Senior Professor, Department of Biological Sciences, BITS- Pilani, Hyderabad Campus, Jawahar Nagar, Shameer Pet, Hyderabad-500078, skapur@hyderabad.bits-pilani.ac.in and submit a report for river Musi and any other clean river in the state falling in the category of 'A' and or 'B.' For this survey we request Professor Suman Kapoor to execute the survey at a cost 9.5 lakhs which will be paid by CPCB out of its environment compensation fund. The scientist of CPCB and TSPCB will be associated during the survey and field testing of pathogenic bacteria."

3. Accordingly, CPCB filed status report dated 28.06.2019 observing as follows:

"3.0 Observations:

- i. There are 24 STPs in and around Musi River. Out of 24 STPs, two STPs namely Lingamaiah Kunta and Goppanpally STPs having total treatment capacity of 8 MLD are under construction stage.
- ii. Out of 22 STPs monitored, two STPs namely M/s Krishnakanth Park and M/s Pragathi nagar STPs having total treatment capacity of 3 MLD were not in operation. No officials and operators were present in the site during inspection.
- iii. Out of 20 Operational STPs, seventeen STPs are operational without consent. However, TSPCB has issued notice to all seventeen STPs for obtaining CFO.
- iv. Three STPs namely M/s Amberpet, M/s Nalla Cheruvu and M/s Nagole are operating with valid consent.
- v. Except Vikarabad STP, KIMS STP & Khairatabad STP; all nineteen STPs are operated and maintained by Hyderabad Metropolitan Water Supply and Sewerage Board (HMWSSB).
- vi. KIMS and Khairatabad STPs are operated and maintained by Hyderabad Metropolitan Development Authority (HMDA).
- vii. Vikarabad STP is operated and maintained by Vikarabad Municipality.
- viii. Only 49% of the sewage generated from the city is being treated with the existing STPs. 51% of untreated sewage is discharged to River Musi directly or through drains/nallah.
- ix. Out of 22 STPs, 13 STPs are not operational to full designed capacities.

- x. Out of 20 Operational STPs, following five STPs are not complying with the discharge norms.
- ✓ M/s Rangadhamuni STP
 - ✓ M/s Nalla Cheruvu STP
 - ✓ M/s Amberpet STP
 - ✓ M/s Langer house STP
 - ✓ M/s Patel Cheruvu STP
- xi. Most of the STPs are not having flow measuring devices and no proper records are maintained, so actual flow for treatment could be assessed.
- xii. The treated sewage from all STPs are discharged into River Musi directly or through nallah that finally joins river Musi
- xiii. The Sludge generated from the STPs are sold to farmer utilize as manure in free of cost except M/s Amberpet and M/s Nallacheruvu STP.
- xiv. M/s Amherpct and and M/s Nallacheruvu STPs genrates revenue of Rs. 11.40 Lakhs & 3 Lakhs respectively.
- xv. No STPs has installed OCEMS in compliance to NGT directions in the matter of O.A 593/2017 Paryavaran Suraksha Samiti Vs UOI
- xvi. There is a proposal from four STPs to enhance the existing treatment capacity. The details are as follows:

S. No.	Name of STP	Existing	treatment	Additional capacity*	proposed
1	M/s Amberpet STP	339 MLD		142 MLD	
2	M/s Nagole STP	172 MLD		140 MLD	
3	M/s Nalla Cheruvo	30 MLD		88 MLD	
4	M/s Durgam Cheruvu	9 MLD		12 MLD	

*as Informed the proposal is still under consideration."

4. The suggestions of the CPCB in the said report are as follows:

"4.0 Suggestions:

- 1) HMWSSB & HMDA shall enhance the existing treatment capacity to treat the 100 % of the sewage generated in the city.
- 2) HMWSSB & HMDA shall prepare an time hound action plan tor collection and treatment of 100% sewage generated in the city
- 3) Seventeen STPs shall obtain consent for operation from Telangana State pollution control hoard (TNPCB) immediately without any delay.
- 4) All STPs should ensure 100% treatment of designed capacity and operated scientifically to ensure compliance to discharge norms.
- 5) All STPs should install flow measuring devices at inlet and outlet and maintain the log records.

- 6) All STPs should install OCEMS in compliance to NGT order in the matter O.A. No. 593 of 2017 Paryavaran Suraksha Samiti Vs. UoI.
- 7) HMWSSB shall prepare action plan for utilization of treated sewage and utilize the treated sewage to the maximum extent instead of discharging into River Musi.
- 8) Most of the STPs are operated by untrained officials. HMWSSB shall ensure capacity building programmes to all STP operators on scientific operation and maintenance of STPs.
- 9) Telangana State pollution control board shall ensure the compliance of all STPs to operate with valid consents, installation of OCEMS and utilisation of treated sewage."

5. Apart from the above, CPCB has also filed a consolidated report dated 18.11.2019 in O.A. No. 673/2018 wherein reference has also been made to status of Musi river subject matter of O.A. No. 426/2018 and O.A. No. 829/2019. On the subject of quick hygienic survey, it is stated as follows:

"C3. Assessment of Quick Hygienic Survey of River Musi and River Krishna using Right Biotic Method

(i) Major findings of the study carried out by BITS —Pilani, Hyderabad campus

Final report entitled "Quick Hygienic Survey of River Musi" carried out by BITS Pilani, Hyderabad Campus has been received by CPCB vide letter dated 04.09.2019 from Prof. Suman Kapoor, BITS Pilani. Comments on the report were communicated to Prof S.Kumar vide CPCB letter dated 17.10.2019 for incorporation. A copy of the quick hygienic survey of river Musi as received by CPCB from Prof. Suman Kapur, BITS Pilani, Hyderabad Campus vide letter dated 24.10.2019 is enclosed at **Annexure-XIX**. Salient features of the quick hygienic survey of river Musi and river Krishna are detailed below:

Five out of the nine sites namely, Nagole, Pratapsingaram, Pillaipalli, Rudravelly, and Kasaniguda had higher diversity of pathogenic bacteria and overall load all through the study period (page 21 of the report under serial no. 6).

Five pathogenic strains (such as *E. coli*, *Klebsiella* spp., *Pseudomonas* spp., *Staphylococcus* spp., and *Enterococcus* spp.) were isolated in six sampling locations, and remaining 3 did not grow any bacteria which includes sampling location on river Musi at Wadapally (before confluence),

sampling location on river Krishna at Wadapally (before confluence), Musi after joining Krishna at Wadapally (after confluence). (Details given at Page No. 103 and Table 40 of the assessment report).

Profile of isolated pathogenic strains predominantly include gram negative organisms such as *E. Coll*, *Klebsiella spp.* and *Pseudomonas spp.* as well as gram positive organisms such as *Enterococcus spp.* and *Staphylococcus spp.*

A panel of antibiotics (total 14) including major class of antibiotics relevant to water bodies and important representative from each class was tested for determining Anti-Microbial Resistance (AMR) pattern. Out of the 14 antibiotics tested, Multi Drug Resistance (resistance to 2 or more antibiotics) was observed at the rate of 29% at Nagole, in *Klebsiella spp.* (4/14 equivalent to 28.57%) to 93% at Pillaipalli in *Pseudomonas spp.* (13/14 equivalent to 93%) against frontline antibiotics. (Details given at Annexure 13, Page No. 64 to 65 of the assessment report).

Several strains of *Staphylococcus spp.* showed very high resistance ranging from 79% to 86% indicating an alarming pan-drug resistance like situation. (Details given at Annexure -13, Page No.67 of the assessment report).

Right Biotic assay can be used for rapid and quick hygienic survey of river and other surface and ground water surveys for assessing presence of pathogens resistance to any given panel of antibiotics for assessing the health hazard posed by ABM with accuracy of >70% (Details given at Page No. 26 of the assessment report).

Out of 90 bacterial strains isolated from 54 water samples all fall in multi drug resistance (MDR) and some even fall in Extensively Drug Resistance (XDR) category (as mentioned in Figure 19 of the assessment report).

(ii) Major Findings of General Parameters carried out by TSPCB during the study period

A Joint Team comprising RD, CPCB, Bengaluru, TSPCB have participated along with BITS-Pilani, Hyderabad Campus team and carried out sampling at 9 locations namely Gandipet, Nagole, Pratapsingaram, Pillaipalli, Rudravelly, Kasaniguda, Musi at Wadapally (before Confluence), Krishna at Wadapally (before Confluence), Musi+Krishna at Wadapally (after confluence) on 6 different visit dates during May to July 2019. Collected samples were stored at 40 C and sent to TSPCB Central Laboratory for investigation of general parameters. TSPCB submitted the report vide letter dated 28.08.2019 on the water quality data of river Musi at all 9 selected locations. A copy of the detailed report on the general parameters

carried out by TSPCB is annexed as Annexure-XX. Main observations of TSPCB on the water quality of river Musi and River Krishna during the study period are as follows:-

The compiled average BOD value throughout the stretch from Gandipet (Osmanagar) i.e., upstream of river Musi to river Krishna after confluence with river Musi at Wadapally during the period 9th May 2019 to 23rd July 2019 is ranging between 3 to 44 mg/L.

The BOD of 3mg/L which falls under Class -B i.e., outdoor bathing quality was recorded at upstream of river Musi at Gandipet (Osmanagar), river Krishna before confluence and after confluence with river Musi at Wadapally.

River Krishna water quality before confluence with river Musi and after confluence with river Musi at Wadapally falls in Class -C i.e., drinking water source after conventional treatment and disinfection.

River Musi at Rudravalli at Kasaniguda and before confluence with river Krishna at Wadapally falls under Class -D (i.e., Propagation of Wild life and Fisheries) with BOD at 22, 34 and 8 mg/L respectively.

River Musi at Nagole, Pratapasingaram, Pillaipally falls under Class -E, the BOD observed are 44, 27, 25 mg/L respectively.

Musi river at Pratapasingaram has highest Total Coliform of 1250 MPN/100ml followed by Pillaipalli with 1133 MPN/100ml.

It is observed that the Total Coliform count in river Musi stretch from Nagole to Kasaniguda (Monitoring locations at SI. No. 2,3,4 &5) is more when compared to other part of river Musi stretch which could be due to discharge of treated and untreated sewage into river Musi.

(iii) One-day hands-on training on Quick Hygienic Survey of River Body using Right Biotic method

A one-day hands-on training on Quick Hygienic Survey of River Body using Right Biotic System for the officials of SPCBs/PCCs in association with BITS-Pilani, Hyderabad campus was organized on 26.08.2019 at BITS-Pilani Hyderabad Campus. 8 officials from different SPCBs attended the training programme at BITS-Pilani, Hyderabad campus.

(iv) Analysis of extracted water samples for pharmaceuticals

The extracted and vacuum dried water samples of river Musi and river Krishna (54 nos) which were collected

during quick hygienic survey of river Musi and river Krishna by BITS -Pilani were also analyzed for 21 different pharmaceuticals in NRTOL laboratory in CPCB. The analysis results reveal that the concentration of 21 pharmaceuticals in all the 54 samples is observed as 'below detection limit (BDL). The analysis results of 21 pharmaceuticals in all the 54 samples is enclosed at Annexure-XXI.

(v) Views of CPCB on Quick Hygienic Survey of River using Right Biotic System

Broadly, the most prevalent methods used to detect *E.-Coli* or *Fecal Coliforms* are based on Membrane Filter technique or Multiple Tube Fermentation techniques (or Most Probable Number method). However, both the methods are having its own advantages and disadvantages. Other than available methods for detection of pathogenic bacteria, there are rapid methods available for identification of pathogenic bacteria including fecal coli and fecal streptococci which include (a) Radiometric methods, (b) Glutamate decarboxylase, (c) Electrochemical, (d) Impedance, (e) Gas Chromatographic assay, (f) Colorimetric, and (g) Potentiometric. These methods generally take time ranging from 3 hrs to 15 hours with varying sensitivity (0.1 to > 10⁷ cells /mL), but are very costly, require lab setup & expertise for analysis of the assay and are lab based only.

Quick Hygienic Survey of river Musi using Right Biotic method involves Optical Detection System which converts the optical signal into electrical signal. Optical density is used as a measure of the concentration of bacteria in a suspension. As visible light passes through a cell suspension the light is scattered. Greater scatter indicates that more bacteria or other material is present. Right Biotic Platform neither work on the principle of Multiple Tube Fermentation (MPN method) nor Membrane Filtration Technique (MF). Right Biotic method utilises disposable membrane filters of 0.45µm for filtering the water sample in initial steps of sample preparation before incubation at the ambient temperature and thus associated with quick measurement utilizing Optical Density of the pathogenic bacteria in short duration (4-5 hours).

Quick Hygienic study of river Musi carried out during 9th May, 2019 - 23rd July, 2019 (over 10-week period) reveals presence of pathogenic (diseases causing) bacteria apart from pathogenic indicator bacteria i.e. fecal coli & fecal Streptococci. Majority of the selected sampling locations i.e. 5 out of 9 selected sampling locations namely Nagole, Pratapsingaram, Pillaipalli, Rudravelly and Kasaniguda showed higher diversity of pathogenic bacteria which were multi drug resistant (resistance to atleast one agent in three or more antimicrobial class of antibiotics) showing 4 out of 14 antibiotics tested

Right Biotic Method developed by BITS-Pilani, Hyderabad extended for carrying out quick hygienic survey of river require further validation jointly in association with at least 2 independent agencies having similar facilities for comparison with the analysis results of conventional methods being followed for assessment of Fecal Coll and Fecal Streptococci with different water samples with species both sensitive (non-acclimatizing) and non-sensitive (acclimatizing) for estimating Fecal Coli and Fecal Streptococci. Applicability of Right Biotic method in turbid waters also needs to be assessed as suspended solids matter present in water sample may clog the pores and thereby inhibits free passage of specific volume of water sample.

Right Biotic method also be compared in terms of sensitivity and specificity by utilizing commonly available conventional methods such as Multiple Tube Fermentation (MPN- most trusted method) and other approved rapid and automated methods.

Quick Hygienic Survey of River using Right Biotic System developed by BITS-Pilani, Hyderabad campus enable to analyse microbial profile of a water body just in 4 to 6 hours. However, for wide use and applicability of Right Biotic method for quick assessment of hygienic survey of rivers, it would be advisable if it is validated and or approved by Department of Science and Technology, Government of India, for its adoption in the Country.”

6. The report of CPCB dated 28.6.2019 clearly indicates that only 49% of the sewage generated in the city is treated and remaining 51% of untreated sewage is discharged directly into the River Musi. The STPs are not granted with the Consents under the Water Act and the 5 STPs are found to be not complying with the discharged norms out of 20 operational STPs. The STPs need up-gradation as applicable to meet with the standards with reference to faecal coliform and the treated water will have to be utilized for the non-portable use.

The report of CPCB dated 18.11.2019 describes about the Quick Hygienic Survey carried out by engaging Birla Institute of Technology and Science (BITS). The purpose of the survey was to

design quick method of detection of pathogenic bacteria as the existing methods are time consuming and also involves, long transportation distances in many cases. The method developed by BITS which has been witnessed by Scientists of CPCB and Telangana SPCB, may now further workout appropriate mechanism to adopt the Method and widely practice to carry out such survey of Indian Rivers following the standardized protocol and its procedures which may remain inconsonance and matchable with the Internationally adopted Standard Methods.

7. We have heard the matter along with O.A. No. 673/2018. While general directions to the extent relevant for the above case will govern the present matter as river *Musi* is one of the 351 polluted river streches and for this purpose this matter need not be heard along with O.A. No. 673/2018 henceforth, the individual issue relating to *Musi* River raised in this application is being dealt with by this separate order without prejudice to the general order in O.A. No. 673/2018. Relevant part of the directions in the said case is as follows:

"47. We now sum up our directions as follows:

- i. 100% treatment of sewage may be ensured as directed by this Tribunal vide order dated 28.08.2019 in O.A. No. 593/2017 by 31.03.2020 atleast to the extent of in-situ remediation and before the said date, commencement of setting up of STPs and the work of connecting all the drains and other sources of generation of sewage to the STPs must be ensured. If this is not done, the local bodies and the concerned departments of the States/UTs will be liable to pay compensation as already directed vide order dated 22.08.2019 in the case of river Ganga i.e. Rs. 5 lakhs per month per drain, for default in in-situ remediation and Rs. 5 lakhs per STP for default in commencement of setting up of the STP.*
- ii. Timeline for completing all steps of action plans including completion of setting up STPs and their commissioning till 31.03.2021 in terms of order dated 08.04.2019 in the present*

case will remain as already directed. In default, compensation will be liable to be paid at the scale laid down in the order of this Tribunal dated 22.08.2019 in the case of river Ganga i.e. Rs. 10 lakhs per month per STP."

8. In view of status report of CPCB dated 28.06.2019, let necessary remedial steps be taken by the Urban Development Department, Telangana, Municipal Corporation, Hyderabad and the TSPCB. The nodal agency will be TSPCB for the purpose. The CPCB may itself validate the Right Biotic system for Quick Hygienic Survey of rivers by seeking opinion of experts on the subject rather than referring it to the Department of Science and Technology, Government of India for its adoption in the country.
9. Further reports may be filed by CPCB and TSPCB in above terms before the next date by e-mail at judicial-ngt@gov.in.

List again on 22.04.2020.

Adarsh Kumar Goel, CP

S.P Wangdi, JM

K. Ramakrishnan, JM

Dr. Nagin Nanda, EM

Saibal Dasgupta, EM

December 06, 2019
Original Application No. 727/2018
With O.A. No. 426/2018
DV