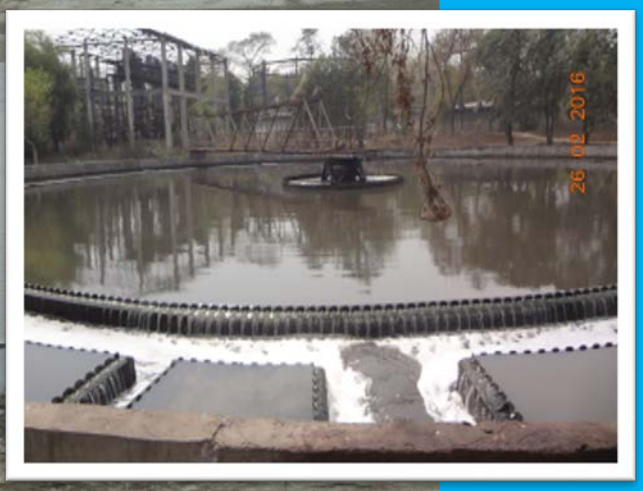
A Report
on
GANGA MATTERS
(Uttarakhand and Uttar Pradesh)



[Phase I – Segment A&B]

Submitted to:

Hon'ble National Green Tribunal (NGT)

(July 25, 2016)

Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar
Shahdara, Delhi - 110032

www.cpcb.nic.in, email: adaba.cpcb@nic.in

THE REPORT

GANGA MATTER

(Uttarakhand and Uttar Pradesh)

[Phase I – Segment A&B]

MATTERS

1

OA No. 297 of 2015

And

OA No. 132 of 2015
(MA No. 385/2015 & MA No. 769/2015)

And

OA No. 384/2015 & MA No. 769/2015)

(ORDER OF HON'BLE NGT DATED 2nd NOVEMBER, 2015)

2

OA No. 200/2014
(CWP No. 3727/1985)

And

OA No. 501 of 2014
(MA No. 404 of 2015)

And

OA No. 146 of 2015

(ORDER OF HON'BLE NGT Dated 8th February, 2016)

Report: 25th July, 2016

(CPCB presenting this report in compliance)

CONTENTS OF THE REPORT

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THE REPORT

GANGA MATTERS IN HON'BLE NATIONAL GREEN TRIBUNAL

1.0 ORDERS OF HON'BLE NATIONAL GREEN TRIBUNAL (NGT)

1.1 The present report is in compliance with the orders of Hon'ble NGT, dated 2nd November, 2015 (in OA Nos. 297 of 2015, OA No. 132 of 2015 – MA No. 385/2015, MA No. 769/2015 and OA No. 133 of 2015 – M.C. Mehta) which direct as under:

a. The Joint Inspection team consisting of nominee of the Principal Committee constituted by the Tribunal by the order dated 12.10.2015 not below the rank of Joint Secretary, Member Secretary of the Central Pollution Control Board, Member Secretary of the Uttar Pradesh Pollution Control Board, Member Secretary of the Uttarakhand Pollution Control Board, Professor from IIT, Delhi nominated by the Director IIT, Delhi on water quality.

b. Nominee from IIT, Kanpur.

c. Professor Tare from IIT, Kanpur

"This committee shall collect effluent samples from inlet and outlet of the CETP located in all industrial clusters located on the bank or anywhere near the vicinity of river Ganga or in all its tributaries. The committee shall also collect effluent samples at random from Sugar, Sugar Distillery, Paper, Textile and Tannery industries which are not discharging their effluents into the conveyor belt and claim to be Zero Discharge Unit. It will be identified as to what is the source and what is the element discharged upon and the mechanism adopted by such industry for claiming to be Zero Discharge Unit. The Committee will also collect and get samples collected in its presence from the points where river Ganga or any of its tributary comes to the territory of Uttar Pradesh from Uttarakhand. The samples would be collected from the places where in Uttarakhand Industrial pockets are located on river Ganga or its tributaries. The samples so collected shall be analysed in IIT, Kanpur, IIT, Delhi and CPCB. Comparative analysis statement with the report of the Committee shall be filed before the Tribunal positively by the next date of hearing.

The water quality samples would be collected at the points where tributaries join river Ganga and downstream there from as well to examine the water quality. The samples shall be analysed for all parameters metallic or otherwise which such industries are generating or are expected to generate in normal course of their business. We do not restrict scope of analysis, but we lead it to the wisdom of the committee and the committee would be free to direct analysis/testing of the samples in relation to all such parameters which are or not such specified parameters declared for any law for the time being. Wherever, the committee feels appropriate even the groundwater samples would be collected and analysed. Let this report be submitted to the Tribunal within three weeks from today.

We direct the Learned Counsel appearing for Central Pollution Control Board to inform the Member Secretary, CPCB who shall be the Nodal Officer for execution of the directions contained in this order. Registry would also send the order by tomorrow to all the concerned institutions and confirm the same functioning of the committee would start positively by Friday of this week i.e. 6th November, 2015.

However, meeting of the committee would positively be taken on 6th November, 2015. As far as the cases listed before the Tribunal from Item No. 28 to 157, we have heard the arguments and reserved for Judgement".

1.2 Hon'ble NGT in its another Order dated 8th February, 2016 directed;

"We constitute a team of experts consisting of Member Secretary of the CPCB, Member Secretary, Uttar Pradesh Pollution Control Board, Member Secretary of State of Uttarakhand Pollution Control Board, General Manager of Jal Nigam, Director of specialised section from MoEF and Professor Kazmi from IIT Roorkee and submit a report within three weeks from today.

The Member Secretary of the CPCB will be the Nodal Officer and in-charge of holding the meeting proceedings of the Committee. This team of experts shall submit its report to the Tribunal on the following:-

1. *Actual discharge from each major drain that joins river Ganga in the section from Haridwar to Kanpur.*
2. *It shall also measure the load of sewage at the point of STPs and the point where STPs are sought to be constructed.*
3. *It shall be stated, in the case of existing STP's whether they receive the entire discharged from the drain and part of the effluent directly is discharged or untreated sewage is discharged in the River Yamuna.*
4. *The Committee shall collect or cause to be collected under its supervision, the Samples from the drains and the inlet points of STPs (existing/proposed). These will be analysed for all parameters and compared with the bathing quality water standards which will not be restricted to BOD, COD, pH etc. Analysis should also be done with regard to metals, insecticide, pesticide, Colifrom, and other phenolic compounds. This we have indicated to give a wider scope but list is not exhaustive. It will be in the discretion of the committee to have some other tests conducted as per their instructions.*
5. *Samples would be collected and analysed at the laboratory of CPCB and IIT, Roorkee. The Committee may adopt at least two methods for measuring the discharge.*

Besides the above, the Committee shall also report as to what is the actual contribution of Grossly Polluting Industries and other industries to sewage. Comments also be given as to what is the extent of water extraction from River Ganga for various usage particularly by industries.

2.0 INTRODUCTION TO THE REPORT AND ISSUES

The present report is the combined and joint report of the two orders of Hon'ble NGT dated 2nd November, 2015 and 8th February, 2016. As per the directions, efforts have been made to cover all issues and arrive at precise observations and findings. It is humbly submitted that since the contents of directions of Hon'ble NGT are interrelated and hence, for technical coherence, the report has taken guidance of both the orders of the Tribunal.

The Report also includes additional features like monitoring of micro-pollutants, biological monitoring and some of the recent studies conducted by CPCB to support water quality issues of river Ganga.

3.0 THE COMMITTEES

3.1 Committee - I: (Order dated 2nd November, 2015)

(i) Nominee of Principal Committee (constituted by the Tribunal by the Order dated 12th October, 2015)
(ii) Member Secretary, Central Pollution Control Board (CPCB) (Nodal Officer)
(iii) Member Secretary, Uttar Pradesh Pollution Control Board (UPPCB
(iv) Member Secretary, Uttarakhand Pollution Control Board (UKSPCB)
(v) Professor, Nominated by IIT, Delhi
(vi) Nominee of IIT, Kanpur
(vii) Professor, Vinod Tare, IIT, Kanpur

3.2 Committee – II (Order dated 8th February, 2016)

(i) Member Secretary, CPCB (Nodal Officer)
(ii) Member Secretary, Uttar Pradesh Pollution Control Board (UPPCB)
(iii) Member Secretary, Uttarakhand Pollution Control Board (UKSPCB)
(iv) General Manager of Jal Nigam
(v) Director of specialised section from Ministry of Environment, Forest & Climate Change (MoEF&CC)
(vi) Professor Kazmi, IIT, Roorkee

4.0 ISSUES TO BE OBSERVED BY THE COMMITTEES

4.1 Part I

(i) Collection of effluents samples from inlet and outlets of CETPs located on bank or anywhere near vicinity of river Ganga or tributary

(ii) Collect effluent samples at random from Sugar, Distillery, Paper, Textile and Tannery not discharging effluents into CETP/conveyor belt and claiming zero discharge and mechanism adopted.

(iii) Collection of samples from points where river Ganga or its tributary comes to territory of Uttar Pradesh to Uttarakhand

(iv) Collection of samples from the places where Uttarakhand industrial pockets are located on Ganga or its tributaries

(v) Collect test samples of groundwater

4.2 **Part II**

(i) Actual discharge from each major drain that joins river Ganga from Haridwar to Kanpur

(ii) Load of sewage at the point of STP and point where STPs are sought to be constructed

(iii) Whether existing STPs receive entire discharge from drain or treated effluent again discharged into drain

(iv) Contribution of grossly polluting industries and other industries to sewage

(v) Extent of water extraction from river Ganga for various use particularly by industries.

5.0 METHODOLOGY OF SURVEY

The Committees of Part I and II with decided schedule assembled at identified city/town and proceeded to locations to be seen. The survey included physical inspections of the issues like CETPs, STPs, Industry, Drains, River Ganga (its tributaries and interaction with local citizens and concerned officials of the Departments (Prof Vinod Tare could not join)

6.0 SAMPLING AND ANALYSIS

In accordance with the Orders of Hon'ble Tribunal;

6.1 **Part I**

(i) The collected samples are to be analysed in IIT, Kanpur, IIT, Delhi and CPCB. Comparative statement is required to be placed.

(ii) There is no restriction on scope of analysis to cover any parameters

6.2 **Part II**

(i) Collection of samples from drains and inlet points of existing/proposed STPs. Samples were required to be comprehensively analysed

(ii) Samples are required to be analysed in the laboratory of CPCB and IIT, Roorkee

(iii) Adopting two methods of discharge

6.3 **Sampling and Analytical Methods**

(i) The sampling is done as per prescribed methods described in "American Public Health Association"; and

(ii) Analysis of samples is also carried out as per prescribed SoPs and defined analytical procedures. [It is place for kind information that Laboratory of CPCB is NABL accredited and duly notified as "Environment Laboratory'' by Ministry of Environment & Forest.]

S. No.	Date of Visit	Locations
1.	November 21-22, 2015	Haridwar[STPs, River Ganga, Tributaries, Industries, CETPs]
2.	November 28-29, 2015	Kanpur-Unnao (CETPs,CCRU,Pumping Stations, Disposal area)
3.	February 27-28, 2016	Kanpur – Farukkhabad [CETPs, River Ganga, Tributaries]
4.	May 8, 2016	BrijGhat, Ballawali [STPs, Drain, River]
5.	May 29, 2016	Mathura CETP
6.	June 4-5, 2016	Narora, Anupsheher, Bijnore [Drains, STPs, Industries, River]
7.	June 18-19, 2016	Sitarganj, Rudrapur [CETP, Tributaries]

7.0 FINDINGS/OBSERVATIONS

Part I (Order dated 2nd November, 2015)

Attempts are made in following paras to summarise the findings on issues directed in the Order of Hon'ble Tribunal dated 2nd November, 2015.

Report on Compliance Status (Reference: OA No. 10 of 2015 order dated: November 02, 2015)

SUMMARY

S. No.	Activity	Activities complied	Observations and conclusion
1.	Collection of effluent samples from inlet and outlet of the CETPs from all industrial clusters located on the bank or anywhere near the vicinity of river Ganga or its tributaries.	**Samples collected from 4 CETPs :-**	
		1 at **SIDCUL Haridwar**(on 21.11.2015) – Final effluent analysis results - **Annexure – I**	**CETP at SIDCUL, Haridwar:** final overflow from lagoon is being discharge into the river Sukhi leading to Ganga. The CETP is supposed to be ZLD as per directions of UEPPCB. Find outlet not complying.
		1 at **Jajmau Kanpur** 28.11.2015 - Final effluent analysis results - **Annexure – II**	**CETP at Jajmau Kanpur:** The concentration of many parameters such as BOD, COD, Suspended Solids, Chlorides, Total Chromium and Oil & Grease are not meeting the prescribed standards.
		1 at **BantherUnnao** 28.11.2015 - Final effluent analysis results - **Annexure – III**	**CETP at BantherUnnao:** The concentration of many parameters such as BOD, COD, Suspended Solids, Chlorides, Total Chromium and Oil & Grease are not meeting the prescribed standards.
		1 at **UPSIDC site – II Unnao** 28.11.2015 - Final effluent analysis results - **Annexure – IV**	**CETP at UPSIDC site – II Unnao:** The concentration of many parameters such as BOD, COD, Suspended Solids, Chlorides, Total Chromium and Oil & Grease are not meeting the prescribed standards.
		Sitarganj	Sample collected and CETP non-complying
		Pant Nagar	Under construction
		Mathura	Sample collected and CETP non-complying
		Rumapur, Kanpur	Closed
2.	i. Collection of effluent samples at random from Sugar, Sugar Distillery, Paper, Textile and Tannery industries which are not discharging their effluents into the conveyor belt and claim to be Zero Discharge Units.	Samples collected from 1 Pulp & Paper unit in Haridwar on 21.11.2015. The results are shown in **Annexure – V**	The concentration of parameters such as COD, Suspended Solids are not meeting the prescribed standards.

S. No.	Activity	Activities complied	Observations and conclusion
	ii. Identification of the source, element discharged upon and mechanism adopted by the industry	-	-
3.	Collection of samples from the points where river Ganga or any of its tributary comes to the territory of Uttar Pradesh from Uttarakhand.	Samples collected from 3 different locations on 21.11.2015. The results are shown in **Annexure – VI, VII, VIII**	The parameters such as pH, DO, BOD, TDS are within permissible limit. However, Coliform count were found on the higher side in two cases and in one case Coliform count was found within limit.
4.	Collection of samples from the places where Uttarakhand Industrial pockets are located on river Ganga or its tributaries.		
5.	Collection of samples from points where the tributaries join river Ganga and downstream to examine the water quality		
6.	Samples collected where river Ganga or any of its tributary comes to the territory of Uttar Pradesh from Uttarakhand.	Sample Collected from 6 locations on 23.01.2016.The results are shown in **Annexure – IX**	At three (3) locations DO was found less than 5 mg/l. At five (5) locations BOD was found in the range from 6-9 mg/l. At one location color was found 100 Hazen Unit
7.	Collection of groundwater samples as and when required	Samples collected from 4 different locations on 28.11.2015. The results are shown in **Annexure – X, XI**	The analytical result indicates the ground water quality was found inferior compare to the surface water.

ANNEXURE-I

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM CETP, SIDCUL, HARIDWAR

Date of Sampling: 21-11-2015

Sl. No.	Sampling Location	Sampling point	As	Cd	Co	Cr	Cu	Fe	Mn	Ni	Pb	Sb	Se	V	Zn
1.	CETP SIDCUL, Haridwar	**Inlet**	BDL	BDL	BDL	2.31	0.11	2.86	0.13	0.66	BDL	0.05	BDL	BDL	0.98
2.		**Outlet**	BDL	BDL	BDL	0.49	0.04	3.71	0.14	0.35	BDL	BDL	BDL	BDL	0.16
3.		**Outlet overflow Lagoon**	BDL	BDL	BDL	0.18	BDL	1.00	0.14	0.25	BDL	BDL	BDL	BDL	0.04
4		**Sludge**	BDL	BDL	0.004	6.500	0.739	32.087	0.161	1.110	0.122	BDL	BDL	0.049	4.630

Sl. No.	Sampling Location	Sampling Point	pH	TSS	COD	BOD	Cl^-	Oil & Grease	Total coliform (MPN/100 ml)	Faecal coliform (MPN/100 ml)
1.	CETP SIDCUL, Haridwar	**Inlet**	6.63	141	623	288	468	13	$54x10^7$	$40x10^6$
2.		**Outlet**	7.33	68	214	57	430	BDL	$92x10^4$	$28x10^4$
3.		**Outlet overflow Lagoon**	7.53	17	132	22	411	BDL	$54x10^4$	$14x10^4$

Note: All values are expressed in mg/l except pH& Conductivity (µmho/cm).

ANNEXURE-II

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM CETP JAJMAU, KANPUR

(Date of Sampling: 28-11-2015)

Sl No.	Parameters	CETP Inlet			Outlet	Irrigation channel
		Industrial	Sewage	Mixed Influent		
1.	pH	8.50	8.30	8.25	8.05	8.06
2.	Conductivity	20,273.00	1,942.00	9,498.00	6,092.00	3,191.00
3.	Suspended Solids	2,648.00	390.00	1,081.00	199.00	83.80
4.	Total Dissolved Solids	13,411.00	1,196.00	5,876.00	3,362.00	1,870.00
5.	Calcium as Ca^{2+}	144.00	64.00	108.00	86.40	63.20
6.	Chloride as Cl^-	6,515.00	343.00	2,614.00	1,825.00	572.00
7.	Sulphate as SO_4^{2-}	2,070.00	125.00	1,086.00	111.00	208.00
8.	Sulphide as S	168.00	1.29	3.70	2.46	2.44
9.	Phosphate as P	BDL	0.524	0.367	0.631	0.643
10.	Am. Nitrogen	343.00	71.90	219.00	BDL	BDL
11.	Alkalinity	1,360.00	467.00	954.00	1,280.00	622.00
12.	Oil & Grease	288.00	50.40	86.60	16.10	21.00
13.	BOD	1,644.00	206.00	601.00	201.00	64.50
14.	COD	2,832.00	410.00	1,203.00	423.00	212.00
15.	Total Coliform MPN/100 ml	7.9×10^5	4.6×10^7	1.6×10^7	3.5×10^6	5.4×10^6
16.	Faecal Coliform MPN/100ml	3.3×10^5	4.6×10^7	2.2×10^6	1.7×10^6	1.4×10^6
17.	Total Chromium (Cr)	77.20	2.09	7.48	23.40	1.98
18.	Cadmium (Cd)	BDL	BDL	BDL	BDL	BDL
19.	Cobalt (Co)	BDL	BDL	BDL	BDL	BDL
20.	Copper (Cu)	BDL	BDL	BDL	BDL	BDL
21.	Iron (Fe)	6.06	2.71	1.17	3.80	0.76
22.	Manganese (Mn)	0.54	0.15	0.15	0.26	0.10
23.	Nickel (Ni)	0.37	BDL	BDL	0.21	BDL
24.	Lead (Pb)	0.55	BDL	BDL	BDL	BDL
25.	Zinc (Zn	0.52	0.39	0.23	0.42	BDL

Note: All values are expressed in mg/l except pH, Cond. (µmho/cm), TC & FC.

We have observed that all the treated wastewater is utilized for irrigation, However, the Total Chromium in the Irrigation Channel is reduced from 23.4 mg/L to 1.98 mg/L. It is highly recommended that food grains and vegetables grown should be checked for heavy metals specifically chromium.

IIT ROORKEE LABORATORY ANALYTICAL RESULTS OF IRRIGATION CHANNEL
(DATE OF SAMPLING: 27.02.2016)

S.No.	Parameters	Irrigation Channel
1	pH	8.1
2	Turbidity (NTU)	920
3	Alkalinity (mg/L)	880
4	Sulphate (mg/L)	368
5	COD (mg/L)	522
6	BOD (mg/L)	177
7	TDS (mg/L)	1928
8	TSS (mg/L)	560
9	VSS (mg/L)	134
10	NH_3N (mg/L)	10.8
11	NO_3N (mg/L)	4
12	TKN (mg/L)	13.0
13	TN (mg/L)	17.0
14	PO4-P (mg/L)	5.8
15	TP (mg/L)	10.2
16	TC (MPN/100mL)	24000
17	FC (MPN/100mL)	1500

S.No.	Heavy Metal	Irrigation channel
1	Cd (mg/L)	0.1031
2	Cr (mg/L)	7.51058
3	Cu (mg/L)	6.78944
4	Fe (mg/L)	10.45311
5	Pb (mg/L)	0.08461
6	Zn (mg/L)	3.47313
7	As (mg/L)	0.1483
8	Ni (mg/L)	0.01121
9	Co (mg/L)	0.89593
10	Mn (mg/L)	0.25667

ANNEXURE-III

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM CETP, BANTHAR, UNNAO
(Date of Sampling: 28-11-2015)

Sl no.	Parameters	Inlet	Outlet
1.	**pH**	8.29	8.31
2.	**Conductivity**	21,261.00	24,882.00
3.	**Suspended Solids**	563.00	401.00
4.	**Total Dissolved Solids**	14,578.00	17,386.00
5.	**Calcium as Ca^{2+}**	305.00	252.00
6.	**Chloride as Cl^-**	6,496.00	7,462.00
7.	**Sulphate as SO_4^{2-}**	3,611.00	5,120.00
8.	**Sulphide as S**	29.60	2.01
9.	**Phosphate as P**	BDL	BDL
10.	**Am. Nitrogen**	BDL	BDL
11.	**Alkalinity**	1,225.00	1,190.00
12.	**Oil & Grease**	64.60	15.90
13.	**BOD**	1,250.00	453.00
14.	**COD**	2,231.00	1,341.00
15.	**Total Chromium**	21.10	3.32
16.	**Cadmium (Cd)**	BDL	BDL
17.	**Cobalt (Co)**	BDL	BDL
18.	**Copper (Cu)**	BDL	BDL
19.	**Iron (Fe)**	1.05	0.33
20.	**Manganese (Mn)**	0.16	0.08
21.	**Nickel (Ni)**	0.34	0.26
22.	**Lead (Pb)**	0.53	BDL
23.	**Zinc (Zn**	0.30	0.36

Note: All concentrations are expressed in mg/l except of pH & Conductivity (µmho/cm).

ANNEXURE-IV

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM C.E.T.P., UPSIDC INDUSTRIAL AREA, SITE-II, UNNAO

(Date of Sampling: 28-11-2015)

Sl. No.	Parameters	Inlet	Outlet
1.	**pH**	7.83	8.16
2.	**Conductivity**	21,273.00	22,683.00
3.	**Suspended Solids**	854.00	324.00
4.	**Total Dissolved Solids**	13,982.00	14,197.00
5.	**Calcium as Ca^{2+}**	200.00	34.00
6.	**Chloride as Cl^{-}**	6,389.00	6,058.00
7.	**Sulphate as SO_4^{2-}**	2,703.00	3,162.00
8.	**Sulphide as S**	14.10	3.07
9.	**Phosphate as P**	BDL	BDL
10.	**Am. Nitrogen**	BDL	BDL
11.	**Alkalinity**	1290	1,551.00
12.	**Oil & Grease**	72.70	60.20
13.	**BOD**	1,152.00	438.00
14.	**COD**	1,962.00	987.00
15.	**Total Chromium**	27.60	6.01
16.	**Cadmium (Cd)**	BDL	BDL
17.	**Cobalt (Co)**	BDL	BDL
18.	**Copper (Cu)**	BDL	BDL
19.	**Iron (Fe)**	2.72	0.65
20.	**Manganese (Mn)**	0.35	BDL
21.	**Nickel (Ni)**	0.26	0.26
22.	**Lead (Pb)**	BDL	BDL
23.	**Zinc (Zn**	0.36	BDL

Note: All concentrations are expressed in mg/l except pH& Conductivity (µmho/cm).

ANNEXURE-V

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM GANGOTRI PAPER MILLS PVT.LTD.

(Date of Sampling: 21-11-2015)

Sl. No.	Sampling Location	Sampling Point	pH	TSS	COD	BOD	Cl^-	SO_4
1	Gangotri Paper Mills Pvt. Ltd.	Inlet	5.88	6638	21300	16486	1600	2175
2		After primary clarifier	5.98	1540	27312	15684	1647	2185
3		After sand filter	6.01	1390	26848	16850	1447	1420
4		After Secondary clarifier	7.71	313	472	109	644	432

Note: All concentrations are expressed in mg/l except pH & Conductivity (µmho/cm)

ANNEXURE-VI

WATER QUALITY ANALYTICAL RESULTS

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM RIVER GANGA AT AJEETPUR VILLAGE, DOWNSTREAM OF OUTLET JAGJEETPUR STPs (STP 27MLD + 18MLD)
(Date of Sampling: 21-11-2015)

Sampling Location	pH	Cond	COD	BOD	TDS	DO	Cl-	Total Alkalinity as CaCO3	Ca++	Mg+	NH_3
River Ganga at Ajeetpur after meeting with Jagjeetpur STP drain	7.8	203	14	02	118	11.2	09	76	29	02	BDL

Sampling Location	As	Cd	Co	Cr	Cu	Fe	Mn	Ni	Pb	Sb	Se	V	Zn	Total coliform MPN/100 ml	Faecal coliform MPN/100 ml
River Ganga at Ajeetpur after meeting with Jagjeetpur STP drain	BDL	BDL	BDL	BDL	BDL	0.62	0.02	BDL	BDL	BDL	BDL	BDL	BDL	170	130

Note: All concentrations are expressed in mg/l except of pH & Conductivity (µmho/cm).

ANNEXURE-VII

WATER QUALITY ANALYTICAL RESULTS

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM LAKSAR DRAIN AFTER MEETING WITH BANGANGA RIVER AT IDRISPUR
(Date of Sampling: 21-11-2015)

Sampling Location	pH	Cond.	COD	BOD	TDS	DO	Cl^-	Total Alkalinity as CaCO3	Calcium as Ca^{++}	Magnesium as Mg^{+}	NH3
Laksar drain after meeting with Banganga river at Idrispur	7.7	495	06	02	290	7.8	10	226	66	02	BDL

Sampling Location	As	Cd	Co	Cr	Cu	Fe	Mn	Ni	Pb	Sb	Se	V	Zn	TCM PN/100 ml	FC MPN/ 100 ml
Laksar drain after meeting with Banganga river at Idrispur	BDL	BDL	BDL	BDL	BDL	0.38	0.06	BDL	BDL	BDL	BDL	BDL	BDL	$13x10^4$	$17x10^3$

Note: All concentrations are expressed in mg/l except of pH & Conductivity (µmho/cm).

ANNEXURE-VIII

WATER QUALITY ANALYTICAL RESULTS

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM RIVER KALI & RIVER GANGA BEFORE CONFLUENCE OF RIVER KALI

(Date of Sampling: 28-11-2015)

Sl no.	Parameters	River Ganga Before Confluence of River Kali	River Kali	River Kali (Sampling by IIT Roorkee) 28th Feb 2016
1.	**pH**	8.30	7.90	8.1
2.	**Turbidity**	50.00	140.00	29.2
3.	**Colour**	15.00	20.00	-
4.	**Conductivity**	296.00	227.00	-
5.	**Suspended Solids**	175.00	1299.00	23
6.	**Total Dissolved Solids**	164.00	148.00	355
7.	**Calcium as Ca^{2+}**	33.60	27.80	-
8.	**Magnesium as Mg^{2+}**	17.70	7.70	-
9.	**Sodium as Na^{+}**	11.00	7.40	-
10.	**Carbonate**	59.16	BDL	-
11.	**Bi-Carbonate**	47.90	93.80	-
12.	**Phosphate as P**	0.019	0.230	1.2
13.	**Nitrite as N**	0.014	0.042	-
14.	**Am. Nitrogen**	BDL	BDL	3.0
15.	**COD**			75
16.	**BOD**			20
17.	**Nitrate**			5.8
18.	**TKN**			3.1
19.	**Total Coliforms**			240
20.	**Fecal Coliforms**			40

Note: All concentrations are expressed in mg/l except of pH & Conductivity (µmho/cm) and coliforms (MPN/100 ml).

ANNEXURE – IX

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM INTERSTATE RIVER INUTTARAKHAND AND UP

(Date of Sampling: 23-01-2016)

Sl. No.	Sampling Location	Sample Code	pH	Cond.	DO	COD	BOD	TDS	Colour (Hazen unit)	Chloride	NH_3-N
1.	River Dhela Before confluence to river Ramganga At BhojpurRoad From Bridge	RD	7.4	900	6.66	66	06	530	100	90	0.4
2.	River Kosi before confluence of riverBehlla Rampur Moradabad Road from Dadhiyal Bridge	RKD	7.8	635	10.17	12	03	370	40	14	BDL
3.	River Bahela before confluence of river Kosi at Lohia Bridge	RB	7.5	411	3.68	24	09	240	70	19	BDL
4.	River Kosibefore confluence to river Ramgangaat Rampur Moradabad Road from Bridge	RKO	7.5	616	3.51	38	08	358	53	20	0.7
5.	River Ramganga before confluence of river Kosi at Katghar From bridge	RRK	7.5	435	7.46	32	09	251	66	29	2.8
6.	River Ramganga after confluence of river Kosiat Shahabad from Bridge	RRS	7.4	555	4.32	30	08	325	40	41	6.4

Note: All values are expressed in mg/l except pH & Conductivity (µmho/cm).

ANNEXURE – IX
Page 1/2

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM INTERSTATE RIVER IN UTTARAKHAND AND UTTAR PRADESH.

(Date of Sampling: 23-01-2016)

Sl. No.	Sampling Location	Code	As	Cd	Cr	Cu	Fe	Mn	Ni	Pb	Zn	Co	Sb	Se	V
1.	River Dhela before confluence to river Ramganga at BhojpurRoadFrom Bridge	RD	BDL	BDL	BDL	BDL	1.17	0.27	BDL	BDL	0.01	BDL	BDL	BDL	BDL
2.	River Kosi before confluence of river Behllaat Rampur Moradabad Road from Dadhiyal Bridge	RKD	BDL	BDL	BDL	BDL	1.53	0.29	BDL	BDL	0.06	BDL	BDL	BDL	BDL
3.	River Bahela before confluence of river Kosi at Lohia Bridge	RB	BDL	BDL	BDL	0.01	1.75	0.31	BDL	BDL	0.15	BDL	BDL	BDL	0.02
4.	River Kosi before confluence to river Ramganga at Rampur Moradabad Road from Bridge	RKO	BDL	BDL	BDL	BDL	0.24	0.11	BDL	BDL	BDL	BDL	BDL	BDL	0.04
5.	River Ramganga before confluence of river Kosi at Katghar from bridge	RRK	BDL	BDL	BDL	0.13	1.40	0.09	0.04	0.07	0.39	BDL	BDL	BDL	BDL
6.	River Ramganga after confluence of river Kosi at Shahabadfrom Bridge	RRS	BDL	BDL	BDL	0.02	0.35	0.22	BDL	BDL	0.05	BDL	BDL	BDL	BDL

Note: All values are expressed in mg/l.

IIT ROORKEE LABORATORY ANALYTICAL RESULTS OF RIVER RAMGANGA BEFORE CONFLUENCE OF GANGA
(DATE OF SAMPLING: 28.02.2016)

Parameters	River Ramganga Before Confluence of River Ganga
pH	8
Turbidity (NTU)	4
Alkalinity (mg/L)	200
Chlorides (mg/L)	4
Sulphate (mg/L)	322
COD (mg/L)	27
BOD (mg/L)	7
TDS (mg/L)	38
TSS (mg/L)	0
NH3N (mg/L)	0.34
NO3N (mg/L)	0.8
TKN (mg/L)	1.1
TN (mg/L)	0.06
PO4-P (mg/L)	0.2
TP (mg/L)	170
TC (MPN/100mL)	11
FC (MPN/100mL)	8

ANNEXURE-X

GROUND WATER QUALITY ANALYTICAL RESULTS

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM GROUND WATER

(Date of Sampling: 28-11-2015)

Sl no.	Parameters	GW - 1	GW - 2	GW – 3
		Shekhpur Village	ShekhpurChourah	Jana Village
1.	**pH**	7.20	7.22	7.35
2.	**Conductivity**	1,980.00	1,716.00	1,186.00
3.	**Suspended Solids**	10.20	BDL	120.50
4.	**Total Dissolved Solids**	1,341.00	1186	783.00
5.	**Calcium as Ca^{2+}**	101.00	109.00	41.00
6.	**Chloride as Cl^-**	339.00	295.00	159.00
7.	**Sulphate as SO_4^{2-}**	158.00	106.00	34.90
8.	**Phosphate as P**	0.003	BDL	0.003
9.	**Alkalinity**	452.00	403	400.00
10.	**COD**	BDL	BDL	BDL
11.	**Cadmium (Cd)**	BDL	BDL	BDL
12.	**Cobalt (Co)**	BDL	BDL	BDL
13.	**Total Chromium (Cr)**	0.068	BDL	BDL
14.	**Copper (Cu)**	BDL	BDL	BDL
15.	**Iron (Fe)**	7.90	0.97	BDL
16.	**Manganese (Mn)**	0.164	0.232	BDL
17.	**Nickel (Ni)**	BDL	BDL	BDL
18.	**Lead (Pb)**	BDL	BDL	BDL
19.	**Zinc (Zn**	0.18	0.42	BDL

Note: All concentrations are expressed in mg/l except of pH & Conductivity (µmho/cm)

ANNEXURE-XI

GROUND WATER QUALITY ANALYTICAL RESULTS

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM GROUND WATER OF RBNS SUGAR MILLS

(Date of Sampling: 21-11-2015)

Sampling Location	pH	Cond	COD	BOD	TDS	Chloride	Total Alkalinity as CaCO3	Calcium as Ca^{++}	Magnesium as Mg^{+}	NH3
Ground water of RBNS Sugar mills	7.6	772	06	01	449	15	260	64	19	-

Note: All concentrations are expressed in mg/l except of pH & Conductivity (µmho/cm)

7.1 COMMON EFFLUENT TREATMENT PLANTS (CETPs)

Common Effluent Treatment Plant (CETP) is a facility to cater the need of medium/small scale industries to facilitate them for treating their effluents collectively with joint responsibilities to operate the system. CETP thus, is a larger version of industrial effluent treatment plant (ETP). The Member Industry of CETP has to however comply with the norms prescribed to dispose their effluent into common conveyance system which leads to CETP for treatment. CETP as per nature of industry can be for Homogenous or Heterogeneous industrial effluents.

The CETPs existing on the main bank of river Ganga visited by the team and those located on Tributaries and inspected in one or other context are as under:-

S.No.	**Common Effluent Treatment Plant (CETP)**	**State**	**Location**	
1.	SIDCUL	Uttarakhand	Haridwar	Operational
2.	SIDCUL	Uttarakhand	Sitarganj	Operational
3.	SIDCUL	Uttarakhand	Pant Nagar(Rudrapur)	Under Construction
4.	CETP (Tanneries)	Uttar Pradesh	Unnao, Kanpur	Operational
5.	CETP (Tanneries)	Uttar Pradesh	Banthar(Unnao)	Operational
6.	CETP (Tanneries)	Uttar Pradesh	Jajmau (Kanpur)	Operational
7.	CETP (Textile)	Uttar Pradesh	Rumapur, Kanpur	Non Operational
8.	CETP (Textile)	Uttar Pradesh	Mathura, UP	Operational

Status of Common Effluent Treatment Plants (CETP)
[Uttarakhand]

SN	Name of CETP	Capacity (flow)	Treatment Technology	Operational Status	Operating Agency	Member units		System of Conveyance	Disposal	
						Number	Process / Activity		Waste water	Sludge
01	CETP , SIDCUL, Haridwar	4.5 MLD	ASP	Operational	SK UEM Water Project (P) Ltd.,	424 (395)	Plastic, Agro products, Pharma, Electronics Textile	Closed conveyance by gravity	R. Ganga	TSDF Roorkee
02	CETP Sitarganj	4.0 MLD	ASP	Operational	JITF ESIPL, Sitarganj Ltd.	96 (78)	Plywood, Soap and Starch mfg.	Closed conveyance by gravity	On land	TSDF Roorkee
03	CETP Pant Nagar	4.0 MLD	ASP	Incomplete and Non-operational. (Under Construction)	Ramky (Contractor for Construction)	310 (180)	Automobile, Plywoods, Pharma, Food	Closed conveyance by gravity + pump	ZLD consent, with permission for Reuse in Auto-sector.	Under construction

Status of Common Effluent Treatment Plants (CETP)
[Uttar Pradesh]

SN	Name of CETP	Capacity (flow)	Treatment Technology	Operating Agency	Criteria for O&M cost	Member units		System of Conveyance	Disposal	
						Number	Process / Activity		Waste water	Sludge
01	36 MLD, Jajmau, Kanpur (UP)	36 MLD	UASB followed by Aerobic Post Treatment	UP Jal Nigam	No. of hyde processed	402 (260)*	Tanneries	Underground, partly open	Irrigation	TSDF Kanpur Dehat
02	Site-II, UPSIDC Indl Area, Unnao (U.P.)	2.15 MLD	ASP	Unnao Tanneries Pollution Control Co.	Water consumption	21 (14)*	Tanneries	Underground, partly open	Municipal drain (Loni)	Captive TSDF Banthar
03	UPSIDC Leather Tech Park, Banthar, Unnao (UP)	4.5 MLD	ASP	Banthar Pollution Control Co., Leather Technology Park, Banthar, Unnao	Water consumption	45 (25)*	Tanneries and allied units	Open	Municipal drain (Jail)	Captive TSDF Banthar
04	Site-A, D-70, Industrial Area, Mathura (U.P.)	6.25MLD	ASP	Mathura Indl Area Poll. Control Co. Ltd	No. of Sari printing tables	30 (15)*	Textile (Cotton) Dying/ printing	Underground/ Partly open	Municipal drain	TSDF Kanpur Dehat
05	CETP UPSIDC Textile Park Rooma, Kanpur (UP)	1.5 MLD	Aerated Bio-reactor Currently not in operation and under re-vamping	UPSIDC	Plot size	40 (08)*	Textile Dyeing and bleaching	Underground/ Partly open	Industrial drain leading to R. Ganga	Proposed for TSDF Kanpur Dehat (Not operational)

*Operating and connectd to CETP – and number varies

7.1.1 COMMON EFFLUENT TREATMENT PLANT (CETP), SIDCUL, HARIDWAR (UK)

- SIDCUL (State Industrial Development Corporation of Uttarakhand Ltd.), a nodal agency of of State Government of Uttarakhand for Industrial development, established Waste water Collection System and Common Effluent Treatment Plant (CETP) in IIE- Haridwar, on BOT basis.

- UEPPCB granted Consent to Establish in 2005 for establishing 4.5 MLD capacity CETP, which was later extended to 2008, as CETP commissioned in 2008.

- As per the NOC condition;

  i) SIIDCUL has been asked to submit the proposal for Recycle and Reuse the treated water of the CETP.
  ii) Provision for continuous online monitoring to be installed at CETP.

- It is to mention here, since 2009, SIDCUL is being asked from UEPPCB regarding status of ZLD/reuse plan of treated effluent.

Waste Water Collection System &Common Effluent Treatment Plant:-

S. NO.	COTEGORIES	PH	COD (mg/l)	TDS (ppm)
1.	Cosmetic and Allied	6.5-8.5	> 10000	> 2000
2.	Food and Allied	6-7.5	> 5000	> 800
3.	Domestic and sanitary	6-7.5	> 250	> 500
4.	Plastic and Allied	6-7.5	> 15000	> 1800
5.	Textile and Allied	6.5-8.5	> 5000	> 1500
6.	Pharma Products	6.5-8.5	> 8000	> 2000
7.	Electrical, Electronics	5.5-8.5	> 5000	> 2000
8.	Automotive and Allied	6.5-8.5	> 10000	> 2000

Category of Industries:

- Heterogeneous types of industries over here in this estate.
- Proper pre-treatment of Effluent by the industry itself is imposed before discharging it to the Waste Water Collection System line of CETP.

Source: UEPPCB

- Due to heterogeneous mixed type of industries and domestic sewage, wastewater being received at inlet of CETP is mixed type and varied in nature from time to time. There are 424 industrial units in the estate of SIDCUL area. At present 395number of industries are connected with the CETP with approximate daily wastewater flow of 3.5 MLD. However, present installed capacity of the CETP is 4.5 MLD for which Pollution Control Board has issued Consent to Establish. Major contribution of effluent is by M/s Hero Motors which is having

a volume nearly 470 KLD and M/s Hindustan Unilever Ltd which is having waste water volume nearly 250 KLD. Both of these units have ETP. Remaining industries are small in nature and also having their own treatment system.

TREATMENT PROCESS SCHEME OF CETP

A) Primary Treatment:

Screening: Two no. of screen have been provided, one at the inlet of raw influent and another is fine screen installed before Equalization Cum Neutralization tank.
Oil and Grease Removal System: The mechanical oil skimmer is provided to remove the of oil and grease collected at the top of the tank. It is being collected in separate tank for further disposal.
Equalization Cum Neutralization Tank: Equalization cum neutralization system is provided to;-

- Enhance Biological Treatment and stabilize pH.
- Improve Biological Treatment Process by consistency in solids loading.
- Equalise the BOD and TSS loading, to improve chemical feed control and process reliability.

Flash Mixing, Flocculation and lamella Clarification.

This process is found operational where alum was being added for flocculation to remove chemically destabilized particles and thus, reducing BOD and Suspended Solids. In this process metals are also precipitated at elevated pH and clarified by lamella clarifier. The sludge so generated is being stored separately.

B) Secondary Treatment, comprising of Aeration Tank operating in extended aeration mode and Secondary Clarification.

The wastewater is let into aeration tank where an aerobic bacterial culture is maintained in suspension that removes the BOD present in the incoming wastewater. In aeration tank, air is introduced through diffused aeration system along with the complete network of piping and blowers.

C) Tertiary Filtration:

In order to decrease the pollution load in terms of BOD, COD, TSS and Color, the CETP has made arrangement of Tertiary Treatment including Pressure Sand Filter s and Activated Carbon Filter.

D) Disposal:

Finally, treated effluent is being stored in to the lagoon. It is informed that nearly 2.5 to 3 MLD of treated effluent is being generated which is stored into the lagoon. From the lagoon nearly 0.5 MLD of effluent is used for gardening at Industrial Area. Mode of transportation is Tankers. Remaining effluent is being disposed in to the nearby drain “River Sukhi” Pollution Control Board has imposed condition of re-utilization of treated effluent, but, it is not complied.

OBSERVATIONS

- Based on the results it has been observed that CETP is not complying with the CETP inlet norms (as per design criteria) with respect to parameters which include Phenol, Boron, Oil & Grease. The CETP does not comply with the stipulated norms of effluent discharge norms with respect to parameters which include Phenol, Boron and BOD. The treated effluent collected at the lagoon is also not confirming to the stipulated norms of treated effluent with respect to parameters which include TDS, Phenol, Boron BOD and COD.

- The unit has not installed any flow measuring device at the outlet of CETP.

- The CETP has system of dewatering primary sludge by centrifuge and after dewatering; it is collected in bags and sent to TSDF, Roorkee. It was observed that a temporary HW storage room is provided. The roof of HW storage room was not completely covered. Effluent from Centrifuge is again collected at the inlet chamber of effluent.

- The sludge generated from the secondary clarifier was collected in sludge drying beds and required to be used as manure.

- The unit has not installed online monitoring system at the outlet. As per NOC, granted by UEPPCB the unit has to install Ion Exchange system, RO system as well as incineration system to achieve Zero Liquid Discharge (ZLD) and continuous online monitoring system. The unit has not complied with the condition of NOC and granted to the CETP till 31.03.2015.

- The unit has established a lab for the analysis of pH, TSS, BOD, COD etc. and log book of same is maintained.

- The unit has also not made any mechanism to check the effluent quality of member units and informed to SPCB regarding non-compliance of inlet standards stipulated to inlet to CETP.

- The treated effluent after lagoon finds its way into River Sukhi which leads to river Ganga.

CONCLUSION

CETP is non-complying & required to set-up on-line devices & install system for ZLD / system to utilize treated water.

CETP Haridwar
[Date of Sampling: 21-11-2015]

Parameters ⇨ Sampling Locations ⇩	Equalization Tank of CETP	**CETP inlet norms(as per Design)**	Outlet of CETP	Lagoon	**Outlet Standards**
pH	7.10	**5.5-9.0**	7.35	7.34	**6.0-9.0**
SS	373	**1500***	43.8	59.2	**100**
TDS	--	**---**	1234	2987	**--**
Chloride	--	**---**	378.6	373.8	**1000**
Fluoride	1.24	**15**	1.71	1.07	**2.0**
Sulphate	64.6	**---**	98.7	63.8	**1000**
Ammonia	24.3	**50**	28.3	28.9	**50**
TKN	--	**--**	39.6	37.2	**50**
Phenol	5.52	**5.0**	2.92	1.95	**1.0**
Boron	4.12	**2.0**	5.89	3.21	**2.0**
Oil & Grease	67.3	**20**	5.52	--	**10**
BOD	326	**500***	47.2	112	**30**
COD	814	**900***	164	251	**250**
Cr (VI)	BDL	**2.0**	BDL	BDL	**0.1**
Total Cr	1.22	**2.0**	BDL	0.34	**--**
Cd	BDL	**1.0**	BDL	BDL	**0.05**
Cu	0.28	**3.0**	BDL	BDL	**03**
Ni	1.03	**3.0**	1.19	0.67	**03**
Pb	BDL	**1.0**	BDL	BDL	**0.1**
Zn	2.54	**15.0**	0.25	0.43	**05**

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM CETP, SIDCUL, HARIDWAR
Date of Sampling: 21-11-2015

Sl. No.	Sampling Location	Sampling point	As	Cd	Co	Cr	Cu	Fe	Mn	Ni	Pb	Sb	Se	V	Zn
1.	CETP SIDCUL, Haridwar	**Inlet**	BDL	BDL	BDL	2.31	0.11	2.86	0.13	0.66	BDL	0.05	BDL	BDL	0.98
2.		**Outlet**	BDL	BDL	BDL	0.49	0.04	3.71	0.14	0.35	BDL	BDL	BDL	BDL	0.16
3.		**Outlet overflow Lagoon**	BDL	BDL	BDL	0.18	BDL	1.00	0.14	0.25	BDL	BDL	BDL	BDL	0.04
4		**Sludge**	BDL	BDL	0.004	6.500	0.739	32.087	0.161	1.110	0.122	BDL	BDL	0.049	4.630

Sl. No.	Sampling Location	Sampling Point	pH	TSS	COD	BOD	Cl^-	Oil & Grease	Total coliform MPN/100 ml	Faecal coliform MPN/100 ml
1.	CETP SIDCUL, Haridwar	**Inlet**	6.63	141	623	288	468	13	$54x10^7$	$40x10^6$
2.		**Outlet**	7.33	68	214	57	430	BDL	$92x10^4$	$28x10^4$
3.		**Outlet overflow Lagoon**	7.53	17	132	22	411	BDL	$54x10^4$	$14x10^4$

Note: All values are expressed in mg/l except pH& Conductivity (µmho/cm).

7.1.2 COMMON EFFLUENT TREATMENT PLANT (CETP), SITARGANJ

- Common Effluent Treatment Plant (CETP), Sitarganj is located at Industrial Area, Sitarganj (Uttarakhand). It is operated and maintained by JITF ESIPL (Sitarganj) Ltd. and operated under Build, Operate and Transfer (BOT) basis.

- The CETP has installed capacity of 4.0 MLD. The CETP has presently 78 members out of 96 are connected to CETP and approx. 2.5 MLD (avg.) flow is received at CETP from its member units. The CETP has installed electromagnetic flow meter at the inlet of CETP.

- Following type of industries contribute the effluent primarily:

  a. Starch manufacturing units
  b. Plywood
  c. Soap

- The effluent generated from the member units is conveyed through closed pipelines by gravity to CETP. The treatment process of CETP is based on the Activated Sludge Process (ASP) with tertiary treatment system. The CETP comprises of following units:

  a. Equalization Tank
  b. Primary Clarifier
  c. Aeration Tank
  d. Secondary Clarifier
  e. Pressure Sand Filter and Activated Carbon Filter
  f. Sludge Drying Beds

- The unit has not installed Online Continuous Effluent Monitoring Systems at the outlet of CETP.

- Treated effluent from CETP is disposed into drain.

- HW generated (Primary Clarifier Sludge) is sent to TSDF, Roorkee. While, Secondary Clarifier Sludge is dispose off on land.

- The CETP is operated without consent from UEPPCB.

Quality of Influent:

In this proposed Industrial Estate various type of industries as well as residential complexes and other utilities and services have located. Main contribution is from the following industries:-

  - Starch manufacturing units
  - Plywood

- Cosmetic and Allied
- General Manufacturing and Allied
- Domestic and sanitary
- Plastic and Allied
- Apparel and Allied
- Agro, Food and Allied
- Pharma Products.
- Electrical, Electronics and Allied.

Due to heterogeneous nature of industries and domestic sewerages, wastewater being received at inlet of CETP is mixed and varied in nature. The present installed capacity of the CETP is 4.0 MLD for which Pollution Control Board has issued Consent to Establish against which only 2.25 MLD is being received. CETP has following units:-

A) Primary Treatment:

Screening: Two screens had been provided, one at the inlet of raw influent and another is fine screen installed before Equalization Cum Neutralization tank. Mechanical bar screens were found non-operational

Oil and Grease Removal System: The mechanical oil skimmer is found operational for collection and removal of oil and the muck collected at the top of the tank is being collected in separate tank for further disposal.

Equalization cum Neutralization Tank: Equalization cum neutralization system is provided to:-

- Enhanced Biological Treatment and stabilize pH.
- Improve Biological Treatment Process by consistency in solids loading.
- As for as chemical treatment is concerned, damping of mass loading improves chemical feed control and process reliability.

Flash Mixing, Flocculation and Primary Tube Settlers.

This process is found operational where alum was being added for flocculation to remove chemically destabilized particles and thus reducing BOD and Suspended Solids. In this process metals are also gent precipitated at elevated pH and clarified by *Primary Tube Settlers*. The sludge so generated is being stored separately.

B) Secondary Treatment, comprising of Aeration Tank operating and Secondary Clarification.

The wastewater is introduced into aeration tank where an aerobic bacterial culture is maintained in suspension to remove the BOD present in the incoming wastewater. In aeration tank air is introduces through diffused aeration system along with the complete network of piping and blowers.

C) Tertiary Treatment- Filtration:
In order to decrease the pollution load in terms of BOD, COD, TSS and Color, the CETP has made arrangement of Tertiary Treatment including Pressure Sand Filter s and Activated Carbon Filter.

	
Inspection Team at CETP, Sitarganj	**Aeration Tank- Dark appearance**

	
Effluent Samples collected from CETP	**Drain receiving treated effluent discharge from CETP (showing storm water presence)**

OBSERVATIONS

- From the quantitative point of view committee finds that the CETP Sitarganj while in operation and it is unable to treat the wastewater volume as receiving into the plant. As per flow meter (installed at inlet sump) data nearly 2.25 MLD effluent is being received daily. However, installed capacity is 4.0 MLD.

- CETP is required to make arrangement for re-utilization of treated effluent so that it should not enter into any river or its tributary or inundated on land.

- OCEMS (online continuous monitoring system) had not been installed.

- CETP has not provided alternate power source like D.G. Set in case of power failure.

Physico-chemical analysis report of sample collected from CETP at Sitarganj

Date of Inspection: 18th, June 2016
Analysis report Issue date: 30 June 2016

S. No.	Sampling point	Parameters analysed					
		pH	**COD**	**BOD**	**TDS**	**TSS**	**NH_3-N**
1.	Inlet Sump	8.60	161	87	1016	199	169
2.	Equalization Tank	8.44	737	281	1316	2352	208
3.	Secondary Clarifier Outlet	6.58	507	125	2636	187	179
4.	Final Outlet	6.70	543	166	2512	226	174

Note: All the concentrations are expressed in mg/l except of pH and Conductivity (µmho/cm).

CONCLUSION

CETP is non-complying and must modify to meet the stipulated norms. The agency has to install on-line device- OCEMS at final outlet. The agency should have alternate power source like D.G. Set. The treated effluent as seen is discharged into the drain. The possibility of reuse should be explored.

7.1.3 CETP: PANT NAGAR (Uttarakhand)

This CETP was under construction. This CETP is expected to have 310 members and the plant is to handle heterogeneous nature of effluent.

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Team at CETP Pant Nagar</td><td>Incomplete Equipment</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">CETP- Non-operational condition</td></tr>
</table>

7.1.4 CETP: TANNERY EFFLUENT AT JAJMAU, KANPUR

- Jajmau cluster is located on the right bank of river Ganga on north eastern border of Kanpur city. There are 400 tanneries in the Cluster. Most of the tanneries are chrome tanning with varying scale of operations. Details of tanneries in Kanpur are as below:

Total Nos.	:	402
In Jajmau Cluster	:	400
In other parts of city	:	02

- The 36 MLD CETP for the treatment of wastewater generated from 175 tanneries (presently about 402 tanneries) was constructed and commissioned in 1994. The UASB based CETP has an inflow capacity of 36 MLD with tannery effluent to sewage (T: S) blending ratio 1:3 i.e. 9 MLD tannery effluent and 27 MLD sewage. For treatment after UASB reactors, a conventional treatment plant was constructed in 1996.

- For collection of tannery wastewater from the tanneries located in Jajmau area, 12 Km long conveyance system was constructed. The conveyance system is meant for tannery wastewater conveyance through four (4) pumping stations from where it is pumped to the 36 MLD UASB treatment plant (CETP). The tannery wastewater and domestic sewage are blended in a mixing tank in a ratio of 1:3 and ultimately pumped into the UASB reactors. The treated effluent is being utilized for irrigation after mixing with treated sewage of two STPs located in the same premises (130 and 5 MLD).

The salient features of Jajmau CETP Kanpur are tabulated below:-

Name of CETP	**CETP at Jajmau (36 MLD)**
Operated by	Ganga Pollution control Unit (G.P.C.U), U.P. Jal Nigam, Kanpur
Facility owned by	Ganga Pollution control Unit, U.P. Jal Nigam-Kanpur
Treatment Technology	Up Flow Anaerobic Sludge Blanket (UASB)
Treatment Capacity	36 MLD (Sewage : Tannery Effluent : 27 MLD:09MLD)
Member units	402 Tannery and allied units
Wastewater Collection	Through drain and underground conveyance system
Pre-treatment by member units	Solid removal systems provided
Power (electric) consumption	4636595 KWH / Year
Effluent Disposal	The treated effluent is being utilized for irrigation mixed with treated sewage of two STPs.

Sludge generation	400 cum/ day (Wet Sludge)
Sludge Disposal	Sent to TSDF for disposal
Consents & Authorisation	Not having valid consents under Water & Air Acts from UPPCB.

DRAINS IN JAJMAU, KANPUR AREA

The Jajmau area of Kanpur has four major drains. The drains were meant to carry storm water which started receiving industrial and domestic sewage and joins River Ganga. For collection of tannery wastewater from all the tanneries, 12 Km long collecting drains have been constructed. These drains bring the waste water at 4 pumping stations from where it is pumped to the 36 MLD UASB treatment plant through 5.3 Km long pipeline

The drains at Jajmau were monitored during visit of the Committee on 28.11.2015 and on other occasions. One-time flow in drains were measured on each monitoring day by float ball method and based on the velocity of wastewater, the average wastewater generation from Jajmau area was measured/calculated as below:

a. Calculation based on actual measurements at four pumping station (grab measurement)

Sr No	Pumping Station	Date of monitoring	Discharge measured at Bypass Drain (MLD)
01	Chabilepur	31.03.2015	---
		16.09.2015	16.00
02	Sheetala Bazar	31.03.2015	22.73
		16.09.2015	15.00
03	Wajidpur	31.03.2015	23.24
		16.09.2015	20.00
04	Buriyaghat	31.03.2015	15.73
		16.09.2015	06.00
Total Quantity		31.03.2015	61.7 MLD (Bypass Quantity) +11.00 MLD (CETP Inlet) **= 72.7 MLD**
		16.09.2015	57.00 MLD (Bypass Quantity) +11.00 MLD (CETP Inlet) = **68.00 MLD**

b. Calculation based on measurements at four pumping station(composite measurement)

To assess the total wastewater generation from the area, the quantity of waste water taken to treatment and excess quantity of untreated waste water discharged into the river Ganga was measured. The flow of each drain was measured using float ball method at the interval of 4 hrs for 24 hrs and the composite samples of wastewater being discharged into river Ganga through these drains. The data on wastewater being received at

CETP Jajmau during the different period was also collected along with pumping details of each pumping station.

The wastewater generation measured during April 05 – May 05, 2016 is tabulated below:

	06-07/04/2016	12-13/04/2016	21-22/04/2016	02-03/05/2016	Average
Wazidpur Drain	18.82	14.37	16.81	15.05	16.26
Shitla Bazar Drain	17.50	17.92	23.82	14.94	18.55
CETP Inlet (Ind.)	8.81	9.22	9.68	7.25	8.74
TOTAL	45.13 MLD	41.50 MLD	50.31 MLD	37.27 MLD	43.55 MLD

- Around 43.55 Million Litres (ML) wastewater is generated per day from Jajmau Area.
- The Wazidpur drain was discharging around 16.26 MLD & Shitla Bazar Drain discharging around 18.55 MLD untreated wastewater directly into the river Ganga, whereas around 8.74 MLD wastewater was taken to treatment at CETP.

Drains emanating from urban and industrial area and meeting to River Ganga in Jajmau area.

CHARACTERSTICS OF THE EFFLUENT BEING DISCHARGED THROUGH MAJOR DRAINS IN JAJMAU AREA TO RIVER GANGA

S. No	Name of Drain	Location of Sampling Points	Flow (MLD)	Characteristics						BOD Load (TPD)
		Land Mark		pH	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Chloride (mg/l)	
1	DabkaNala –III (N. Nigam) Kanpur	Near Cantt.	16.8	7.45	433.0	729.0	151.0	6625	46.1	7.27
			13	7.87	465	961	614	8079	3924	6.04
2	WazidpurNala, Kanpur	Near Wazidpur	24.2	9.42	1221	2454	2046	10560	47.2	29.54
			20	8.32	1580	2723	2053	10052	3866	31.6
3	Sheetla Bazar Nala, Jajmau	Sheetala Bazar Ghat	27.0	9.65	1195	3170	898.0	19138	27.7	32.26
			15	7.62	256	897	802	4356	1651	3.84
4	BudhiaghatNala, Kanpur	Near Pumping Station No.2	6	8.51	1062	2121	667	7489	3030	6.37

- Pollution load discharge into R Ganga measured during April 05 – May 05, 2016

Wazidpur --- Pollution Load discharged into the river Ganga in TPD					
	06-07/04/2016	**12-13/04/2016**	**21-22/04/2016**	**02-03/05/2016**	**Average**
SS	24.70	14.51	26.74	15.27	**20.31**
TDS	152.74	133.31	160.38	116.61	**140.76**
TS	181.96	---	---	137.35	**159.66**
Calcium	3.40	2.59	2.54	1.85	**2.60**
Chloride	59.20	54.91	69.99	58.04	**60.54**
Sulphate	32.85	30.86	22.87	21.68	**27.06**
Sulphide	0.80	0.76	1.17	0.32	**0.77**
Phosphate	0.00	0.01	0.67	0.00	**0.17**
Am Nitrogen	3.56	3.21	3.88	4.64	**3.82**
Alkalinity	29.64	16.88	11.71	12.33	**17.64**
Oil & Grease	---	1.16	1.78	1.62	**1.52**
BOD	19.66	11.94	24.66	14.08	**17.59**
COD	36.56	30.49	36.09	31.68	**33.71**

Shitlabazar --- Pollution Load discharged into the river Ganga in TPD					
	06-07/04/2016	**12-13/04/2016**	**21-22/04/2016**	**02-03/05/2016**	**Average**
SS	19.89	17.71	30.94	13.90	**20.61**
TDS	106.99	106.40	139.87	78.96	**108.06**
TS	130.43			94.63	**112.53**
Calcium	3.22	2.61	3.33	2.13	**2.82**
Chloride	38.08	43.73	62.39	29.28	**43.37**
Sulphate	22.48	23.54	14.95	13.39	**18.59**
Sulphide	0.39	0.46	0.50	0.22	**0.39**
Phosphate	0.00	0.01	0.61	0.01	**0.16**
Am Nitrogen	2.62	2.42	4.11	3.28	**3.10**
Alkalinity	19.85	18.64	18.74	12.67	**17.48**
Oil & Grease	---	0.73	3.83	1.51	**2.02**
BOD	12.10	10.48	24.75	13.37	**15.17**
COD	23.18	24.22	38.36	23.18	**27.24**

OBSERVATIONS

- For collection of wastewater from all the tanneries, 12 Km long collecting drains have been constructed. These drains bring all the waste at 4 pumping stations from where it is pumped to the 36 MLD UASB treatment plant through 5.3 Km long pipeline. The domestic waste water is being collected in sump well, from where the required quantity is pumped into CETP for treatment. The tannery wastewater and domestic wastewater are mixed in a mixing tank in a ratio of 1:3

- The current state of the Trunk Sewer has adversely affected its sewage carrying capacity due to which 104 MLD sewage is received at the pumping stations against 170 MLD as per its designed capacity. One more 43 MLD STP at jajmau is constructed and under trial run.

- As a pre-requisite all the tanneries in Jajmau, Kanpur being member of the CETP are required to ensure primary treatment of the wastewater. The primary treatment is first to ensure optimised flow of the wastewater, structural safety of the conveyance system and also to feed pre-treated wastewater to the CETP. Based on monitoring by various enforcement agencies including CPCB it has been noted that the primary treatment including chrome recovery by the member units is not satisfactory. This results in receipt of pre-treated waste water at the CETP with excessively high concentration of chromium and suspended solids. The concentrations as noted in the current inspection were Total Chromium: 77.20 mg/l as against the designed characteristics of 2.0 mg/l. Poor characteristics of primary treated wastewater has adverse impact on overall performance of the CETP.

- The CETP is designed based on treatability of a mixed waste comprising 09 MLD of tannery wastewater and 27 MLD sewage. Both the input components are required to be consistent in terms of designed characteristics. Based on monitoring by various enforcement agencies including CPCB, it has been noted that unauthorised discharge of tannery waste in 90 inch trunk sewer has disturbed characteristics of sewage and hence, the mixed waste characteristics fed to the CETP is, adversely impacting the performance.

- The CETP, Jajmau, was designed for only 9 MLD tanneries effluent considering the flow at the time of CETP design and tanneries were 175 in number. However, over the time more tanneries were allowed which has increased the number of effluent generating tanneries to 350 (402 minus 26 tanneries dismantled and 26 having dry process) and phenomenal increase in generation of waste water.

- High concentration of Total Dissolved Solids (TDS) (13411 mg/l) in the incoming (tannery wastewater) is an indication of an overall poor

state of segregation at source and cleaner operations adopted by individual tanneries with special reference to separation of high TDS bearing soak liquor in their individual processes.

- CPCB's old monitoring reports suggest that the CETP is always underperforming.

A- Common Effluent Treatment Plant (CETP)

Grit Chamber of CETP Jajmau

Tannery Wastewater Inlet to CETP

V – Notch for measurement of Effluent

Outlet of CETP

Irrigation Channel made by UP Jal Nigam for disposal of treated wastewater of CETP.

Wastewater from the irrigation canal going to River Ganga

- The samples are collected from Inlet, outlet and irrigation channel to verify the status of performance. Three groundwater samples from the irrigation areas are also collected to verify the impact of treated effluent on groundwater; if any. The results of monitoring during Nov 28-29,2015 are tabulated below:

MONITORING RESULTS OF JAJMAU CETP (28.11.2015)

Parameters	CETP Inlet			
	Industrial	Sewage	Mixed Influent feed to CETP	EPA Standards
pH	8.50	8.30	8.25	5.5 -9.0
Conductivity	20,273.00	1,942.00	9,498.00	---
Suspended Solids	2,648.00	390.00	1,081.00	---
Total Dissolved Solids	13,411.00	1,196.00	5,876.00	---
Calcium as Ca^{2+}	144.00	64.00	108.00	---
Chloride as Cl^{-}	6,515.00	343.00	2,614.00	---
Sulphate as SO_4^{2-}	2,070.00	125.00	1,086.00	---
Sulphide as S	168.00	1.29	3.70	---
Phosphate as P	BDL	0.524	0.367	---
Am. Nitrogen	**343.00**	**71.90**	**219.00**	**50.0**
Alkalinity	1,360.00	467.00	954.00	---
Oil & Grease	**288.00**	**50.40**	**86.60**	**20**
BOD	1,644.00	206.00	**601.00**	**100**
COD	2,832.00	410.00	1,203.00	---
Total Coliform	7.9×10^5	4.6×10^7	1.6×10^7	---
Feacal Coliform	3.3×10^5	4.6×10^7	2.2×10^6	---
Total Chromium (Cr)	**77.20**	**2.09**	**7.48**	**2.0**
Cadmium (Cd)	BDL	BDL	BDL	---
Cobalt (Co)	BDL	BDL	BDL	
Copper (Cu)	BDL	BDL	BDL	
Iron (Fe)	6.06	2.71	1.17	
Manganese (Mn)	0.54	0.15	0.15	
Nickel (Ni)	0.37	BDL	BDL	
Lead (Pb)	0.55	BDL	BDL	
Zinc (Zn	0.52	0.39	0.23	

MONITORING RESULTS OF CETP JAJMAU & IRRIGATION CHANNEL

Parameters	CETP Outlet (Treated)	Irrigation Channel	EPA Standard for irrigation
pH	8.05	8.06	5.5 – 9.0
Conductivity	6,092.00	3,191.00	
Suspended Solids	199.00	83.80	200.0
Total Dissolved Solids	**3,362.00**	**1,870.00**	**2,100.0**
Calcium as Ca^{2+}	86.40	63.20	
Chloride as Cl^-	**1,825.00**	**572.00**	**600.00**
Sulphate as SO_4^{2-}	111.00	208.00	1,000.0
Sulphide as S	2.46	2.44	
Phosphate as P	0.631	0.643	
Am. Nitrogen	BDL	BDL	
Alkalinity	1,280.00	622.00	
Oil & Grease	**16.10**	**21.00**	**10.0**
BOD	**201.00**	**64.50**	**100.0**
COD	423.00	212.00	
Total Coliform	3.5×10^6	5.4×10^6	
Feacal Coliform	1.7×10^6	1.4×10^6	
Total Chromium (Cr)	23.40	1.98	
Cadmium (Cd)	BDL	BDL	
Cobalt (Co)	BDL	BDL	
Copper (Cu)	BDL	BDL	
Iron (Fe)	3.80	0.76	
Manganese (Mn)	0.26	0.10	
Nickel (Ni)	0.21	BDL	
Lead (Pb)	BDL	BDL	
Zinc (Zn	0.42	BDL	
Lead (Pb)	BDL	BDL	BDL
Zinc (Zn	0.18	0.42	BDL

Characteristic of wastewater (Industrial/ domestic) and treated wastewater of CETP, Jajmau, (Monitoring Date 02/02/2016)

Parameters	CETP Inlet		Final Outlet
	Industrial	Mixed Influent	
pH	8.71	8.05	8.25
Suspended Solids	**1201**	**1162**	**58.2**
Total Dissolved Solids	**9939**	**5619**	**3941**
Chloride as Cl^-	4589	2814	2214
Sulphate as SO_4^{2-}	755	798	212
Am. Nitrogen	25.1	184	179
BOD	**1528**	**1000**	**226**
COD	**2248**	**1453**	**529**
Total Chromium (Cr)	**44.2**	**30.4**	1.01

PERFORMANCE EVALUATION OF CETP: 36 MLD UASB LOCATED AT JAJMAU, KANPUR
(During 2013-2016 – for reference)

Sl.NO	Location Of CETP	State	Type of Industries connected with CETP	Designed capacity/day in MLD	Actual Treatment/day in MLD	Status operation	Characteristics				Disposal of Treated Effluent	Year
							INLET (mg/l) (Mixing Tank)		OUTLET (mg/l)			
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)		
1	Jajmau, Kanpur	U.P	Tannery	36 MLD	-	Operational	322	682	137	283.6	On-Land	Jan-2013
2	Jajmau, Kanpur	U.P	Tannery	36 MLD	19.05	Operational	354.8	736	321	526	On-Land	July-2014
3	Jajmau, Kanpur	U.P	Tannery	36 MLD	-	Operational	1129	2624	209	634	On-Land	Jan-2015
4	Jajmau, Kanpur	U.P	Tannery	36 MLD	-	Operational	601	1203	201	423	On-Land	Nov-2015
5	Jajmau, Kanpur	U.P	Tannery	36 MLD	-	Operational	1000	1453	226	529	On-Land	Feb 2016
6	Jajmau, Kanpur	U.P	Tannery	36 MLD	-	Operational	489	1016	194	540.6	On-Land	April 2016

Samples Collected during Feb 27-28, 2015 by the Technical Expert Committee in Compliance to N.G.T. Order Dated Feb. 04, 2015

Parameter	36 MLD CETP, Jajmau Kanpur								
	Raw Tannery inlet (36 MLD)			Collection Sump (36 MLD)			Raw Sewage (36 MLD)		
	NC1			NC2			NC3		
	IIT	CPCB	UPPCB	IIT	CPCB	UPPCB	IIT	CPCB	UPPCB
pH	8.6	9.55	8.90	8.02	8.67	8.21	7.39	7.47	7.52
BOD	1200	1012	1140.00	540	556	420.00	330	186	290.00
COD	3224	2414	3120.00	1146	1213	1440.00	645	479	640.00
TDS	11500	12068	11805.00	5580	5452	5160.00	1130	932	960.00
TSS	2488	2463	1929.00	525	1229	613.00	325	455	380.00
T. Cr	87.21	70	70.320	59.83	54	53.300	1.72	1.35	1.373
Pb	BDL	0.55	0.335	BDL	0.38	0.291	BDL	0.12	0.231
Zn	BDL	0.27	0.282	0.2	0.52	0.520	0.449	0.57	0.549
As	0.0059	0.04	0.00590	BDL	0.02	0.00441	BDL	BDL	0.00282
S	156	42	104.000	--	--	--	--	--	--

Parameter	CETP Kanpur					
	Final Outlet (36 MLD)			Irrigation Channel		
	NC4			NC9		
	IIT	CPCB	UPPCB	IIT	CPCB	UPPCB
pH	8.07	8.54	8.32	8.04	8.81	8.28
BOD	410	540	360.00	180	88	100.00
COD	1110	852	1120.00	358	363	432.00
TDS	5155	5016	5055.00	1975	1740	1700.00
TSS	535	24	472.00	120	226	153.00
T. Cr	15.87	38.6	11.032	5.86	8.6	5.427
Pb	BDL	0.3	0.302	BDL	0.24	0.288
Zn	BDL	0.47	0.206	BDL	0.23	0.252
As	BDL	BDL	0.00250	BDL	BDL	0.00280

STATUS OF EXISTING CHROME RECOVERY PLANTSIN JAJMAU, KANPUR

- Jajmau cluster has 211 chrome tanning units. Out of which 118 units have individuals chrome recovery unit and 83 units are attached with Common Chrome recovery plant, 10 units are not in operation. In addition to the chrome recovery plants established by tanneries, there is a common chrome recovery plant (CCRP) functional in Jajmau, Kanpur The plant has a capacity of processing 70 KL/d chrome liquor received from member tanneries.

- Chrome Recovery System (CRS) installed in many tanneries are not properly designed and installed. Very few tanneries are recovering chromium. The CRS in individual tanneries is to be re-designed for enhanced production capacity.

- **Common Chrome Recovery System (CCRS) at Jajmau has beenunder-utilized.** It indicates improper segregation, collection and transportation of spent chrome liquor from tanneries to CCRS for recovery and reuse of chromium.

CONCLUSION

CETP plant at Jajmau is not complying with the stipulated standards and need modification. The treated effluent is mixed with treated sewage and combined effluent is carried by an irrigation channel. Farmers are using this waste water. Under unutilized condition, effluent finds its way to river Ganga.

PERFORMANCE EVALUATION OF COMMON CHROME RECOVERY UNIT (CCRU) : 72 KLD AT JAJMAU, KANPUR

Sl.No	Location Of CETP	Type of Industries connected with CETP	Designed capacity /day in KLD	Actual Treatment/day in KLD	Characteristics										Disposal of Treated Effluent	Year
					INLET (mg/l) (Mixing Tank)					OUTLET (mg/l)						
					pH	SS	COD	Cr VI	T Cr	pH	SS	COD	Cr VI	T Cr		
1	Jajmau, Kanpur	Tannery	72 KLD	-	3.05	31378	10797	BDL	21852	7.47	443	787	BDL	14.21	On-Land	May, 2016
		Prescribed standard (General Std for discharge)									100	250		2.0		

Samples Collected during Feb 27-28, 2015 by The Technical Expert Committee In Compliance To N.G.T. Order Dated Feb. 04, 2015

Parameter	CCRP, Jajmau, Kanpur					
	CCRP Inlet			CCRP Outlet		
	NC14			NC15		
	IIT	CPCB	UPPCB	IIT	CPCB	UPPCB
T. Cr	3864.94	3510	3082.000	6.64	6.9	4.574
Pb	2.842	3.16	1.670	BDL	1.46	0.481
Zn	0.662	0.91	0.830	BDL	0.1	0.085
As	0.0044	3.8	0.00985	BDL	BDL	0.00121

7.1.5 STATUS OF TANNERY EFFLUENT MANAGEMENT IN UNNAO, KANPUR

Unnao industrial area is situated near Kanpur in northern side of Ganga River having more than 50 industrial units and these are tanneries. The effluents discharged by the industries, after passing through a common effluent treatment plant having approx. 70% treating capacity, is finally discharged in the Ganga River. The quality of ground water in the industrial areas is under constant threat of contamination directly or indirectly. Industries in Unnao District are located at three locations, UPSIDC Industrial Area Site -1, UPSIDC Industrial Area Site - 2 and UPSIDC Industrial Area Site - 3 (Leather Technology Park, Banthar). Apart from these three industrial sites, industries are also located in Akarampur-Chakarampur Industrial Area.

Common effluent treatment plant (CETP)- Unnao is located at -7, Site-2, UPSIDC Industrial Area, Unnao in 20,000 m^2 area which is operated by Unnao Tanneries Pollution Control Company. The CETP Unnao was commissioned in October 1995 with capacity of 2.15 MLD to treat wastewater generated from 21 tannery units located in UPSIDC Industrial Area, Unnao. In October 2013, the treatment facilities were upgraded to achieve better performance and treatment capacity of 2.35 MLD.

The primary treated effluent from the entire 21 member units is collected through underground network of conveyance system.

The salient features of CETP Unnao are tabulated below

Name of CETP	CETP at UPSIDC Industrial Area Unnao Site-II
Operated by	Unnao Tanneries Pollution Control Company
Facility owned by	User Industries of CETP who formed the CETP Company as per scheme of GOI, MoEF, GOI under world bank assistance.
Treatment Technology	2 Stage ASP technology followed by a tertiary treatment
Treatment Capacity	2.15 MLD
Member units	21 nos. out of which at present 14 are in operation and other are not in operation due to their own reasons.
Wastewater Collection	Through underground conveyance system
Pre-treatment by member units	All the member units have PETP for solid removal and CRU for chrome recovery
Power (electric) consumption	About 350 HP and our power + Diesel cost comes about Rs 8.0 Lakh/month
Effluent Disposal	Treated effluent is discharged into the Loni Drain.
Sludge generation	1 to2 T/day
Sludge Disposal	Sent to TSDF Banthar for disposal
Consents & Authorisation	Valid consents & Authorisation

Characteristics of Major Drains Flowing at Unnao

S No	Name of Drain	Flow (MLD)	Characteristics					
			pH	**BOD** (mg/l)	**COD** (mg/l)	**TSS** (mg/l)	**TDS** (mg/l)	**Chloride** (mg/l)
1	City jail drain	37.63	8.06	277	519	117	5868	2102
2	Loni drain	46.65	8.05	203	422	223	3426	1203

OBSERVATIONS

Observations and performance of CETP (on Nov 28, 2015):

- On the day of visit around 2Mld tannery effluents was being taken for treatment at CETP, Unnao against the treatment capacity of 2.15 MLD. Facility was not provided to measure flow at inlet.
- The logbook entries of outlet flow suggest that around 2 MLD wastewater is treated on average basis which is less than designed treatment capacity.
- CPCB's old monitoring reports reveals that most of the time the CETP is not complying with the discharge standards.
- The samples are collected (28.11.2015) from Inlet, outlet and irrigation channel to verify the status of performance. The results are tabulated below

Parameters	**CETP Inlet**		**CETP Outlet**	
	Conc	**EPA Standards**	**Conc**	**EPA Standards**
pH	7.83	5.5 -9.0	8.16	5.5 -9.0
Conductivity	21,273.00	---	22,683.00	
Suspended Solids	854.00	---	**324.00**	**100.0**
Total Dissolved Solids	13,982.00	---	**14,197.00**	**2,100.0**
Calcium as Ca^{2+}	200.00	---	34.00	
Chloride as Cl^{-}	6,389.00	---	**6,058.00**	**1,000.0**
Sulphate as SO_4^{2-}	2,703.00	---	**3,162.00**	**1,000.0**
Sulphide as S	14.10	---	3.07	2.8
Phosphate as P	BDL	---	BDL	---
Am. Nitrogen	BDL	50.0	BDL	50.0
Alkalinity	1290	---	1,551.00	---
Oil & Grease	72.70	20	**60.20**	**10.0**

BOD	1,152.00	---	**438.00**	**30.0**
COD	1,962.00	---	**987.00**	**250.0**
Total Chromium	27.60	2.0	**6.01**	**2.0**
Cadmium (Cd)	BDL		BDL	
Cobalt (Co)	BDL		BDL	
Copper (Cu)	BDL		BDL	
Iron (Fe)	2.72		0.65	
Manganese (Mn)	0.35		BDL	
Nickel (Ni)	0.26		0.26	
Lead (Pb)	BDL		BDL	
Zinc (Zn	0.36		BDL	

CONCLUSION

- CETP, Unnao is being operated on Activated Sludge Process (ASP) Technology.
- The result of analysis shows the quality of treated effluent at CETP outlet exceeds the Notified Standards under E(P)Act,1986.
- It was noticed that high concentration of TSS & Total Chromium found at inlet of CETP than the prescribed norms indicates poor Operation of PETP's by member units.
- Higher concentration of Total Chromium at inlet adversely affects the biological treatment system due to its toxic nature.

7.1.6 CETP , Banthar, Unnao

U.P. State Industrial Development Corporation (UPSIDC) has developed a new leather complex near Banthar village in Unnao District and equipped with Common effluent treatment plant (CETP).

The CETP Unnao was commissioned in October 2004 with capacity of 4.5 MLD to treat wastewater generated from 45 tannery and allied units located in UPSIDC Industrial Area, Banthar.

The primary treated effluent from the member units is collected through underground network of conveyance system.

The salient features of CETP, Banthar, and Unnao are tabulated below

Name of CETP	CETP at UPSIDC Leather Technology Park Banthar,Unnao
Operated by	Banthar Industrial Pollution Control Company(BIPCC)

Facility owned by	All the member tanneries who are shareholders and promoters of BIPCC
Treatment Technology	2 Stage ASP technology followed by a tertiary clarification
Treatment Capacity	4.5 MLD
Member units	Total 45 members and 25 unit are currently operational
Wastewater Collection	Through underground conveyance system
Pre-treatment by member units	All the member units have PETP for solid removal and CRU for chrome recovery
Power (electric) consumption	550 KVA + Diesel DG Back-up, Total power cost is approx. Rs. 12 lakh per month
Effluent Disposal	Into Pucca Drain of UPSIDC which finally joins City Jail Drain after about 2 km drain travel
Sludge generation	5-7 Tons/day
Sludge Disposal	Sent to TSDF Banthar for disposal
Consents & Authorisation	Valid consent & Authorisation is applied for renewal

OBSERVATIONS

Observations and performance of CETP (on 28 Nov, 2015):

- 2.6 MLD tannery effluents was being taken for treatment at CETP, Banthar against the treatment capacity of 4.15 MLD.
- The logbook entries of outlet flow suggest that around 2.6 to 2.9 MLD wastewater is treated on average basis which is less than designed treatment capacity.

CETP AT BANTHAR

Parameters	**CETP Inlet**		**CETP Outlet**	
	Conc	**EPA Standards**	**Conc**	**EPA Standards (inland Surface Water)**
pH	8.29	5.5 -9.0	8.31	5.5 -9.0
Conductivity	21,261.00	---	24,882.00	
Suspended Solids	563.00	---	401.00	100.0
Total Dissolved Solids	14,578.00	---	**17,386.00**	**2,100.0**
Calcium as Ca^{2+}	305.00	---	252.00	
Chloride as Cl^{-}	6,496.00	---	**7,462.00**	**1,000.0**
Sulphate as SO_4^{2-}	3,611.00	---	5,120.00	1,000.0
Sulphide as S	29.60	---	2.01	2.8
Phosphate as P	BDL	---	BDL	---
Am. Nitrogen	BDL	50.0	BDL	50.0

Alkalinity	1,225.00	---	1,190.00	---
Oil & Grease	**64.60**	**20**	**15.90**	**10.0**
BOD	1,250.00	---	**453.00**	**30.0**
COD	2,231.00	---	**1,341.00**	**250.0**
Total Chromium	**21.10**	**2.0**	**3.32**	**2.0**
Cadmium (Cd)	BDL		BDL	
Cobalt (Co)	BDL		BDL	
Copper (Cu)	BDL		BDL	
Iron (Fe)	1.05		0.33	
Manganese (Mn)	0.16		0.08	
Nickel (Ni)	0.34		0.26	
Lead (Pb)	0.53		BDL	
Zinc (Zn	0.30		0.36	

CONCLUSION

- As per the analysis report CETP was found non -complying.
- It was noticed that higher concentration of total chromium found more than the prescribed norms at the inlet of CETP which indicates that member units which are operating their PETPs are not efficiently working which may also hamper the biological treatment system due to its toxic in nature.

7.1.7 CETP - Rumapur

Presently closed.

7.1.8 CETP Mathura:

- CETP of 6.25MLD installed at industrial area Site-A, operated by M/s Mathura UdhogikKshetra-A PradushanNiwaran Company Ltd. since 1996. At present 15 units are members of CETP.

- The units of CETP are consisting of equalization tank (dia. 35.7mtr), Grit chamber (15.5-2.0mtr), Chemical dosing tank (3*3mtr), clarifloculator (dia 24mtr & 0.75mtr), Aeration tank (55*16mtr), Secondary clarifier (dia 22.5mtr), sludge drying beds (10*10mtr) and oil & grease separation tank (12*9*5.5mtr) and 01DG set of 63.5KVA.

- During inspection, it was found that the plant was operational. As told by the operator, the CETP (3-4MLD) is receiving effluent from 15 industries and running for 10-11 hrs daily. Lime (40kg/hr), Poly (30kg/hr), Ferrous (25kg/hr) used for chemical treatment in CETP.

- No flow measuring device is installed at the inlet. Screen at inlet was broken, so floating material is going to mixing chamber. One compressor of mixing chamber was not operational.

- Sludge drying beds were not maintained. No authorization for disposal of sludge has been taken by CEPT operator from UPPCB.

- UPPCB has issued direction for zero liquid discharge to CETP.

- Sample collected from the inlet of mixing chamber, outlet of clarifloculator and final out let of CETP by team. Final analysis results for different parameters received from the ZO-Lucknow laboratory of effluent analysis are presented below table-2 & table-2(a).

- It is evident from the tested results that the outlet effluent characteristic is not meeting the CETP inland surface waters standards, except pH, Temperature & Ammonical Nitrogen as N. The values of COD, BOD, SS, Oil & Grease & Phenols are higher than standard limit at outlet effluent. At the inlet, effluent values of Oil & Grease & Phenols are also higher that prescribed inlet effluent quality standard for CETP.

- Metal analysis results shows that tested metals (Cd, Cr, Cu & Ni) are within the prescribed limit of inlet and outlet effluent of CETP.

CETP Mathura (Textile)

Sl. No.	Parameter	Unit	Table-2: Description of CETP Sample/Code					
			CETP-01 (inlet)	CETP-02 (Aeration tank)	CETP-03 (Outlet Clari.)	CETP-04 (Final outlet)	CETP-05 (inlet at 4PM)	CETP-06 (inlet at 8PM)
01	pH		6.57	-	7.22	7.52	7.05	6.75
02	Temperature	^{0}C	26.0	-	27.0	28.0	26.0	26.0
03	SS (Suspended Solids)	mg/l	208.0	-	258.0	290.0	189.0	351.0
04	TDS	mg/l	3410	-	3416.0	3512.0	3185.0	4369.0
05	MLSS	mg/l	-	417.0	-	-	-	-
06	Sulphide as S	mg/l	1.66	-	5.86	4.74	-	-
07	Amonical Nitrogen asN	mg/l	1.91	-	0.949	0.809	0.385	0.264
08	Phenols as C_6H_5OH	mg/l	5.39	-	7.51	8.17	-	-
09	Oil & Grease	mg/l	84.4	-	-	37.4	-	-
10	BOD	mg/l	520.0	-	473.0	417.0	370.0	625.0
11	COD	mg/l	1202.0	-	1039.0	1063.0	807.0	1514.0

Sr. No.	Parameters	Unit	Table-2(a): Description of samples		
			CETP-01	CETP-03	CETP-04
1	Cd	mg/l	0.02	0.02	0.03
2	Cr	mg/l	BDL	BDL	BDL
3	Cu	mg/l	BDL	BDL	BDL
4	Fe	mg/l	0.84	1.15	1.36
5	Ni	mg/l	0.16	0.26	0.18

Code	Description
CETP-01	Site-A, Industrial Area, Mathura (Inlet of CETP)
CETP-03	Primary outlet of clarifloculetor, CETP, Mathura (UP)
CETP-04	Final outlet of CETP, Mathura
BDL	Below detection limit

PART – II

8.0 SEWAGE DRAINS

8.1 STATUS OF SEWAGE MANAGEMENT IN KANPUR

- In Kanpur city at present and in future estimated sewage generation is as follows:

    - Year 2015 – 412 MLD
    - Year 2020 – 448 MLD
    - Year 2030 – 512 MLD
    - Year 2040 – 576 MLD
    - Year 2050 – 640 MLD

- At present there are 162 MLD (5+130+27) capacity STPs are installed in Jajmau, Kanpur and are operational. 4 more STPs having capacity 310 (210+43+42+15) MLD are under construction under JNNURM programme at various location of Kanpur namely; 210 MLD capacity STP at Bingawan, 43 MLD capacity STP at Jajmau, 42 MLD capacity STP at Sajari & 15 MLD capacity STP at Baniapur, Kanpur. Two more STPs are required to achieve the requirement of year 2040. Therefore, one 75 MLD capacity STP at Panka and other 30 MLD STP at Bingawan near 210 MLD STP is being proposed under NGRBA programme. As per the policy of NGRBA Programme, the STP's have to be proposed in the module of every 10 year requirements.

- 210 MLD STP at Bingawanis under stabilization stage and to be made fully operational at the earliest.

- About 40% area of Kanpur Nagar is covered by Sewerage Network.

Drain in Kanpur

The wastewater of Kanpur city is meeting to river Ganga (Total 21 drains) and River Pandu (Total 05 drains) through total 26 drains on both side of city. Wastewater generated from the tanneries is finding their path in to river Ganga through four major drains after treatment or without treatment and rest of the drains are mainly carrying the urban wastewater in to river.

Table: Details of Major Drains Discharging Directly/ Indirectly in River Ganga at Kanpur (As reported by UP Jal Nigam)

S No	Name of drain	Nature of effluent	Status of Drain	Discharge (MLD)	Domestic discharge (in MLD)	Industrial Discharge (MLD)	Remark
A. Nala falling in to River Ganga							
1	KESA colony	Domestic	Tapped through sewer to nawabganj SPS	0.16	0.16	-	
2	Roadways colony Nala	Domestic	Tapped through sewer to nawabganj SPS	0.40	0.40	-	
3	KheoraNala	Domestic	Tapped in to septic tank	0.14	0.14		Ultimately meets with river as JewaraNala
4	JageshwarNala	Domestic	Tapped through sewer to nawabganj SPS	0.92	0.92		
5	JewraNala	Domestic	Tapped through sewer to nawabganj SPS	0.79	0.79		
6	Nawabganj Nala	Domestic	Tapped through sewer to nawabganj SPS	1.66	1.66		
7	Ranighatnala	Domestic	Tapped through sewer to nawabganj SPS	0.43	0.43		

S No	Name of drain	Nature of effluent	Status of Drain	Discharge (MLD)	Domestic discharge (in MLD)	Industrial Discharge (MLD)	Remark
8	SisamauNala	Domestic	DPR under preparation under NamamiGange	138.33	138.33		80 MLD prepared to intercept and divert to STP Bingawan& 60MLD proposed to intercept and divert to STP Jajmau
9	TafcoNala	Domestic	Tapped through Sewer to Parmat, SPS	0.43	0.43		
10	ParmaghatNala	Domestic	DomesticTapped through sewer to Parmat SPS	1.78	1.78		
11	Muir Mill Nala	Domestic	Tapped in to Muir Mill, SPS	3.13	3.13		
12	Police Line Nala	Domestic	Tapped through sewer to Parmat, SPS	0.79	0.79		
13	Jail Nala	Domestic	Tapped through sewer to Parmat, SPS.	1.22	1.22		

S No	Name of drain	Nature of effluent	Status of Drain	Discharge (MLD)	Domestic discharge (in MLD)	Industrial Discharge (MLD)	Remark
14	GuptarghatNala	Domestic	Tapped through sewer to Guptarghat, SPS.	2.29	2.29		
15	Golf club Nala-I	Domestic	Tapped through sewer to Jajmau, SPS	1.26	1.26		Ultimately meets with river as Golf Club Nala
16	Golf club Nala-II	Domestic	Tapped through sewer to Jajmau, SPS	0.40	0.40		
17	DubkaNala	Mixed	Tapped into intermediate Pumping station no 1 under GAP-I	1.23	As per the observation made by technical expert comitee 26 MLD mixed inseparable effluent generated in Jajmau area		As per the observation made by joint Technical expert committee, estimated 26 MLD inseparable mixed effluent
18	Sheetla Bazar (BangalighatNala)	Mixed	-	5.75			
19	BuriyaghatNala	Mixed	Tapped into intermediate pumping station no 3 under GAP-I	2.34			

S No	Name of drain	Nature of effluent	Status of Drain	Discharge (MLD)	Domestic discharge (in MLD)	Industrial Discharge (MLD)	Remark
20	WazidpurNala	Mixed	-	7.68			generated in Jajmau area in which 9 MLD goes to CETP and rest 17 MLD pre-treated effluent reaches to drains through pumping station overflow to river
21	Airforcenala	Domestic	-	Not measurable	-	-	

B. Nala falling in to River Pandu							
22	Gandanala	Mixed	Tapped under GAP-II	55.09	52.37	2.72	Industrial effluent goes in drain after treatment. Domestic sewage tapped and diverted to STP, Bingawan.
23	HalwaKhanda drain	Domestic	Tapped under GAP-II	11.44	11.44		Tapped and diverted to STP, Bingawan.
24	COD drain	Domestic	Tapped to Bingawan STP	8.81	8.81		
25	Thermal power nala	Mixed		30.0	15.70	14.30	Industrial effluent goes in drain after treatment
26	ICI nala	Mixed		40.0	32.88	7.12	
Total				**316.47**	**275.33**	**50.14**	

Detail of Major Drains Monitored By CPCB in Kanpur City is given below:

SisamauNala	(Near Power House and Tafco company)	26^0 29'28.7"/ $80^0$19' 58.6"	River Ganga (Directly)
PermiyaNala	Visnupur, Mandana, HBTI, Makdikheda, Kalyanpur, Indria Nagar, Khewravill., Jageswarvill., Jevravill., Machuavill., Ranighatvill., (Near Ranighat)	$26^0$30'05. 3"/ $80^0$19' 04.5"	River Ganga(Directly)
Bhagwat Das Nala	Tannery/Cantt (Near Bhagwat das ghatcantt. road)	26^0 28'27.8"/ $80^0$21' 54.1"	River Ganga (Directly)
GolaGhatNala	Tannery/Cantt (Near Golaghatcantt. road)	$28^0$24'34. 2"/ $80^0$23' 47.6"	River Ganga (Directly)
SattiChauraNala	Tannery/Cantt. (Near Sattichauraghat, cantt. road)	26^0 27'34.2"/ $80^0$22' 47.4"	River Ganga (Directly)
Dabka Nala-1 (KachhaNala)	Tannery/Cantt (Near Dapkeswarmandir, cantt. road)	26^0 26'40.0"/ $80^0$23' 38.2"	River Ganga (Directly)
Dabka Nala-2 (PakkaNala)	Tannery/Cantt (Near Dapkeswarmandircantt. Road)	26^0 26'40.0"/ $80^0$23' 38.2"	River Ganga (Directly)
Dabka Nala-3 (PakkaNala)	Tannery/Cantt (Near Dapkeswarmandir, cantt. road	26°26'38. 5"/ 80°23'37. 1"	River Ganga (Directly)
Shetla Bazar (KachhaNala)	Tannery/Cantt (Near Bengali ghat)	$26^0$26'40. 0"/ 80°24'13. 2"	River Ganga (Directly)
WazidpurNala	Jajmau (Near CETP , P-3)	26^0 26'40.0"/ $80^0$23' 38.2"	Directly to River Ganga
BudhiyaghatNala	Jajmau (pumping station – 4)		River Ganga (Directly)

PankiNala	Kanpur City	26°27'60.0"/ 80° 13' 59.8"	River Pandu
Ganda Nala	Kanpur City, (Vijay Nagar, Barra -4)	26°26'46.3"/ 80°17'38.46"	River Pandu
COD Nala	Kanpur City, Neura Village	26°25'35.4"/ 80°20'96.4"	River Pandu
ICI Nala	Kanpur city (Near LML Industry, Panki Kanpur)	--	River Pandu

THE DRAINS VISITED & MONITORED BY THE COMMITTEE IN KANPUR

I. Wajidpur Drains (Bypass of Pumping Station no. 3) Jajmau,Kanpur

WazidpurNalha carries untreated industrial wastewater from leather units. This drain is meeting to river Ganga at downstream of Jajmau bridge. Trade effluent and domestic wastewater from the catchment of this drain is pumped in to CETP Jajmau by the pumping station No.3 and excess overflow/byepass is discharged into River Ganga without treatment. This drain directly confluence to river Ganga.

- Originated from : Jajmau Industrial cluster
- Running path length to reach river Ganga: around 500 m from Wazidpur pumping stations
- Nature of catchment area: Industrial cluster having tannery industries.
- Wastewater discharge measured at the time of inspection by the team : 18.273 MLD at 2:45 PM.
- Nature of wastewater: industrial effluent – tannery and allied units

CPCB Analysis Results of sample collected from Wajidpur Drains before its confluence to the River Ganga is placed below:

S. No.	Parameters	Value(mg/l)	General standard for discharge		
			Inland Surface Water	Public Sewers	Land for irrigation
1.	pH	8.43	5.5-9.0	5.5-9.0	5.5-9.0
2.	Turbidity	480			
3.	Colour(Hazen)	400			
4.	Conductivity (µS/cm.)	12239			
5.	TSS	2038	100	600	200
6.	TDS	1903			
7.	Chloride as Cl^-	2196			
8.	Sulphate as SO_4^{--}	1050			
9.	Sulphide as S	276	2.0	--	--
10.	Phosphate as P	BDL	5.0	--	--
11.	Nitrate as N	91.2	10	--	--
12.	Nitrite as N	32.9			
13.	Ammonical Nitrogen	155.9	50	50	--
14.	SAR	40.6			
15.	T.K.N	243			
16.	Alkalinity	1872			
17.	Phenols as C_6H_5OH	5.48	1.0	5.0	--
18.	Oil & Grease	29.2	10	20	10
19.	BOD	1465	30	350	100
20.	COD	2873	250	--	--
21.	Chromium- VI	BDL	0.1	2.0	--
22.	Total Coliform	$7.8x10^5$			
23.	Fecal Coliform	$2.0x10^5$			

Photo 1: Wajidpur Drain

Photo 2: Wajidpur Drain

IIT Roorkee laboratory analysis results of sample collected from Wajidpur Drains before its confluence to the River Ganga is placed below:

S.No.	Parameters	Value
1	pH	8.4
2	Turbidity (NTU)	484
3	Alkalinity (mg/L)	1050
4	Chlorides (mg/L)	942
5	Sulphate (mg/L)	1144
6	COD (mg/L)	1247
7	BOD (mg/L)	797
8	TSS (mg/L)	1022
9	VSS (mg/L)	452
10	NH_3-N (mg/L)	125.5
11	NO_3-N (mg/L)	33.8
12	TKN (mg/L)	156.9
13	TN (mg/L)	190.7
14	PO4-P (mg/L)	0.2
15	TP (mg/L)	0.3
16	TC (MPN/100mL)	430000
17	FC (MPN/100mL)	15000

S.No.	Heavy Metals	Value(mg/l)
1	Cd	0.02193
2	Cr	15.09963
3	Cu	5.69402
4	Fe	5.2777
5	Pb	0.04684
6	Zn	2.32872
7	As	0.09112
8	Ni	0.00779
9	Co	0.209
10	Mn	0.23614

II Sisamau Drain, Kanpur

This drain carries domestic wastewater from nearby areas i.e. Sisamau area, Gwalltoli, civil lines, Swroopnagar, Bakkarmandi this is puckkanala and this is the biggest drain of Kanpur city Monitoring of Sisamaunala is done near power house/TEFCO company, before confluence to river Ganga.

Sisamau Drain Flow measured by the team at the time of inspection: 216 MLD at 5.15pm.

CPCB Laboratory Analysis Results of sample collected from Sisamau Drains before its confluence to the River Ganga is placed below :

S. No.	Parameters	**Value**(mg/l)
1.	pH	7.21
2.	Turbidity	280
3.	Colour (Hazen)	50
4.	Conductivity (µS/cm.)	951
5.	SS	618
6.	TDS	569
7.	Chloride as Cl^-	165.4
8.	Sulphate as SO_4^{--}	84.6
9.	Sulphide as S	4.53
10.	Phosphate as P	1.46
11.	Nitrate as N	5.56
12.	Nitrite as N	BDL
13.	Ammonical Nitrogen	14.9
14.	SAR	2.88
15.	T.K.N	44.3
16.	Alkalinity	577
17.	Phenols as C_6H_5OH	1.16

18.	Oil & Grease	12.2
19.	BOD	89.3
20.	COD	232
21.	Chromium- VI	BDL
22.	Total Coliform	$1.1x10^7$
23.	Fecal Coliform	$1.1x10^7$

IIT Roorkee laboratory analysis results of sample collected from Sisamau Drain before its confluence to the River Ganga is placed below :

S.No.	Parameters	Value
1	pH	7.7
2	Turbidity (NTU)	398
3	Alkalinity (mg/L)	750
4	Chlorides (mg/L)	172
5	Sulphate (mg/L)	145
6	COD (mg/L)	306
7	BOD (mg/L)	77
8	TDS (mg/L)	620
9	TSS (mg/L)	644
10	VSS (mg/L)	440
11	NH_3-N (mg/L)	26.8
12	NO_3-N (mg/L)	2.2
13	TKN (mg/L)	32.4
14	TN (mg/L)	34.6
15	PO4-P (mg/L)	1.2
16	TP (mg/L)	2.0
17	TC (MPN/100mL)	4300000
18	FC (MPN/100mL)	23000

Photo 3: Sisamau Drain

Photo 4: Sisamau Drain

S.No.	Heavy Metals	Value(mg/l)
1	Cd	0.002095
2	Cr	0.78589
3	Cu	5.92018
4	Fe	23.18227
5	Pb	0.0929
6	Zn	1.27438
7	As	0.12706
8	Ni	0.02146
9	Co	0.60412
10	Mn	0.17769

III. PermiyaNalaKanpur

Permiyanala carries raw domestic wastewater from nearby villages i.e. Nawabgunj, Kheura, Jeura village and meet in to river Ganga at downstream of water treatment plant (WTP) at Permiya ghat. The over flow of WTP was also mixed in to this drain so the wastewater characteristics get diluted before mixing to Ganga.

Area covered by the Drain: Visnupur, Mandana, HBTI, Makdikheda, Kalyanpur, Indria Nagar, Khewravill.,Jageswarvill., Jevravill., Machuavill., Ranighatvill.,
Permiya drain is made by combination of RanighatNala, MachuaNala, JevraNala, JageshwerNala, KhewraNala, NRIsNala. The length of the drain is approximately 15 km from Mandana to Ranighat.

Permiya Drain Flow measured by the team at the time of inspection: 8.26 MLD at 6:30 P.M

CPCB Laboratory Analysis Results of sample collected from permiya Drains before its confluence to the River Ganga is placed below:

S. No.	Parameters	Value(mg/l)
1.	pH	7.39
2.	Turbidity	52
3.	Colour (Hazen)	75
4.	Conductivity (µS/cm.)	1572
5.	TSS	62.2
6.	TDS	887
7.	Chloride as Cl^-	168.2
8.	Sulphate as SO_4^{--}	88.7
9.	Sulphide as S	15.2
10.	Phosphate as P	3.61
11.	Nitrate as N	5.37
12.	Nitrite as N	3.97
13.	Ammonical Nitrogen	25.2
14.	SAR	3.0
15.	T.K.N	38.2
16.	Alkalinity	816
17.	Phenols as C_6H_5OH	1.04
18.	Oil & Grease	BDL
19.	BOD	38.6
20.	COD	101
21.	Chromium- VI	BDL
22.	Total Coliform	$4.9x10^6$
23.	Fecal Coliform	$4.9x10^6$

Photo 5: Permiya Nala

Photo 6: Permiya Nala

Conveyance system for Bingawa STP, Kanpur

Photo 7: Conveyance system for Bingawa STP

Photo 8: Conveyance system for Bingawa STP

8.2 DRAINS IN FARRUKHABAD

The township of Farrukhabad- Fatehgarh consist of two district towns, Farrukhabad & Fatehgarh, the former being the headquarters of the tehsil and the latter forming the headquarters of the district, both lying about 5 kms apart.

Major drains in Farrukhabad are given below:

Bhairovghat drain	Farrukhabad city (Near Ghatiyaghat)	$27^0$24'20.4''/ $079^0$37'7.65''	River Ganga
Dhinapur drain	Dairy Farm units, Near Dairy waste, Amethikona, Ghatiyaghat, Farrukhabad.	$27^0$24'0.92''/ $079^0$37'37.3''	River Ganga
Biwiganj drain	Near Kashiram colony , Farrukhabad	$27^0$24'34.1'' / $079^0$34'36.4''	River Ganga
Hathikhana Drain	Near Fatehgarh "STP"	$27^0$21'20.0''/ $079^0$38'10.2''	River Ganga
Bargadia ghat Nala, Fatehgarh	Near Bargadi ghat Temple, Fatehgarh.	$27^0$21'89.5''/ $079^0$38'32.1''	River Ganga

DRAINS VISITED & MONITORED BY THE COMMITTEE IN FARRUKHABAD

I. Bhairav Ghat Drain, Farrukhabad

Thee Tokaghatnala and Pakkapullnala mixed at Bhairovghat temple and makes Bhairovghat drain/nala which carries domestic wastewater and trade effluent from textile units from Farrukhabad city. Most of the wastewater in Tokaghat and Pakkapullnala is used by farmers for irrigation purposes and flow at Bhairovghat

becomes lean during dry season time. Bhairovghat drain confluence directly to river Ganga near Ghatiyaghat.

Bhairav Ghat Drain Flow measured by the team at the time of inspection: 23.5 MLD at 10.0 AM.

CPCB Laboratory Analysis Results of sample collected from Bharav Ghat Drain before its confluence to the River Ganga is placed below:

S. No.	**Parameters**	**Value** (mg/l)
1.	pH	7.73
2.	Turbidity	90
3.	Colour (Hazen)	75
4.	Conductivity (µS/cm.)	2016
5.	TSS	57.8
6.	TDS	1069
7.	Chloride as Cl^-	227
8.	Sulphate as SO_4^{--}	69.9
9.	Sulphide as S	62.5
10.	Phosphate as P	6.34
11.	Nitrate as N	10.28
12.	Nitrite as N	7.763
13.	Ammonical Nitrogen	28.6
14.	T.K.N	45.07
15.	Alkalinity	673
16.	Phenols as C_6H_5OH	BDL
17.	Oil & Grease	BDL
18.	BOD	30.8
19.	COD	111
20.	Chromium- VI	BDL
21.	Total Coliform	$7.9x10^6$
22.	Fecal Coliform	$4.9x10^6$

IIT Roorkee laboratory analysis results of sample collected from Bharav Ghat Drain before its confluence to the River Ganga is placed below:

S.No.	Parameters	Value
1	pH	8
2	Turbidity (NTU)	80.2
3	Alkalinity (mg/L)	530
4	Chlorides (mg/L)	268
5	Sulphate (mg/L)	96
6	COD (mg/L)	186
7	BOD (mg/L)	90
8	TDS (mg/L)	1090
9	TSS (mg/L)	82
10	VSS (mg/L)	44
11	NH_3-N (mg/L)	27
12	NO_3-N (mg/L)	6.8
13	TKN (mg/L)	34.4
14	TN (mg/L)	41.2
15	PO4-P (mg/L)	4.6
16	TP (mg/L)	7.6
17	TC (MPN/100mL)	930000
18	FC (MPN/100mL)	43000

S.No.	Heavy Metals	Value(mg/l)
1	Cd	0.0013
2	Cr	0.3147
3	Cu	5.1511
4	Fe	4.0670
5	Pb	0.0290
6	Zn	0.6427
7	As	0.0865
8	Ni	0.0024
9	Co	0.2336
10	Mn	0.0900

II Bargadia Ghat Drain/Nala:-

This drain carries raw domestic wastewater from nearby areas and its monitoring has been carried out near Bargadia ghat temple at Fatehgarh.

Bargadia Ghat Drain Flow measured by the team at the time of inspection: 1.5 MLD at 12:30 P.M.

CPCB Laboratory Analysis Results of sample collected from Bargadia Ghat Drains before its confluence to the River Ganga is placed below:

S. No.	Parameters	Value (mg/l)
1.	pH	7.64
2.	Turbidity	115
3.	Colour (Hazen)	50
4.	Conductivity (µS/cm.)	1228
5.	TSS	367
6.	TDS	641
7.	Chloride as Cl^-	97.3
8.	Sulphate as SO_4^{--}	42.6
9.	Sulphide as S	4.97
10.	Phosphate as P	5.22
11.	Nitrate as N	5.16
12.	Nitrite as N	3.9.9
13.	Ammonical Nitrogen	53.4
14.	T.K.N	56.39
15.	Alkalinity	488.5
16.	Phenols as C_6H_5OH	BDL
17.	Oil & Grease	BDL
18.	BOD	68.3
19.	COD	216
20.	Chromium- VI	BDL
21.	Total Coliform	$1.4x10^7$
22.	Fecal Coliform	$7.9x10^6$

BargadiaghatDrain/Nala

Bharav ghat Farrukhabad

IIT Roorkee laboratory analysis results of sample collected from Bargadia Ghat Drainbefore its confluence to the River Ganga is placed below:

S.No.	Parameters	Value
1	pH	7.9
2	Turbidity (NTU)	85.5
3	Alkalinity (mg/L)	380
4	Chlorides (mg/L)	102
5	Sulphate (mg/L)	79
6	COD (mg/L)	256
7	BOD (mg/L)	94
8	TDS (mg/L)	655
9	TSS (mg/L)	152
10	VSS (mg/L)	52
11	NH_3-N (mg/L)	48.4
12	NO_3-N (mg/L)	3.3
13	TKN (mg/L)	60.5
14	TN (mg/L)	62.5
15	PO4-P (mg/L)	4.4
16	TP (mg/L)	6.0
17	TC (MPN/100mL)	11000
18	FC (MPN/100mL)	1500

S.No.	Heavy Metals	Value(mg/l)
1	Cd	0.0080
2	Cr	0.5831
3	Cu	6.8839
4	Fe	6.8321
5	Pb	0.0847
6	Zn	2.7836
7	As	0.2910
8	Ni	0.0113
9	Co	0.2687
10	Mn	0.2046

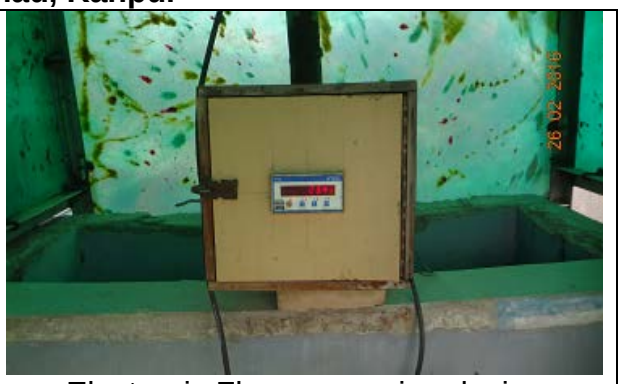
9.0 SEWAGE TREATMENT PLANTS

9.1 SEWAGE TREATMENT PLANT (STPs) AT JAJMAU STP (130 MLD), KANPUR

The STP based on activated sludge process was constructed and commissioned in January 1999. This plant is designed for treatment of 130 MLD of domestic wastewater. At the time of inspection STP actual treatment was 144 MLD.

STP 130 MLD Jajmau, Kanpur

Inlet of STP



Electronic Flow measuring device

Aeration Tank

Clarifier

Outlet of the STP

Sewage from various pumping stations is collected in sump well; from where it is being applied to three treatment plants, *i.e.*, two STPs and one CETP, in appropriate volume.

Summary of STP 130 MLD, Jajmau, Kanpur is given below:

Name/ Location of STP	Jajmau, Kanpur
Process of Sewage Treatment	Activated Sludge Process
Designed Capacity/day	130 MLD
Actual Treatment	144 MLD at the time of Inspection
Inlet chamber to STP	6.4 x6.4 x 5 meters, DT-1mn.
Screen Chamber	Mechanical 1.9m x 1.81 m
Sludge Pumping Station/sludge sump	7.65 x 4.5 m Sump size : 7.65 x 1.18 m
Sludge Drying Beds	79 Nos. , 400 sqm. (Surface Area)
Gas Holder	Dia-23m; Capacity -2850m^3 gas holder
Agency for operation and maintenance of STP	Ganga Pollution Control Unit, U.P. Jal Nigam, Kanpur
Consent from State Pollution Control Board or not	Not Obtained
Status	Non Compliance

Source: UP Jal Nigam

OBSERVATIONS

- The operation of STP is based on ASP process. The STP consists of inlet chamber, screen chamber and dirt removal from sewage, primary settling tanks, aeration tanks, secondary settling tanks, gas storage tanks, gas scrubber, sludge drying beds.
- STP was found operational during inspection .Instantaneous flow meter reading observed was 87 MLD.
- Screening in the inlet chamber was found ineffective especially for removing polyethylene bags of different sizes seen in the sewage effluent from primary sedimentation tank.
- One of the secondary settling tanks was closed due to mechanical fault in the stirrer motor.
- No information has been received about the gas generation in the digester and stored in the gas storage tank. No logbook has been maintained in this regard.
- Out of nine aeration tank, two were under maintenance at the time of monitoring.
- Log books for energy meter, water meter, chemical consumption, running of different motor, gas generator, DG set etc. have not been maintained.
- Electromagnetic flow measuring device and Online effluent monitoring system is not yet installed at the outlet of STP

CPCB Laboratory Analysis Results of the grab sample collected from inlet & outlet of STP 130 MLD, Jajmau, Kanpur is given below:

S. No.	Parameters	Inlet	Outlet	General standard for discharge		
				Inland Surface Water	Public Sewers	Land for irrigation
1.	pH	7.4	7.53	5.5-9.0	5.5-9.0	5.5-9.0
2	Turbidity	180	125			
3.	Colour(Hazen)	75	75			
4.	Conductivity (µS/cm.)	2171	2496			
5.	TSS	590	310	100	600	200
6.	TDS	1227	1419			
7.	Chloride as Cl^-	360.6	345.7			
8.	Sulphate as SO_4^{--}	175.4	163.2			
9.	Phosphate as P	3.77	3.94	5.0	--	--
10.	Nitrate as N	BDL	BDL	10	--	--
11.	Nitrite as N	3.91	BDL			
12.	Ammonical Nitrogen	54.2	60.5	50	50	--
13.	Alkalinity	750	673.5			
14.	BOD	277	96	30	350	100
15.	COD	477	328	250	--	--
16.	Total Coliform	--	$4.6x10^5$			
17.	Fecal Coliform	--	$3.3x10^5$			

Note – all values are in mg/l except coliform.

- **Standard Limits -**

F. Coliform: 1000 MPN/ 100 ml. desirable
10,000 MPN / 100 ml (Max Permissible)

} New standards of <230 MNP are proposed and to be achieved.

IIT Roorkee Laboratory Analysis Results of the grab sample collected from Inlet &Outlet of STP 130 MLD, Jajmau, Kanpur is given below :

S.No.	Parameters	Inlet	Outlet	General standard for discharge		
				Inland Surface Water	Public Sewers	Land for irrigation
1	pH	8	8.1	5.5-9.0	5.5-9.0	5.5-9.0
2	Turbidity (NTU)	214	142			
3	Alkalinity (mg/L)	710	660			
4	Chlorides (mg/L)	330	320			
5	Sulphate (mg/L)	270	211			
6	COD (mg/L)	496	338	250	--	--
7	BOD (mg/L)	184	152	30	350	100
8	TDS (mg/L)	1235	1342			
9	TSS (mg/L)	572	218	100	600	200
10	VSS (mg/L)	212	92			
11	NH_3-N (mg/L)	60.6	60			
12	NO_3-N (mg/L)	4.2	4.6	10	--	--
13	TKN (mg/L)	72.7	78.7			
14	TN (mg/L)	76.9	83.3			
15	PO4-P (mg/L)	3.2	1.1	5	--	--
16	TP (mg/L)	3.7	2.2			
17	TC (MPN/100mL)	930000	93000			
18	FC (MPN/100mL)	23000	2300			

S.No.	Heavy Metals	Inlet (mg/L)	Outlet (mg/L)	General standard for discharge	
				Inhibition threshold levels for activated sludge	Indian Effluent Standards (Env Protection Rules 1996)
1	Cd	0.04191	0.07819	1-10	2
2	Cr	3.63217	3.90044	1-100	2
3	Cu	8.93895	9.84429	-	-
4	Fe	12.86148	6.95275	-	3
5	Pb	0.28948	0.0824	0.1-5.0	0.1
6	Zn	8.05213	2.39763	0.3-5.0	5
7	As	0.8033	0.28157	-	0.2
8	Ni	0.22461	0.07363	-	-
9	Co	0.01334	0.008926	1.0-2.5	3
10	Mn	0.66113	0.37795	-	-

9.2 SEWAGE TREATMENT PLANT (STP) AT JAJMAU STP (5.0 MLD), KANPUR

Sewage treatment plant based on UASB Process at Kanpur, Uttar Pradesh under NGRBA was visited by the team.

Summary of Jajmau STP (05 MLD) Kanpur is as below:

Name/ Location of STP and design Capacity/ year	5 MLD, Jajmau, Kanpur
Process of Sewage Treatment	UASB (Raw sewage- screen channel-UASB-Anoxic tank-Aeration tank-Final polishing unit- Filtration unit-Chlorination unit-Final outlet
Designed Capacity/day	05 MLD
Actual Treatment	4.7 MLD
Status	**Non Compliance**

CPCB Laboratory Analysis Results of grab samples collected from Inlet & Outlet of STP 05 MLD, Jajmau, Kanpur

S. No.	Parameters	Inlet	Outlet	General standard for discharge		
				Inland Surface Water	Public Sewers	Land for irrigation
1.	pH	7.24	7.46	5.5-9.0	5.5-9.0	5.5-9.0
2	Turbidity	160	39			
3.	Colour(Hazen)	75	75			
4.	Conductivity (µS/cm.)	1681	2566			
5.	TSS	531	28.8	100	600	200
6.	TDS	946	1469			
7.	Chloride as Cl^-	403.6	375.6			
8.	Sulphate as SO_4^{--}	177.5	175.4			
9.	Phosphate as P	3.73	4.51	5.0	--	--
10.	Nitrate as N	5.38	BDL	10	--	--
11.	Nitrite as N	BDL	BDL			
12.	Ammonical Nitrogen	48.7	80.1	50	50	--
13.	Alkalinity	642.9	658.2			
14.	BOD	255	139	30	350	100
15.	COD	527	234	250	--	--
16.	Total Coliform	$2.2x\ 10^6$	$2.7x10^5$			
17.	Fecal Coliform	$1.7x10^6$	$1.7x10^5$			

Note – all values are in mg/l except coliform.

Standard Limits

F. Coliform: 1000 MPN/ 100 ml. desirable
10,000 MPN / 100 ml (Max Permissible)

New standards of <230 MNP are proposed and to be achieved.

IIT Roorkee Laboratory Analysis Results of the grab sample collected from Inlet & Outlet of STP 05 MLD, Jajmau, Kanpur is given below:

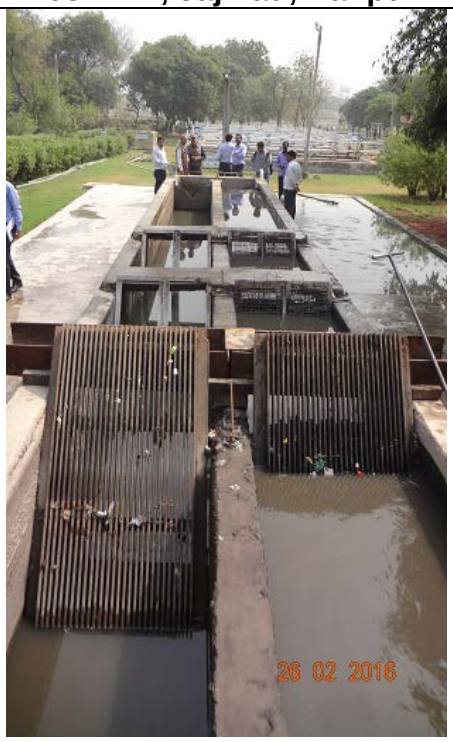
S.No.	Parameters	Inlet	Outlet	General standard for discharge		
				Inland Surface Water	Public Sewers	Land for irrigation
1	pH	7.9	8	5.5-9.0	5.5-9.0	5.5-9.0
2	Turbidity (NTU)	152	27.1			
3	Alkalinity (mg/L)	1180	700			
4	Chlorides (mg/L)	498	318			
5	Sulphate (mg/L)	168	121			
6	COD (mg/L)	479	320	250	--	--
7	BOD (mg/L)	256	102	30	350	100
8	TDS (mg/L)	960	1455			
9	TSS (mg/L)	496	38	100	600	200
10	VSS (mg/L)	172	13			
11	NH_3-N (mg/L)	55.2	65.4			
12	NO_3-N (mg/L)	4.6	2	10	--	--
13	TKN (mg/L)	66.2	80.4			
14	TN (mg/L)	70.8	82.4			
15	PO_4-P (mg/L)	3.8	3.8	5 (as P)	--	--
16	TP (mg/L)	6.6	5.9			
17	TC (MPN/100mL)	430000	75000			
18	FC (MPN/100mL)	15000	2300			

S.No.	Heavy Metals	Inlet (mg/L)	Outlet (mg/L)	General standard for discharge	
				Inhibition threshold levels for activated sludge	Indian Effluent Standards (Env Protection Rules 1996)
1	Cd	0.14372	0.01185	1-10	2
2	Cr	1.44121	0.86089	1-100	2
3	Cu	9.55055	1.59362	-	-
4	Fe	8.27066	3.78299	-	3
5	Pb	0.11276	0.0304	0.1-5.0	0.1
6	Zn	1.94272	2.23023	0.3-5.0	5
7	As	0.20936	0.07684	-	0.2
8	Ni	0.05974	0.04071	-	-
9	Co	0.00497	0.0052	1.0-2.5	3
10	Mn	0.38545	0.31798	-	-

OBSERVATIONS

- STP is **not complying** with prescribed norms.
- The STP was found operational during the inspection.
- Actual flow measured was 4.18 MLD at the time of inspection.
- Log books for energy meter, water meter, chemical consumption, running of different motor, gas generator, DG set etc. have not been maintained by STP.
- The excess foaming near the outlet of the plant was noticed.
- The STP is operating without the valid Consent order under Water & Air Acts and Hazardous Waste Authorization
- Electromagnetic flow measuring device and online effluent monitoring system are not yet installed at the outlet of STP.

STP 05 MLD, Jajmau, Kanpur



Inlet of the STP


UASB reactor

Settling Tank

Sludge Drying Beds


Outlet of the STP

9.3 SEWAGE TREATMENT PLANT (STPS) AT Bingawa, Kanpur (210 MLD)

Area covered: District- 2 (Munshipura, Sisamau, COD Nala, Rakhi Mandi, Ganda Nala and Halwakhanda Nala)

Flow measured at Inlet: 56 MLD at 12:30 P.M.

Technology: UASB based

STP was reported under Stabilisation and underutilized & hence effluent sample was not collected for compliance monitoring.

Screen chamber

Inlet Tank

Screening

Reactors

Aeration Tank

Outlet of the STP

9.4 SEWAGE TREATMENT PLANT (STP) AT SAJARI, KANPUR (42 MLD)

Area covered: District-4 (Shyam Nagar, Chakeri, Sujat Nagar, Shanigawa)

Technology: ASP based

STP was found under Construction

<table>
<tr><td> 
Inlet of the STP</td><td> 
Clarifier</td></tr>
<tr><td> 
Clarifier</td><td> 
Aeration tank</td></tr>
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9.5 SEWAGE TREATMENT PLANT (STP) AT BANIYAPURWA, KANPUR (15 MLD)

Area covered: District -3 (Nawbganj, Lakhanpuri, Azad Nagar, Sharda Nagar, NRI city)

Technology: SBR based

STP was found under Construction

9.6 SEWAGE TREATMENT PLANT (STP) AT FATEHGARH, FARRUKHABAD, (UP)

Summary of STP, Fatehgarh, Farrukhabad, (UP) is as below:

Name/ Location of STP and design Capacity/ year	2.7 MLD,Fatehgarh
Process of Sewage Treatment	OP-Oxidation Pond/Waste Stabilization Process - Oxidation Pond
Designed Capacity/day	2.7 MLD
Actual Treatment	2.7 MLD
Status	**Non Compliance**

CPCB Laboratory Analysis Results of samples collected from Inlet & Outlet of STP is given below:

S. No.	Parameters	Inlet	Outlet	General standard for discharge		
				Inland Surface Water	Public Sewers	Land for irrigation
1	pH	7.41	8.70	5.5-9.0	5.5-9.0	5.5-9.0
2	SS	84.8	54.9	100	600	200
3	TDS	922	887			
4	Chloride as Cl^-	159.7	15.2			
5	Sulphate as SO_4^{--}	58.1	54.0			
6	Phosphate as P	5.08	2.55	5.0	--	--
7	Nitrate as N	1.23	1.66	10	--	--
8	Nitrite as N	BDL	1.36			
9	Ammonical Nitrogen	37.9	5.60	50	50	--
10	Oil & Grease	5.83	5.80			
11	BOD	52.8	59.8	30	350	100
12	COD	132	140	250	--	--
13	Total Coliform	$2.0x10^6$	<1.8			
14	Fecal Coliform	$2.0x10^6$	<1.8			

Note – all values are in mg/l except coliform.

IIT Roorkee Laboratory Analysis Results of the grab sample collected from Inlet & Outlet of STP 2.7 MLD, Fatehgarh, Farrukhabad is given below :

S.No.	Parameters	Inlet	Outlet	General standard for discharge		
				Inland Surface Water	Public Sewers	Land for irrigation
1	pH	8	8.5	5.5-9.0	5.5-9.0	5.5-9.0
2	Turbidity (NTU)	97.8	15.7			
3	Alkalinity (mg/L)	520	320			
4	Chlorides (mg/L)	113	31			
5	Sulphate (mg/L)	88	85			
6	COD (mg/L)	251	167	250	--	--
7	BOD (mg/L)	125	41	30	350	100
8	TDS (mg/L)	727	927			
9	TSS (mg/L)	222	38	100	600	200
10	VSS (mg/L)	106	21			
11	NH_3-N (mg/L)	52	7.1			
12	NO_3-N (mg/L)	2.4	3.2	10	--	--
13	TKN (mg/L)	65.0	12.4			
14	TN (mg/L)	67.4	15.6			
15	PO4-P (mg/L)	1.8	1.6	5	--	--
16	TP (mg/L)	2.7	2.7			
17	TC (MPN/100mL)	430000	4300			
18	FC (MPN/100mL)	23000	150			

S.No.	Heavy Metals	Inlet (mg/L)	Outlet (mg/L)	General standard for discharge	
				Inhibition threshold levels for activated sludge	Indian Effluent Standards (Env Protection Rules 1996)
1	Cd	0.00491	0.001918	1-10	2
2	Cr	0.5307	0.36355	1-100	2
3	Cu	8.62923	8.19571	-	-
4	Fe	8.19525	4.41364	-	3
5	Pb	0.06172	0.05281	0.1-5.0	0.1
6	Zn	2.38316	2.30521	0.3-5.0	5
7	As	0.14344	0.12951	-	0.2
8	Ni	0.0352	0.01945	-	-
9	Co	0.00689	0.00424	1.0-2.5	3

10	Mn	0.42358	0.30491	-	-

OBSERVATIONS

- The Fatehgarh STP (2.7 MLD) is based on Oxidation Pond.
- The STP Fatehgarh has one Sewage Pumping Stations (SPS) located at Cant. area and one main pumping station at Hathikhana Nalla. 2.7 MLD sewage is directly pumped in STP from Hathikhana Nalla.
- The STP consisting of two (100m x150m x 1.2 m each) primary oxidation pond and one secondary oxidation pond. (100m x150m x 1.2m).
- The Hathikhana nalla MPS consisting of four pumps with capacity 40 HPX2 (3500 LPM) and 25 HPX2.(1800 LPM).The sewage collected from Ambakhar colony, Bholepur, Naglading, Jainvi Road, Hathikhana, Poolmandi, Nawadia, Civil line area and pumped through MPS in to STP Fatehgarh for treatment.
- The Oxidation Pond no. 02 was not operational due to maintenance.
- The outlet of STP is being discharged into River Ganga after travelling approx. 2 Km. 50-60 % treated sewage used for irrigation the nearby land of the farmers.
- The STP is operating without the valid Consent order under Water & Air Acts and Hazardous Waste Authorization
- The STP was found **Not Complying** with the prescribed standard.

***Photograph*-View of oxidation pond**

***Photograph*-Outlet of STP**

9.7 STP AT BRIJGHAT

Drians/Nallahs meeting with River Ganga in the region from Garhmukteshwar and Simbhaoli on **08-05-2016**.

Under construction STP of 3.14 MLD at Brijghat

Under construction STP of 6.14 MLD at Garh

Garh drain

- Garh drain carries untreated sewage of Garh-Mukteshwar, Nayabas village and directly falls into River Ganga at Brijghat. It is situated at the right bank of river Ganga. At the time of monitoring it was found dry approx. 100 m before the sampling location therefore sampling was done near the confluence point (20m)**.**

- At this point the water is stagnant and there might be some mixing of Ganga water with the drain. Sample was also drawn from mid-point of river Ganga from Brijghat. The analytical result is given below in the table.

Waste water Physico-Chemical and biological analysis report of Garh Drains

(Date of Sampling: **08-05-2016**)

Sl. No.	Sampling Location	pH	Cond.	DO	COD	BOD	Chloride	Total Coliform (TC)	Faecal Coliform (FC)
1.	**Garh drain**	7.3	650	4.9	29	05	18	92000	54000
2.	**River Ganga at Brijghat**	7.2	235	8.8	18	04	09	1600	920

Note: All values are expressed in mg/l except pH, Conductivity (µmho/cm)& TC/FC (MPN/ 100 ml)

- Total coliform and Faecal coliform of both the samples are comparatively high and exceeds prescribe standard of bathing criteria (500 MPN/100ml or less) and BOD of both sample is also marginally high from bathing criteria of bathing water (3mg/l or less).

Fuldehra Drain

- Fuldehra Drain originates from Simbhawali and directly falls into River Ganga at Pooth village. It carries industrial effluent (Simbhawali Sugar Mills & Distillery) and untreated sewage of Simbhawali town. During inspection it was found dry and no sampling was collected.

Found dry approx. 100 m before the sampling location

Sampling point Stagnant water before confluence to river Ganga

	
Dried -Fuldhera drain	Meeting point of Fuldhera drain with Syana canal

9.8 River Ganga and STP-I and STP-II in Anupshahar

- Afterwards, team has moved to Anupshahar where the team has visited the River Ganga location downstream of Anupshahar near Baba Mast Ram Ashram, located after the confluence of outlet of an Oxidation pond /STP in Anupshahar.
- Water samples from river Ganga and macro-zoo benthos samples were collected for analysis of water quality.
- Anupshahar city has been divided into two zones for waste water management, Zone-A, and Zone-B where waste water is tapped through Nallahs and treated in STPs.
- There are two STPs presently running which were constructed in the year 2005 with a combined treatment capacity of 2.55 MLD.
- STP-II is located in ZONE-B with an installed treatment capacity of 1.75 MLD, samples were collected from Inlet and outlet of STP.
- Team has visited another STP/oxidation pond STP-I in ZONE-A with installed treatment capacity of 0.805 MLD in Anupsahar near Gangabas Khadar Urf Jafrabad, and collected samples from inlet and outlet of the STP

Under construction STP at Narora

River Ganga near Baba Mastram Ashram at Anupsahar (D/S of confluence of STP-II outlet)

Oxidation ponds at STP-II in Zone-B of Anupsahar

Waste water Physico-Chemical analysis report (Anupshahar STP)

Sl.No.	Sampling Location	Analysis Results								
		BIS: 10500: 2012 Desirable								
		6.5-8.5	-	-	500	250	30	200	200	-
		pH	EC	TSS	TDS	COD	BOD	Cl^-	SO_4^-	PO_4-p
1	Anupshahar STP-I Outlet	9.59	765	51	540	116	20	68	41	0.63
2	Anupshahar STP-II Outlet	8.78	987	32	640	76	17	83	42	1.62
3	Anupshahar STP-II Inlet	7.60	1260	203	748	245	114	91	49	2.30

**All the values are in mg/l except pH, EC (µS/cm) and FC (MPN/100ml)*

Waste water Bacteriological analysis report (Anupshahar STP)

		Total Coliform	Fecal Coliform	Fecal Streptococci	Enterococcus	E.Coli	TPC
2	Anupshahar STP-I Outlet	3300	180	20	20	180	2950
3	Anupshahar STP-II Outlet	1700	200	20	20	200	1260

**All the values are in MPN/100ml,*

IIT Roorkee Laboratory Analysis Results of Fresh water (Anupshahar)

Sampling Location of River Ganga at	Analysis Results													
	BIS: 10500: 2012 Desirable													
	6.5-8.5	-	-	500	250	30		45			-	-		
	pH	Turbidity	TSS	TDS	COD	BOD	NH_4-N	NO_3-N	TKN	TN	PO_4-p	TP	TC	FC
Anupshahar STP D/S	7.6	4.5	6	140	10	5	0.25	1.8	4	5.8	0.02	0.2	200	200

**All the values are in mg/l except pH , Turbidity (NTU) and TC, FC (MPN/100ml)*

IIT Roorkee Laboratory Analysis Results of the grab sample collected from Inlet & Outlet (Anupshahar STP)

Parameters	Inlet	Outlet 1	Outlet 2	BIS: 10500: 2012 Desirable
pH	7.8	8.2	7.9	6.5-8.5
Alkalinity	400	330	320	-
Turbidity	68	18	17	-
TDS	810	600	740	500
BOD_T	125	24	24	30
COD_T	261	91	76	250
TSS	193	46.9	33.6	
VSS	71	5	6	
NH_4-N	20.1	0.29	1.2	-
NO_3-N	1.9	2.1	2.2	-
TKN	26.8	16	28	-
TN	28.7	16.29	29.2	-
PO_4-P	1.5	1.6	1.1	-
TP	2.4	1.8	1.9	-
TC	4300000	9.8×10^2	2.4×10^2	-
FC	23000	150	120	-

**All the values are in mg/l except pH , Turbidity (NTU) and TC, FC (MPN/100ml)*

Fresh water Physico-Chemical analysis report (Anupshahar)

Sampling Location of River Ganga at	Analysis Results													
	BIS: 10500: 2012 Desirable													
	6.5-8.5	-	-	500	250	30	200	200	250	1	-	200	-	45
	pH	EC	TSS	TDS	COD	BOD	TA	TH	Cl^-	F	B	SO_4^-	PO_4-p	NO_3
Anupshahar STP D/S	8.6	180	BDL	122	6	1	94	72	6	0.2	BDL	15	BDL	0.2

**All the values are in mg/l except pH, EC (µS/cm).*

Fresh water Bacteriological analysis report (Anupshahar)

Sampling Location of River Ganga at	Total Coliform	Fecal Coliform	Fecal Streptococci	Enterococcus	E.Coli	TPC
Narora Barrage D/S	33	26	<1.8	<1.8	24	420
Anupshahar STP D/S	780	450	13	13	450	750
Bijnor Chhoiya drain D/S	3500	1700	1100	1100	1100	2460

**All the values are in MPN/100ml,*

9.9 STP at Narora

Narora Barrage

- The team first visited the location at River Ganga d/s of Narora Barrage (near bathing ghat) on 4thJune, 2016.
- The team observed the flow of the barrage and informed by the Barrage Management that,at the time of inspection the water flow from the barrage to downstream of barrage was around 1300 cusec and water discharge to lower Ganga canal was maintained at 6,699 cusecs a consented discharge of 8500 cusecs.
- Water sample was taken from the downstream of barrage for analysis of Physico-chemical parameters for fresh water,Pesticide Total Coliform and Faecal Coliform in the river water.
- Macroinvertebrate samples were also collected for Biological Water Quality (BWQ) analysis.

Monitoring location at river Ganga downstream of Narora barrage

Under Construction Sewage Treatment Plant at Narora and STP at NPCIL Township in Narora

- The team then visited the site of an under construction Sewage Treatment Plant (STP) with the name of Narora Sewage Yojna which is being constructed by UP Jal Nigam under the Namami Gange Programme

- The under construction STP is located near the river Ganga just behind the township of Narora Atomic Power Station.
- The proposed STP will be based on SBR Technology with an operational capacity of 4.0 MLD and construction is proposed to be finished by January 2018.
- The team has also visited the STP inside the township of Narora Atomic Power Station of Nuclear Power Corporation of India Limited (NCPIL) which is exclusively used for treatment of waste water/ sewerage generated inside the township.
- NCPIL township officials has informed the team that the township STP is not discharging treated water outside the campus to any water body instead they are reusing it for horticulture and other purpose inside the township.
- Sample was drawn from inlet and outlet of the STP for analysis of waste water parameters.

Waste water Physico-Chemical analysis report (Narora STP)

S. No.	Sampling Location	Analysis Results								
		BIS: 10500: 2012 Desirable								
		6.5-8.5	-	-	500	250	30	200	200	-
		pH	EC	TSS	TDS	COD	BOD	Cl^-	SO_4^-	PO_4-p
1	Narora STP Outlet	7.75	710	BDL	456	16	5	-	-	-
2	Narora STP Inlet	7.14	718	890	428	532	208	29	27	1.64

**All the values are in mg/l except pH, EC (µS/cm) and FC (MPN/100ml)*

Waste water Bacteriological analysis report (Narora STP)

S. No	Sampling Locaiton	Total Coliform	Fecal Coliform	Fecal Streptococci	Enterococcus	E.Coli	TPC
1	Narora STP Outlet	1600	920	490	490	350	1010

**All the values are in MPN/100ml,*

IIT Roorkee Laboratory Analysis Results of the grab sample collected from Inlet & Outlet (Narora STP)

Parameters	Inlet	Outlet	BIS: 10500: 2012 Desirable
pH	7.2	7.6	6.5-8.5
Alkalinity	260	330	-
Turbidity	132	3.78	-
TDS	520	520	500
BOD_T	224	8	30
COD_T	376	19	250
TSS	315	7	
VSS	95	2	
NH_4-N	17.5	4.4	-
NO_3-N	2.7	1.8	-

TKN	11	18	-
TN	28.5	22.4	-
PO_4-P	1.8	0.8	-
TP	2.8	1	-
TC	2.41×10^6	1.14×10^4	-
FC	4.6×10^2	388	-

**All the values are in mg/l except pH , Turbidity (NTU) and TC, FC (MPN/100ml)*

Fresh water Physico-Chemical analysis report (Narora)

Sampling Location of River Ganga at	Analysis Results													
	BIS: 10500: 2012 Desirable													
	6.5-8.5	-	-	500	250	30	200	200	250	1	-	200	-	45
	pH	EC	TSS	TDS	COD	BOD	TA	TH	Cl^-	F	B	SO_4^-	PO_4-p	NO_3
Narora Barrage D/S	8.0	191	BDL	113	BDL	BDL	100	74	5	0.2	BDL	16	BDL	0.3

**All the values are in mg/l except pH, EC (µS/cm).*

Fresh water Bacteriological analysis report (Narora)

Sampling Location of River Ganga at	Total Coliform	Fecal Coliform	Fecal Streptococci	Enterococcus	E.Coli	TPC
Narora Barrage D/S	33	26	<1.8	<1.8	24	420

**All the values are in MPN/100ml,*

IIT Roorkee Laboratory Analysis Results of Fresh water (Narora)

Sampling Location of River Ganga at	Analysis Results													
	BIS: 10500: 2012 Desirable													
	6.5-8.5	-	-	500	250	30		45			-	-		
	pH	Turbidity	TSS	TDS	COD	BOD	NH_4-N	NO_3-N	TKN	TN	PO_4-p	TP	TC	FC
Narora Barrage D/S	7.6	3.3	5	140	10	5	0.23	0.8	2	2.8	0.02	0.2	134	110

**All the values are in mg/l except pH , Turbidity (NTU) and TC, FC (MPN/100ml)*

9.10 STP Jagjeetpur, Kankhal, Haridwar

- The Committee has visited Sewage treatment Plant (STP) of 27 MLD and 18 MLD on 21/11/ 2015 situated at Jagjeetpur, Kankhal Haridwar in order to verify its compliance.

- The STP is designed to handle domestic sewage coming from the nearby town. On the basis of the water sample results we can say that almost all the major parameters i.e. BOD, COD and TSS are meeting the norms prescribed for discharge in land surface water.

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM STP JAGJEETPUR, KANKHAL, HARIDWAR

(Date of Sampling: 21-11-2015)

Sl. No.	Sampling Location	Sampling Point	pH	TSS	COD	BOD	Cl^-	SO4
1	STP Jagjeetpur, Kankhal, Haridwar	Inlet	7.13	219	324	196	63	37
2		Outlet (27MLD)	7.3	09	16	02	38	45
3		Outlet (18MLD)	7.43	06	33	04	34	37

Note: All concentrations are expressed in mg/l except of pH & Conductivity (µmho/cm)

10.0 INTERSTATE RIVER WATER QUALITY

River Banganga after confluence with Laksar drain

- The Committee has visited Idrispur village in Haridwar District, the point where River Ganga leaves the state of Uttarakhand. Samples were drawn from River Banganga after confluence with Laksar drain. The results of collected sample is given below. Observation of Committee based on visit to Rivers and the analytical results of the samples drawn from the River Banganga shows that:-
    - BOD and COD values are below the permissible limits.
    - None of the metal found in the water sampled so for except Iron and manganese.
    - Total Coliform (TC) and Fecal Coliform (FC) found in higher concentration as per the standards prescribed for bathing purposes.

WATER QUALITY ANALYTICAL RESULTS

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM LAKSAR DRAIN AFTER MEETING WITH BANGANGA RIVER AT IDRISPUR

(Date of Sampling: 21-11-2015)

Sampling Location	pH	Cond.	COD	BOD	TDS	DO	Cl^-	Total Alkalinity as CaCO3	Calcium as Ca^{++}	Magnesium as Mg^+	NH3
Laksar drain after meeting with Banganga river at Idrispur	7.7	495	06	02	290	7.8	10	226	66	02	BDL

Sampling Location	As	Cd	Co	Cr	Cu	Fe	Mn	Ni	Pb	Sb	Se	V	Zn	TCMPN/100 ml	FC MPN/100 ml
Laksar drain after meeting with Banganga river at Idrispur	BDL	BDL	BDL	BDL	BDL	0.38	0.06	BDL	BDL	BDL	BDL	BDL	BDL	$13x10^4$	$17x10^3$

Note: All concentrations are expressed in mg/l except of pH & Conductivity (µmho/cm).

11.0 GROUND WATER

Water quality of River Kali East and River Ganga before confluence with River Ganga

The samples were collected on 28.11.2015, on the basis of the analytical results of river Kali shows that water is having more suspended solids and turbidity than the Ganga River. Before confluence of River Kali River Ganga has conductivity 296.00 umho/cm and suspended solids are 175 mg/l . The results are given below:-

WATER QUALITY ANALYTICAL RESULTS

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM RIVER KALI & RIVER GANGA BEFORE CONFLUENCE OF RIVER KALI

(Date of Sampling: 28-11-2015)

Sl no.	Parameters	River Ganga Before Confluence of River Kali	River Kali
1.	**pH**	8.30	7.90
2.	**Turbidity**	50.00	140.00
3.	**Colour**	15.00	20.00
4.	**Conductivity**	296.00	227.00
5.	**Suspended Solids**	175.00	1299.00
6.	**Total Dissolved Solids**	164.00	148.00
7.	**Calcium as Ca^{2+}**	33.60	27.80
8.	**Magnesium as Mg^{2+}**	17.70	7.70
9.	**Sodium as Na^{+}**	11.00	7.40
10.	**Carbonate**	59.16	BDL
11.	**Bi-Carbonate**	47.90	93.80
12.	**Phosphate as P**	0.019	0.230
13.	**Nitrite as N**	0.014	0.042
14.	**Am. Nitrogen**	BDL	BDL

Note: All concentrations are expressed in mg/l except of pH & Conductivity (µmho/cm).

Ground water quality analytical results

- The samples were collected from Shekhupur villege, shekhupur chauraha and Jana villege on 28.11.2015 to evaluate the quality of ground water near to industrial units. The results are given below. The observations on the basis of results are as follows:
    - The total dissolved solids (TDS) concentration of all the three ground water samples are high enough i.e. 1341.0, 1186.0 and 783.0 mg/l for shekhupur village, shekhupur chauraha and Jana village sites respectively against the standard i.e. 500.0 mg/l.
    - The concentration of calcium is 101.0 mg/l and 109.0 mg/l for shekhupur village, shekhupur chauraha ground water samples against the permissible limit i.e. 75 mg/l.
    - The Iron concentration is more the limit at shekhupur village, shekhupur chauraha sites i.e. 7.90 and 097 mg/l.

GROUND WATER QUALITY ANALYTICAL RESULTS

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM GROUND WATER

(Date of Sampling: 28-11-2015)

Sl no.	Parameters	GW - 1 Shekhpur Village	GW - 2 Shekhpur Chourah	GW - 3 Jana Village
1.	**pH**	7.20	7.22	7.35
2.	**Conductivity**	1,980.00	1,716.00	1,186.00
3.	**Suspended Solids**	10.20	BDL	120.50
4.	**Total Dissolved Solids**	1,341.00	1186	783.00
5.	**Calcium as Ca^{2+}**	101.00	109.00	41.00
6.	**Chloride as Cl^{-}**	339.00	295.00	159.00
7.	**Sulphate as SO_4^{2-}**	158.00	106.00	34.90
8.	**Phosphate as P**	0.003	BDL	0.003
9.	**Alkalinity**	452.00	403	400.00
10	**COD**	BDL	BDL	BDL
11	**Cadmium (Cd)**	BDL	BDL	BDL
12	**Cobalt (Co)**	BDL	BDL	BDL
13	**Total Chromium (Cr)**	0.068	BDL	BDL
14	**Copper (Cu)**	BDL	BDL	BDL
15	**Iron (Fe)**	7.90	0.97	BDL
16	**Manganese (Mn)**	0.164	0.232	BDL
17	**Nickel (Ni)**	BDL	BDL	BDL
18	**Lead (Pb)**	BDL	BDL	BDL
19	**Zinc (Zn**	0.18	0.42	BDL

Note: All concentrations are expressed in mg/l except of pH & Conductivity (µmho/cm)

GROUND WATER QUALITY ANALYTICAL RESULTS

ANALYTICAL RESULTS OF SAMPLE COLLECTED FROM CONFLUENCE POINT OF CHHOIYA DRAIN AT RASULPUR BHAWER NEAR BIJNOR

(Date of Sampling: 05.06.2016)

Sl. no.	Parameters	Groundwater Sample code: RBB
		Location: Rasulpur Bhawer
1.	**pH**	7.5
2.	**Conductivity**	420
3.	**Suspended Solids**	BDL
4.	**Total Dissolved Solids**	255
5.	**Calcium as Ca^{2+}**	42
6.	**Magnesium as Mg^{+2}**	9
7.	**Chloride as Cl^{-}**	12
8.	**Fluoride as F^{-}**	0.3
9.	**Boron**	BDL
10.	**Sulphate as SO_4^{2-}**	BDL
11.	**Phosphate as P**	0.1
12.	**Nitrate as NO_3**	BDL
13.	**Alkalinity**	296
14.	**COD**	6
15.	**BOD**	-
16.	**Arsenic (As)**	0.29
17.	**Cadmium (Cd)**	BDL
18.	**Cobalt (Co)**	BDL
19.	**Total Chromium (Cr)**	BDL
20.	**Copper (Cu)**	BDL
21.	**Iron (Fe)**	0.30
22.	**Manganese (Mn)**	0.53
23.	**Nickel (Ni)**	BDL
24.	**Lead (Pb)**	BDL
25.	**Zinc (Zn)**	BDL

Note: All concentrations are expressed in mg/l except of pH & Conductivity (µmho/cm)

Groundwater collected from confluence point of Chhoiya drain at Rasulpur Bhawer near Bijnor.

IIT ROORKEE LABORATORY ANALYTICAL RESULTS OF SAMPLE COLLECTED FROM CONFLUENCE POINT OF CHHOIYA DRAIN AT RASULPUR BHAWER NEAR BIJNOR
(DATE OF SAMPLING: 05.06.2016)

Sl. no.	Parameters	Groundwater Sample
		Location: Rasulpur Bhawer
1.	**pH**	7.3
2.	**Conductivity**	380
3.	**Suspended Solids**	BDL
4.	**Total Dissolved Solids**	200
5.	**Chloride as Cl^-**	10
6.	**Sulphate as SO_4^{2-}**	BDL
7.	**Phosphate as P**	0.01
8.	**Nitrate as NO_3**	BDL
9.	**Alkalinity**	150

Parameter	Unit	Rasoolpur During mixing in River Ganga	Rasoolpur After mixing in River Ganga
pH	-	7.7	7.6
Alkalinity	mg/L as $CaCO_3$	310	80
Turbidity	NTU	31.9	16.8
TSS	mg/L	33	25
TDS	mg/L	640	120
BOD	mg/L	21	6
COD	mg/L	87	18
NH_4-N	mg/L	3.8	0.2
NO_3-N	mg/L	1.8	0.9
TKN	mg/L	6	0.5
TN	mg/L	7.8	1.4
PO_4-P	mg/L	1.2	0.2
TP	mg/L	1.5	0.8
TC	MPN/100 mL	8.6×10^4	2.89×10^3
FC	MPN/100 mL	520	860

12.0 INDUSTRIAL POLLUTION

M/S Gangotri Paper Mills Pvt. Ltd., Jhabreda Road, Dist. Haridwar

- The Committee was informed by Member Secretary, UEPPCB that M/S Gangotri Paper Mills Pvt. Ltd., Jhabreda Road, Dist. Haridwar is also meeting the ZLD standard as per the report submitted by Central Pulp and Paper Research Institute (CPPRI), Saharanpur, UP and therefore Committee has decided to visit the same.
- The Committee was informed by the Industry representative that the unit is operating at 200 tonnes per day (TPD) production capacity and consuming fresh water about 40m3 per day and using treated recycled water about 160 m3 per day. The Industry is fully operating on imported waste paper.
- The samples were drawn from different points inside the industry during the inspection to ascertain the efficacy of the system diploid for achieving ZLD norms. The analytical results from CPCB laboratory are as follows:-.
- Observation of Committee based on analytical results of samples from Gangotri Paper Mills Pvt. Ltd. is as follows:
    - The value of finally treated effluent (after secondary clarifier) shows that the effluent treatment plant is not working properly to achieve the standards in respect to TSS, BOD and COD parameters.

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM GANGOTRI PAPER MILLS PVT.LTD. (Date of Sampling: 21-11-2015)

Sl. No.	Sampling Location	Sampling Point	pH	TSS	COD	BOD	Cl^-	SO_4
1	Gangotri Paper Mills Pvt. Ltd.	Inlet	5.88	6638	21300	16486	1600	2175
2		After primary clarifier	5.98	1540	27312	15684	1647	2185
3		After sand filter	6.01	1390	26848	16850	1447	1420
4		After Secondary clarifier	7.71	313	472	109	644	432

Note: All concentrations are expressed in mg/l except pH & Conductivity (µmho/cm)

RBNS Sugar Mills Ltd., Laksar

- After completing the CETP the Committee has visited RBNS Sugar Mills Ltd., Laksar, where both sugar and distillery units of the industry were found not in operation.
- As supported by Member Secretary, Uttarakhand Environmental Protection and Pollution Control Board (UEPPCB) the distillery unit of RBNS Sugar Mills Ltd. would be operating in accordance to the action plan prepared by CPCB for achieving ZLD standards. The Committee therefore suggested to verify the same by CPCB immediately soon after the distillery comes into operation (expected to start operation in the month of December, 2015).
- One sample of ground water from bore-well within the industrial complex has been drawn to obtain the baseline ground water quality data as such the distillery unit is proposing to carry out compost manufacturing by utilizing the spent wash and press mud.
- The analytical result of the sample is given below. It shows that the quality of water meets the standards prescribed for groundwater as per IS: 10500.

GROUND WATER QUALITY ANALYTICAL RESULTS

ANALYTICAL RESULTS OF SAMPLES DRAWN FROM GROUND WATER OF RBNS SUGAR MILLS

(Date of Sampling: 21-11-2015)

Sampling Location	pH	Cond	COD	BOD	TDS	Chloride	Total Alkalinity as CaCO3	Calcium as Ca^{++}	Magnesium as Mg^{+}	NH3
Ground water of RBNS Sugar mills	7.6	772	06	01	449	15	260	64	19	-

Note: All concentrations are expressed in mg/l except of pH & Conductivity (µmho/cm)

13.0 ABOUT TRIBUTARIES

In between Haridwar to Kanpur there are two important tributaries namely Kali East and Ramganga. These two tributaries meets River Ganga in Kannauj area. The water quality of these two tributaries is impaired because of contamination of sewage indicating higher number of Fecal Coliform bacteria.

The other tributary is Banganga which enters from Uttarakhand to Uttar Pradesh in the Shukrataal area. Which also carries bacterial load.

14.0 OVERALL CONCLUSION / FINDINGS OF THE REPORT

1. It is respectfully submitted before the Hon'ble National Green Tribunal that the inspection carried out in compliance with the two order dated 02.11.2015 and 08.02.2016 related to various important aspects of prevention and control of pollution of river ganga which included CETPs, STPs, Water Quality of River Ganga, Tributaries joining river Ganga, sewage carrying drains and the water extraction / diversion from the River Ganga.

   The Committee constituted has made the observations and pin-pointed the observations / conclusion and are as under:-

A. CETPs (3 in Uttarakhand and 4 in Uttar Pradesh)

(i) All the 7 CETPs in Uttarakhand and Uttar Pradesh are not complying with the stipulated standards.

(ii) All the CETPs (out of 4 in Uttar Pradesh) except Jajmau, are underutilized - receiving less industrial effluent than the design discharge capacity of CETP.

The actual generation of wastewater from tanneries in Jajmau Cluster, Kanpur, is beyond the designed capacity of 9 MLD tannery wastewater in the 36 MLD CETP at Jajmau Kanpur.

(iii) Inlet to the CETP are non-confirming to the prescribed standard due to the inadequate and poorly managed PETP in the member industries as a result, functioning of CETPs is upset. This has been particularly observed in Jajmau, Unnao, Banther (UP) and Sitarganj (in UK).

(iv) The finally treated effluent from the operating CETPs required polishing so to bring the effluent for irrigation or of bathing water standards for disposal into river.

(v) The common conveyance system to all CETPs is not properly maintained and they are either silted / choked.

(vi) Till such time additional treatment provision is provided particularly in Tannery Cluster Jajmau, there is an immediate need to; **(a)** firstly restrict the number and production capacity of tanneries contributing their wastewater. Since the CETP is designed only for 9 MLD of Tannery effluent as well as accordingly the conveyance system, the pre-treated effluent generation is higher when it is not treated. Thus, excess and overflow from pumping stations goes directly/indirectly to the river. **(b)** Considering characteristics of combined tannery wastewater carrying high concentration of chromium and other objectionable pollutants, it requires additional pre-treatment provision to accept shock loading at the CETP.

(c) All the tanneries are required to provide a tamper proof sealed electro-mechanical flow meters at the outlet of their Primary Treatment plants. UPPCB has to ensure that the wastewater discharge is in strict conformity of notified standards for the consented capacity of hide processing; **(d)** O & M cost sharing should be based on load based contribution by the member units in place of volume.

(vii) The Committee felt the necessity to explore possibility for augmenting capacity of pumping, conveyance system and treatment for tannery wastewater. This is required to integrate untreated wastewater and convey it to CETP for adequate treatment. This will eliminate currently observed overflow of tannery wastewater from pumping stations. It is suggested that the entire collection network and pumping stations have to be redesigned to cater for increased flow of 50 MLD please (refer 7.1.4 & as reported by CLRI).

IIT Roorkee: Has made specific observation that among all CETPs it was observed that Haridwar SIDCUL CETP is comparatively better. The non-compliance for other CETPs is due to the lack of will for operation of CETPs. Strict action can be taken for non-compliance CETPs in the Ganga basin.

B. Sewage Drains

(i) At all places / locations from Haridwar to Kanpur, the storm water drains are converted into sewage drains. Till such time these drains are rejuvenated and treated by either STP any other system and bringing the effluent of BOD value <10 mg/l and fecal coliform reduction, the water quality of River Ganga will be difficult to restore. The terminal points of all drains as well as along its travel length in cities or otherwise should be periodically cleaned and hygienically maintained.

(ii) The concerned authorities controlling the sewage drains are not monitoring the actual flow. Therefore, there has to be proper flow measuring system at the terminal points of all the drains.

C. STPs

(i) The Committee visited STPs between Haridwar to Kanpur which includes Brijghat, Narora, Anoopsheher, Farukkhabad and Kanpur.

(ii) Three STPs at Kanpur, STP at Farukkhabad and Oxidation Pond at Anupshahar are not meeting fecal coliform criteria.

(iii) STPs like Bingavan at Kanpur is underutilized.

(iv) There is a need to expedite up-gradation of sewage treatment infrastructure to fill the major gaps of sewage generation & sewage treatment considering actual maximum quantity of wastewater discharged through all the drains into River Ganga & future growth. (Examples, STPs at Kanpur, Farukhabad, Anupshahar)

(v) STPs which are under construction like Kanpur (2 STPs) and at Brijghat and Narora should have simultaneous conveyance system ready so that total designed sewage is collected and reaches to these STPs.

"Comments IIT Roorkee"

Regarding Sewage Treatment in Haridwar and Kanpur:
It has been observed that the all three STPs in Haridwar are working well and bringing out the effluent quality for direct discharge or non-potable reuse. However, the condition in Kanpur is completely opposite: Interception and diversion systems are under designed, STP technology is outdated and all are malfunctioning. Hence, UP Jal Nigam Kanpur should revamp their sewerage system and come out with comprehensive O&M plan on the lines of CPHEEO Manual 2013 (Part B&C). At least, they should completely divert all four drains from tannery cluster to Jajmau STP, thereafter advanced wastewater treatment and reuse can be thought of.

Regarding Sewage Treatment for cities between Kanpur & Haridwar: At present the condition is not so bad, New STPs on advanced technologies are under construction. It is advised that they share the experiences of Haridwar and Nuclear Power Corporation Limited, Narora owned well functioned STPs and Reuse system. There should be the availability of sufficient O&M funds on the Lines of CPHEEO Manual 2013 (Part B &C) for the smooth functioning of sewerage system of these cities. "However, CPCB at this stage is not able to certify any performance and STPs must meet hygiene criteria of fecal coliform which have STPs to do.

D. Industrial Pollution

(i) The committee has performed surprised check of few paper units, distilleries and tanneries. The committee could surprisedly observe that a Choiya drain joining River Ganga was carrying colored effluent and a patch of Ganga was also found colored. On this observation, UPPCB immediately has issued show-cause notices under Water Act to 3 industries (M/s. Mohit Papers, M/s. Mohit Petrochem & M/s. Jain Distillery).

(ii) There is need to have regular vigilance on industries which should be based on backyard inspections to see that industries do not let out, particularly, the colored

effluent and treated effluent should meet prescribed standards.

"Comments IIT Roorkee:

Regarding Industrial Pollution: Based on visits to several industries in Ganga Basin, it was observed that all the polluting industries had well operating ETPs. However, the water quality conditions of drains doesn't seems to improved. It can be concluded that these industries are operating ETPs for a limited period of time. In the night time or in weekends they bypass the untreated effluent to the storm water drains. Hence, source identification methodology for illegal discharge into the drain is to be adopted. There should be random sampling and checking of industrial ETPs by a dedicated workforce in Ganga Basin. Strict action can be taken against non-complying ETPs of polluting industries in Ganga Basin.

E. River Water Quality and Tributaries

(i) Water quality of River Ganga at the interstate boundary of Uttarakhand and Uttar Pradesh at Ballawali was monitored. At this point the BOD level was 5 mg/l and fecal coliform was higher.

(ii) River Kali East and Ramganga meet River Ganga at Kannauj. The water quality of both the tributaries is not meeting with the prescribed norms/criteria in respect of BOD & fecal coliform.

F. Ground Water Quality

(i) Ground water quality monitoring at selected locations has shown inferior quality as compared to river water quality.

G. Water Flow in Ganga

(i) The water of River Ganga is diverted at Narora significantly. The downstream of Narora requires more water to maintain its flow as well as ecological sanctity.

2. It has been concluded based on the comprehensive field surveys, a stretch between Haridwar to Kanpur requires regular monitoring and the concerned authorities of Uttarakhand and Uttar Pradesh to ensure compliance by CETPs and STPs. The drains joining River Ganga should be appropriately either diverted to STPs or to be rejuvenated upto the level of bathing water quality standards at the terminal points Strict Vigilance, enforcement & compliance by industries to be enforced by the Uttarakhand & Uttar Pradesh State Pollution Control Boards.

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Central Pollution Control Board
'Parivesh Bhawan', East Arjun Nagar,
Shahadara, Delhi – 110032
Tel. 011-43102030
Telefax- 22305793/22307078/22301932/22304948
e-mail: cpcb@nic.in Web: cpcb.nic.in