PERFORMANCE EVALUATION OF SEWAGE TREATMENT PLANTS UNDER NRCD

AUGUST, 2013

CENTRAL POLLUTION CONTROL BOARD
(Ministry of Environment and Forests, Govt. of India)
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FOREWORD

In urban areas, water is tapped from rivers, streams, wells and lakes for domestic and industrial uses. Almost 80% of the water supplied for domestic use, comes back as wastewater. In most of the cases untreated wastewater is let out which either sinks into the ground as a potential pollutant of ground water or is discharged into the natural drainage system causing pollution in downstream areas.

The present report is the outcome of the study on performance evaluation of STPs funded under National River Conservation Plan of Ministry of Environment and Forests, Government of India carried out by Central Pollution Control Board (CPCB).

The report envisages performance evaluation of 152 STPs spread over 15 states in the country and having total treatment capacity of 4716 MLD. The study revealed that the actual treatment capacity utilization is only 3126 MLD (66%). Out of the 152 STPs, 9 STPs are under construction, 30 STPs are non-operational and performance of 28 STPs not satisfactory. Out of the 152 STPs, the treated effluent from 49 STPs exceeds the BOD standards and with respect to COD, 07 STPs are violating the general standards of Discharge.

The status of STPs in Andhra Pradesh, Bihar, Delhi, Goa, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal indicate that maximum Sewage treatment capacity exists in Tamil Nadu (16.9%) followed by Uttar Pradesh (16.4%), Andhra Pradesh (15%), Punjab (14%), West Bengal (10%). Haryana (7%), Maharashtra (6%), Gujarat (4.9 %), Madhya Pradesh (3.6 %), Bihar (3.4 %), Uttarakhand (1.1 %), Karnataka (0.9 %), Delhi (0.4%) and Goa (0.2%). STPs designed on Trickling filter and Sequential Batch Reactor (SBR) technologies are meeting the standards and having more than 90 % efficiency in terms of BOD removal.

I gratefully acknowledge the contribution of my collegues Sh A K Sinha Sc. ‘D’, Sh. Vishal Gandhi, Scientist ‘C’ and Ms. Garima Dublish, Research Associate under the supervision of Sh R.M Bhardwaj, Sc.’D’ and overall guidance of Sh. J.S Kamyotra, Member Secretary. I am hopefull that the document would prove useful as a reference for all concerned individuals or organizations working in the field of improvement of water quality of aquatic resources and treatment of municipal wastewater.

(Ajay Tyagi)
Chairman

Date: 04/09/2013

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1.0 INTRODUCTION

Pursuant to the follow up action on Parliamentary Standing Committee note regarding performance evaluation of Sewage Treatment Plants (STPs) funded by Ministry of Environment and Forest (MoEF), Government of India, Central Pollution Control Board (CPCB) has monitored Sewage Treatment Plants installed in different parts of India

2.0 BACKGROUND INFORMATION

2.1 Urban Population Growth in India

Growth of Urbanisation in India is at rapid rate. This is illustrated in Figure 1 and summarized in Table 1.

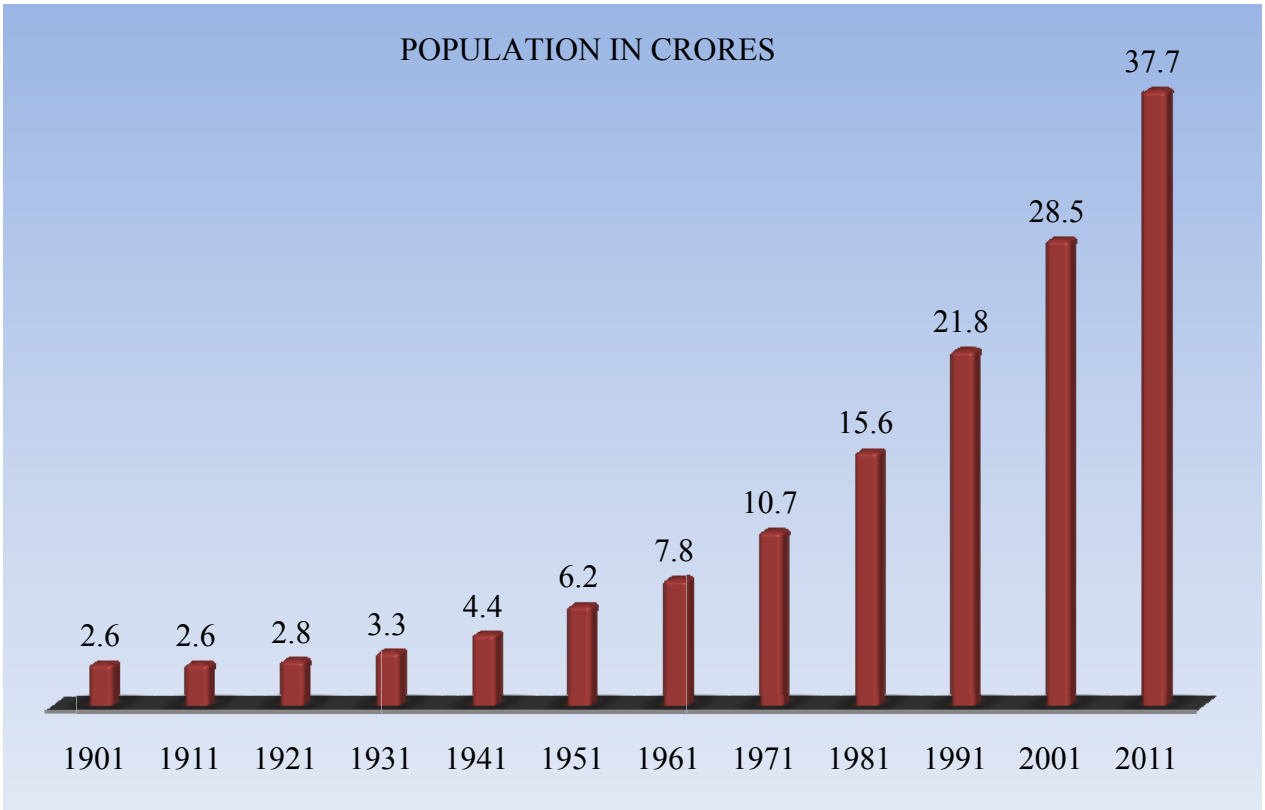

Figure 1: Bar diagram shows growth of urban population 1901-2011

Table 1: Decadal Urban Population Growth Since 1901

Year	Total	Rural	Urban	Urban, as % of total	Decadal % increase in urban population
1901	238,396,327	212,544,454	25,851,873	10.84	-
1911	252,093,390	226,151,757	25,941,633	10.29	0.35

Year	Total	Rural	Urban	Urban, as % of total	Decadal % increase in urban population
1921	251,321,213	223,235,043	28,086,170	11.18	8.3
1931	278,977,238	245,521,249	33,455,989	11.99	19.1
1941	318,660,580	274,507,283	44,153,297	13.86	32.0
1951	361,088,090	298,644,381	62,443,709	17.29	41.4
1961	439,234,771	360,298,168	78,936,603	17.97	26.4
1971	548,159,652	439,045,675	109,113, 977	19.91	38.2
1981	683,329,097	523,866,550	159,462,547	23.34	46.1
1991	846,302,688	628,691,676	217,611,012	25.71	36.5
2001	1,027,015,247	741,660,293	285,354,954	27.78	31.1
2011	1,210,193,422	83,30,87662	377,105,760	31.16	32.2

While the government has sought to provide facilities like housing and water supply, sanitation including sewage management has not received the required focus. As a result, untreated sewage is discharged into open storm water drains causing pollution to water bodies and health hazard.

3.0 STATUS OF MUNICIPAL WASTE WATER GENERATION AND TREATMENT CAPACITY IN METROPOLITIAN CITIES, CLASS I CITIES AND CLASS II TOWNS

Central Pollution Control Board carried out study on status of Municipal wastewater generation and treatment capacity in Metropolitan cities, Class I cities and Class II towns of India and published a document (CUPS/61/2005-06). The salient features are stated below:

3.1 Status of Municipal Wastewater Generation and treatment capacity in Metropolitan Cities

1. 15,644 Million Liters per Day (MLD) sewage is generated from 35 metropolitan cities (more than 10 Lac Population) (Table 2). The sewage treatment capacity exists for 8040 MLD i.e. 51% treatment capacity (Figure 2).
2. Among the Metropolitan cities, Delhi has the highest capacity of sewage treatment (2330 MLD) (29% of the total treatment capacity of metropolitan cities)
3. Mumbai has the second highest capacity (2130 MLD), which is 26% of total capacity in metropolitan cities.
4. Delhi and Mumbai therefore in combination have 55% of treatment capacity of the metropolitan cities.

5. Treatment capacity meets the volume of generation in some cities such as Hyderabad, Vadodara, Chennai, Ludhiana and Ahmadabad.
6. Delhi, Mumbai and Pune have created sewage treatment capacity to treat more than 50% sewage generation. In rest of the metropolitan cities sewage treatment capacity is less than 50% of sewage generation.
7. The status of sewage generation in metropolitan cities is presented in Table 2.

Table 2: Status of sewage generation and treatment capacity in metropolitan cities

S. No.	Name of the city	Sewage generation (MLD)	Sewage Treatment Capacity (MLD)	Percent of treatment capacity
1	Hyderabad	426.21	593	100
2	Vishakhapatnam	134.99	-	-
3	Vijayawada	128.39	-	-
4	Patna	279.14	105	37
5	Delhi	3800	2330	61
6	Ahmadabad	472	488	100
7	Surat	432	202	46
8	Rajkot	108.8	44.5	40
9	Vadodara	180	206	100
10	Bangalore	771.75	-	-
11	Indore	204	78	38
12	Bhopal	334.75	22	6
13	Jabalpur	143.34	-	-
14	Mumbai	2671	2130	80
15	Pune	474	305	64
16	Nagpur	380	100	26
17	Nasik	227.84	107.5	47
18	Ludhiana	235.2	311	100
19	Amritsar	192	-	-
20	Jaipur	451.71	54	11
21	Chennai	158	264	100
22	Kanpur	417.35	171	41
23	Lucknow	363.81	42	11
24	Agra	260.36	88	33
25	Kolkata	705.86	172	24
26	Faridabad	164	65	39
27	Jamshedpur	199.43	-	-
28	Asansol	147	-	-
29	Coimbatore	120	-	-
30	Madurai	97.93	-	-
31	Meerut	177.05	-	-

S. No.	Name of the city	Sewage generation (MLD)	Sewage Treatment Capacity (MLD)	Percent of treatment capacity
32	Varanasi	230.17	102	44
33	Allahabad	176	60	34
34	Kochi	188.4	-	-
35	Dhanbad	192	-	-
Total		**15644**	**8040**	**51**

Source: Status of sewage treatment in India (CUPS/61/2005-06)- Central Pollution Control Board

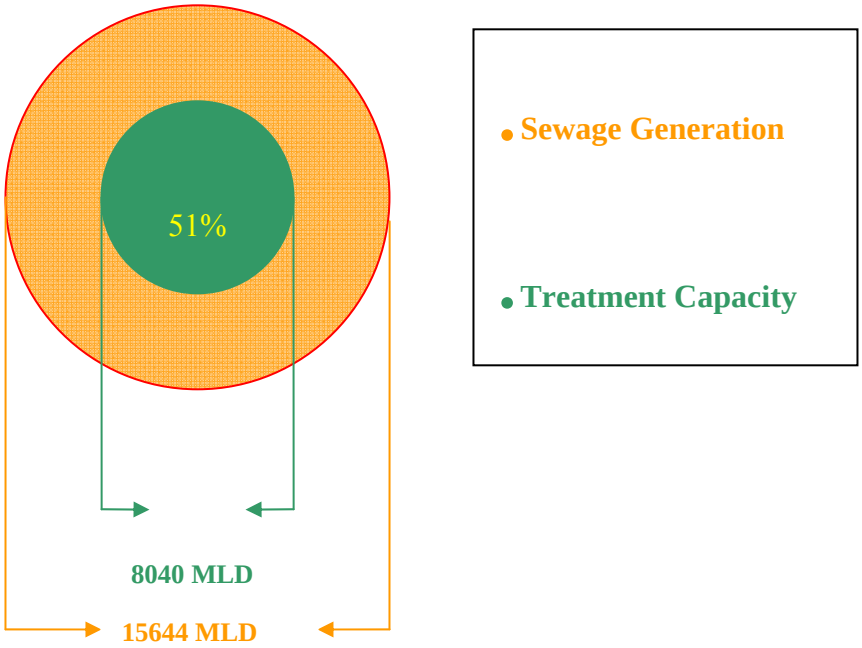

Figure 2: Sewage generation and treatment capacity in Metropolitan Cities

3.2 Status of Municipal Wastewater Generation and treatment capacity in Class-I Cities (including metropolitan cities):

1. There are 498 Class-I Cities (including Metropolitan cities)having population more than 1 Lac as per 2001 census.
2. Nearly 52% cities (260 out of 498) are located in five States viz. Andhra Pradesh, Maharashtra, Tamilnadu, Uttar Pradesh and West Bengal.
3. Sewage generated in class-I cities is estimated as 35558.12 MLD
4. Share of Class I Cities is 93 % of total urban sewage generation in the country.

5. Total Sewage treatment Capacity of class-I citiesis 11553.68 MLD, which is 32% of the sewage generation.
6. Out of 11553.68 MLD sewage treatment capacity in Class I Cities, 8040 MLD exists in 35 Metropolitan cities i.e. 69%. The capacity of sewage treatment in remaining 463 Class-I cities is only 31% (figure 3).
7. Actual sewage treatment, due to inadequacy of the sewage collection system, shall be low compare to capacity.
8. State wise sewage generation and treatment in class-I cities is presented in Table 3.

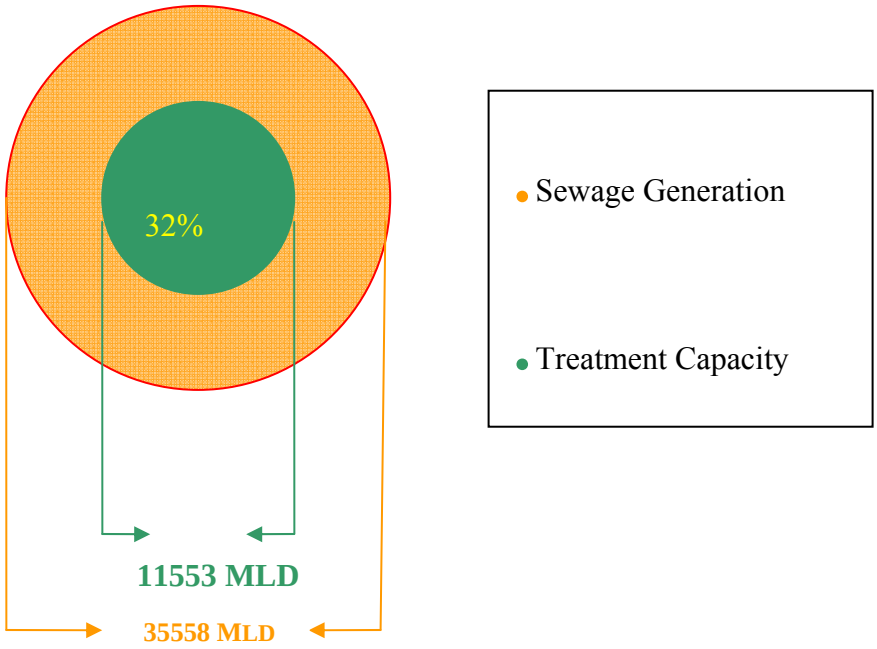

Fig 3: Sewage generation and treatment capacity in Class-I Cities

Table 3: Status of sewage generation and treatment capacity in class- I cities

S. No.	State/Union Territory	No. of Cities	Population (in Year 2008)	Sewage Generation (MLD)	Sewage Treatment Capacity (MLD)
1	Andaman & Nicobar	1	107200	12	-
2	Andhra Pradesh	47	20143050	1760.60	654
3	Assam	5	1417820	380.14	-
4	Bihar	23	5783554	1009.7	135.5
5	Chandigarh	1	994820	429.76	164.79

S. No.	State/Union Territory	No. of Cities	Population (in Year 2008)	Sewage Generation (MLD)	Sewage Treatment Capacity (MLD)
6	Chhattisgarh	7	2515100	350.47	69
7	Delhi	1	14858800	3800	2330
8	Goa	1	122330	9.79	-
8	Gujarat	28	14678240	1680.92	782.5
9	Haryana	20	5494110	626.69	312
10	Himachal Pradesh	1	163490	28.94	35.63
11	Jammu & Kashmir	2	1910060	213.93	-
12	Jharkhand	14	4964171	830.47	-
13	Karnataka	33	15102373	1790.40	43.44
14	Kerala	8	3778516	575.17	-
15	Madhya Pradesh	25	10795000	1248.72	186.1
16	Maharashtra	50	40255170	9986.29	4225.25
17	Manipur	1	249870	26.74	-
18	Meghalaya	1	186030	20.84	-
19	Mizoram	1	282550	5.71	-
20	Nagaland	1	171810	13.62	-
21	Orissa	12	3335930	660.73	53
22	Pondicherry	2	504130	56.46	-
23	Punjab	19	6329860	1528.26	411
24	Rajasthan	24	9611490	1382.37	54
25	Tamilnadu	42	16852940	1077.21	333.42
26	Tripura	1	214327	24	-
27	Uttar Pradesh	61	25762280	3506.01	1240.13
28	Uttrakhand	6	1249380	176.97	18
29	West Bengal	60	19818471	2345.21	505.92
	Total	**498**	**22,76,52,872**	**35558.12**	**11553.68**

Source: Status of sewage treatment in India (CUPS/61/2005-06)- Central Pollution Control Board

3.3 Status of Municipal Wastewater Generation and treatment capacity of class-II Towns

1. There are 225 class-II towns(50% of total number) existing in five States viz. Andhra Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh and Gujarat .
2. Total sewage generation in class-II towns is 2696.70 MLD
3. Total sewage treatment capacity in Class-II towns is 233.7 MLD which is 8% of the total sewage generation(Figure 4).

4. State wisesewage generation and treatment in Class-II Town is summarized in Table 4.

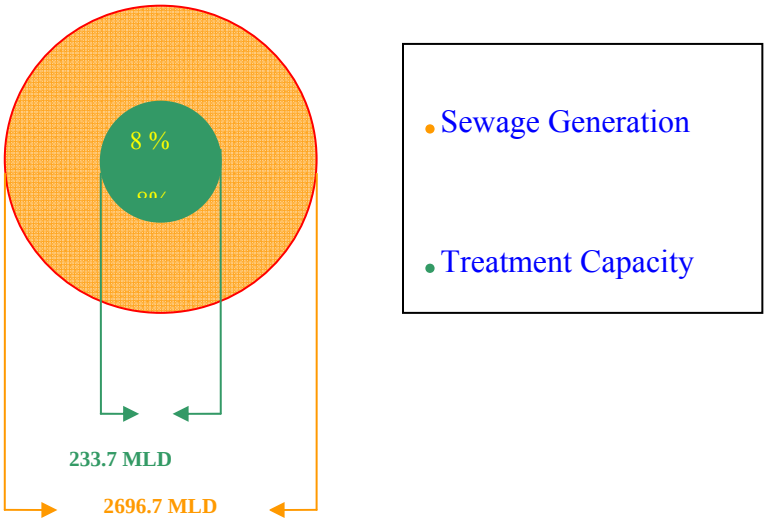

Fig 4: Sewage generation and treatment capacity in Class-II Towns

Table 4: State wise sewage generation in Class-II Towns

S.No.	State/Union Territory	Population in Year 2008	No of Class-II Towns	Sewage generation in Class-II Towns (MLD)	Sewage Treatment Capacity (MLD)
1	Andhra Pradesh	3448610	52	217.59	10.42
2	Assam	573290	8	6.46	-
3	Bihar	1113800	14	107.42	2
4	Chhattisgarh	566080	7	40.82	
5	Goa	172850	2	13.89	18.18
6	Gujarat	2180590	31	227.55	-
7	Haryana	544040	7	43.52	-
8	Jammu & Kashmir	244990	4	27.86	-
9	Jharkhand	826300	10	78.21	-
10	Karnataka	1800258	26	233.37	12.18
11	Kerala	1686660	26	231.32	-
12	Madhya Pradesh	1745050	23	130.9	9.00
13	Maharashtra	2503080	34	213.73	29

S.No.	State/Union Territory	Population in Year 2008	No of Class-II Towns	Sewage generation in Class-II Towns (MLD)	Sewage Treatment Capacity (MLD)
14	Meghalaya	81750	1	11.25	-
15	Nagaland	126520	1	1.36	-
16	Orissa	904510	12	78.42	-
17	Pondicherry	79690	1	7.984	-
18	Punjab	1109670	14	157.4	42.80
19	Rajasthan	1599260	21	147.79	-
20	Tamilnadu	3254950	42	184.67	29.3
21	Uttar Pradesh	3382520	46	345.7	12.61
22	Uttrakhand	69490	1	9.07	6.33
23	West Bengal	2004440	27	180.42	61.88
	Total	**3,00,18,398**	**410**	**2696.70**	**233.7**
Source: Status of sewage treatment in India (CUPS/61/2005-06)- Central Pollution Control Board					

A significant volume of wastewater is not subjected to any treatment and is ultimately discharged into surface water bodies leading to deterioration of water quality. In order to protect the water quality of various rivers, Government of India established National River Conservation Directorate (NRCD) in the MoEF to provide technical and financial support to State Governments for development of sewage treatment capacities of those municipalities which are discharging their wastewater into natural water bodies.

4.0 METHODOLOGY

- CPCB collected and collated information from National River Conservation Directorate (NRCD), inhouse information available within the CPCB and laid down detail monitoring programme. The programme has been carried out with the help of Zonal offices of CPCB alongwith a well designed format given in Annexure-I.
- NRCD has provided assistance to State Governments for construction of sewage treatment plants. List of the STPs is summarized in Annexure-II.
- Performance evaluation of STPs compared with General Standards for Discharge of Environmental Pollutants into inland surface, public Sewers, land for irrigation, marine

coastal areas under Schedule-VI of The Environment (Protection) Rules, 1986 and attached at Annexure-III

5.0 TREATMENT TECHONOLOGIES

Treatment technologies adopted under NRCD funded schemes can be classified in three broad groups:

- Natural system
- Conventional technology
- Advanced Technology

State-wise summary of treatment technologies is presentedin Table 5. It is observed from the Table 5 that the most used technologies are UASB (37), Activated sludge process (19), oxidation pond (34) and waste stabilization pond (31).

Table 5: Treatment Technologies installed in India

Treatment Technologies / State	Natural Treatment Systems			Conventional Treatment						Advanced Technologies			Others
	OP	WSP	AL	ASP	EA	TF	Cyclic ASP	UASB	K.T	SBR	FAB	Bio-far	
Andhra Pradesh	-	5	-	-	-	-	-	4	-	-	-	-	1
Bihar	1	1	1	2	-	-	-	-	-	-	-	-	-
Delhi	-	-	-	-	-	-	-	-	-	-	-	2	-
Goa	-	-	-	-	-	-	-	-	-	1	-	-	-
Gujrat	-	-	-	-	-	-	-	2	-	-	-	-	-
Haryana	3	4	-	-	-	-	-	9	-	-	-	-	-
Karnataka	-	8	-	-	-	-	-	-	-	-	-	-	1
Maharashtra	1	1	-	2	-	-	-	1	-	-	1	-	-
Madhya Pradesh	2	1	-	-	-	-	-	2	4	-	-	-	-
Punjab	2	-	-	-	-	-	-	6	-	1	-	-	2
Uttrakhand	1			1	-			2				-	-
Uttar Pradesh	9	-	-	2	1	1	-	10	-	-	1		-
Tamil Nadu	-	7	-	6	1		2	1	-	1	-	-	-
West Bengal	15	4	2	6	-	6	-	-	-	-	-	-	1
Kerala	-	-	-	-	-	-	-	-	-	-	-	-	1

Treatment Technologies / State	Natural Treatment Systems			Conventional Treatment						Advanced Technologies			Others
	OP	WSP	AL	ASP	EA	TF	Cyclic ASP	UASB	K.T	SBR	FAB	Bio-far	
Total	**34**	**31**	**3**	**19**	**2**	**7**	**2**	**37**	**4**	**3**	**2**	**2**	**6**

Operation & Maintenance cost for per MLD treatment of sewage is estimated as Rs 30,000 per month. Advanced treatment technologies incur higher expenses towards operation and maintenance.. Energy demand also depends on the type of treatment. In activated sludge treatment process, 2.6 Kilo Watt of electricity is required for the treatment of per MLD sewage. The cost comparison for various technologies for sewage treatment is presented in Table 6. Assessment of Technology option for Sewage Treatment plant is depicted in Table 7.**Cost Comparison for various technologies for sewage treatment plant and Assessment of Technology options for Sewage Treatment plant** reveals Upflow Anaerobic Sludge Blanket (UASB) treatment method requires maximum land area and least energy requirement. BOD and SS of the effluent quality is 20 mg/l and 30 mg/l. Capital cost for the treatment of UASB plant isRs. 68 lacs/MLD.The average area requirement for Activated Sludge Plant is 450 m^2/MLD and capital cost for the treatment is Rs. 68 lacs/MLD. Power consumption of ASP in comparison to UASB is high i.e 180 kwh/d/MLD.Land requirement for MBR and SBR plant is least among all treatment process whereas energy requirement is highest.Treated effluent quality with respect to BOD, COD, SS, Coliform reduction is better in SBR and MBR plant among other treatment technologies.

Table 6:Cost Comparison for various technologies for sewage treatment plant

S.NO	Assessment Parameter/Technology	ASP*,[a]	MBBR[*,c]	SBR[*,a]	UASB+EA[*,b]	MBR[*,a]	WSP**,b
1.0	**Performance after Secondary treatment**						
1.1	Effluent BOD (mg/l)	<20	<30	<10	<20	<5	<40
1.2	Effluent SS (mg/l)	<30	<30	<10	<30	<5	<100
1.3	Faecal coliform removal, Log unit	Upto2<3	Upto2<3	Upto3<4	Upto2<3	Upto5<6	Upto2<3
1.4	T-N removal Efficiency, %	10-20	10-20	70-80	10-20	70-80	10-20
2.0	**Performance after tertiary treatment**						
2.1	Effluent BOD (mg/l)	<10	<10	<10	<10	<10	<10
2.2	Effluent SS (mg/l)	<5	<5	<5	<5	<5	<5
2.3	Effluent NH_3N (mg/l)	<1	<1	<1	<1	<1	<1
2.4	Effluent Total Coliforms, MPN/100 ml	10	10	10	10	10	10
3.0	**Capital Cost**						
3.1	Average Capital Cost (Secondary Treatment), ` lacs/MLD	68	68	75	68	300	23

S.NO	Assessment Parameter/Technology	ASP*,[a]	MBBR*,[c]	SBR*,[a]	UASB+EA*,[b]	MBR*,[a]	WSP**,b
3.2	Average Capital Cost (Tertiary Treatment), ` lacs/MLD	40	40	40	40		40
3.3	Total Capital Cost (Secondary + Tertiary), ` lacs/MLD	108	108	115	108	300	63
3.4	Civil Works, % of total capital costs	60	40	30	65	20	90
3.5	E & M Works, % of total capital costs	40	60	70	35	80	10
4.0	**Area Requirements**						
4.1	Average Area, m^2/MLD Secondary Treatment + Secondary sludge handling	900	450	450	1000	450	6000
4.2	Average Area, m^2/MLD Tertiary treatment + Tertiary Sludge Handling	100	100	100	100	0	100
4.3	Total Area, m^2/MLD Secondary + Tertiary treatment	1000	550	550	1100	450	6100
5.0	**Operation & Maintenance Costs**						
5.1	**Energy Costs (per MLD)**						
5.1.1	Avg. Technology Power Requirement, kWh/d/MLD Secondary Treatment + Secondary sludge handling	180	220	150	120	300	2
5.1.2	Avg. Technology Power Requirement, kWh/d/MLD Tertiary treatment + Tertiary Sludge Handling	1	1	1	1	1	1
5.1.3	Avg. Non–Technology Power Req., kWh/d/MLD Tertiary Treatment	4.5	2.5	2.5	4.5	2.5	2.5
5.1.4	Total daily Power requirement (avg.), kWh/d/MLD	185.70	223.70	153.70	125.70	302.50	5.70
5.1.5	Daily Power Cost (@` 6.0 per KWh), `/MLD/h (including Standby power cost)	46.43	55.93	38.43	31.43	75.93	1.43
5.1.7	Yearly Power Cost, ` lacs pa/MLD	4.07	4.90	3.37	2.75	6.65	0.49
5.2	**Repairs Cost /MLD**						
5.2.1	Civil Works per Annum, as % of civil works cost	3	3	3	3		3

S.NO	Assessment Parameter/Technology	ASP*,[a]	MBBR[*,c]	SBR[*,a]	UASB+EA[*,b]	MBR[*,a]	WSP**,b
5.2.2	E &M Works, as % of E &M Works Cost	1	1	1	1		1
5.2.3	Civil Works Maintenance, `Lacs pa/MLD	1.94	1.3	1.04	2.11		1.7
5.2.4	E & M Works Maintenance, `lacs pa/MLD	0.43	0.65	0.81	0.38		0.06
5.2.5	Annual repairs costs, ` lacspa/MLD	2.38	1.94	1.84	2.48		1.76
5.3	**Chemical Cost (per MLD)**						
5.3.1	Recurring Chemical/Polymer Costs, `lacs pa/MLD SecondaryTreatment	0.4	0.4	0.4	0.4		0
5.3.2	Recurring Chemical, `Lacs pa/MLD (Alum, Chlorine, Polymer) Costs, Tertiary Treatment	4	4	2	5		6
5.3.3	Other Chemical Cost `Lacs pa/MLD	0.9	0.9	0.9	0.9		1.2
5.3.4	Total Chemical Cost, `Lacs pa/MLD	5.3	5.3	3.3	6.3		7.2
5.4	**Manpower Cost (Assuming 50 MLD Plant)**						
5.4.1	Manager `pa (1No.)	3.6	3.6	3.6	3.6		3.6
5.4.2	Chemist/Engineer, `pa (1No.)	3.6	3.6	3.6	3.6		3.6
5.4.3	Operators **v** pa (@`12000pm)	8.64	5.76	4.32	8.64		4.32
5.4.4	Skilled technicians ` pa (@`10000pm)	7.2	4.8	3.6	7.2		1.2
5.4.5	Unskilled personnel ` pa (@ `7000pm)	5.04	2.88	2.16	5.04		8.64
5.4.6	Total salary Costs `lacs pa	28.08	20.64	17.28	28.08		21.36
5.4.7	Benefits (50% of total salary) `lacs pa	14.04	10.32	8.64	14.04		10.68
5.4.8	Salary + Benefits ` lacs pa	42.12	30.96	25.92	42.12		32.04
5.4.9	Total annual O & M costs ` lacs pa	629.26	638.11	451.22	618.96	832.55	504.86
6.0	Average Capital Cost, ` lacs/MLD upto secondary Treatment	68	68	75	68		23
6.1	Yearly Power Cost, ` lacs/MLD upto secondary Treatment	4.04	4.87	3.34	2.73		0.1
6.2	Annual Repairs Cost, ` lacs/MLD upto secondary	1.5	1.22	1.16	1.56		1.11

S.NO	Assessment Parameter/Technology	ASP*,[a]	MBBR[*,c]	SBR[*,a]	UASB+EA[*,b]	MBR[*,a]	WSP**,b
	Treatment						
6.3	Annual Chemical Cost, ` lacs/MLD upto secondary Treatment	0.85	0.85	0.85	0.85		0.60
6.4	Manpower Cost, ` lacs/MLD for 50 mld plant upto secondary Treatment	33.7	24.77	20.74	33.7		25.63
6.5	Total Annual O & M Costs, ` lacs/MLD upto secondary Treatment	353.02	372.11	288.15	290.72		116.09
6.6	NPV (2010) of capital + O & M Cost for 15 years, ` lacs/MLD upto secondary Treatment	8695.35	8981.58	8072.24	7760.85		2891.39
6.7	Present (2010) treatment cost, paisa/L upto secondary treatment	0.32	0.33	0.29	0.28		0.11

Sludge Treatment: * Thickner +Centrifuge; ** Drying Process Type : [a] Aerobic; [b] Anaerobic-Aerobic; [c] Anoxic/Anaerobic-Aerobic ASP: Activated Sludge Process UASB: Upflow Anaerobic Sludge Blanket WSP: Waste Stablization Pond MBBR: Moving Bed Biological Reactor EA: Extended Aeration SBR: Sequential Batch Reactor MBR: Membrane Bio Reactor

Table 7: Assessment of Technology options for Sewage Treatment plant

Criteria	ASP	UASB+ASP	SBR	MBBR	MBR	WSP
Performance in Terms of Quality of Treated Sewage						
Potential of Meeting the RAPs TSS, BOD, and COD Discharge Standards	+++	+++	++++	++++	++++	++
Potential of Total / Faecal Coliform Removal	+++	+++	++++	++++	++++	++++
Potential of DO in Effluent	+++	+++	+++	+++	+++	+++
Potential for Low Initial/Immediate Oxygen Demand	++++	++++	++++	++++	++++	++++
Potential for Nitrogen Removal (Nitrification-Denitrification)	+	+	++++	++	++	+
Potential for Phosphorous Removal	+	+	++++	++	++	+
Performance Reliability	++++	++	++	+++	++++	++
Impact of Effluent Discharge						
Potential of No Adverse Impact on Land	++	++	+++	+++	++++	+++
Potential of No Adverse Impact on Surface Waters	+++	+++	+++	+++	++++	+++

Criteria	ASP	UASB+ASP	SBR	MBBR	MBR	WSP
Potential of No Adverse Impact on Ground Waters	+++	+++	+++	+++	++++	++
Potential for Economically Viable Resource Generation						
Manure / Soil Conditioner	++	++	++	++	+	+
Fuel	+++	++	+	+	+	+
Economically Viable Electricity Generation/Energy Recovery	++++	+++	+	+	+	+
Food	++	+	+	+	+	+
Impact of STP						
Potential of No Adverse Impacts on Health of STP Staff/Locals	++	+	+++	+++	+++	++
Potential of No Adverse Impacts on Surrounding Building/Properties	+++	++	+++	+++	+++	++++
Potential of Low Energy Requirement	++	++	++	++	+	++++
Potential of Low Land Requirement	+++	++	+++	+++	++++	+
Potential of Low Capital Cost	++	++	++	++	+	++++
Potential of Low Recurring Cost	++	++	++	++	+	+++
Potential of Low Reinvestment Cost	++	++	++	++	+	+++
Potential of Low Level of Skill in Operation	+++	++	+++	+	+	++++
Potential of Low Level of Skill in Maintenance	+++	++++	+++	++	+	++++
Track Record	++++	+++	+++	+	+	++
Typical Capacity Range, MLD	All flows	All flows	All flows	Smaller	Smaller	All flows

+ : Low; ++ : Medium; +++ : High; ++++ : **Very High**

ASP: Activated Sludge Process **UASB: Upflow Anaerobic Sludge Blanket**
WSP: Waste Stablization Pond **MBBR: Moving Bed Biological Reactor** **EA: Extended Aeration**
SBR: Sequential Batch Reactor **MBR: Membrane Bio Reactor**

6.0 OBSERVATION

- Ministry of Environment & Forests funded 179 Sewage Treatment Plants under GAP-I, YAP-I and NRCD schemes. The installed capacity of sewage treatment plant under NRCD schemes is **4864.6** MLD. Statewise break up of number of STPs, installed capacity and treatment technology is provided in Annexure-II.

- Inspection of 152 STPs **(4716 MLD**) is carried out and the actual utilized capacities of these STPs is assessed as **3126.42** MLD which is **66%** of the installed capacity. Out of 152 STPs, 08 STPs (4-West Bengal, 2-Tamil Nadu, 2-Andhra Pradesh) are not funded under any MoEF scheme.

- State-wise installed treatment capacity and actual utilization capacity is summarized in table 8.

Table 8: State-wise treatment capacity and capacity utilization

Sl. No.	State	Installed Capacity (MLD)	Actual Utilized capacity (MLD)	No. of STPs
1.	Andhra Pradesh	729.5	547.12	10
2.	Bihar	158	100	5
3.	Delhi	20	20	2
4.	Goa	12.5	12	1
5.	Gujrat	232	226	2
6.	Haryana	337	269.5	16
7.	Karnataka	42.8	26	9
8.	Kerala	4.5	0	1
9.	Madhya Pradesh	168.4	123.7	9
10.	Maharashtra	284	124.2	6
11.	Punjab	636.8	475.6	11
12.	Tamil Nadu	798.94	394	18
13.	Uttar Pradesh	779.6	585.8	24
14.	Uttrakhand	54	-	4
15.	West Bengal	458.29	222.5	34
Total		**4716.33**	**3126.42**	**152**

- Percent-wise distribution of installed capacity in various States is illustrated in Figure 5. It is observed that in Tamil Nadu (16.9%), U.P. (16.4%) followed by Andhra Pradesh (15%), Punjab (14%), West Bengal (10%). Haryana (7%), Maharashtra (6%), Gujarat (4.9 %), Madhya Pradesh (3.6 %), Bihar (3.4 %), Uttarakhand (1.1 %), Karnataka (0.9 %), Delhi (0.4%) and Goa (0.2%).

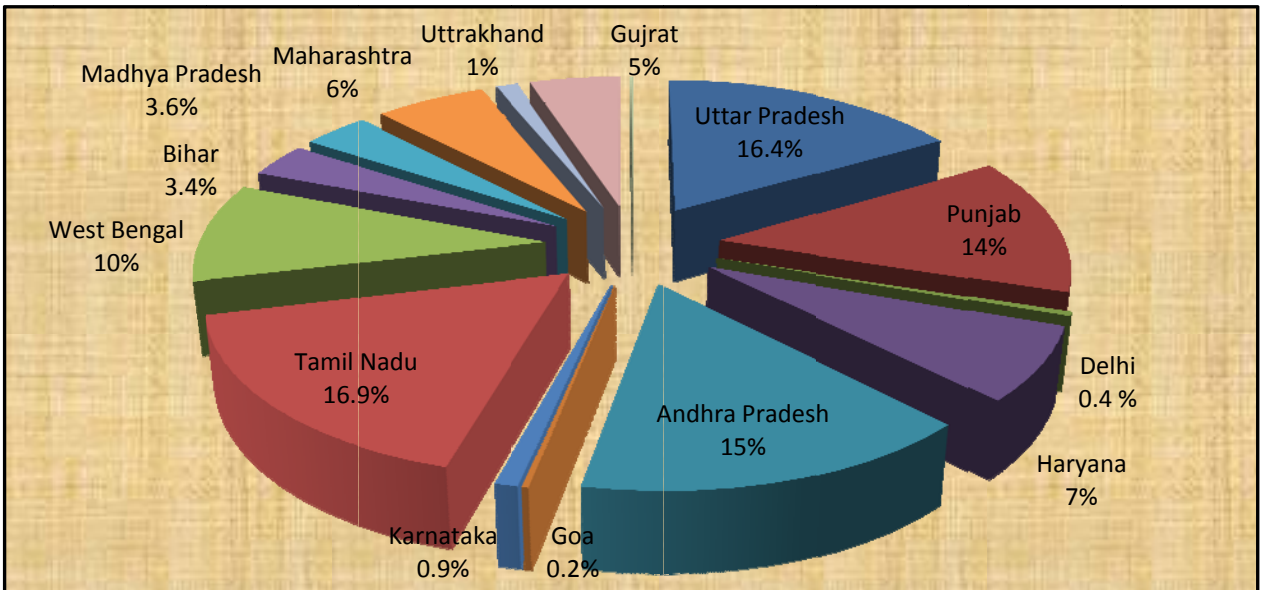

Figure 5: Percent-wise distribution of installed capacity of STP

- State-wise installed treatment capacity and capacity utilization is depicted in Figure 6. Close examination of the data indicates that the percent capacity utilization is maximum in the states of Gujarat, Punjab, Haryana and Goa.

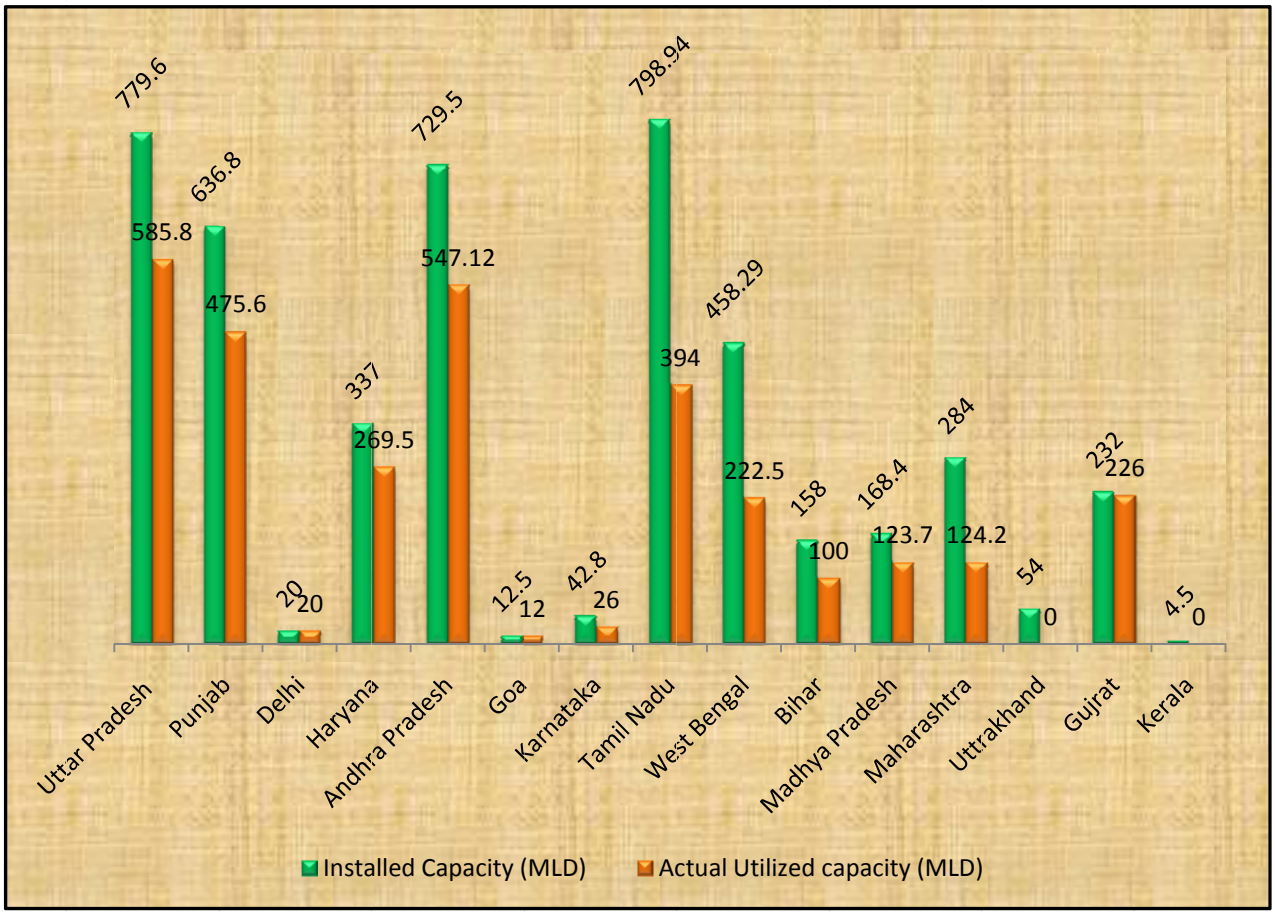

Figure 6: State-wise capacity utilization

- River wise sewage treatment capacity and utilized capacity are provided in Figure 7 and Table 9. It is observed that STPs installed along river Ganga need improvement in capacity utilization.

Table 9: River-wise Sewage Treatment capacity and utilisation

Discharge to River	Designed capacity (MLD)	Utilized Capacity (MLD)	%age of treatment
Ganga	587	322	55
Godavari	151	129	85
Hindon	164	138	84
Musi	541	480	89
Satluj	588	564	96
Yamuna river	754	562	75
Others	393	249	63

Land/Irrigation	1538	682	44
Total	**4716**	**3126**	66

6.1 Performance Evaluation of STPs funded under NRCP

CPCB monitored and evaluated the performance of 152 STPs in India. Based on the analytical results of STPs (Annexure-IV) following observations are made. Detailed assessment report of the STPs is given in Annexure-V

i. Out of 152 STPs, 9 STPs (319 MLD) were under construction, 30 STPs (202 MLD) were non-operational and working of 28 STPs was not satisfactory. Details of **STPs under construction** and **non-operating STPs** is provided in table 10 and 11respectively.

Table 10: STPs under construction

State	City	Location	Capacity (MLD)
Andhra Pradesh	Attapur	Attapur	132
Karnataka	Nanjangud	-	1.4
	Shimoga	-	18
Kerala	Pamba	-	4.5
Maharashtra	Sangli	-	27
	Kohlapur	-	76
Tamil Nadu	Kumbakaonal	-	17
	Bhavani	-	3.9
Uttar Pradesh	Agra	Bichpuri	40
	Total		**319.8**

Table 11: STPs non-operating

State	City	Location	Capacity (MLD)
Andhra Pradesh	Bhadrachlam		2
	Malkpur		14
	Old Bazar		4
	Saikunta		2.5
Bihar	Patna	Chapara	2
Haryana	Karnal	Gharandai	3
	Yamuna Nagar	Yamuna Nagar	1
Karnataka	Bhadravathi		5.83
Madhya Pradesh		Chhapara	1.2
		Keolari	0.75
		Nagda	9
Tamil Nadu	Erode	Lakkapuram	20
	Erode	Vairapalayam	5

	Namakkai	Kumarapalayam	6
Uttar Pradesh	Vrindavan	Kalideh	0.5
	Muzaffarnagar		32.5
West Bengal		Barrackpore	1
		North Barrackpore	4
		Kalyani Block-6	11
		Kalyani Town	6
		Chandan Nagar	18
		Budge Budge	4.25
		Champadani	0.3
		Garulia	8
		Jagaddal Bhatpara (old)	8.5
		Jagaddal Bhatpara	4.5
		Jiaganj, Azimpur	1.39
		Gayeshpur, Halishar & Kanchrapara	13
		Asanol	12
	Total		201.22

ii. With respect to BOD and COD, 49 and 7 of STPs respectively are not meeting the General Standards for Discharge of Environmental Pollutants into inland surface, public Sewers, land for irrigation, marine coastal areas under Schedule-VI of The Environment (Protection) Rules, 1986 are provided in Table 12.

Table 12: STPs violating GeneralDischarge Standards

State	Total No. of STPs	STPs exceeding BOD standard	STPs violating COD standard	STPs meeting BOD standard	STPs meeting COD standard
Andhra Pradesh	10	2	0	8	10
Bihar	5	1	0	4	5
Delhi	2	0	0	2	2
Goa	1	0	0	1	1
Gujrat	2	1	0	1	2
Haryana	16	14	6	2	10
Karnataka	9	1	0	8	9
***Kerala**	1	0	0	0	0
Madhya Pradesh	9	4	0	5	9
Maharashtra	6	1	0	5	6
Punjab	11	6	0	5	11
Tamil Nadu	18	3	0	15	18

State	Total No. of STPs	STPs exceeding BOD standard	STPs violating COD standard	STPs meeting BOD standard	STPs meeting COD standard
Uttar Pradesh	24	12	0	12	24
Uttrakhand	4	1	1	3	3
West Bengal	34	3	0	31	34
Total	**152**	**49**	**7**	**102**	**144**
Note: *Under construction					

- State-wise details of non-operational & under construction STPs are provided in Table 13

Table 13: Non-operational and under construction STPs

State	STPs non-operational	STPs under construction
Andhra Pradesh	5	1
Bihar	1	0
Haryana	2	0
Karnataka	1	2
Kerala	0	1
Madhya Pradesh	3	0
Maharashtra	0	2
Punjab	0	0
Tamil Nadu	3	2
Uttar Pradesh	2	1
Uttrakhand	0	0
West Bengal	13	0
Total	**30**	**9**

6.2 Performance evaluation of STPs installed under catchment of Ganga river

STPs installed under catchment of Ganga river are 64 whereas MoEF has sanctioned 52 STPs. Out of 51 monitored STPs, 4 STPs (23.3 MLD) of West Bengal are not under MoEF scheme. Total installed capacity of 51 STPs is 1009 MLD and actual utilization is 602 MLD which is 59 %. 9 STPs are violating BOD limit and 1 STP exceed the COD limit for discharge. 14 STPs are found non-operational. Status of performance evaluation of STPs is depicted in Table 14 and 15. State-wise performance is appended.

i. Uttrakhand

- Installed capacity of 4 STPs is 54 MLD.
- 1 STP exceeds the BOD and COD limits.

ii. Uttar Pradesh

- Installed capacity of 8 STPs is 358 MLD out of which 287 MLD is utilized.
- 4 STPs exceed the BOD limit.
- 1 STP was found non-operational.

iii. Bihar

- Installed capacity of 5 is 140 MLD whereas actual utilization is 100 MLD.
- 1 STP was found non-operational.
- 1 STP exceeds the BOD limits.
- All STP meet the COD limits.

iv. West Bengal

- Installed capacity of 34 STPs is 457 MLD whereas actual utilization is only 214 MLD which is 49 %.
- 3 STPs exceeded the BOD limit whereas COD limit of all STPs is under the prescribed limit.
- 13 STPs were found non-operational.

Table 14: State wise performance evaluation of STPs

Sl. No	States	STPs	Designed capacity (MLD)	Actual Treatment (MLD)	Characteristics			
					Inlet		Outlet	
					BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)
			General Discharge Standard (Inland Surface Water)				***30 mg/l***	***250 mg/l***
1.	**Uttar Pradesh**	Jajmau, Kanpur	5	4.5	162	293	76	197
2.		Jajmau, Kanpur	130	100	314	672	69	211
3.		Salori, Allahabad	29	22.7	44	207	23	53
4.		Naini, Allahabad	60	46	86	176	19	29
5.		Dinapur	80	88	225	447	44	100
6.		Bhagwanpur, BHU (Varanasi)	8	12.16	66	154	71	151
7.		Muzaffar Nagar	32.5					
8.		Mirzapur	14	14.5	160	455	27	80
Sub-total			**358.5**	**287.86**				

Sl. No	States	STPs	Designed capacity (MLD)	Actual Treatment (MLD)	Characteristics			
					Inlet		Outlet	
					BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)
			General Discharge Standard (Inland Surface Water)				***30 mg/l***	***250 mg/l***
9.	**Uttrakhand**	Jagjeetpur, Haridwar	27	-	-	-	13	42
10.		Jagjeetpur, Haridwar	18	-	-	-	14	68
11.		Swarg Ashram Rishikesh	3	-	-	-	10	42
12.		Lakkarghat, Rishikesh	6				44	308
	Sub-total		**54**	-				
13.	**Bihar**	Pahari, Patna	25	18	54	91	25	55
14.		Chapara, Patna	2	0	-	-	-	-
15.		Beur, Patna	35	24	72	169	38	50
16.		Saidpur, Patna	45	33	130	315	5	8
17.		Mattagajpur	33	25	28	78	17	67
	Sub-total		**140**	**100**				
18.		Barrackpore	1	**0**				
19.		Baidyabati	6	6	14	59	1	20
20.		Kannogar	22		21	82	12	43
21.	**West Bengal**	North Barrackpore	4.35	Not functional				
22.		Berhampore	3.7	-			12	35
23.		Kalyani Block-B2,B3	11	-	-	-	-	-
24.		Kalyani Town area	6	-	-	-	-	-
25.		Madrail, Kinkara, Bhatpara	10	10	63	9	5	67
26.		Chandan Nagar, Khalisani	18	Not functional	-	-	-	-
27.		Chandan Nagar, Khalisani	18	18	82	260	8	71
28.		****Titagarh***	4.5		110	216	58	130
29.		****Titagarh***	4.5		110	216	67	146
30.		****Bandipur***	14	14	14	47	5	35
31.		Panihati	12	12	23	126	8	55
32.		Serampore	19	19	51	137	15	59

Sl. No	States	STPs	Designed capacity (MLD)	Actual Treatment (MLD)	Characteristics			
					Inlet		Outlet	
					BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)
			General Discharge Standard (Inland Surface Water)				***30 mg/l***	***250 mg/l***
33.	**West Bengal**	Chakapara, Howrah	30	30	56	312	11	55
34.		Arupara, Howrah	45	45	110	549	27	67
35.		Bansberia	0.3	0.3	17	59	16	51
36.		Garden Reach	48	Trial Phase	13	51	8	7
37.		Mahestala, Nungi	4	4	13	51	2	23
38.		Budge Budge	4.25	Not functional	7	90	-	-
39.		Bhadreshwar	7.6	7.6	103	335	4	39
40.		****Champadani***	0.3	Not functional	-	-	-	-
41.		Garulia	7.9	Not known	-	-	-	-
42.		Cossipore Chitpur	45	Trial Phase	7	148	7	45
43.		Naihati	11.5	-	55	125	8	39
44.		Kamarhati	40	40	66	250	6	41
45.		Jagaddal, Bhatpara(New)	10	06	126	392	66	165
46.		Jagaddal, Bhatpara(old)	8.5	Not functional	-	-	-	-
47.		Jagaddal, Bhatpara	4.5	Not functional	-	-	-	-
48.		Nabadwip	10	2.5	88	232	8	43
49.		Jiaganj, Azimpur	1.39	Not functional	-	-	-	-
50.		Gayeshpur, Halishar & Kanchrapara	13	Not functional	-	-	-	-
51.		Asanol	12	Not functional	-	-	-	-
Sub-Total			**457.29**	**214.4**				
Total			**1009.79**	**602.26**				
Note: * STPs are not under any MoEF scheme								

Table 15: Performance evaluation of STPs installed under Ganga river catchment

States	No. Of Stps	Installed Capacity	Actual Utilised Capacity	Total No. Of STPs Not In Operation	Total No. Of STPs Under Construction	STPs Exceeding BOD Limits	STPs Exceeding COD Limits
Uttar Pradesh	8	358	287	1	0	4	0
Uttrakhand	4	54	-	0	0	1	1
West Bengal	34	457	214	13	0	3	0
Bihar	5	140	100	1	0	1	0
Total	**51**	**1009**	**602**	**15**	**0**	**9**	**1**

7.0 FINDINGS

i. 49 STPs are exceeding BOD limit, out of which 12 are in Uttar Pradesh, 14 in Haryana,6 in Punjab, 3 STPs in Madhya Pradesh and 3 in Tamil Nadu.
ii. With respect to COD, 7 STPs are not meeting the limitout of which 06 are in Haryana.
iii. 30 STPs are non-operational, 09 STPs are under construction and working of 28 STPs found unsatisfied.
iv. 37 STPs are using Upflow Anaerobic Sludge Blanket (UASB) technology . Among them 22 are not confirming to limits and are located in Uttar Pradesh and Haryana.
v. 26 out of 34 STPs having oxidation pond (OP) technology followed by Waste Stabilization ponds (WSP) (25/31) technologyare meeting the discharge standard limits.
vi. 15 out of 19 STPs on Activated Sludge Process are meeting the dischage limits.
vii. STPs designed on Trickling Filter and Sequential batch reactor technologies are meeting the discharge standards and showing more than 90 % efficiency in terms of BOD removal.

8.0 CONCLUSION

Operation & Maintenance of STPs depend on three factors:

- Uninterrupted energy supply
- Skilled manpower

- Preventive & regular maintenance

In case of natural treatment technology, energy requirement is quite low whereas. conventional treatment technologies need considerably high demand of energy. Natural treatment technology STPs requires few personals to operate the system whereas advanced & conventional treatment technology based STPs require large number of skilled professionalsMaintenance is required with due diligence in all the treatment technologies but the most important aspect is collect and deliver the sewage to Sewage Treatment PlantsAll STPs should obtain consent under Water (Prevention and Control of Pollution) Act, 1974 from concerned SPCBs. SPCB shall regularly inspect the plant & provide guidance to the concerned authorities in optimum operation and maintenance of STPs.

ANNEXURE-I

CHECK LIST FOR MONITORING OF PROFORMANCE OF SEWAGE TREATMENT PLANTS (STPs) by CPCB

1.	Name / Location of STP	:	
2.	Process of Sewage Treatment (i) ASP - Activated sludge process (ii)TF - Trickling filter (iii)AL - Aerated lagoon (iv)UASB - Upflow anaerobic sludge blanket (v)OP - Oxidation pond/waste stabilization ponds (vi)EA - Extended Aeration (vii)SBR – Sequential Batch Reactor (viii)MBR – Membrane Bio Reactor (ix) MBBR – Moving Bed Bio Reactor	:	
3.	Flow sheet of STP(to be attached)		
4.	Designed Capacity/day	:	
5.	Actual treatment	:	
6.	Raw sewage characteristics COD BOD TSS Fecal coliform Total coliform		
7.	Primary Settling Tank (i) Primary Settling Tank Volume m^3 (ii)Settling Surface area m^2 (iii)Weir length m (iv) Retention period (v)PST outlet TSS, BOD, COD (mg/L) (vi)Underflow solids concentrationmg/L or % (vi)Actual primarySludge production rate (Flow rate m3/hr multiplied by hr/day) (vii)Availability of Mechanical Scrapper	:	
8.	Aeration Tank (i) Aeration Tank Volume m^3 (ii) Retention period	:	

	(iii)Mixed Liquor MLSS & MLVSS mg/L (iv)Aeration Capacity KW or HP (v)Rated aeration capacity Kg/KW hr		
9.	Secondary Settling Tank (i) Secondary Settling Tank Volume m3 (ii)Settling Surface area m2, (iii) Retention period (iv)Weir length m (v) Return flow rates m3/hr or m3/day (vi)Return flow solids (TSS) concentration	:	
10.	A. Activated Sludge Process (i) Waste sludge generation (Flow rate m^3/hr multiplied by hr/day) (ii)Waste Sludge Solids (TSS) concentration mg/L (iii) ASP outlet TSS, BOD B. UASB (i) No. of reactors (ii)Capacity of each reactor (iii)Average flow (iv)HRT (v)UASB outlet BOD, COD, TSS (mg/L)	:	
11.	Final Effluent Quantity BOD, TSS, COD, TKN, Nitrate, Phophate, T.C, F.C	:	
12.	Sludge Thickener (i) Volume m3 (ii)Thickening Surface m3 (iii)Underflow solids concentration mg/L (iv)Actual thickened sludge production Rate (Flow rate, m/hr multiplied by hr/day)	:	
13.	Sludge Digesters (i) Digester Volume m3 (ii)Thickening Sludge BOD & COD mg/L (iii)Actual digester sludge production rate (Flow rate m3/hr multiplied by hr/day)	:	
14.	Biogas produced, if any and its composition	:	
15.	Operational status of gas utilization	:	

16.	Power generation, if any	:	
17.	Point of treated sewage disposal (river / lake / irrigation / land and disposal/ pisciculture/ aquaculture / any other)	:	
18.	Bypass arrangement at STPs, if any		
19.	Method of sludge disposal and status (satisfactory / unsatisfactory)	:	
20.	Operation and maintenance of Sewage Treatment Plant (satisfactory / unsatisfactory)		
21.	Agency for operation and maintenance of Sewage Treatment Plant	:	
22.	Operation through Sub Contractor, if any		
23.	Power requirement	:	
24.	Status of power availability for uninterrupted and continuous running of STP	:	
25.	Standby arrangement for power, if any		
26.	Status of Skilled/Trained Manpower	:	
27.	Annual expenditure on O&M & STP		
28.	Consent from State Pollution Control Board/Pollution Control Committee or not	:	
29.	Volume of industrial waste being mixed in sewage, if any.	:	
30.	Status of maintenance of Log Books	:	
31.	Status of Laboratory facility	:	

Signature of STP Manager **Signature of team leader**

Signature of Team Head

ANNEXURE-II

LIST OF SEWAGE TREATMENT PLANTS INSTALLED UNDER NRCD SCHEME

State	S.NO	STP	STP capacity created (MLD)	Technology	Sanctioned commissioned under GAP-1/NRCP
Andhra Pradesh	1.	Bhadrachalam	4	WSP	NRCP
	2.	Saikunta, Mancherial Town	2.5	WSP	NRCP
	3.	Reddy colony, Mancherial Town	3.9	WSP	NRCP
	4.	Rajmundry	30		NRCP
	5.	Old Bazar, Ramagundam	14	WSP	NRCP
	6.		4	WSP	NRCP
	7.		14	WSP	NRCP
	8.	Hyderabad	339		NRCP
	9.		172		NRCP
	10.		21		NRCP
	11.		30		NRCP
	12.		60		NRCP
		Sub total	694.4		
Karnataka	13.	Bhadravathi	5.83	WSP	NRCP
	14.	Shimoga	18.16	WSP	NRCP
	15.	Davangere	19.45	WSP	NRCP
	16.	Harihara	8.84	WSP	NRCP
	17.	Kollegal	3.34	WSP	NRCP
	18.	Kantenahalli,KR Nagar	1.45	WSP	NRCP
	19.	Nanjangud	1.37	WSP	NRCP
	20.	Srirangapatna	1.36	WSP	NRCP
		Sub total	59.8		
Delhi	21.	Sen Nursing Home	10	BIOFAR	YAP-1
	22.	Delhi gate	10	BIOFAR	YAP-1
	23.	***In low income community***	3	FAB	YAP-1
	24.	***In low income community***	3	FAB	YAP-1
	25.	***In low income community***	2	FAB	YAP-1
	26.	***In low income community***	2	FAB	YAP-1
		Sub total	30		

State	S.NO	STP	STP capacity created (MLD)	Technology	Sanctioned commissioned under GAP-1/NRCP
Goa	27.	Panaji	12.5	SBR (C TECH)	NRCP
	28.		***5.68***	***TF***	***NRCP***
		Sub total	18.18		
Gujrat	29.	Behrampura, Ahemdabad	106	UASB	NRCP
	30.	Narol Sarkhej Highway, Ahemdabad	126	UASB	NRCP
		Sub total	232		
Kerala	31.	Pamba	4.5		NRCP
Haryana	***32.***	***Chhachhrauli***	***1***	***OP***	***NRCP***
	33.	Faridabad,Zone-I	20	UASB	NRCP
	34.	Faridabad,Zone-II	45	UASB	NRCP
	35.	Faridabad,Zone-III	50	UASB	NRCP
	36.	Gharaunda	3	OP	NRCP
	37.	Gohana	3.5	OP	NRCP
	38.	***Gurgaon***	***30***	***UASB***	***NRCP***
	39.	***Indri***	***1.5***	***OP***	***NRCP***
	40.	karnal	40	UASB	NRCP
	41.	karnal	8	OP	NRCP
	42.	Palwal	9	OP	NRCP
	43.	Panipat	10	UASB	NRCP
	44.	Panipat	35	UASB	NRCP
	45.	***Radour***	***1***	***OP***	***NRCP***
	46.	Sonepat	30	UASB	NRCP
	47.	Yamuna Nagar/Jagadhari	10	UASB	NRCP
	48.	Yamuna Nagar/Jagadhari	25	UASB	NRCP
		Sub total	322		
Madhya Pradesh	49.	Bhopal	8	OP	NRCP
	50.	Burhanpur	6	WSP	NRCP
	51.	***Burhanpur***	***2***	***FAB***	***NRCP***
	52.	***Burhanpur***	***2***	***FAB***	***NRCP***
	53.	Chhapara	1.2	KT	NRCP
	54.	Indore	78	UASB	NRCP
	55.	Indore	12	UASB	NRCP
	56.	Keolari	0.75	KT	NRCP
	57.	Nagda	9	KT	NRCP
	58.	Ujjain	52	WSP	NRCP

State	S.NO	STP	STP capacity created (MLD)	Technology	Sanctioned commissioned under GAP-1/NRCP
	59.	***Ujjain***	***3.46***	***KT***	***NRCP***
	60.	Vidisha	9	KT	NRCP
	61.	***Hoshangabad***	***16***		***NRCP***
	62.	***Rewa***	***12***		***NRCP***
	63.	***Chitrakoot***	***4.7***		***NRCP***
		Sub total	216.11		
Maharashtra	64.	Karad	28	OP	NRCP
	65.	Trimbakeshwar	1	OP	NRCP
	66.	Sangli	27		NRCP
	67.	Kohlapur	76		NRCP
	68.	Nasik	78	UASB	NRCP
	69.	Chehedi,Nasik road	22	UASB	NRCP
	70.	***Nanded***	***26***	***OP***	***NRCP***
		Sub total	258		
Orissa	*71.*	*Cuttack*	*33*	*OP*	NRCP
	72.	*Puri*	*20.3*		NRCP
	73.	*Talcher*	*2*	*WSP*	NRCP
		Sub total	*55.3*		
Punjab	74.	Jalandhar	100	UASB	NRCP
	75.	Balloke, ludhiana	152	UASB	NRCP
	76.	Bhattian, Ludhiana	111	UASB	NRCP
	77.	Jamalpur, Ludhiana	48	UASB	NRCP
	78.	Phillaur	2.6	OP	NRCP
	79.	Phagwara	20	UASB	NRCP
	80.	Kapoorthala	19.3	OP	NRCP
	81.	***Sultanpur Lodhi***	***2.6***	***OP***	***NRCP***
		Sub total	455.5		
Tamil Nadu	82.	Bhiwani	3.94	WSP	NRCP
	83.	Nesapakkam, Chennai (Zone-IV)	40		NRCP
	84.	Perungudi, Chennai (Zone-V)	54		NRCP
	85.	Kodungaiyur, Chennai (Zone-I & II)	110		NRCP
	86.	Koyambedu Chennai (Zone-III)	60		NRCP
	87.	Erode	20	OP	NRCP
	88.	Erode	5.17	UASB	NRCP

State	S.NO	STP	STP capacity created (MLD)	Technology	Sanctioned commissioned under GAP-1/NRCP
	89.	Kumarapalayam	60	WSP	NRCP
	90.	Trichy	28	WSP	NRCP
	91.	Karur	15	WSP	NRCP
	92.	Kumbakonam	17		NRCP
	93.	Madurai	99		NRCP
	94.	Mayiladuthurai	8.3		NRCP
	95.	Thanjavur	28		NRCP
	96.	Tirunelveli	24		NRCP
	97.	***Trichirappalli-Srirangam***	***58***		***NRCP***
		Sub total	630.41		
U.P.	98.	Agra	78	UASB	YAP-I
	99.	Agra	10	OP	YAP-I
	100.	Agra	2.25	OP	YAP-I
	101.	Agra	14	UASB	YAP-II
	102.	Agra	40	OP	YAP-II
	103.	Etawah	10	OP	OP
	104.	Naini,Allahabad	60	ASP	GAP-I
	105.	Salori,Allahabad	29		NRCP
	106.	Jajmau, Kanpur	36	ASP	GAP-I
	107.	Jajmau, Kanpur	130	ASP	GAP-I
	108.	Jajmau, Kanpur,CETP	5	UASB	GAP-I
	109.		***0.0045***		***GAP-I***
	110.	Masani Nalla,Mathura	12.5	OP	YAP-I
	111.	Laxmi Nagar,Mathura	14.5	WSP	YAP-I
	112.	Mirzapur - VINDYACHALA	4		NRCP
	113.	Mirzapur	14	UASB	GAP-I
	114.	Muzaffar Nagar	32	OP	NRCP
	115.	***Lucknow-Daulatganj***	***42***	***FAB***	***NRCP***
	116.	***Lucknow-Gomatinagar***	***375***		***NRCP***
	117.	***Anupshaher***	***10***	***OP***	***NRCP***
	118.	***Farrukhabad***	***3.96***	***OP***	***GAP-I***
	119.	Noida (sector-54)	9	OP	NRCP
	120.	Noida (sector-50)	34	UASB	NRCP
	121.	Noida (sector-54)	27	UASB	NRCP

State	S.NO	STP	STP capacity created (MLD)	Technology	Sanctioned commissioned under GAP-1/NRCP
	122.	Saharanpur	38	UASB	NRCP
	123.	Vrindavan	4	OP	NRCP
	124.	Vrindavan	0.5	OP	NRCP
	125.	Bhagwanpur , BHU(Varanasi)	9.8	ASP	GAP-I
	126.	***DLW-Varanasi***	***12***	***ASP***	***GAP-I***
	127.	Dinapur-VARANASI	80	ASP	GAP-I
	128.	Ghaziabad-Indirapuram	56	UASB	NRCP
	129.	Ghaziabad	70	UASB	NRCP
	130.	Ghaziabad	3	KT	NRCP
	131.	***Sultanpur***	***6.4***		***NRCP***
		Sub total	1271.9145		
Uttrakhand	132.	Jagjeetpur,Haridwar	18	ASP	GAP-I
	133.	Jagjeetpur,Haridwar	27	C Tech	
	134.	***Ranipur***	***4.17***		***NRCP***
	135.	Swarg Ashram Rishikesh	0.33	RBRC	GAP-I
	136.	Rishikesh	6	OP	GAP-I
	137.	Rishikesh	3	C Tech	NRCP
	138.	***Srinagar***	***3.5***		***NRCP***
		Sub total	62		
West Bengal	139.	Barrackpore	1		NRCP
	140.	Baidyabati	6		NRCP
	141.	Kannogar	22		NRCP
	142.	North Barrackpore	4.35		NRCP
	143.	Berhampore	3.7	OP	GAP-I
	144.	Gayeshpur,Halishar & Kanchrapara	12		NRCP
	145.	Jijganj, Azimpur	1.39		NRCP
	146.	***Kharda***	***3***		***NRCP***
	147.	Nabadwip	4	OP	NRCP
	148.	Kalyani (old)	11	TF	NRCP
	149.	Kalyani (new)	6	OP	NRCP
	150.	Bhatpara	10	ASP	NRCP
	151.	Bhatpara	4.5	ASP	NRCP
	152.	Bhatpara (old)	8.5	ASP	NRCP
	153.	Bhatpara(new)	10	OP	NRCP

State	S.NO	STP	STP capacity created (MLD)	Technology	Sanctioned commissioned under GAP-1/NRCP
	154.	Chandan Nagar,Khalisani	18	TF	NRCP
	155.	Chandan Nagar,Khalisani	4.5	OP	NRCP
	156.	Panihati	12	OP	NRCP
	157.	Serampore	19	TF	NRCP
	158.	Bansberia	0.3	WSP	NRCP
	159.	Garden Reach	47.5	ASP	NRCP
	160.	Mahestala,Nungi	4	WSP	NRCP
	161.	Budge Budge	4.25		NRCP
	162.	Bhadreshwar & champdani	7.6	AL	NRCP
	163.	Asansol	14		NRCP
	164.	Garulia	7.9	WSP	NRCP
	165.	Cossipore Chitpur	45	ASP	NRCP
	166.	Naihati	11.5		NRCP
	167.	Kamarhati	40	TF	NRCP
	168.	North Howrah,kona,Bally	30	OP	NRCP
	169.	Howrah	45	TF	NRCP
		Sub total	417.99		
Bihar	170.	Beur (old),Patna	20	ASP	GAP-I
	171.	Beur (new),Patna	15	ASP	GAP-I
	172.	Saidpur (new),Patna	17	ASP	GAP-I
	173.	Saidpur (old),Patna	28	ASP	GAP-I
	174.	Pahari,Patna	25	AL	GAP-I
	175.	Chapara	2	OP	GAP-I
	176.	***Bhagalpur***	***11***	***AL***	***GAP-I***
		Sub total	118		
Sikkim	***177.***	***Gangtok***	***16.59***		***NRCP***
	178.	***Singtom***	***1***		***NRCP***
	179.	***Ranipool***	***1***		***NRCP***
		Sub total	18.59		

Note: Red color marked STPs are not monitored

ANNEXURE-III

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENTAL POLLUTANTS

Add Typed

The Environment (Protection) Rules, 1986

Schedule VI

General Standards for discharge of environmental pollutants

Part A - Effluents

Sl.No.	Parameter	Standards			
		Inland Surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	*2*	*3(a)*	*3(b)*	*3(c)*	*3(d)*
1.	Colour and odour	See 6 of Annexure-I	-	See 6 of Annexure-I	See 6 of Annexure-I
2.	Suspended solids mg/l, Max.	100	600	200	(a) For process waste water-100.
					(b) For cooling water effluent 10 per cent above total suspended matter of influent.
3.	Particle size of suspended solids.	shall pass 850 micron IS Sieve	-		(a) Floatable solids, max. 3 mm.
					(b) Settleable solids, max. 850 microns.
4 .	[*Omitted*]				
5.	pH value.	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
6.	Temperature	shall not exceed 5°C above the receiving water temperature	-	-	shall not exceed 5 °C above the receiving water temperature
7.	Oil and grease mg/l, Max.	10	20	10	20
8.	Total residual chlorine mg/l, Max.	1.0	-	-	1.0

Sl.No.	Parameter	Standards			
		Inland Surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	*2*	*3(a)*	*3(b)*	*3(c)*	*3(d)*
9.	Ammonical nitrogen (as N), mg/l Max.	50	50	-	50
10.	Total Kjeldahl nitrogen [(N)] mg/l, Max.	100	-	-	100
11.	Free ammonia [(NH_3)] mg/l, Max.	5.0	-	-	5.0
12.	[Biochemical oxygen demand (5 days at 20 ^{0}C)] [mg/l, Max.]	30	350	100	100
13.	Chemical Oxygen demand, mg/l, Max.	250	-	-	250
14.	Arsenic (as As) [mg/l, Max.]	0.2	0.2	0.2	0.2
15.	Mercury (As Hg), mg/l, Max	0.01	0.01	-	0.01
16.	Lead (as Pb) mg/l, Max.	0.1	1.0	-	2.0
17.	Cadmium (as Cd) mg/l, Max.	2.0	1.0	-	2.0
18.	Hexavalent chromium (as Cr + 6), mg/l, Max.	0.1	2.0	-	1.0
19	Total chromium (as Cr) mg/l, Max.	2.0	2.0	-	2.0
20.	Copper (as Cu) mg/l, Max.	3.0	3.0	-	3.0
21.	Zinc (as Zn) mg/l, Max.	5.0	15	-	15

Sl.No.	Parameter	Standards			
		Inland Surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	*2*	*3(a)*	*3(b)*	*3(c)*	*3(d)*
22.	Selenium (as Se) mg/l, Max.	0.05	0.05	-	0.05
23.	Nickel (as Ni) mg/l, Max.	3.0	3.0		5.0
[24.	*	*	*	*	*]
[25.	*	*	*	*	*]
[26.	*	*	*	*	*]
27.	Cyanide (as CN) mg/l, Max.	0.2	2.0	0.2	0.2
[28.	Omitted				]
29.	[Fluoride] (as F) mg/l , Max.	2.0	15	-	15
30.	Dissolved phosphates (as P), mg/l, Max.	5.0	-	-	-
[31.	Omitted				]
32.	Sulphide (as S) mg/l, Max.	2.0	-	-	5.0
33.	Phenolic compounds [as C6H5OH] mg/l, Max.	1.0	5.0	-	5.0
34.	Radioactive materials :				
	(a) Alpha emitters [Micro curie/ml] Max.	10^{-7}	10^{-7}	[10^{-8}]	10^{-7}
	(b) Beta emitters [Micro curie/ml] Max.	10^{-6}	10^{-6}	10^{-7}	[10^{-6}]

Sl.No.	Parameter	Standards			
		Inland Surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	*2*	*3(a)*	*3(b)*	*3(c)*	*3(d)*
35.	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
36.	Manganese (as Mn)	2 mg/l	2 mg/l		2 mg/l
37.	Iron (as Fe)	3 mg/l	3 mg/l		3 mg/l
38.	Vanadium (as V)	0.2 mg/l	0.2 mg/l		0.2 mg/l
39.	Nitrate Nitrogen	10 mg/l	-	-	20 mg/l
[40.	Pesticides : (microgram per lit., Maximum)				]

ANNEXURE-IV

CHARACTERISTICS OF SEWAGE TREATMENT PLANTS

Sl.NO.	Location Of STP	State	Process of Sewage Treatment	Designed capacity / day in MLD	Actual Treatment / day in MLD	Status operation	Characteristics				Disposal of treated sewage
							Inlet		Outlet		
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)	
					General Discharge Standard (Inland Surface Water)				30 mg/l	250 mg/l	
1.	Jajmau, Kanpur	Uttar Pradesh	UASB	5	4.5	Operational	162	293	76	197	Irrigation
2.	Jajmau, Kanpur	Uttar Pradesh	ASP	130	100	Operational	314	672	69	211	Irrigation & river Ganga
3.	Dhandupur, Agra	Uttar Pradesh	UASB	78	50	Operational	197	605	41	165	Agriculture & rest in River
4.	Pilakhar, Agra	Uttar Pradesh	OP	10	8	Operational	87	248	29	121	Yamuna River
5.	Burhika Nagla, Agra	Uttar Pradesh	OP	2.25	2.25	Operational	No Flow	-	8.2	92	Yamuna River
6.	Jaganpur , Agra	Uttar Pradesh	UASB	14	12.5	Operational	67	274	37	128	Irrigation & Yamuna River
7.	Bichpuri , Agra	Uttar Pradesh	UASB	40		Under Construction		-	-	-	Yamuna River
8.	Kalideh, Vrindavan	Uttar Pradesh	OP	0.5		Not Operational		-	-	-	Yamuna River
9.	Pagal Baba, Vrindavan	Uttar Pradesh	OP	4		Operational	122	515	40	161	Irrigation & Yamuna River
10.	MasaniNalla, Mathura	Uttar Pradesh	OP	13.5	13.5	Operational	154	551	8	109	Yamuna River
11.	LaxmiNagar, Mathura	Uttar Pradesh	OP	14.5	14.5	Operational	212	732	76	135	Yamuna River
12.	Salori	Uttar Pradesh	FAB	29	22.7	Operational	44	207	23	53	River Ganga
13.	Etawah	Uttar Pradesh	OP	10.4	10.2	Operational	134	339	28	101	Yamuna River

Sl.NO.	Location Of STP	State	Process of Sewage Treatment	Designed capacity / day in MLD	Actual Treatment / day in MLD	Status operation	Characteristics				Disposal of treated sewage
							Inlet		Outlet		
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)	
					General Discharge Standard (Inland Surface Water)				30 mg/l	250 mg/l	
14.	Naini	Uttar Pradesh	ASP	60	27.57	Operational	69	207	17	35	Irrigation & Ganga River
15.	Dinapur, Varanasi	Uttar Pradesh	Trickling Filter	80	88	Operational	101	289	14.1	39.9	Irrigation & sale
16.	Bhagwanpur, BHU (Varanasi)	Uttar Pradesh	Extented Aeration	9.8	11.26	Operational	21.2	43.3	9.6	15.7	Irrigation & sale
17.	Muzaffar Nagar	Uttar Pradesh	OP	32.5		Not working					
18.	Ghaziabad	Uttar Pradesh	UASB	56	58	Operational	103	186	35	102	Hindon River
19.	Ghaziabad	Uttar Pradesh	UASB	70	68	Operational	108	219	33	124	Hindon River
20.	Saharanpur	Uttar Pradesh	UASB	38	12	Operational	82	195	22	95	Hindon River
21.	Mirzapur	Uttar Pradesh	UASB	14	9.93	Operational	91.5	183	71	162	Irrigation & Ganga River
22.	Noida (sector-50)	Uttar Pradesh	UASB	34	11	Operational	87	202	32	115	Yamuna River
23.	Noida (sector-54)	Uttar Pradesh	UASB	27	29	Operational	114	168	47	129	Yamuna River
24.	Noida	Uttar Pradesh	OP	9	9	Operational	91	178	31	129	Yamuna River
25.	Jagjeetpur, Haridwar	Uttrakhand		27		Operational			13	42	River Ganga
26.	Jagjeetpur, Haridwar	Uttrakhand	ASP	18		Operational			14	68	River Ganga
27.	Swarg Ashram Rishikesh	Uttrakhand	UASB+PP	3		Operational			10	42	River Ganga
28.	Lakkarghat, Rishikesh	Uttrakhand	OP	6		Operational			44	308	River Ganga

Sl.NO.	Location Of STP	State	Process of Sewage Treatment	Designed capacity / day in MLD	Actual Treatment / day in MLD	Status operation	Characteristics				Disposal of treated sewage
							Inlet		Outlet		
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)	
					General Discharge Standard (Inland Surface Water)				30 mg/l	250 mg/l	
29.	Delhi Gate	Delhi	Bio-far	10	10	Operational	106	446	4	14	Power plant
30.	Sen Nursing Home	Delhi	Bio Far	10	10	Operational	306	925	3	13	Power plant
31.	Jamalpur	Punjab	UASB+PP	48	42	Operational	124	510	42	210	River Satluj
32.	Jalandhar	Punjab	UASB	100	85	Operational	154	324	26	34	River Satluj
33.	Sultanpur Lodhi	Punjab	OP	2.6	3.6	Operational	331	842	31.5	111	River Satluj
34.	Balloke, Ludhiana	Punjab	UASB+PP	152	200	Operational	120	480	36	170	River Satluj
35.	Bhattian, Ludhiana	Punjab	UASB+PP	111	110	Operational	104	380	36	170	River Satluj
36.	Phillore, Jalandhar	Punjab	OP	2.6	Flow meter not working	Operational (Unsatisfactory)	153	327	51	142	River Satluj
37.	Phagwara	Punjab	UASB	20	12.5	Operational	225	625	30	98	River Satluj
38.	Kapoorthala	Punjab	UASB	25	0.504	Operational	120	461	22	89	River Satluj
39.	Bhagoraya, Kapoorthala	Punjab	OP	2.6	3.6	Operational	331	842	31.5	111	River Satluj
40.	Fulariwala, Jalandhar	Punjab	SBR	25	22	Operational	154	324	13.5	39	River Satluj
41.	Fulariwala, Jalandhar	Punjab	UASB	100	85	Operational	154	324	26	87	River Satluj
42.	Faridabad Badshapur	Haryana	UASB + SBR	65 (45+20)	45	Operational	186	549	28 & 50	73 & 118	Yamuna River
43.	Faridabad-Mirzapur	Haryana	UASB	45	24	Operational	70	404	180	84	Yamuna River
44.	Ballabgarh STP	Haryana	UASB	50	-	Operational	198	-	564	638	Yamuna River
45.	Palwal	Haryana	OP/WSP	9	9	Operational (Unsatisfactory)	141	377	72	158	Yamuna River

Sl.NO.	Location Of STP	State	Process of Sewage Treatment	Designed capacity / day in MLD	Actual Treatment / day in MLD	Status operation	Characteristics				Disposal of treated sewage
							Inlet		Outlet		
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)	
						General Discharge Standard (Inland Surface Water)			30 mg/l	250 mg/l	
46.	Sonepat	Haryana	UASB	30	45	Operational (Unsatisfactory)	134	342	50	258	Drain no.-6
47.	Gohana, Sonepat	Haryana	OP	3.5	3	Operational (Unsatisfactory)	129	382	Not provided	Not provided	Drain
48.	Panipat	Haryana	UASB	10	17	Operational (Unsatisfactory)	112	359	152	490	Nora Drain
49.	Panipat	Haryana	UASB	35	50	Operational (Unsatisfactory)	104	533	44	234	Panipat Drain
50.	Yamuna Nagar	Haryana	OP	1	1	Operational (Unsatisfactory)	32	172	No Final Outlet	No Final Outlet	Drain
51.	Yamuna Nagar	Haryana	OP	1	1	Not Operational					Drain
52.	Yamuna Nagar	Haryana	UASB	25	25	Operational (Unsatisfactory)	72	313	35	130	Drain
53.	Yamuna Nagar	Haryana	UASB	10		Operational (Unsatisfactory)	136	483	33	142	Drain
54.	Karnal	Haryana	OP	1.5	1.5	Operational (Unsatisfactory)	135	351	58	320	Old Mughal Canal Drain
55.	Gharundai, Karnal	Haryana	OP/WSP	3		Not in Operation					GandaNala Drain
56.	Karnal	Haryana	OP	8	8	Operational (Unsatisfactory)	204	649	67	393	Barota Drain

Sl.NO.	Location Of STP	State	Process of Sewage Treatment	Designed capacity / day in MLD	Actual Treatment / day in MLD	Status operation	Characteristics				Disposal of treated sewage
							Inlet		Outlet		
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)	
						General Discharge Standard (Inland Surface Water)			30 mg/l	250 mg/l	
57.	Karnal	Haryana	UASB	40	40	Operational (Unsatisfactory)	98	363	40	147	Drain No.-1
58.	Amberpet	Andhara Pradesh	UASB	339	300	Operational	51	313		4	Musi River
59.	Bhadrachalam	Andhara Pradesh	Facultative & Maturation Ponds/WSP	2	0	Not in operation	260	356	-	-	Godavari
60.	Malkpur, Ramagundan	Andhara Pradesh	Anaerobic Ponds,Facultative& Maturation Ponds	14	20	Not in operation	-	-	21	74	Godavari
61.	Nagole	Andhara Pradesh	UASB,Facultative Aerobic Ponds	172	160	Operational	73	258	-	12	Musi River
62.	Nallacheruvu	Andhara Pradesh	UASB,Facultative Aerobic lagoons	30	25	Operational	154	610	5	16	Musi River
63.	Old Bazar, Ramagundam	Andhara Pradesh	Anaerobic lagoons & stabilization Ponds	4	0	Not in operation			3	20	Bypassed to River
64.	Saikunta, Mancherial Town	Andhara Pradesh	Anaerobic lagoons & stabilization Ponds	2.5	0	Not in operation			14	71	Thoullavagu Lake & Irrigation

Sl.NO.	Location Of STP	State	Process of Sewage Treatment	Designed capacity / day in MLD	Actual Treatment / day in MLD	Status operation	Characteristics				Disposal of treated sewage
							Inlet		Outlet		
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)	
						General Discharge Standard (Inland Surface Water)			30 mg/l	250 mg/l	
65.	Rajmundry	Andhara Pradesh	UASB,Polishing Ponds	30	34	Operational	96	208	36	105	Dowleswaram Barrage
66.	Reddy colony, Mancherial Town	Andhara Pradesh	Anaerobic lagoons & stabilization Ponds	4	0	Not in operation	-	-	74	153	Godavari
67.	Attapur	Andhra Pradesh	-	21+60+51	-	Under construction	-	-	-	-	-
68.	Tonca,panaji	Goa	Sequential Batch Reactor	12.5	12	Operational	270-350	462	<30	<250	River Madovi& for developing forest lands
69.	Bhadravathi	Karnataka	WSP	5.83	0	Not Operational	-	-	-	-	Bhadara River
70.	Davangere	Karnataka	WSP	19	15	Operational	429	737	12	78	ElebethurNallah
71.	Harihara	Karnataka	WSP	8.4	5	-	36	98	23	75	Cotton Plantation &Tungabhadara River
72.	Kollegal	Karnataka	WSP	3	1	Poorly Operational	*5	*39	*27	*176	Irrigation Canal
73.	Kantenahalli, KR Nagar	Karnataka	Anaerobic Ponds,Facultative& Maturation Ponds	1.5	1.5	Operational	32	71	31	106	Irrigation Canal & lake
74.	Maduvanahalli,	Karnataka	Anaerobic	1.5	1.5	Operational	84	122	10	63	Irrigation

Sl.NO.	Location Of STP	State	Process of Sewage Treatment	Designed capacity / day in MLD	Actual Treatment / day in MLD	Status operation	Characteristics				Disposal of treated sewage
							Inlet		Outlet		
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)	
						General Discharge Standard (Inland Surface Water)			30 mg/l	250 mg/l	
	KR Nagar		Ponds, Facultative & Maturation Ponds								Canal & KRS dam
75.	Nanjangud	Karnataka		1.4		Construction stopped					
76.	Shimoga	Karnataka	WSP			Under construction					Krishna River
77.	Srirangapatna	Karnataka	Anaerobic lagoons, Facultative Ponds	1.4	1	Poorly Operational	37	94	21	86	Land
78.	Bhavani	Tamil Nadu	WSP	3.94		Construction stopped		-	-	-	Cauvery River
79.	Lakkapuram, Erode	Tamil Nadu	WSP	20	0	Not in operation since July, 2005	3	16	-	-	Drain
80.	Vairapalayam, Erode	Tamil Nadu	UASB	5	0	Not in Operation since May, 2009	70	20	35	20	Agriculture
81.	Karur	Tamil Nadu	Extended Aeration	15	4	Operational but under utilized	37	152	33	116	Amaravathi River
82.	Kodungaiyur, Chennai	Tamil Nadu	ASP	110	90	Operational	138	408	6	47	Land filling
83.	Koyambedu	Tamil Nadu	ASP	60	60	Operational	129	776	9	67	Open area within the premises
84.	Kumarapalayam, Namakkai	Tamil Nadu	WSP	6	0	Not Operational	35	104	32	88	Cauvery River

Sl.NO.	Location Of STP	State	Process of Sewage Treatment	Designed capacity / day in MLD	Actual Treatment / day in MLD	Status operation	Characteristics				Disposal of treated sewage
							Inlet		Outlet		
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)	
						General Discharge Standard (Inland Surface Water)			30 mg/l	250 mg/l	
85.	Kumbakonam	Tamil Nadu	Conventional ASP	17	7.8	Partly constructed - Partly commissioned	433	862	2	82	Irrigation Canal
86.	Madurai	Tamil Nadu	Cyclic ASP	125	17	Operational	180	384	3	28	Grass cultivation
87.	Mayiladuthurai	Tamil Nadu	WSP	8.3	5.8	Operational	40	167	14	149	Arupathy canal
88.	Nesapakkam, Chennai	Tamil Nadu	ASP	40	43	Operational	138	651	5	63	River adyar
89.	Panjapur, Trichy	Tamil Nadu	WSP	88	45	Operational	100	286	26	75	Koraiyur River
90.	Perungudi, Chennai	Tamil Nadu	ASP	54	65	Operational	135	255	25	39	Buckingham Canal
91.	Sakkimanglam	Tamil Nadu	Cyclic ASP	45.7	10	Operational	230	536	4	64	Grass cultivation
92.	Thanjure	Tamil Nadu	ASP	28	9	Operational	100	176	17	40	River Vadavara
93.	Tiruelveli	Tamil Nadu	WSP	24.2	10	Operational	53	176	10	72	pudukulam Irrigation tank
94.	Avaniapuram	Tamil Nadu	SBR	125	17	Operational	180	384	3	28	Grass cultivation
95.	Ramayanpathi	Tamil Nadu	WSP	24	10	Operational	72	110	24		pudukulam Irrigation tank
96.	Pahari, Patna	Bihar	Aerated lagoon	25	18	Operational	54	91	25	55	River,Pisciculture
97.	Chapara, Patna	Bihar	OP	2	0	Not Operational					Irrigation & River
98.	Beur, Patna	Bihar	ASP	35	24	Operational	72	169	38	50	Irrigation & River
99.	Saidpur, Patna	Bihar	ASP	45	33	Operational	130	315	5	8	River Pun-pun

Sl.NO.	Location Of STP	State	Process of Sewage Treatment	Designed capacity / day in MLD	Actual Treatment / day in MLD	Status operation	Characteristics				Disposal of treated sewage
							Inlet		Outlet		
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)	
						General Discharge Standard (Inland Surface Water)			30 mg/l	250 mg/l	
100.	Mattagajpur	Bihar	OP/WSP	33	25	Operational	28	78	17	67	River
101.	Barrackpore	West Bengal	OP	s	0	Not functional					N/A
102.	Baidyabati	West Bengal	OP	6	6	Operational	14	59	1	20	River Ganga
103.	Kannogar	West Bengal	OP	22		Operational	21	82	12	43	N/A
104.	North Barrackpore	West Bengal	OP	4.35		Not functional					
105.	Berhampore	West Bengal	OP	3.7	3.7	Operational			12	35	discharged to a beel
106.	Kalyani Block-B2,B3	West Bengal	Trickling Filter	11		Not functional					River Ganga
107.	Kalyani Town area	West Bengal	OP	6		Not functional					River Ganga
108.	Madrail, Kinkara, Bhatpara	West Bengal	Trickling Filter	10	10	Operational	63	9	5	67	River Ganga
109.	Chandan Nagar, Khalisani	West Bengal	Trickling Filter	18		Not functional					River Ganga
110.	Chandan Nagar, Khalisani	West Bengal	OP	18	18	Operational	82	260	8	71	River Ganga
111.	Titagarh	West Bengal	ASP	4.5		Operational(Unsatisfactory)	110	216	58	130	Irrigation & Fishery
112.	Titagarh	West Bengal	OP	4.5		Operational(Unsatisfactory)	110	216	67	146	Irrigation & Fishery
113.	Bandipur	West Bengal	OP	14	14	Operational	14	47	5	35	Irrigation
114.	Panihati	West Bengal	OP	12	12	Operational	23	126	8	55	Irrigation

Sl.NO.	Location Of STP	State	Process of Sewage Treatment	Designed capacity / day in MLD	Actual Treatment / day in MLD	Status operation	Characteristics				Disposal of treated sewage
							Inlet		Outlet		
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)	
						General Discharge Standard (Inland Surface Water)			30 mg/l	250 mg/l	
115.	Serampore	West Bengal	Trickling Filter	19	19	Operational	51	137	15	59	River Ganga
116.	Chakapara	West Bengal	OP	30	30	Operational	56	312	11	55	River Ganga
117.	Arupara	West Bengal	Trickling Filter	45	45	Operational	110	549	27	67	River Ganga
118.	Bansberia	West Bengal	WSP	0.3	0.30	Operational	17	59	16	51	
119.	Garden Reach	West Bengal	ASP	48	Trial Phase	Operational	13	51	8	7	River Ganga
120.	Mahestala, Nungi	West Bengal	WSP	4	4	Operational	13	51	2	23	Not known
121.	Budge Budge	West Bengal	WSP	4.25	Not known	Not Operational	7	90			Neighbouring Industries outlet
122.	Bhadreshwar	West Bengal	Aerated Lagoons	8	8	Operational	103	335	4	39	River Ganga
123.	Champadani	West Bengal	Aerated Lagoons	0.3	Not functional	Not functional					Not known
124.	Garulia	West Bengal	WSP	8	Not known	Not Operational					Not known
125.	Cossipore Chitpur	West Bengal	ASP	45	Trial Phase	Operational	7	148	7	45	River Ganga
126.	Naihati	West Bengal	ASP	12		Operational	55	125	8	39	River Ganga
127.	Kamarhati	West Bengal	Trickling Filter	40	40	Operational	66	250	6	41	River Ganga
128.	Jagaddal, Bhatpara (New)	West Bengal	ASP	10	10	Operational	126	392	66	165	River Ganga
129.	Jagaddal, Bhatpara (old)	West Bengal	ASP	8.5	Not known	Not functional					River Ganga

Sl.NO.	Location Of STP	State	Process of Sewage Treatment	Designed capacity / day in MLD	Actual Treatment / day in MLD	Status operation	Characteristics				Disposal of treated sewage
							Inlet		Outlet		
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)	
						General Discharge Standard (Inland Surface Water)			30 mg/l	250 mg/l	
130.	Jagaddal, Bhatpara	West Bengal	OP	4.5	Not known	Not functional					River Ganga
131.	Nabadwip	West Bengal	OP	10	2.5	Operational	88	232	8	43	Nothing
132.	Jiaganj, Azimpur	West Bengal	OP	1.39	Not known	Not functional					N/A
133.	Gayeshpur, Halishar & Kanchrapara	West Bengal	OP	13	Not known	Not functional					
134.	Asanol	West Bengal	-	12	Not known	Not functional	-	-	-	-	River Ganga
135.	Behrampura, Ahemdabad	Gujrat	UASB, Aerated Lagoons	106	106	Operational	191	421	35	127	River
136.	Narol Sarkhej Highway, Ahemdabad	Gujrat	UASB	126	120	Operational	115	259	27	103	River
137.	Karad	Maharashtra	OP	28	-	poor condition	-	-	-	-	
138.	Trimbak, Nasik	Maharashtra	FAB	1	1.2	Operational(Unsatisfactory)	132	312	102	245	River Godavari/Irrigation
139.	Sangli	Maharashtra	WSP	27		Construction almost complete					Irrigation & River Krishna
140.	Kohlapur	Maharashtra	Cyclic ASP	76		Under construction					
141.	Tapovan,Nasik	Maharashtra	ASP,UASB	78 + 53	103	Operational	64+25	240+91	11	24	River Godavari at Tapovan
142.	Chehedi, Nasik road	Maharashtra	UASB,OP, AL	22	20	Operational	34	135	8	21	River Darna

Sl.NO.	Location Of STP	State	Process of Sewage Treatment	Designed capacity / day in MLD	Actual Treatment / day in MLD	Status operation	Characteristics				Disposal of treated sewage
							Inlet		Outlet		
							BOD (mg/l)	COD (mg/l)	BOD (mg/l)	COD (mg/l)	
						General Discharge Standard (Inland Surface Water)			30 mg/l	250 mg/l	
143.	Kabit Khedi, Indore	Madhya Pradesh	UASB	78	72	Operational	170	322	38	139	Khand River
144.	Kabit Khedi, Indore	Madhya Pradesh	UASB	12	10.5	Operational (Unsatisfactory)	198	347	39	98	Khand River
145.	Nagda	Madhya Pradesh	Karnal Technology	9	-	Not Operational	59	92	-	-	Chambal River
146.	Sadawal, Ujjain	Madhya Pradesh	WSP, Anaerobic Lagoon	52	20	Operational (Unsatisfactory)	74	140	48	75	Kshipra River
147.	Burhanpur	Madhya Pradesh	OP	10	0	Not operational	-	-	-	-	Irrigation
148.	Bhopal	Madhya Pradesh	Oxidation Pond	8	8	Operational (Unsatisfactory)	102	157	64	82	Lake
149.	Vidisha	Madhya Pradesh	K.T.Karnal Technology	7.2	7.2	Operational	103	195	-	-	Plantation
150.	Chhapara	Madhya Pradesh	K.T.Karnal Technology	1.2	Not operational	Not operational	-	-	-	-	-
151.	Keolari	Madhya Pradesh	K.T.Karnal Technology	0.75	Not operational	Closed	-	-	-	-	-
152.	Pamba	Kerala	-	4.5	Under construction	-	-	-	-	-	-

ANNEXURE-V

DETAILED PERFORMANCE EVALUATION REPORT ON SEWAGE TREATMENT PLANTS

1. Uttar Pradesh

i) Location: Mirzapur
Designed Capacity/day: 14 MLD
Actual treatment/day: 9.93 MLD
Date of Inspection: 25/10/2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Screen Channel	-	-
Grit Channel	Mechanically done	
UASB Reactors	02 No.;(46.02 x 20.81 x 5.0 m) each	8 hrs.
Polishing Ponds	1	24 hrs.
Sludge drying beds	12 No. ; 18 x 14 m each	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	-	91.5	183	112	-	2.2×10^7	2.8×10^8		
After UASB Reactor 1	-			39					
After UASB Reactor 2	-			46					
After Polishing Ponds	-	7.1	13.2	24				0.8	1.8
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) It was observed that the bar-screens installed were found non-operational.
b) During power failure, operator does not operate the DG set at pumping station which alters the efficiency of STP and untreated water is discharged into river through Ghode shaheed drain.
c) Formation of scum layers and foaming were observed in reactors channel due to the presents of insoluble components i.e. fats and oil etc

d) Polishing pond is not periodically cleaned which causes the algal growth and reduces the efficiency of STP.
e) In general, maintenance of plant and housekeeping is good but digesters are not found working properly.
f) Since no Chemical treatment process applied for reduction of Fecal coliform, therefore, the fecal coliforms were found exceeding norms.

ii) Location : Naini, Allahabad
Designed Capacity/day: 60 MLD
Actual treatment/day: 46 MLD
Sewage Treatment Technology: ASP

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Primary Clarifiers	3 ; 2263 m^3	2.49 hrs.
Aeration tanks	3 ; 3333 m^3	4.10 hrs.
Final Clarifiers	3 ; 2722.3 m^3	3.26 hrs.
Sludge digesters	3 ; 4000m^3	30 days
Sludge drying beds	22 nos. ; (size 24.6 X 24.6 m.)	

Results of Analysis of grab samples after different stages of treatment

Sample Point	**pH**	**BOD**	**COD**	**TSS**	**VSS**	**Faecal Coliform**	**Total Coliform**	**Nitrate-Nitrogen**	**Ammoniacal-N**	**Phosphate (PO4-)**
Raw Sewage	7.5	86	176	147	101	9.4×10^6	1.7×10^7	0.96	16	3.60
After Primary Clarifier 1	7.5	46	86	51	40			1.25	33	3.9
After Primary Clarifier 2	7.5	53	105	49	39			1.21	30	4
After Primary Clarifier 3	7.6	46	81	51	39			0.53	46	2.9
After secondary Clarifier 1	7.8	18	29	13	10			4.73	44	2.2
After secondary Clarifier 2	7.9	18.7	28	14	11			4.57	18	2
After secondary Clarifier 3	7.8	19.4	25	11	9			4.3	28	1.6
Final Outlet of STP	7.7	18.6	28	18	12	3.3×10^5	4.9×10^5	4.8	20	1.7

Sample Point	**pH**	**BOD**	**COD**	**TSS**	**VSS**	**Faecal Coliform**	**Total Coliform**	**Nitrate-Nitrogen**	**Ammoniacal-N**	**Phosphate (PO4-)**
Standards for discharge in Stream	5.5 - 9	30	250	100						
Note: All values are in mg/l except pH and Coliform (MPN/100ml)										

Remarks:

a) Removal of the larger particle from the inlet of STP is being carried out manually and the collected solid waste is dumped indiscriminately within the premises.
b) Flow measuring device of STP always out of order.
c) Over flow from All PSTs and SSTs were seen during inspection.
d) During power failure, the plant (STP and Pumping stations) get stopped, which hampers the efficiency of STP and ultimately discharge untreated water in to river.
e) Maintenance of the STP was poor.
f) Since no chlorination practice adopted for reduction of coliforms therefore the fecal coliform were found exceeding the NRCD norms.

iii) Location: Dinapur (Varanasi)
Designed Capacity/day: 80 MLD
Actual treatment/day: 88 MLD

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Primary Clarifiers	3 ; Diameter 31.20 m ; Volume 2676 m^3	2.41 hrs(avg.)
Trickling Filter	3 ; (Diameter 22.5m)	70 hrs.
Aeration tanks	3 ; 2667 m^3 / day	3.5 hrs.
Final Clarifiers	3 ; (40 Dia. x 3.5 SWD)	3.95 hrs.
Sludge digesters	3 ; (Size -29 m diameter)	18 days
Sludge drying beds	29 nos. ; 300m^3/day	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
After Primary Clarifier 1	-	48	202	198					
After Primary Clarifier 2	-	50	216	230					
After Primary Clarifier 3	-	36	179	190					
Trickling Filter 1		34	174	174					

Trickling Filter 2		38	171	168					
Final Outlet of STP	-	14	39	45		5.4×10^6		0.45	1.91
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) Plant is not being periodically maintained which is causing regular break down of deferent components of STP which reduces the efficiency.
b) Poor maintenance noticed in the plant.
c) During power failure, the plants (STP and Pumping stations) do not operate the DG sets which hamper the efficiency of STP and untreated wastewater discharged into river Ganga.
d) Flow meter measurement is not being carried out due to non-availability of Water Meters, in the plant.
e) Chlorination at the outlet of STP is not being practiced by unit resulting the increase number of Total and Fecal coliforms at the outlets.
f) Plant was running at it's over capacity.

iv) Location: Bhagwanpur (Bhu), Varanasi
Designed Capacity/day: 9 MLD
Actual treatment/day: 11 MLD
Date of Inspection: 25/10/2011

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Chamber	Mechanically done	
Primary Clarifiers	2 ; Volume 1222 m^3	2.41 hrs
Aeration tanks	2 ; 1491m^3 (DIA,15.6, SWD each)	2.6 hrs.
Final Clarifiers	2 ; 1609 m^3 (16.0 DIA x 3.5)M	4 hrs.
Sludge digesters	2 ; Dia. 34M	30 days
Sludge drying beds	9 ; 35m^3/day	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	-	21	43	93	-	1×10^7	2.2×10^8		
After Primary Clarifier 1	-	43	202	198					
After Primary Clarifier 2	-	9.9	27	29					

Final Outlet of STP	-	9.6	15.7	13		4.9×10^5		0.58	0.58
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
(All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) Water meter at the out let of STP is not installed.
b) Most of the components of STP were found working except digesters and gas holder.
c) The unit has 2 nos. gas holders which are out of order since last two years.
d) No provision is made to disinfect the treated waste water before discharge into drain.
e) It was observed that floating material in the secondary clarifier tank is directly discharged into river Ganga through drains.
f) Since no Chemical treatment process applied for reduction of Fecal coliform, therefore, the fecal coliforms were found exceeding the NRCD norms.

v) Location: Dhandupura (Agra)
Designed Capacity/day: 78 MLD
Actual treatment/day: 50 MLD

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Screen Channel	2 ; 6 m x 2.5 m x 0.52 m each	
Grit Channel	3 ; 20 m x 3.05 m x 0.75 m each	
UASB Reactors	6 ;40 m x 24 m x 5.35 m each	8-12 hrs.
Polishing Ponds	3 ; 214 m x 93 m x 1.25 m, 160 x 129 x 1.25 m, and 162 m x 122 m x 1.25 m	
Sludge drying beds	36 ; 26 m x 14 m each	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.3	197	605	844		2.4×10^7	3.5×10^7		
After UASB Reactor 1	-								
After UASB Reactor 2	7.5	52	251	105					
Final Outlet of STP	7.68	41	165	21		2×10^4	4×10^4	0.97	0.005
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				

Note: (All values are in mg/l except pH and Coliform (MPN/100ml)

Remarks:

a) During inspection, plastic pouch were observed at the reactor. It may be due to improper screening at the inlet of STP.
b) STP has no proper screening system at the MPS. Screen installed at the MPS is manual and it seems that it is ineffective for the proper screening. During inspection, it was observed that construction of automatic screening system was under progress.
c) DG sets (1250 KVAX2) installed at the MPS was not in operation.
d) During inspection, one of the reactors was found not functional due to maintenance.
e) Gas collection pipe of the reactor was observed damaged at many places. Due to this, unit is not collecting gas and it is emitted in environment.
f) It is evident from the results that STP does not meet with the stipulated norms of discharge.

vi) Location: Pilakhar (Agra)
Designed Capacity/day: 78 MLD
Actual treatment/day: 50 MLD

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	2 no.: 20 m x47 m x 3.5 m each	
Facultative(Primary) ponds	4 nos.: 40 m x 97 m x 1.5 m each	
Facultative(Secondary) ponds	2 nos.: 40 m x 97 m x 1.5 m each	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.65	87.6	248.6	204		$3.3X10^6$	$4.9X10^6$		
Final Outlet of STP	7.95	29	121.2	59		$2 X10^4$	$4 X10^4$	3.75	0.19
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
Note: All values are in mg/l except pH and Coliform (MPN/100ml									

Remarks:

a) During inspection, it was informed by the STP representative that the total sewage generation of the area is approx. 25 MLD.STP is treating only 10 MLD and the remaining is discharged through the bypass drain into Yamuna River without treatment.
b) It was observed that one pump installed at the MPS was not functional.
c) STP is not carry proper screening of sewage at the inlet of STP. Due to this plastic pouches were observed at the oxidation pond.
d) It was observed that STP is lacking the proper Safety and security arrangements. During night time STP becomes inaccessible due to darkness.

vii) Location :BurhiKaNagla (Agra)
Designed Capacity/day: 2.25 MLD
Actual treatment/day: 2.25 MLD

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	2 no.: 28.5 m x29.5 m x 3.5 m each	
Facultative(Primary) ponds	4 nos.: 40 m x 61 m x 1.5 m each(02) & 42 m x 59 mx1.5 m each (02)	
Facultative(Secondary) ponds	2 nos.: 40 m x 61 m x 1.5 m each	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage									
Final Outlet of STP	8.22	8.2	92.1	20		$4.5 X10^5$	$7.8 X10^5$	0.13	1.96
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
Note: All values are in mg/l except pH and Coliform (MPN/100ml									

Remarks:

a) The BurhiKaNagla STP is based on Oxidation Pond with installed capacity of 2.25 MLD. During Inspection, no flow at the inlet of STP was observed.
b) Bypass arrangement was made at the Nagla Burhi nalla. Possibility of discharge of excess sewage cannot be ruled out.
c) During inspection, it was observed that NaglaBurhinalla is tapped at two places, one for the BurhiKaNagla STP and another for STP located at DayalBagh.
d) It was observed that the Oxidation Pond was damaged at many places, also cleaning of oxidation pond was not done since long time.
e) STP lacks the maintenance like improper lighting arrangement, screening at the inlet, cleaning at the pond (plastic pouches and floating material) etc.

viii) Location: Jaganpur (DayalBagh)
Designed Capacity/day: 14 MLD
Actual treatment/day: 12.5 MLD

Unit size & Loading on main treatment units at full load condition :

Treatment Unit	Number/size	HRT/SOR/Loading
Screen Channel		
UASB Reactors	2	24 hrs.
Polishing Ponds		

Sludge drying beds		

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.38	67.4	274.8	122		2.4X107	3.5X107	----	----
After UASB Reactor 1									
After UASB Reactor 2	7.36	44.9	175.4	75		-----	----	---	---
Final Outlet of STP	7.63	37.9	128.1	22		$7 X10^5$	$9.4 X10^5$	0.25	7.18
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) The coarse material collected through screening and grit chamber is dispose off in open area in the plant premises, as informed by the STP representative.
b) The Sewage Pumping Station (SPS) has five no. of pump (3X95 HP, 2X25 HP) which is pumped sewage by tapping BurhikaNaglanalla.SPS has two DG set with capacity of 160 KVA. During inspection, log book regarding operation of SPS was not properly maintained.
c) STP has 62.5 KVA capacity dual fuels DG set using Diesel and Bio-Gas as fuel. During inspection, Bio-gas generated is flaring in the atmosphere.
d) It is evident from the results that STP is not meeting with the stipulated norms.

ix) Location: Bichpuri
Designed Capacity/day: 40 MLD
Actual treatment/day: ---------
Status: Under construction

x) Location :Kalideh , Vrindavan
Designed Capacity/day: 0.5MLD
Actual treatment/day : ---------
Status : Not in Operation

xi) Location :Pagal Baba, Vrindavan
Designed Capacity/day: 4 MLD
Actual treatment/day: ----

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	2	
Facultative(Primary) ponds	4	

Facultative(Secondary) ponds	2	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.35	122.4	515.1	260		$5.4X10^7$	$1.6X10^8$	----	------
Final Outlet of STP	8.08	40.5	161.6	94		$2.2\ X10^5$	$2.7\ X10^5$	0.68	5.65
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) This plant lacks proper maintenance. All the STP area is converted into forests. It seems that the STP is not taken care of by the STP operator.
b) It was observed that the sludge accumulated in the ponds was not removed since long time.
c) The plant has no light arrangements.
d) The plant has no proper screening system at the inlet. During inspection, it was observed that excess plastic pouches were in the OP.
e) The SPS & MPS has no proper log book for the operation.
f) It is evident from the results that the STP is not meeting with the standards.

xii) Location: Masani Nalla ,Mathura
Designed Capacity/day: 13.5 MLD
Actual treatment/day : 13.5 MLD

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Chamber		
Primary Clarifiers	4 ; Volume 117599 m^3	24 hrs
Aeration tanks		
Final Clarifiers	2 ;Volume 76356m^3	24 hrs.

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.51	154.5	551.5	623		$2.4\ X10^7$	$3.5X10^7$	----	------
Final Outlet of STP	8.29	7.7	109.2	56		$4.9X10^5$	$7.9\ X10^5$	0.08	1.26
Standards for discharge in	5.5 - 9	30	250	100	2100				

Stream									
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) The STP is operated with excess load. During inspection of MPS located at MasaniNall, it was observed that MPS has pumped approx. 19.80 MLD of sewage to the STP.
b) During inspection, it was observed that the MPS and STP have no proper screening system at the inlet.
c) During inspection, it was observed that the generation of sewage is much higher than the operating capacity of STP. Masaninalla is not completely tapped, hence large quantity of untreated sewage is discharged into Yamuna River without treatment.
d) It is evident from the results that STP is meeting with the stipulated norms.
e) During inspection, it was observed that the coarse material collected from the screening is collected and dispose off in open area by Nagar Nigam.

xiii) Location :Laxmi Nagar
Designed Capacity/day: 14.5MLD
Actual treatment/day: 14.5 MLD

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Chamber		
Primary Clarifiers	4 ; Volume (21844 x 4) m^3	24 hrs
Aeration tanks		
Final Clarifiers	2 ; Volume43688m^3	24 hrs.

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.30	212.3	732.4	584		$9.2 X10^7$	$1.6X10^8$	----	------
Final Outlet of STP	8.33	76.7	135.4	69		$4.5X10^4$	$6.8 X10^4$	0.29	1.96
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) During inspection, it was observed that one pump in Bengali Ghat MPS and four pumps in Dairy Farm MPS were not working.
b) It was observed that MPS was not maintaining proper log book
c) It is evident from the results that STP is not meeting with the stipulated standards.
d) During inspection, it was informed by the pump operator that due to leakage of raising main of Dairy Farm MPS, sewage was bypassed to Yamuna River through AbmakharNalla.

xiv) Location :Etawah
Designed Capacity/day: 10.445 MLD

Actual treatment/day: --------

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	2 ; (45mx22mx04m) each	
Facultative(Primary) pond	155mX60mX1.5m	24 hrs
Facultative(Secondary) pond	217m x48mx1.2m	24 hrs.

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.70	134.7	339.2	593		$9.2 X10^7$	$1.6X10^8$	----	------
Final Outlet of STP	8.32	28.1	101.9	78		$7.9X10^5$	$1.3 X10^6$	0.34	0.97
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) During inspection, it was observed that part of the nalla is tapped through MPS and remaining/excess sewage is discharge through drain. As per record available with STP, approx. 10.26 MLD sewage is pumped to STP on date 02.11.2011.
b) During inspection it was observed that inlet of Secondary Facultative pond was damaged and part of sewage is bypassed.
c) STP has no lab facility at the site. As per information given by the representative, Sample of sewage is analyzed in the STP located at Dhandhupura (Agra) on weekly. But, No record is maintained by the STP.

xv) Location: Noida
Designed Capacity/day: 9 MLD
Actual treatment/day:
Date of Sampling: 13/03/2012
Sewage Treatment Technology: OP

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	VSS	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Ammoniacal-N	Phosphate (PO4-)
Raw Sewage	7.9	146	363	295	181	$>24x10^{11}$	$>24x10^{11}$	9.8	38	4
Final Outlet of STP	9.1	39	193	122	86	$23x10^2$	$23x10^2$	9.2	28	3.4
Standards for discharge in Stream	5.5 - 9	30	250	100						

Note: All values are in mg/l except pH and Coliform (MPN/100ml)

xvi) Location: Noida (sector-54)
Designed Capacity/day: 27 MLD
Actual treatment/day:
Date of Sampling: 13/03/2012
Sewage Treatment Technology: UASB

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	VSS	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Ammoniacal-N	Phosphate (PO4-)
Raw Sewage	7.8	222	445	281	207	$>24x10^{11}$	$>24x10^{11}$	10	27	4.7
UASB Outlet	7.75	87	296	190	158	$23x10^{7}$	$23x10^{8}$	9.7	24	3.5
Final Outlet of STP	8	67	190	142	95	$23x10^{6}$	$23x10^{6}$	7.7	20	2.8
Standards for discharge in Stream	5.5 - 9	30	250	100						
Note: All values are in mg/l except pH and Coliform (MPN/100ml)										

xvii) Location: Noida (sector-50)
Designed Capacity/day: 34 MLD
Actual treatment/day:
Date of Sampling: 13/03/2012
Sewage Treatment Technology: UASB

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	VSS	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Ammoniacal-N	Phosphate (PO4-)
Raw Sewage	8	194	313	213	181	$>24x10^{11}$	$>24x10^{11}$	10	27	4.3
UASB Outlet	7.7	86	196	140	95	$23x10^{7}$	$23x10^{9}$	8.5	23	4
Final Outlet of STP	8.3	51	148	115	71	$23x10^{5}$	$23x10^{5}$	6.6	22	3.2
Standards for discharge in Stream	5.5 - 9	30	250	100						
Note: All values are in mg/l except pH and Coliform (MPN/100ml)										

xviii) Location :Muzaffar Nagar
Designed Capacity/day: 32.5 MLD
Actual treatment/day : ---------
Status :Not Working

Date : 15/03/2012
Sewage Treatment Technology : OP

xix) Location :Saharanpur
Designed Capacity/day: 38 MLD
Actual treatment/day:
Date of Sampling: 15/03/2012
Sewage Treatment Technology: UASB

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	VSS	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Ammoniacal -N	Phosphate (PO4-)
Raw Sewage	7.9	178	324	180	106	$>24x10^{11}$	$>24x10^{11}$	5.3	23	5
UASB Outlet	7.7	43	259	108	87	$23x10^{8}$	$93x10^{8}$	4.6	20	4.6
Final Outlet of STP	7.8	37	130	79	54	$23x10^{7}$	$23x10^{7}$	3.8	19	3.7
Standards for discharge in Stream	5.5 - 9	30	250	100						

xx) Location: Ghaziabad
Designed Capacity/day: 56 MLD
Actual treatment/day: 58 MLD
Date of Sampling: 15/03/2012
Sewage Treatment Technology: UASB

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	VSS	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Ammoniacal-N	Phosphate (PO4-)
Raw Sewage	7.7	194	264	188	144	$>24x10^{11}$	$>24x10^{11}$	9.3	22.3	5.8
UASB Outlet	7.4	86	199	128	101	$23x10^{8}$	$23x10^{8}$	7.7	21.6	5
Final Outlet of STP	7.5	49	154	99	61	$93x10^{6}$	$93x10^{7}$	6.3	20	4.3
Standards for discharge in Stream	5.5 - 9	30	250	100						
Note: All values are in mg/l except pH and Coliform (MPN/100ml)										

xxi) Location :Ghaziabad
Designed Capacity/day: 70 MLD

Actual treatment/day: 68 MLD
Date of Sampling: 15/03/2012
Sewage Treatment Technology: UASB

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	VSS	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Ammoniacal-N	Phosphate (PO4-)
Raw Sewage	7.5	205	310	204	146	$>24x10^{11}$	$>24x10^{11}$	11.3	33.9	5.5
UASB Outlet	7.5	85	193	171	103	$23x10^{8}$	$23x10^{8}$	9.9	30	4.1
Final Outlet of STP	7.9	42	152	104	63	$23x10^{7}$	$23x10^{7}$	9.4	29.3	3
Standards for discharge in Stream	5.5 - 9	30	250	100						
Note: All values are in mg/l except pH and Coliform (MPN/100ml)										

xxii) Location: Salori, Allahabad
Designed Capacity/day: 29 MLD
Actual treatment/day: 22.7 MLD
Sewage Treatment Technology: FAB

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	VSS	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Ammoniacal-N	Phosphate (PO4-)
Raw Sewage	7.6	44	207	223	154	$2 X 10^{5}$	$4 X 10^{5}$	0.86	10	3.58
FAB No.1 outlet	8.3	33	48	35	32			0.96	8	3.67
FAB No.2 outlet	7.9	38	55	29	23			0.77	9	4.19
Final Outlet of STP	8.1	22.9	53	25	21	$2 X 10^{4}$	$4 X 10^{6}$	0.53	10	4
Standards for discharge in Stream	5.5 - 9	30	250	100						
Note: All values are in mg/l except pH and Coliform (MPN/100ml)										

xxiii) Location :Jajmau, Kanpur
Designed Capacity/day: 130 MLD
Actual treatment/day: 100 MLD

Sewage Treatment Technology: ASP
Date of Inspection: 28/02/2012- 29/02/2012

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TDS	SS	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Ammoniacal-N	Phosphate (PO4-)
Raw Sewage	7.6	314	672	1527	969	9.4×10^6	1.7×10^7	1.31	19.2	4.27
Inlet of PST		253	577							
Outlet of AT										
Outlet of SST		76	237	58	58					
Final Outlet of STP	7.5	68.9	211	71	71	3.3×10^5	4.9×10^5	3.03	24.5	2.5
Standards for discharge in Stream	5.5 - 9	30	250	2100	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)										

Remarks:

a) The STP was found operational during Inspection.
b) Primary Settling tank was not functioning properly –sewage was overflowing.
c) Scrubber installed for scrubbling of the flue gases with the plant was found non-operational.
d) Screening at inlet chamber was found ineffective.
e) Extreme foaming seen in the final outlet of the plant.

xxiv) Location :Jajmau, Kanpur
Designed Capacity/day: 5 MLD
Actual treatment/day: 4.5 MLD
Sewage Treatment Technology: UASB
Date of Inspection: 28/02/2012- 29/02/2012

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Inlet chamber	$(6.4 \times 6.4 \times 5)m^3$	
Bar screen chamber	Manual; 2nos.	
Sludge drying beds	8 nos.; $(20 \times 20 \times 80)\ m^3$	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	VSS	SS	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Ammoniacal-N	Phosphate (PO4-)

Sample Point	pH	BOD	COD	VSS	SS	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Ammoniacal-N	Phosphate (PO4-)
Raw Sewage	7.51	162	293	445	1254	3.3×10^6	4.9×10^6	1.93	47	4
Final Outlet of STP	7.6	76	197	41	62	3.5×10^6	1.6×10^7	1.68	26.7	10.5
Standards for discharge in Stream	5.5 - 9	30	250	2100	100			50	10	
Note: All values are in mg/l except pH and Coliform (MPN/100ml)										

Remarks:

a) The STP was found operational during Inspection.
b) The V- Notch meter is used at the inlet of the plant to measure the flow of sewage.
c) Extreme foaming seen in the final outlet of the plant.
d) Bypassing of the treated wastewater seen in the final outlet channel.

2. Punjab

i) Location: Balloke, Ludhiana
Designed Capacity/day: 152 MLD
Actual treatment/day: 200 MLD
Date of Inspection: 07/11/2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Screen Channel		
UASB Reactors	6	9.24 hr.
Aeration Tank	(27 x 13.5 x 3.0)m with side water depth 3.0 meter	10 minutes

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Nitrate	Ammonia-N	Phosphate (PO4-)
Raw Sewage		120	480	260	3,00,00	1,00,000	8.4	14	
UASB Reactor Outlet		80	320	220					
Final Outlet of STP		36	170	135	20,000	90,000	3	6.4	3.4
Standards for discharge in Stream	5.5 - 9	30	250	100					

Note: All values are in mg/l except pH and Coliform (MPN/100ml)

Remarks:

a) Mechanical screen system installed by STP was not operational since last six month due to break down of motor.
b) Out of four de-gritter only one was in operational.
c) Reactors were not working efficiently as it was observed during inspection.
d) Surface of most of the reactors were covered with very thick layer of sludge and leakage of gas notices during inspection.
e) Unit is not complying with respect to BOD, TSS and coliform.

ii) Location: Bhattian, Ludhiana
Designed Capacity/day: 111 MLD
Actual treatment/day: 110 MLD
Date of Inspection: 15/04/2012

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Screen Channel		
UASB Reactors	9 ; Volume-5472 m^3	8 hrs.
Aeration Tank	12 x 24 x 3 meter =864 m^3	10 minutes
Sludge drying beds		

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TDS	TSS	Faecal Coliform	Total Coliform	Org-N	Ammonia-N	Phosphate (PO4-)
Raw Sewage	7.7	104	380	702	210	8×10^6	1.7×10^7	5	16	
UASB Reactor Outlet		70	290	596						
Final Outlet of STP	7.5	36	156		40	1.1×10^5	2.4×10^5	4.5	14	1.05
Standards for discharge in Stream	5.5 - 9	30	250		100			50	50	5

Note: All values are in mg/l except pH and Coliform (MPN/100ml)

Remarks:

a) Mechanical screen system installed by STP was not operational since last two month due to break down of motor.
b) D G set installed and kept within the room without canopy.
c) Gas generated from the plant is being flared off.
d) Chlorination plant was in operational during inspection.
e) All the analyzed parameter were found well within the norms except TC & FC

iii) Location :Jamalpur, Ludhiana
Designed Capacity/day: 48 MLD
Actual treatment/day: ---------

Date of Inspection: 08/11/2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Screen Channel		
Pre-Aeration tank	10 x 10 x 3 = 300 m^3	10 minutes
UASB Reactors	4 ; 32 m x 30 m x 5.7 m	7.5 hr.

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Nitrate	Ammonia-N	Phosphate (PO4-)
Raw Sewage		124	510	210	$9x10^3$	$2x10^5$			
UASB Reactor Outlet		92	380	315					
Polishing Ponds									
Final Outlet of STP		42	210	55	$3x10^3$	$11x10^3$	2.6	4.8	4.2
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) Contradictory Log Books for energy meter, water meter, chlorination, DG set etc are maintained by STP.
b) One de-gritter was found operational.
c) No laboratory is established to analyze the controlling parameters
d) D G set installed and kept within the room without canopy.
e) The reactors were not appropriately maintained.
f) Gas generated from the plant is almost nil.
g) During the inspection pre aerator installed before polishing pond was found not operational.

iv) Location: Phillore (Jalandhar)
Designed Capacity/day: 2.6 MLD
Actual treatment/day: Flow meter not working

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Screen Channel	Manual	
Duck weed pond	(25 x 12 x 1.5 meter)	
Fish ponds	2	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TDS	TSS	Faecal Coliform	Total Coliform	Org-N	NH_3 –N	Phosphate (PO4-)

Raw Sewage	7.5	153	327	610	175	$1.3x10^7$	$1.7x10^7$	6.10	16.4	Not done
Final Outlet of STP	8	50.7	142	540	50	30,000	30,000	4.8	10.2	1.09
Standards for discharge in Stream	5.5 - 9	30	250		100			50	50	5
Note: All values are in mg/l except pH and Coliform (MPN/100ml)										

Remarks:

a) No record for energy consumption & water meter made by the STP.
b) Manual screen installed in the inlet of STP was full of waste and not being cleaned.
c) Total four pumps (7.5 HP capacity) installed out of four only three operates at a time for approx. 16 hours.
d) All the duckweed ponds are filled with the sludge Drains were damaged at many places which allow the treated/ untreated wastewater spillage.
e) Fish ponds were found without the fish during inspection.

v) Location: Phagwara, (Punjab)
Designed Capacity/day: 20 MLD
Actual treatment/day: 12.5 MLD
Date of Inspection: 16/04/2012

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Screen Channel	Mechanical	
Grit Channel	Manual	
UASB Reactors	2	7-8 hrs.
Aeration Tank	Volume -138.72 m^3	10 minutes

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TDS	TSS	Faecal Coliform	Total Coliform	Org-N	NH_3 –N	Phosphate (PO4-)
Raw Sewage	7	202	456	987	248	7×10^6	$3x10^7$	5.6	18.5	Not done
Final Outlet of STP	7.5	49	248	864	68	1.1×10^6	$3x10^6$	4.2	13.4	1.2
Standards for discharge in Stream	5.5 - 9	30	250		100			50	50	5
Note: All values are in mg/l except pH and Coliform (MPN/100ml)										

Remarks:

a) Mechanical screen installed at inlet of STP was found non-operational during inspection.
b) D G set installed and kept within the room without canopy.
c) The reactors were maintained but Gas generated from the plant was almost nil.
d) Percentage of Industrial wastewater in the STP is approx. 40% which alters the normal functioning of STP.
e) At final policing ponds duckweed added to increase the efficiency of the STP.
f) During inspection chlorination at the outlet of STP was not being carried out.

vi) Location: Kapoorthala (Punjab)
Designed Capacity/day: 25 MLD
Actual treatment/day: 21000 lit per hr.
Date of Inspection: 16/04/2012

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Screen Channel	Mechanical	
Grit Channel	Manual	
UASB Reactors	2	
Aeration Tank	-	10 minutes
Sludge drying beds		

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TDS	TSS	Faecal Coliform	Total Coliform	Org-N	NH_3 –N	Phosphate (PO4-)
Raw Sewage	7.05	205	524	1078	315	7×10^6	$3x10^7$	6.3	16.4	Not done
Final Outlet of STP	7.4	41	240	994	72	1.1×10^6	$3x10^6$	5.10	12.2	1.02
Standards for discharge in Stream	5.5 - 9	30	250		100			50	50	5
Note: All values are in mg/l except pH and Coliform (MPN/100ml)										

Remarks:

a) D G set installed and kept within the room without canopy.
b) The reactors were maintained but Gas generated from the plant is almost nil.
c) During inspection, chlorination at the outlet of STP was not being carried out.
d) The persons deputed in the plant are not well acquainted with the plant operation.
e) All the values of analysed parameters at out let found well within the norms except TC and FC due to non operationaL OF chlorination plant.

vii) Location: Bhagoraya Road, Kapoorthala, (Punjab).
Designed Capacity/day: 3.6 MLD
Actual treatment/day: 2.6 MLD
Date of Inspection: 10/11/2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	2	
Facultative(Primary) ponds	1	
Facultative(Secondary) ponds	1	
Maturation Ponds	6	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	NH_3 –N	Phosphate (PO4-)
Raw Sewage		331	842	474		5.4×10^6	9.2×10^6		
Final Outlet of STP	7.8	31	111	41		4.5×10^3	6.8×10^3	19	2.39
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) The quality of treated wastewater of out let comply with the norms, except the TC and FC. Due to non deployment of chlorination process.
b) Frequency for removal of sludge from the different ponds is 18-20 month.
c) During inspection, Anaerobic pond was full of the sludge which may be affecting the efficiency of the STP.

viii) Location: Fulariwal, Jalandhar (Punjab).
Designed Capacity/day: 25 MLD
Actual treatment/day: 22 MLD
Date of Inspection: 09/11/2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Coarse Screen		
Fine Screen	Manually done	
Grit Chamber	Manually done	
C- Tech Basins	4	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	NH_3 –N	Nitrate	Phosphate (PO4-)
Raw Sewage		154	324	177	5.4×10^6	9.2×10^6			
Final Outlet of STP		13.5	39	28	2×10^{-3}	4.5×10^3	9.6	7.84	2.39
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) The plant is presently being run by the consultant who have installed the unit in the same premises where 100 MLD capacity plant in operation. .
b) A laboratory is established to analyze the controlling parameters found operational.
c) Common D G set is being utilized by both plant i.e. 100 MLD & 25 MLD.

d) The C- basins were found operational as per the cycles designed to efficiently treat the sewage.
e) Percentage of Industrial wastewater in the STP is approx. 30 % which may alter the normal functioning of STP in later stage.

ix) Location : Fulariwal, Jalandhar (Punjab)
Designed Capacity/day: 100 MLD
Actual treatment/day: 85 MLD
Date of Inspection: 13/04/2012

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Screen Channel	Mechnical	
Grit Channel		
UASB Reactors	10 ; (32 x 28 x 56) m^3 each	8 hr.

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TDS	TSS	Faecal Coliform	Total Coliform	Org-N	NH_3 –N	Phosphate (PO4-)
Raw Sewage	7	190	404	896	170	7×10^6	7×10^6	5.8	17.9	Not done
Final Outlet of STP	7.5	29	208	785	62	8×10^5	1.1×10^6	4.1	14.4	1.15
Standards for discharge in Stream	5.5 - 9	30	250		100			50	50	5
Note: All values are in mg/l except pH and Coliform (MPN/100ml)										

Remarks:

a) The plant installed a pre-aeration tank unit to remove dissolved gases such as hydrogen sulphide, carbon dioxide and methane.
b) STP has a gas holder tank to store the gases being produced in reactors. The plant installed a Gas Scrubber to remove gaseous contaminant such as hydrogen sulphide, particulate and water vapouretc, before it is used in as fuel in dual fuel gas engine to produce power.
c) Plant efficiency was observed about 69% in term of BOD reduction and 66 % in term of COD reduction.
d) Authorization for handling of hazardous waste by the Sewage Treatment Plant has not been obtained by the PSPCB and no record maintained for sludge generated by the sludge drying beds.

x) Location :SultanpurLodhi
Designed Capacity/day: 2.6 MLD
Actual treatment/day: --------
Date of Inspection: 16/04/2012
Status: Plant not in operation

3. West Bengal

i) Location: Baidyabati
Designed Capacity/day: 6 MLD
Actual treatment/day: 6 MLD

Unit size & Loading on main treatment units at full load condition :

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	1 with Aerator Device	
Facultative Pond	1 with Aerator Device	
Aerobic Pond	1 with Aerator Device	
Polishing Pond	5 ponds for Pisciculture	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		14	59	49.58		24 X 10^6	16 X10^{10}		
Outlet of Anaerobic pond		6	28	9					
Outlet of Facultative pond		4	39	13					
Final Outlet of STP		1	20	19.6	2.8	2 x 10^6	2 x 10^7	1.76	0.04
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

ii) Location :Barrackpore
Designed Capacity/day: 1 MLD
Actual treatment/day : ---------
Status: Not in function

iii) Location :Gayeshpur, Halishar&Kanchrapara
Designed Capacity/day: 12.50 MLD
Actual treatment/day: ---------
Status: Not in function

iv) Location: Jiaganj, Azimganj
Designed Capacity/day: 1.4 MLD
Actual treatment/day: ---------
Status: Not in function

v) Location :Konnogar
Designed Capacity/day: 22 MLD
Actual treatment/day: Not known
Sewage Treatment Technology: OP

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)

Raw Sewage		21	82	41		$16x10^5$	$16x10^6$		
Final Outlet of STP		12	43	25		$92x10^3$	$24x\ 10^4$	0.38	0.14
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

vi) Location: North Barrackpore
Designed Capacity/day: 4.35 MLD
Actual treatment/day: ---------
Status: Not in function

vii) Location: Berhampore
Designed Capacity/day: 3.7MLD
Actual treatment/day: Not known
Technique Used: Oxidation Pond

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	-	-	-	-	-	-	-	-	-
Final Outlet of STP		12	35	21	2.8	$23x10^3$	$79x10^5$	0.31	0.2
Standards for discharge in Stream	5.5 – 9	30	250	100					
Note: i) All values are in mg/l except pH and Coliform (MPN/100ml) ii) Raw sewage characteristics was nil as sample not collected since water was stagnant and the day the pump operated last could not be known									

viii) Location: Nabadwip, near Fashitola Ghat
Designed Capacity/day: 10 MLD
Actual treatment/day: 2.5 MLD

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	2	
Facultative Pond	2	
Maturation Pond	2 with discontinued boundary in between	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		88	232	201		$>16x10^5$	$>16x10^6$		

Outlet of Anaerobic pond		13	63	24					
Final Outlet of STP		8	43	91.6		$11x10^2$	$93x10^2$	0.04	0.32
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml									

ix) Location :Kalyani Block B2 & B3
Designed Capacity/day: 11 MLD
Actual treatment/day: ---------
Status: Not in function

x) Location :Kalyani, Town Area
Designed Capacity/day: 6 MLD
Actual treatment/day: ---------
Status: Not in function

xi) Location: Jagaddal, Bhatpara (New)
Designed Capacity/day: 10MLD
Actual treatment/day: 6MLD

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Chamber		
Primary Clarifiers	Choked pipeline, not in use, predominant algal growth	
Aeration tanks	8 Aerators – 10 HP each	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		126	392	267		$>16 X 10^9$	$>16 X 10^{10}$		
Final Outlet of STP		66	165	57	35.8	$>16 X 10^9$	$> 16 X 10^{10}$	0.23	3.71
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xii) Location: Jagaddal, Bhatpara (Old)
Designed Capacity/day: 8.5 MLD
Actual treatment/day: ---------
Status: Not in function

xiii) Location :Jaggadal - Bhatpara
Designed Capacity/day: 4.5 MLD
Actual treatment/day: ---------

Status: Not in function

xiv) Location: Madrail, Kinkara, Bhatpara
Designed Capacity/day: 10 MLD
Actual treatment/day: Not known

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Channel		
Anaerobic Ponds	(160x 50x 4.8) m^3	
Facultative Pond	2; (170 x 88 x 4.3) m^3 each	
Maturation Pond	(178 x 116 x 3.9) m^3	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Nitrate	TKN	Phosphate (PO4-)
Raw Sewage		9	63	20	2 X 10^2	45 X 10^2			
Outlet of First pond		7	59	45					
Outlet of Fourth Pond		8	74	46					
Final Outlet of STP		5	67	65	47 X 10^5	39 X 10^6	0.09	4.86	BDL
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xv) Location: Chandannagar, Khalisani
Designed Capacity/day: 18.1MLD
Actual treatment/day: ---------
Sewage Treatment Technology: TF
Status: Not in function

xvi) Location: Chandannagar, Khalisani
Designed Capacity/day: 18.1MLD
Actual treatment/day: Not functional
Sewage Treatment Technology: OP

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		82	260	328		$21x10^6$	$39x10^8$		
Final Outlet of STP		8	71	50	3.92	$45x10^5$	$78x10^6$	0.02	0.01
Standards for	5.5 - 9	30	250	100					

discharge in Stream									
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xvii) Location: Titagarh
Designed Capacity/day: 4.5 MLD
Actual treatment/day: Not functional
Sewage Treatment Technology: ASP

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size
Grit Chamber	
Primary Clarifiers	1; 9.45m Dia. and 8.54m SWD
Aeration tanks	3 aeration tanks in parallel of size (7.3m x 7.3m x 3.6m) each 2 surface aerators of 7.5 HP in each tank
Final Clarifiers	3 ; Two of 9.45m Dia. & 8.54m SWD & another of size 7.3m x 7.3m x 3.6m.

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		110	216	448		$>16x10^8$	$>16x10^{10}$		
Final Outlet of STP		58	130	39	30	$>16x10^8$	$>16x10^{10}$	0.1	3.33
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xviii) Location: Titagarh
Designed Capacity/day: 4.5 MLD
Actual treatment/day: Not functional
Sewage Treatment Technology: OP

Unit size & Loading on main treatment units at full load condition:

Details of Oxidation Pond	The oxidation pond consists of a single pond of size 90m x 55m x 1.5m and having a detention time of 2 days. Dissolved oxygen – nil

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		110	216	448		$>16x10^8$	$>16x10^{10}$		
Final Outlet of STP		67	146	41	33.6	$16x10^4$	$16x10^5$	0.07	3.24
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xix) Location :Bandipur
Designed Capacity/day: 14 MLD
Actual treatment/day: -------
Sewage treatment Technology: OP

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	2 in series having 3 outlets; Area: 0.7 Hectares; Depth: 2.5 m	1 day (approx.)
Facultative ponds	2 nos. in parallel; Area: 4.8 Hectares; Depth : 1.5 m	4 days (approx.)
Maturation ponds	2 nos. in parallel; Area: 4.8 Hectares; Depth : 1 m	4 days (approx.)

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		14	47	57		$92x10^5$	$20x10^7$		
Facultative pond outlet		8	43	27					
Final Outlet of STP		5	35	27	3.92	$92x10^5$	$22x10^7$	0.1	0.04
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xx) Location: Panihati (Natagarh)
Designed Capacity/day: 12 MLD
Actual treatment/day:
Sewage treatment Technology: OP

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Chamber		
Anaerobic Ponds	3	
Facultative ponds	3	
Maturation ponds	2	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		23	126	887		$2x10^6$	$45x10^6$		
Final Outlet of STP		8	78	34	55	$26x10^6$	$22x10^7$	0.06	0.01
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xxi) Location: Serampore
Designed Capacity/day: 18.9 MLD
Actual treatment/day: Not known

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size
Grit Chamber	2; 8.23m x 1.83m x 1m
Primary Settling Tank	2 (no.) 24.4 mϕ with 3.05 SWD
Secondary Settling Tank	2 in Number :30.48 m ϕ X 30m SWD 15.24 m ϕ X 2.5 SWD
Sludge digesters	2
Sludge drying beds	10; (31 x 8 x 0.4)m^3 with free board

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Nitrate	TKN	Phosphate (PO4-)
Raw Sewage		51	137	108	$68x10^6$	$>16x10^9$			
Outlet of primary clarifier		29	98	32					
Trickling filter outlet		23	86	48.8					
Final Outlet of STP		15	59	22	15.6	$68x10^6$	$16x10^{10}$	0.02	1.39
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xxii) Location : Kamarhati
Designed Capacity/day: 40 MLD
Actual treatment/day: Not known

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Chamber		
Primary Settling Tank	No of units – Two . 26.2m Dia and 3.5m SWD	
Trickling Filter	No of units – Two 34.6m Dia and 2m Filter Bed	
Secondary Settling Tank	No of units – Two 34m Dia and 3m SWD	
Primary Sludge digesters	2 ; 16.8m Dia , 6.45m SWD	20 - 25 days
Secondary Sludge digesters	2 ; 11m Dia, 7.5m SWD	10-15 days

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Nitrate	TKN	Phosphate (PO4-)

Raw Sewage		66	250	286	$92x10^8$	$>16x10^{10}$			
Outlet of primary clarifier		21	116	65					
Trickling filter outlet		10	69	19					
Final Outlet of STP		6	41	7.6	$28x10^4$	$13x10^6$	0.95	3.59	0.01
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xxiii) Location : Chakpara, Kona
Designed Capacity/day: 30 MLD
Actual treatment/day: Not known

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size
Anaerobic Ponds	3
Facultative ponds	3
Maturation ponds	2

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		56	312	422		$>16x10^5$	$>16x10^6$		
Final Outlet of STP		11	55	36	3.36	$17x10^2$	$45x10^2$	3.59	0.03
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xxiv) Location :Arupara, Howrah
Designed Capacity/day: 45 MLD
Actual treatment/day: Not known

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size
Grit Chamber	
Primary Settling Tank	2
Trickling Filter	2 nos. in parallel Media: Granite stone in top layer.
Secondary Settling Tank	2

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Nitrate	TKN	Phosphate (PO4-)
Raw Sewage		110	549	1432	$49x10^6$	$35x10^8$			
Outlet of primary clarifier		5	35	28					
Trickling filter outlet		12	27	15.6					
Final Outlet of STP		27	67	12.8	$45x10^5$	$92x10^6$		5.04	
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xxv) Location: Bansberia
Designed Capacity/day: 0.3 MLD
Actual treatment/day:

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size
Anaerobic Ponds	2
Facultative ponds	2

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		17	59	48.8					
Final Outlet of STP		16	51	12	12.32	$28x10^7$	$>16x10^{10}$	0.04	1.1
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xxvi) Location: Garden Reach
Designed Capacity/day: 47.5 MLD
Actual treatment/day: In trial Phase

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size
Primary Clarifiers	Two; Each of 29.3m Dia and 3.5m SWD
Aeration tanks	Two; Each of 50m x 25m x 4.05m SWD
Final Clarifiers	Two; Each of 37.8m Dia and 3.5m SWD
Sludge digesters	2

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		13	51	23.6		$16x10^9$	$>16x10^{10}$		
Outlet of primary clarifier		14	39	9.56					

Final Outlet of STP		8	7	31	12.32	$17x10^7$	$94x10^7$	13.44	2.22
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xxvii) Location: Mahestala, Nungi
Designed Capacity/day: 4 MLD
Actual treatment/day: Not known
Sewage Treatment Technology: WSP

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		13	51	90		$2x10^6$	$17x10^8$		
Anaerobic pond outlet		6	31	15					
Facultative pond outlet		2	31	12					
Final Outlet of STP		2	23	6	0.51	$2x10^4$	$4x10^5$	BDL	1.21
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xxviii) Location: Budge Budge
Designed Capacity/day: 4.25MLD
Actual treatment/day: Not known
Status: Not in function

xxix) Location: Bhadreshwar
Designed Capacity/day: 7.6 MLD
Actual treatment/day: Not known

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		103	335	329		$>16x10^8$	$>16x10^{10}$		
Anaerobic pond outlet		13	59	22.8					
Facultative pond outlet		11	39	20					
Final Outlet of STP		4	39	19	3.92	$45x10^5$	$45x10^6$	1.67	0.37
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xxx) Location: Champdani
Designed Capacity/day: 0.3 MLD

Actual treatment/day: Not known
Status: Not in function

xxxi) Location : Garulia
Designed Capacity/day: 7.9 MLD
Actual treatment/day: Not known
Status: Not in function

xxxii) Location : Cossipore-Chitpur
Designed Capacity/day: 45 MLD
Actual treatment/day: In trial

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/ Loading
Grit Chamber		
Primary Clarifiers	2	
Aeration tanks	Size 91m x 15m x 3.5m 14 aerators of 25HP each	5.06 hrs
Final Clarifiers	2 nos ; Each of 36m Dia and 3.5m SWD	
Sludge Thickeners	Two Sludge Thickeners of 15.3m Dia and 3.5m SWD with 3 nos. of Centrifuges (20 HP) provided	
Sludge digesters	2	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		7	148	73		$16x10^9$	$>16x10^{10}$		
Outlet of primary clarifier		7	101	38.8					
Final Outlet of STP		7	45	11	3.92	$92x10^4$	$79x10^5$	1.14	0.49
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

xxxiii) Location: Naihati
Designed Capacity/day: 11.56 MLD
Actual treatment/day:

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		55	125	160.5		$>16x10^8$	$>16x10^{10}$		

Outlet of primary clarifier									
Final Outlet of STP		8	39	21	11.7	$23x10^5$	$45x10^6$	2.5	
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

4. Bihar:

i) Location :STP,Beur, Patna, Bihar
Designed Capacity/day: 35 MLD
Actual treatment/day: 24 MLD

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Primary Clarifiers	1138.48 m^3	2hrs
Aeration tanks	4725 m^3 Aeration Capacity125 HP	3.5 hrs
Final Clarifiers	2505.98 m^3	2.5 Hrs
Sludge digesters	4422.22 m^3	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		72	169	70		$>16x10^{11}$	$>16x10^{11}$		
Outlet of primary clarifier		65	140	80					
Final Outlet of STP									
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

ii) Location : Chapra
Designed Capacity/day: 2 MLD
Actual treatment/day: ---------
Status: Not in function

iii) Location : Pahari ,Patna-7
Designed Capacity/day: 25 MLD
Actual treatment/day: 16-18 MLD

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		54	91	23		$>16x10^{11}$	$>16x10^{11}$		
Final Outlet of STP		25	55	39	15	$4x10^2$	$68x10^2$	0.36	0.90

Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

iv) Location: STP Saidpur ,Patna
Designed Capacity/day: 45 MLD
Actual treatment/day: 33 MLD
Sewage Treatment Technology: ASP

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Primary Clarifiers	3 ; PST- 40.5 MLD PST-(a) 1303.83 m^3 PST-(b) 1303.83 m^3 PST-(c) 2095.02 m^3	2-2.5 Hours
Aeration tanks	5000 m^3 Aeration Capacity : 4x40 HP For 40.5 MLD Plant Rated aeration capacity Kg/KW hr :3x12.5 HP For 40.5 MLD Plant	6 hrs.
Final Clarifiers	3 ; Volume : 2670.00 m^3,2670m^3& 2334m^3	2-2.5 hours
Sludge digesters	3025.8 m^3	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		130	315	288		>16x10^{11}	>16x10^{11}		
ASP Outlet		18	30						
Final Outlet of STP		5	8	8	3	17x10^2	49x10^2	8.53	0.31
Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

v) Location: Mattagajpur
Designed Capacity/day: 33 MLD
Actual treatment/day: 25 MLD
Sewage Treatment Technology: OP/WSP

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage		28	78	22		34 x 10^3	1.6 x 10^{10}		
Final Outlet of STP		17	67	32	10	70 x 10^3	4 x 10^3	-	-

Standards for discharge in Stream	5.5 - 9	30	250	100					
Note: All values are in mg/l except pH and Coliform (MPN/100ml)									

5. Haryana

(i) Location : Jodhpur Road, Palwal

Designed Capacity/day: 9 MLD

Actual treatment/day: 9 MLD

Sewage Treatment Technology: OP/WSP

Treatment Unit	Number/size	HRT/SOR/Loading
Inlet Chamber	1.25 m x 1.20 m x 2.02m	
Screen Chamber	6 m x 1.20 m x 1.10 m	
Grit chamber	5 m x 1.20 m x 10.14m	10 sec
Anaerobic Ponds	2; (45mx25mx4m) each	1day
Facultative Ponds	2 ; (240mx99mx1.5m)each	8 days
Maturation Ponds	3 ; (275mx85mx1.50m) each	12 days
Final effluent channel	1m x.60m,length 960m	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Ammonia-N	Phosphate (PO4-)
Raw Sewage	7.20	141	377	189	$2.2x10^7$	$3.3x10^4$	38.67	13.60
Final Outlet of STP	8.31	72	158	498	$2.4x10^4$	$3.3x10^7$	01.71	0.41
Standards for discharge in Stream	5.5 - 9	30	250	100				
All values are in mg/l except pH and Coliform (MPN/100ml)								

Remarks:

a) The plant has not installed proper flow measuring system at the outlet point. The automatic mechanical Bar Screen at the inlet chamber of STP is corroded, the floating material is not properly screened.
b) The plant has not obtained consent under The Water Prevention& Control of Pollution Act, 1974 from the HSPCB.
c) Excess sludge/slit accumulation observed in the ponds like Anaerobic, Facultative & Maturation ponds due to reduce depth of the ponds which the retention time reduced.
d) General housekeeping is not satisfactory.
e) During inspection it was observed that main pumping station receives the weak sewage.

(ii) Location : Sonepat (30 MLD)

Designed Capacity/day: 30 MLD

Actual treatment/day :45 MLD

Sewage Treatment Technology: UASB

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
UASB Reactors	3 ; capacity 10 MLD (each)	8 hrs.
Polishing Ponds	3 ; (220m x 1.10m x 1.22m)	24 hrs.
Sludge drying beds	22 ; (16mx16m each)	

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.22	134	342	352		$14x10^8$	$28x10^8$		
UASB Reactor outlet	-	66	297	155					
Final Outlet of STP	8.66	50	258	130		$14x10^5$	$33x10^5$		
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) During inspection UASB reactors were not having proper Sludge Blanket. Oil film is observed in theUASB reactor. There was no sludge in the sludge drying beds and grass was grown.
b) No Bio-gas is produced from UASB reactors due to excess flow feeding into in the reactors which reduce the Hydraulic Retention Time.
c) The plant is not operated properly; the treated domestic waste is discharged into Drain No. 6 which meets Drain no.08 and ultimately confluence the River Yamuna River.
d) During inspection it was found that the screen chamber for removal of solid waste was broken and pipelines in the feeding reactors were leaking at several places.
e) The plant should obtain consent under water act,1974 from the HSPCB.

(iii) Location : Village- Gudha Gohana , Sonipat
Designed Capacity/day: 3.5 MLD
Actual treatment/day: 3 MLD
Sewage Treatment Technology: OP

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Ammonia-N	Phosphate (PO4-)
Raw Sewage	7.16	129	382	258	$11x10^8$	$35x10^8$	-	1.68
Final Outlet of STP	-	-	-	-	-	-	-	-
Standards for discharge in Stream	5.5 - 9	30	250	100				
Note: All values are in mg/l except pH and Coliform (MPN/100ml)								

Remarks:

a) During inspection, Sludge/slit was accumulated in the ponds and grass was grown in the ponds. Stagnant water was observed in the ponds.
b) During inspection, it was observed that the untreated sewage from the plant Oxidation ponds was directly utilized for irrigation/farming by the local farmers.
c) During inspection no final out let was observed. The adjacent drain was dry and the effluent channel was found dismantled. Grab Sample from the main pumping station was collected to check the raw sewage characteristic of the influent sample of the raw sewage is collected from the its main pumping station.
d) The plant should obtain consent from the HSPCB.

(iv) Location : Jattal Road, STP Panipat
Designed Capacity/day: 10 MLD
Actual treatment/day : 17 MLD
Sewage Treatment Technology: UASB

Unit size & Loading on main treatment units at full load condition :

Treatment Unit	Number/size
UASB Reactors	02 x 5 MLD ; (18 m x 24 mx 5 m)
Polishing Pond	(128 m x 64 m x 1.5 m)
Sludge drying beds	12 ; (14 m x 14 m x1 m each)
Gas holder	(7 m(i/d) x 4 m)

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.40	112	359	165		$7x10^8$	$17x10^8$		1.59
UASB Reactor outlet	-	149	463	167					-
Final Outlet of STP	6.94	152	490	58		$14x10^5$	$26x10^5$		1.62
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) The plant is receiving sewage of exceptionally high strength indicating mixing of industrial effluents in sewerage system.
b) During inspection it was found that the screen chamber for removal of solid waste was broken and feeding pipelines in the reactor were leaking at several places.
c) The average flow of the plant is 17 MLD which is more than the designed flow.
d) Performance of parallel-distributed reactors is not identical, which indicate problems in individual unit operations.
e) Gas formation in UASB system was found below optimum level and thus the treatment economics of the plant is seriously jeopardized.

(v) Location : STP Panipat (35 MLD) UASB Siwah YAP Zone- II
Designed Capacity/day: 35 MLD

Actual treatment/day: 50 MLD
Sewage Treatment Technology: UASB

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
UASB Reactors	03 ; 02 x 12.5 MLD (20 m x 24 m x 5 m) 01 x 10 MLD (32 m x24 m x 5 m),	8 hr.
Polishing Pond	(241.9 m x 116 m x 1.5 m)	
Sludge drying beds	20 ; (15.4 m x 15.4 m x 1 m) each	
Gas holder	(10.3 m(i/d) x 5.9 m)	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.30	104	533	58		28×10^8	14×10^9		1.57
UASB Reactor outlet	-	71	342	40					-
Final Outlet of STP	7.88	44	234	182		17×10^5	39×10^5		1.62
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) During inspection the oil film were observed in the UASB Reactors, no sludge blanket.
b) The plant is receiving sewage of exceptionally high strength indicating mixing of industrial effluents in sewerage system.
c) During inspection, the pipelines in the reactor were leaking at several places.
d) Sludge was found in the polishing pond.One polishing plant has been closed for silt removal
e) Performance of parallel-distributed reactors is not identical, which indicates problems in individual unit operations.
f) Gas formation in UASB system was found below optimum level and thus the treatment economics of the plant is seriously jeopardized.

(vi) Location : Chhachhrauli ,Yamuna Nagar
Designed Capacity/day: 1 MLD
Actual treatment/day: 1 MLD
Sewage Treatment Technology: OP

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Ammonia-N	Phosphate (PO4-)
Raw Sewage	7.34	32	172	500	17×10^8	16×10^9		0.58
Final Outlet of STP	Stagnation of water in oxidation ponds was observed, there is no outlet of the STP							

Standards for discharge in Stream	5.5 - 9	30	250	100				
All values are in mg/l except pH and Coliform (MPN/100ml)								

Remarks:

a) It consists of Screen& Grit Chamber, series five stages oxidation ponds. The plant is receiving the domestic sewage at inlet of the STP but not discharging final outlet of the plant which indicates that, the plant is not properly operated.
b) The plant has not installed flow measuring device at inlet &outlet of the plant.log Book is not properly maintained. There is no skilled trained manpower at the plant.
c) During inspection stagnation of water& algal growth were observed in the Oxidation ponds. An accumulation of the sludge/slit was observed in the ponds.
d) There is no boundary wall the around and fence around the oxidation ponds.
e) Housekeeping of the plant is not satisfactory.

(vii) Location : Radaur,Yamunanagar
Designed Capacity/day: 1MLD
Actual treatment/day: ---------
Technology: OP
Status: Not in operation.

(viii) Location: 25 MLD STP Camp Area. YamunaNagar
Designed Capacity/day: 25 MLD
Actual treatment/day: 25 MLD
Sewage Treatment Technology: UASB

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
UASB Reactors	2; (40 x 24 x 5.5 m) each	8 hrs.
Polishing Pond	(323 x 63 x 1.2 m)	24 hrs.
Sludge drying beds	20 ; (16 m x 16 m each)	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	6.87	72	313	195		13×10^8	35×10^8		1.41
UASB Reactor outlet	-	70	266	124					-
Final Outlet of STP	6.99	35	130	60		92×10^4	17×10^5		1.03
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) During inspection both UASB reactor were under repair.
b) During inspection the pipelines in the reactor were leaking at several places. There is no flow measuring device at the outlet point.

c) After the reactor, the treated effluent is passed through polishing pond, during inspection it was found that treated effluent is in black color with oil layer, which shows the mixing of industrial effluent in the sewer.
d) Gas formation in UASB system was found below optimum level and thus the treatment economics of the plant is seriously jeopardized.

(ix) Location : Jagadhri (10 MLD),Yamuna Nagar
Designed Capacity/day: 10 MLD
Actual treatment/day: ---------
Sewage Treatment Technology: UASB

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Screen Grit chamber	(10 x 4m)	
UASB Reactors	2; (24 x16 x5.5) m^3 each	8 hrs.
Polishing Pond	(120 x79x1.2) m^3	24 hrs.
Sludge drying beds	12 ;(14 m x 14 m)each; handle about 176 m^3 Sludge per day with a 8 day filling/drying/emptying cycle	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	6.90	136	483	266		40×10^7	22×10^8		1.61
Final Outlet of STP	7.02	33	142	40		12×10^5	20×10^5		1.80
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) During inspection it was found that the screen chamber for removal of solid waste was corroded & not being operated.
b) During inspection the pipelines in the reactors were leaking at several places. There is no flow measuring device at the outlet point.
c) The algal growth was observed in the Polishing Ponds. Sludge was found in the polishing pond.
d) General housekeeping is not satisfactory.

(xi) Location: 1.5 MLD Sewage Treatment Plant, Indri district Karnal (Haryana)
Designed Capacity/day: 1.5 MLD
Actual treatment/day: 1.5 MLD
Sewage Treatment Technology: OP/WSP

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	1 ; (34m x11m)	
Facultative Ponds	1	
Maturation Ponds	4	

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Ammonia-N	Phosphate (PO4-)
Raw Sewage	7.02	135	351	166	$26x10^7$	$17x10^8$		1.34
Final Outlet of STP	7.27	58	320	134	$11x10^4$	$22x10^5$		3.09
Standards for discharge in Stream	5.5 - 9	30	250	100				
All values are in mg/l except pH and Coliform (MPN/100ml)								

Remarks:

a) The plant has not installed flow measuring device at inlet &outlet of the plant. No log Book is maintained. There is no skilled trained manpower at the plant.
b) During inspection, stagnation of water& algal growth was observed in the ponds. Excess sludge accumulation was observed in the ponds due to which the retention time is reduced.
c) The Facultative &Maturation ponds of STP are being used for fish farming on contract basis. It was informed that contract for fish is awarded for Rs 1.25 Lac this year. This is an additional income from the plant.
d) General housekeeping is not satisfactory.

(xii) Location: 3.0 MLD Sewage Treatment Plant, Gharaunda District Karnal
Designed Capacity/day: 3MLD
Actual treatment/day: ---------
Technology: OP/WSP
Status: Not in operation.

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Collection tank	1	
Screening Chamber	1	
Anaerobic tank	(31.25 m x 12.25 m)	
Facultative tank	(150 m x 50 m)	
Maturation tank	(110.50 m x 50.5 m)	

Remarks:

a) During inspection the plant was found non- operational since last 6 month. As informed by the plant representative, is not receiving the raw sewage from the main pumping station.
b) It is observed that the untreated sewerage from the main pumping station is being directly bypassed into the Ganda Nallah which ultimately joins the River Yamuna.
c) General housekeeping is not satisfactory.

(xiii) Location: 8.0 MLD Sewage Treatment Plant, Shiv Colony Karnal near Western Yamuna Canal
Designed Capacity/day: 8 MLD
Actual treatment/day : 8 MLD
Sewage Treatment Technology: OP/WSP
The plant consists of Main pumping station (6 pumps of 40 HP with 12 meter head each)

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size
Anaerobic Ponds	2 ; (48 x 33 x 4 meter) each
Facultative Ponds	2 ; (165 x 102 x 1.25 m) each

Maturation Ponds	2 ; (165 x 102 x 1.25) m^3& (165 x 90 x 1.25)m^3

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Ammonia-N	Phosphate (PO4-)
Raw Sewage	6.95	204	649	307	7 x10^8	28 x10^8		1.35
Final Outlet of STP	7.23	67	393	338	78 x10^4	17 x10^5		1.30
Standards for discharge in Stream	5.5 - 9	30	250	100				
All values are in mg/l except pH and Coliform (MPN/100ml)								

Remarks:

a) It is evident from results that the STP is showing non-compliance with respect to BOD, COD and TSS.
b) Excess sludge accumulation was observed in Facultative &Maturation ponds due to which the retention time reduced.
c) The Facultative &Maturation ponds of STP are being used for fish farming on contract basis. It was informed that contract for fish is awarded for Rs 2.25 Lac for this year. This is an additional income from the plant.
d) General housekeeping is not satisfactory.

(xiv) Location: 40 MLD STP Near Sector-4 Karnal
Designed Capacity/day: 40 MLD
Actual treatment/day: 40 MLD
Sewage Treatment Technology: UASB

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
UASB Reactors	4 ; capacity 10 MLD each ; volume (32 x 24 x 5.5) m^3 each,	8hrs.
Polishing Pond	Vol.(241 x 135 x 1.25) m^3	24 hrs.
Sludge drying beds	20 ; (18 m x 18 m)each; handle about 483 m^3Sludge per day with an 8 day filling/drying/emptying cycle.	

Results of Analysis of grab samples after different stages of treatment :

Sample Point	pH	BOD	COD	TSS	TDS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.02	98	363	196		39 x10^7	28 x10^8		1.06
	-	55	195	145					
Final Outlet of STP	7.31	40	147	113		49 x10^5	11 x10^6		0.99
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				

All values are in mg/l except pH and Coliform (MPN/100ml)

Remarks:

a) During inspection it was found that the screen chamber for removal of solid waste was corroded & not being operated.
b) During inspection, the pipelines in the reactors were leaking at several places. There is no flow measuring device at the outlet point.
c) The algal growth was observed in the Polishing Ponds. Sludge was found in the polishing pond.
d) General housekeeping is not satisfactory.
e) The plant should obtain consent under water Act, 1974 from the HSPCB.

6. Gujarat

(i) Location: Behrampura, Ahmedabad.
Designed Capacity/day: 106 MLD
Actual treatment/day: 106 MLD
Sewage Treatment Technology: UASB /AL

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Primary Settling Tank	04 nos. x 100.8 m^3	30 min.
Pre Aeration Tank	2 nos. x 110.16 $m^{3;}$ Aeration Capacity:15 HP X 02 nos. = 30 HP Length=151 m, Width=110.2 m, Height=1.5 m	2.5 hours
UASB Reactors	08 nos.; capacity : (32 m x 32 m x 5.1 m)each ; Average flow: 1200 m^3/day	9.4 hours
Aerated lagoon	2 units; No. of aerator = 08; Length=206.6 m, Width=110, Height=3.8 m; Motor = 10 HP, 1440 RPM	Detention time=1.4 day
Sludge drying beds	38 ; Size: length 26 m, Width 15.23 m	

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.16	191	421	206	25.6			0.65	2.5
UASB outlet		38	175	43					
Final Outlet of STP	8.10	35	127	72	34			0.59	0.3
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) The wastewater – sewage generation is about 80% of fresh water supplies i.e. 520 MLD and about 90% of sewage is collected i.e. 468 MLD and treated whereas remaining 10% i.e. 52 MLD sewage as detail provided by AMC. The AMC has capacity to treat about 1075 MLD of sewage, as reported.
b) This STP receives the hydraulic load on an average between 106 MLD to 120 MLD. This STP caters Western region of Ahmedabad city.

c) The STP has primary & Secondary treatment with Inlet, Screen, grit chamber, collection chamber cum primary settling tank, distribution box, Feed inlet box to UASB, UASB reactors, sludge pumps, sludge drying beds, filtrate sump etc.
d) Foam formation was observed in the pre-aerators. The foam was observed spreading due to wind around the area.

(ii) Location : Narol Sarkhej Highway, Ahmedabad
Designed Capacity/day: 126 MLD
Actual treatment/day: 120 MLD
Sewage Treatment Technology: UASB

Unit size & Loading on main treatment units at full load condition:

Primary Settling Tank	101.73 m^3 X 04 nos.	45 min.
Pre Aeration Tank	1313.83 m^3 15 HP X 02 nos. = 30 HP	4 hours
UASB Reactors	10 nos. ; 4838.4 m^3 each ;	09 hours
Secondary Settling Tank	6641.1 m^3 X 02 nos.	1 day

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Nitrate	Phosphate (PO4-)
Raw Sewage	7.31	115	259	148	17.5	0.41	1.39
Outlet of USAB		31	139	40			
Final Outlet of STP	7.26	27	103	34	25	0.35	1.79
Standards for discharge in Stream	5.5 - 9	30	250	100	2100		
All values are in mg/l except pH and Coliform (MPN/100ml)							

Remarks:

a) The wastewater – sewage generation is about 80% of fresh water supplies i.e. 520 MLD and about 90% of sewage is collected i.e. 468 MLD and treated whereas remaining 10% i.e. 52 MLD sewage as detail provided by AMC. The AMC has capacity to treat about 1075 MLD of sewage, as reported.
b) This STP receives the hydraulic load on an average between 106 MLD to 120 MLD. This STP caters Western region of Ahmedabad city.
c) Foam formation was observed in the pre-aerators. The foam was observed spreading due to wind around the area.

5. Maharashtra

(i) Location : Chehedi STP, Nasik Municipal Corporation Chehedi, Nasik road
Designed Capacity/day: 22 MLD
Actual treatment/day: 20 MLD

Sewage Treatment Technology: UASB/AL/OP
Date of Inspection: 24.11.2011

Unit size & Loading on main treatment units at full load condition:

AL-Pre Aeration Tank	2 Nos.; Vol. (8,250 and 2,750 m^3) Aeration Capacity -5 HP X 8 nos. = 40 HP	18 hr and 6 hr
UASB Reactors	02 nos.; Capacity of each reactor-11 MLD	7 hours
Sludge thickener	No sludge thickener is provided	
Sludge drying beds	14 Nos.; (22m X 8.24 m)	

Results of Analysis of samples after different stages of treatment:

Sample Point	Type of sampling	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Inlet to STP	Grab	6.96	32.3	128	73.6	19.2	140	1600	0.09	1.9
	Composite	7.06	33.7	135	69.8	21.6			0.37	2.2
Final Outlet of STP	Grab	7.28	7.7	18	12.0	12.9	26	90	0.19	1.99
	Composite	7.40	7.7	21	12.7	18.9			0.31	2.03
Standards for discharge in Stream		5.5 - 9	30	250	100	2100				
All values are in mg/l except pH and Coliform (MPN/100ml)										

Remarks :

a) NMC has obtained a common consent for total 6800 MLD of sewage generated from Nasik by MPCB. The consent to operate was not valid. It was valid up to 31.12.2003. As informed, NMC has already submitted renewal fees and requested MPCB for the renewal of consent. However, till the date of visit, no renewal was obtained.
b) V-notch is provided at the inlet and outlet of STP. However flow records are maintained based on the pumping time.
c) Sludge drying beds seems to be not in use as lot of vegetation growth was observed in the beds.
d) The housekeeping was poor in view of sludge handling system, leakages from chambers.

(ii) Location : Karad (Maharashtra)
Designed Capacity/day: 28 MLD
Actual treatment/day :
Sewage Treatment Technology: OP
Date of Inspection : 24.11.2011

Remarks:

a) The fresh water supply to the Karad Nagar Parishad (KNP) area is about 14 MLD and the wastewater – sewage generation is about 11 MLD.

b) Presently about 7 MLD sewage is collected for which 01 STP is in operation. Rest about 4 MLD untreated sewage is discharged into river Krishna and Koyana directly.
c) The Karad Nagar Parishad requested Maharashtra Jeevan Pradhikaran (MJP) to prepare a Detailed Project Report (DPR) for 28 MLD Sewage Treatment Plant for Karad Nagar Parishad area. The DPR is under preparation in MJP. The MJP is preparing the proposal up to the year 2045 keeping ever increasing population of Nagar Parishad in view. As per the information of MJP the DPR will be submitted to the Central Govt. within 15 days.
d) The 7 MLD oxidation pond based existing STP is in poor condition. The entire existing units viz Anaerobic lagoon (01 no), Facultative ponds (02 nos) and Maturation Pond (01 no) appears redundant (photo appended).

(iii) Location :Kolhapur (Maharashtra)
Designed Capacity/day: 76 MLD
Actual treatment/day:
Sewage Treatment Technology: Cyclic ASP
Status: Under Construction
Date of Inspection: 25.11.2011

Remarks:

a) The fresh water supply to the Kolhapur corporation area is about 120 MLD and the wastewater – sewage generation is about 100 MLD.
b) The Central Government (MoEF) sanctioned a project for construction, erection and commissioning of 76 MLD STP at Kolhapur through Kolhapur Municipal Corporation (KMC).
c) The KMC has placed an order to M/s Vishwa Infrastructure & Services (P.) Ltd for constructing, erecting and commissioning of the aforesaid STP.
d) M/s Vishwa Infrastructure & Services (P.) Ltd. sourcing the Cyclic Activated Sludge Technology (C-Tech system) component of the STP from M/s SFC Environmental Technologies Pvt. Ltd. Mumbai. The C-Tech system operates in a batch reactor mode using cyclic activated sludge technology which operates on extended aeration activated sludge principle for BOD reduction, Nitrification, De-nitrification with automatic control of oxygen uptake rate.

(iv) Location : Sangli (Maharashtra)
Designed Capacity/day: 27 MLD
Actual treatment/day :
Sewage Treatment Technology: WSP
Status: Construction almost complete
Date of Inspection : 24.11.2011

Remarks:

a) The Central Government (MoEF) sanctioned a project for construction, erection and commissioning of 27 MLD STP at Sangli through SMKMC.
b) The SMKMC handed over the work to Maharashtra JivanPradhikaran,(MJP) an autonomous body under Govt. of Maharashtra for constructing, erecting and commissioning of the aforesaid STP.

c) At present construction work for different units of STP has been completed. The STP will operate on Wastewater Stabilization Pond Method. Total 05 nos. of maturation ponds and 01 no. aeration pond are ready (All are earthen ponds)
d) The treated effluent will be used on land for irrigation and the surplus will find its way to river Krishna through open nallals
e) The constructed ponds being earthen and lying abandoned have grown vegetation

(v) Location : Tapovan STP, Nasik Municipal Corporation -Tapovan, Nasik
Designed Capacity/day: Old STP (78 MLD), New STP (52 MLD)
Actual treatment/day: 103 MLD (Mix)
Sewage Treatment Technology: WSP, UASB
Date of Inspection: 24.11.2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	STP	Number/size	HRT/SOR/Loading
Screen Grit chamber			
Aeration Tank	78 MLD	2 ; Vol. of each-29,600 m^3 Capacity 10 HP, 12 Aerators (6 in each Lagoon)	18 hrs.
	52 MLD	1 ; Pre Aeration Tank (PAT): 25.0 x 7.5 x 6.5m (1218 m^3) 2 ; Aeration Tank (AT) : 25.0 x 40.0 x 6.0 m (6000 m^3)	30 min (for PAT) 03 hrs. (for AT)
UASB Reactors	78 MLD	6 ; Vol. of each- 5000 m^3	8.3 hrs.
	52 MLD	4 ; Vol. of each- 5000 m^3	8.3 hrs.
Sludge Drying Bed	78 MLD	30 Nos.	
	52 MLD	22 Nos.	

Results of Analysis of samples after different stages of treatment

Sample Point	Type of sample	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate-N	Phosphate (PO4-)
Inlet to 78 MLD STP	Grab	6.93	62	211	157	20.8	34	300	1.01	2.1
	Composite	6.80	64	240	101	19.7			0.33	2.3
Inlet to 52 MLD STP	Grab	6.93	15.0	78.0	53.0	16.7	17	70	0.47	1.4
	Composite	6.99	25.0	91.0	49.3	21.3			0.19	1.2
Final Outlet of STP	Grab	6.99	31.0	54.0	16.0	14.8	14	40	0.09	1.7
	Composite	7.17	11.4	24.0	15.0	16.8			0.15	1.7
Standards for discharge in Stream		5.5 - 9	30	250	100	2100				
All values are in mg/l except pH and Coliform (MPN/100ml)										

Remarks:

a) At Tapovan, there are two STPs one 78 MLD started in 2003 and additional 52 MLD started in 2009.
b) Old (78 MLD) STP comprises of UASB→ Aerated Lagoon→ Oxidation Ponds whereas the New (52 MLD) STP comprises of Pre Aeration Tank→Aeration Tanks→Clarifiers. After this treatment, a common chlorine dosing system is provided.
c) During Visit, the diffusers in the Aeration Tanks of 52 MLD were not in operation, as informed it is due to some power problem.
d) Huge foaming was observed at the final outlet, at the discharge point and also little stretch of the Godavari River.

(vi) Location : Trimbak Sewage Treatment Plant, Nasik
Designed Capacity/day: 1 MLD
Actual treatment/day : 1.2 MLD
Sewage Treatment Technology: Flocculated Aerobic Bacteriological Reactor (FAB)

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
FAB Reactor	φ 3.20 m x 5.0 m (2 Nos.)	

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	6.9	132	312	165	18.6	60	300	0.17	4.10
Final Outlet of STP	7.05	102	245	157	12	170	900	0.15	3.60
Standards for discharge in Stream	5.5 - 9	30	250	100	2100				
All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) The consent to operate was not valid.
b) No flow measuring devices are provided at the inlet and outlet of STP.
c) Grab Sampling of the STP was carried out during visit.
d) The percent reduction in the concentration of parameters BOD: 22.7%, COD: 21.5%, TSS: 4.85% and TKN: 35.5% revels the unsatisfactory functioning of STP.
e) As observed, Bleaching powder was added at the outlet of tube settler but no record was available for the regular dosing of the same.
f) Filter Press was not in operation during visit.
g) The housekeeping was poor in view of sludge handling system, Bleach dosing system.

6. Madhya Pradesh

(i) Location : Kabit Khedi, Indore
Designed Capacity/day: 78 MLD
Actual treatment/day: 72 MLD
Sewage Treatment Technology: UASB
Date of Inspection: 04/11/2011

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO_4-P)
Raw Sewage		170	322	653	5.9×10^7	2×10^8		12
UASB Inlet		98	207	136				7.6
UASB Outlet		81	153	70				5.6

Final Outlet of STP		38	139	09	2.9×10^7	1.15×10^8		6.3
Standards for discharge in Stream	5.5 - 9	30	250	100				
All values are in mg/l except pH and Coliform (MPN/100ml)								

(ii) Location :KabitKhedi ,Indore
Designed Capacity/day: 12 MLD
Actual treatment/day: 10.5 MLD
Sewage Treatment Technology: UASB
Date of Inspection: 04/11/2011

Unit size & Loading on main treatment units at full load condition :

Treatment Unit	Number/size	HRT/SOR/Loading
Screen Chambers	Mechanical; 2 nos. ; 2500 x 1500 x 600 LD Manual ; 2 nos. ; 2500 x 1200 x 530 LD	
UASB Reactors	2 nos.; Capacity of each reactor- 6 MLD	10 hrs.
Polishing Ponds	1 nos.; 103300 x 38700 x 1500 LD	5 Days
Sludge drying beds	6 nos.; 29540 x 9240	

LD =Liquid Depth

Results of Analysis of grab samples after different stages of treatment :

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO_4)
Raw Sewage		198	347	297	8.8×10^7	2.39×10^8		10.5
UASB Inlet		169	288	258				11.4
UASB Outlet		98	215	174				9.9
Final Outlet of STP		39	98	30	6.7×10^7	1.8×10^8		8.9
Standards for discharge in Stream	5.5 - 9	30	250	100				
All values are in mg/l except pH and Coliform (MPN/100ml)								

7. Uttrakhand

(i) Location : Jagjeetpur, Haridwar
Designed Capacity/day: 27 MLD
Actual treatment/day:
Date of Sampling: 24/02/2012

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TDS	Total Solids	Odor	Color

Raw Sewage	-	-	--	---	-	---	--	-
Final Outlet of STP	7.82	12.9	42	18	312	330	Odorless	Absent
Standards for discharge in Stream	5.5 - 9	30	250	100				
All values are in mg/l except pH and Coliform (MPN/100ml)								

(ii) Location : Jagjeetpur, Haridwar
Designed Capacity/day: 18 MLD
Actual treatment/day:
Date of Sampling: 24/02/2012
Sewage Treatment Technology: ASP

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TDS	Total Solids	Odor	Color
Raw Sewage	-	-	-	-	-	-	-	-
Final Outlet of STP	8.12	14	68	46	396	442	Odorless	Absent
Standards for discharge in Stream	5.5 - 9	30	250	100				
All values are in mg/l except pH and Coliform (MPN/100ml)								

(iii) Location : Lakkarghat, Rishikesh
Designed Capacity/day: 6 MLD
Actual treatment/day :
Date of Sampling: 24/02/2012
Sewage Treatment Technology: OP

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TDS	Total Solids	Odor	Color
Raw Sewage	-	-	-	-	-	-	-	-
Final Outlet of STP	7.42	44	308	125	618	743	Sewage-like	Turbid
Standards for discharge in Stream	5.5 - 9	30	250	100				
All values are in mg/l except pH and Coliform (MPN/100ml)								

(iv) Location : Swarg Ashram, Rishikesh
Designed Capacity/day: 3 MLD
Actual treatment/day:
Date of Sampling: 24/02/2012
Sewage Treatment Technology: UASB+PP

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TDS	Total Solids	Odor	Color
Raw Sewage								
Final Outlet of STP	6.82	9.9	42	22	318	340	Odorless	Absent
Standards for discharge in Stream	5.5 - 9	30	250	100				

8. Goa

Location: Tonca, Panaji
Designed Capacity/day: 12.5 MLD
Actual treatment/day : 12 MLD
Sewage Treatment Technology: SBR
Date of Inspection: 10-12 Nov.2011

No. of SBR Basins = 2	
Process	Single Cycle of Operation
Filling, Aeration & Recirculation	90 min.
Settling & Removing of Sludge	45 min.
Decanting	45 min.
Total	180 min.

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Ammoniacal-N	Phosphate (PO4-)
Raw Sewage	7.1	140	340	204	-	9	150			
SBR Basin (After Decentation)	7.3	7	60	22	-	-	-			
Final Outlet of STP	7.4	4	40	9	2	NIL	4			0.7
Standards for discharge in Stream	5.5 - 9	30	250	2100	100			50	10	
All values are in mg/l except pH and Coliform (MPN/100ml)										

9. Madhya Pradesh

(i) Location : NAGDA(MP)
Designed Capacity/day: -------
Actual treatment/day: ------
Sewage Treatment Technology: Karnal Technology
Performance Status: Not in operation
Due to fund crisis and lack of coordination between Govt.dept.

(ii) Location : Sadawal, Ujjain
Designed Capacity/ day: 52 MLD
Actual treatment/ day:
Sewage Treatment Technology: WSP

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size
Anaerobic Ponds	2
Facultative Pond	2
Maturation Pond	4

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
WSP inlet	7.91	74	140	67		TNTC	TNTC	6.1	15.1
WSP outlet	7.48	48	75	69		TNTC	TNTC	4.0	10.3
Bypass drain Near KT Ayurvedic College.	7.36	50	79	81		TNTC	TNTC	5.2	9.4
Standards for discharge in Stream	5.5 - 9	30	250	100	2100			50	
All values are in mg/l except pH and Coliform (MPN/100ml)									

Note- TNTC (Too Numerous To Count).

(iii) Location : BURHANPUR (MP)
Designed Capacity/ day: 6 MLD
Actual treatment/ day: -------
Technology Used: WSP
Date of Inspection: 03.11.2011
Performance Status: Not in Operation

Performance could not be assessed because the sewage has not been taken for treatment system and some construction work still not completed, entire sewage is being discharged into River Tapti without any treatment.

(iv) Location : Bhopal(MP)
Designed Capacity/day: 8 MLD
Actual treatment/day: -------
Technology Used: WSP
Date of Inspection: 29.10.2011

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Stabilization pond	255m x 140m	5 days

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
WSP inlet	7.48	102	157	58				0.024	4.00
WSP outlet	7.90	64	82	25				0.022	2.26
Standards for discharge in Stream	5.5 - 9	30	250	100	2100			50	
All values are in mg/l except pH and Coliform (MPN/100ml)									

Note- TNTC (Too Numerous To Count).

Remarks:

a) Cleaning of the pond has not done since its commission. Lot of plastic/polythene material , thermocol etc. has been removed manually from stabilization pond and stored near the site for disposal alongwith MSW.
b) There was no logbook maintained for the flow and O&M details.
c) There was no laboratory facility available for analysis of treated sewage before discharge into Shahpura Lake.
d) The operator has not obtained the Consent under water Act from Madhya Pradesh pollution Control Board.

(v) Location: Indore(MP)
Designed Capacity/day: 78MLD
Actual treatment/day: 72 MLD
Technology Used: UASB
Date of Inspection: 04.11.2011

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Nitrate	Ammonia-N	Phosphate (PO4-)
Raw Sewage		170	322	653	$5.9x10^7$	$2.0x10^8$			12.28
UASBInlet		98	207	136	-	-			7.66
UASBOutlet		81	153	70	-	-			5.61
Final Outlet of STP		38	139	09	$2.9 x10^7$	$1.15 x 10^8$			6.37
%Removal		78	57	98	-	-			
Standards for discharge in Stream	5.5 - 9	30	250	100		-			
(All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) Coarse, fine screens and grit chamber are installed but not being used effectively forremovingfloatingmaterialsandgrit.Thecoarsematerialsremovedinscreenchamberare not collected properly and there was no arrangement for collecting and storing such material.
b) Sophisticated and automated systems are installed for smooth functioning of STP at various components like screen chamber, UASB sludge removal system, gasholder and automatic gas burning system chlorination, but none of them were found in operation.
c) Huge quantity of foam was observed in the aeration tank which was covering the entire aeration tank.

d) 900Kg capacity chlorine tonner is installed at outlet for disinfection of treated sewage. However, dosing was not being done at the time of inspection due to non-availability of chlorine .The operator has informed that PHE official are not provided chlorine gas for disinfection.

(vi) Location: Indore(MP)
Designed Capacity/day: 12MLD
Actual treatment/day: 10.5 MLD
Sewage treatment Technology: UASB
The treatment system consisting of coarse & fine screen, grit chamber, UASB reactors, intermediate aeration and polishing ponds.
Date of Inspection: 04.11.2011

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	Faecal Coliform	Total Coliform	Nitrate	Ammonia-N	Phosphate (PO4-)
Raw Sewage		198	347	297	$8.8x10^7$	$2.39x10^8$			10.53
UASBInlet		169	288	258	-	-			11.46
UASBOutlet		98	215	174	-	-			9.94
Final Outlet of STP		39	98	30	$6.7x10^7$	$1.82x10^8$			8.95
%Removal		80	72	90		-			-
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (MPN/100ml)									

Remarks:

a) Online flow meters were installed at inlet and outlet of the STP and not found in operation. The flow has been calculated based on the pump running hours and two pumps were in operation at the time of inspection and the average flow reported to be10.5MLD.
b) Chlorine gas dosing was not being done due to non-availability of chlorine i.e. PHED officials are not supplying the chlorine gas.
c) The treated water has not been recycled for plantation or construction activities and entire effluent is being discharged into the river without any disinfection.
d) Sludge handling was very poor and requires womore sludge drying Eds and shed for storing the dried sludge for use as manure.

(vii) Location: VIDISHA (MP)
Designed Capacity/day: 7.2MLD
Actual treatment/day: 10.5 MLD
Technology Used: UASB
Date of Inspection: 28.10.2011

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.65	138	200	225				0.017	4.46

KT plantation area	7.62	103	195	165				0.110	4.69
Bypass	7.78	157	263	213	21.1			0.020	4.39
Standards for discharge on Land	5.5 to 9.0	100		200					
All values are in mg/l except pH and Coliform (MPN/100ml):									

Remarks:

a) At the time of visit, the treatment system(KT method) was found operation and sewage was applying on land. The channel carrying sewage to KT plantation was found blocked with silt deposition.
b) Eucalyptus plantation has been donein6.66hectaresareawith 25blocksof50m x 50m size having544trees in each block and the total number of plants are13600.It was informed that the sewage application is not done in rainy season i.e. June to September. At the time of visit untreated sewage was bypassing into Betwa River.
c) The operator has not obtained consent from M.P. Pollution Control Board.
d) Logbooks were made available at site for inspection i.e .DG set, pumps logbook, silt removal etc. No laboratory facility available.
e) Nagar Palika Parishad Vidisha should operate the system efficiently to stop by- passing the untreated sewage into River Betwa.

(viii) Location : Chhapara(MP)
Designed Capacity/day: 1.2MLD
Actual treatment/day: -------
Technology Used: Karnal Technology
Date of Inspection: 01.11.2011
Performance Status: Not in operation

Remarks:

a) At the time of visit, the STP (Karnal Technology) was found non-operative.
b) There is no any consent issued from Madhya Pradesh pollution Control Board.
c) Sump well cum pump house no .I &II were also found non-operative and sewage carrying lines were found damaged at many places.
d) Only 150 Eucalyptus plants are seen on 2.0 hectare land allocated to KT.

(ix) Location : KEOLARI (MP)
Designed Capacity/day: 0.75MLD
Actual treatment/day: -------
Technology Used: Karnal Technology
Date of Inspection: 01.11.2011

Performance Status: Performance could not be assessed because the treatment system (Karnal Technology) was not in operation and entire sewage is being discharged into River Wain ganga without any treatment.

10. Andhra Pradesh

(i) Location :Reddy colony, Mancherial Town
Designed Capacity/day: 4 MLD
Actual treatment/day: 3.9 MLD

Sewage Treatment Technology: Anaerobic lagoons ,WSP
Date of Inspection: 08.11.2011

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TKN	TSS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (Dissolved)
Final Outlet of STP	8.1	74	153	10.6	143	22	66	0.2	3
Standards for discharge in Stream	5.5 - 9	30	250		100				
All values are in mg/l except pH and Coliform (CFU/1ml)									

(ii) Location : Saikunta, Mancherial Town
Designed Capacity/day: 2.5 MLD
Actual treatment/day: 2.4 MLD
Sewage Treatment Technology: Anaerobic lagoons, WSP
Date of Inspection: 08.11.2011

Results of Analysis of grab samples after different stages of treatment (All values are in mg/l except pH and Coliform (CFU/1ml):

Sample Point	pH	BOD	COD	TKN	TSS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (Dissolved)
Final Outlet of STP	6.7	14	71	16.8	41	56	122	0.1	3
Standards for discharge in Stream	5.5 - 9	30	250		100				

(iii) Location : Ramagundam, Old Bazar
Designed Capacity/day: 4 MLD
Actual treatment/day: -------
Sewage Treatment Technology: Anaerobic Pond followed by 4 WSPs
Date of Inspection: 09.11.2011

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TKN	TSS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (Dissolved)
Final Outlet of STP	7.7	3	20	2.8	47	Nil	56	0.2	0
Standards for discharge in Stream	5.5 - 9	30	250		100				
All values are in mg/l except pH and Coliform (CFU/1ml)									

(iv) Location : Malkapur , Ramagundan
Designed Capacity/day: 14 MLD
Actual treatment/day: 20 MLD
Sewage Treatment Technology: 2 Anaerobic Lagoon followed by 4 WSPs
Date of Inspection: 09.11.2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	Remarks
Primary Settling Tank	10 kl capacity	Not in Operation

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TKN	TSS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (Dissolved)
Final Outlet of STP	7.5	21	74	11	113	Nil	84	0.7	1
Standards for discharge in Stream	5.5 - 9	30	250		100				
All values are in mg/l except pH and Coliform (CFU/1ml)									

(v) Location : Bhadrachalam
Designed Capacity/day: 2 MLD
Actual treatment/day :1.8 MLD
Sewage Treatment Technology :Anaerobic lagoons ,WSP
Date of Inspection: 14.11.2011

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TKN	TSS	Faecal Coliform	Total Coliform	Phosphate (Dissolved)
Inlet of STP	7.6	260	356	30	149	48	198	2
Final outlet of STP	STP- NOT IN OPERATION as the local body has not taken over for its regular maintenance							
Standards for discharge in Stream	5.5 - 9	30	250		100			
(All values are in mg/l except pH and Coliform (CFU/1ml)								

Remarks:

a) No maintenance since the plant is constructed.
b) Log book not maintained.
c) Consent from State PCB has not been obtained.

(vi) Location : Rajmundry
Designed Capacity/day: 30 MLD
Actual treatment/day :34 MLD
Sewage Treatment Technology :UASB,WSP

Date of Inspection: 15.11.2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size
UASB Reactors	4 ;capacity 7.5 MLD Average flow-400m^3/hr. in each

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TKN	TSS	Faecal Coliform	Total Coliform	Phosphate (Dissolved)
NRCP Pumping	7.8	96	208	-	157	Nil	84	-
Outlet of Pumping	8.1	35	88	-	121	-		-
Outlet of UASB	8.2	11	20	-	20	-		-
Final Outlet of Polishing Pond	9.1	36	105	9	81	Nil	Nil	0.1
Standards for discharge in Stream	5.5 - 9	30	250		100			
All values are in mg/l except pH and Coliform (CFU/1ml)								

(vii) Location : Nagole , Hyderabad
Designed Capacity/day: 172 MLD
Actual treatment/day :160 MLD
Sewage Treatment Technology : UASB followed by facultative Aerated lagoons
Date of Inspection: 04.11.2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT
UASB Reactors	16 ;capacity 3.5 MLD Average flow-0.66 m^3/hr./m^2	8.88
Aeration tank	20 No.; Vol. (349 x 136 x 3.8)m^3; Capacity-40 HP;	1 day
Sludge drying beds	60 nos. ; (28.2 x 16.6)m^2each	

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TKN	TSS	Faecal Coliform	Total Coliform	Nitrate	Phosphate (Dissolved)
Inlet of STP	7.7	212	258	-	212	24	144	-	-
After Primary treatment	7.6	40	102	-	40	-	-	-	-
Outlet of UASB	7.9	7	43	-	70	-	-	-	-
Final Outlet of STP	7.9	-	12	4	33	Nil	20	15	3

Standards for discharge in Stream	5.5 - 9	30	250		100				

(viii) Location : Amberpet Hyderabad
Designed Capacity/day: 339 MLD
Actual treatment/day: 300 MLD
Sewage Treatment Technology: UASB followed by facultative Aerated lagoons
Date of Inspection: 04.11.2011

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT
UASB Reactors	24 ;size (32 x 28 x 5.8)m^3 ; Capacity-5.19 ML	8.88 Hrs.
Aeration tank	2 No.; Pond I-13500 m^2 x 1.7m ; Pond II- 90400 m^2 x 1.5m Capacity-50 HP;	1 day
Polishing ponds	450 X 300 X 3.8=51300m^3	12 hrs.

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TKN	TSS	Faecal Coliform	Total Coliform	Phosphate (Dissolved)
Inlet of STP	7.5	51	313	-	28	36	150	-
After Primary treatment	7.9	27	102	-	40	-	-	--
Outlet of UASB	7.6	22	70	-	29	-	-	--
Final Outlet of STP	8.1	-	4	41	10	Nil	64	4
Standards for discharge in Stream	5.5 - 9	30	250		100			
All values are in mg/l except pH and Coliform (CFU/1ml)								

(ix) Location: Nallacheruvu
Designed Capacity/day: 30 MLD
Actual treatment/day:25 MLD
Sewage Treatment Technology:UASB followed by facultative Aerated lagoons
Date of Inspection: 04.11.2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT
UASB Reactors	4 ;size (24 x 24 x 4.9)m^3 ; Capacity-2.82 ML	9 hrs.
Aeration tank	Vol.-30000 m^3; Total No. of Aerators= 12; Capacity-20 HP each;	1 day
Sludge Drying Beds	12 ; (23.3 x 13.7)m^2 each	

Results of Analysis of grab samples after different stages of treatment :

Sample Point	pH	BOD	COD	TKN	TSS	Faecal Coliform	Total Coliform	Phosphate (Dissolved)
Inlet of STP	7.5	154	610	-	94	50	76	-
After Primary treatment	7.7	70	266	-	73	-	-	-
Outlet of UASB	7.8	37	90	-	44	-	-	-
Final Outlet of STP	8.3	5	16	37	17	Nil	50	0.3
Standards for discharge in Stream	5.5 - 9	30	250		100			
All values are in mg/l except pH and Coliform (CFU/1ml)								

Remarks:

a) In facultative Ponds there are 12 aerators are available, only 4 aerators were found in operation during inspection.
b) During inspection some pink colored effluent found in the facultative pond which indicates that mixing of industrial effluent in the drain. However, the operator informed that no industrial effluent is accepted in the STP.
c) House-keeping in the STP requires improvement.

11. Tamil Nadu

(i) Location : Nesapakkam, Chennai
Designed Capacity/day: 40 MLD
Actual treatment/day: 43 MLD
Sewage Treatment Technology: ASP
Date of Inspection: 10.11.2011

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Chamber		
Primary Clarifiers	4994 m^3;	3hrs
Aeration tanks	9173 m^3; Aeration Capacity-300 KW	5hrs
Final Clarifiers	6900 m^3	4hrs
Sludge Thickeners	2690 m^3	
Sludge digesters	7700m^3	

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.2	138	651	3700	-	64	174	-	-
Outlet of primary clarifier		100	408	1450	-				
Final Outlet of STP	7.5	5	63	5	14	Nil	[28]	-	1.9
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml)									

(ii) *Location : Koyambedu*
Designed Capacity/day : 60 MLD
Actual treatment/day :60 MLD
Sewage Treatment Technology: ASP
Date of Inspection: 10.11.2011

Unit size & Loading on main treatment units at full load condition :

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Chamber		
Primary Clarifiers	2 Nos.; Vol. 3905 m^3each;	2.30hrs
Aeration tanks	13860 m^3 ; Aeration Capacity-380 KW	5hrs
Final Clarifiers	2 Nos.; Vol. 4663 m^3 each;	2.30hrs
Sludge Thickeners	2000m^3	
Sludge digesters	2 Nos.; Vol. 3974 m^3 each;	

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.3	129	776	265	-	106	192	-	-
Outlet of primary clarifier		200	2195	1966	-				
Final Outlet of STP	7.9	9	67	17	27	Nil	Nil	-	0.9
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml)									

(iii) Location : Kodungaiyur, Chennai
Designed Capacity/day : 110 MLD
Actual treatment/day : 90 MLD
Sewage Treatment Technology: ASP

Date of Inspection: 09.11.2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Primary Clarifiers	Vol. 6860.11 m^3 ;	2.82hrs
Aeration tanks	25255 m^3 ; Aeration Capacity-37 KW	5.5hrs
Final Clarifiers	Vol. 8092.96 m^3 ;	3.30hrs
Sludge Thickeners	3886.28m^3	
Sludge digesters	Vol. 6074.48m^3	

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.2	138	408	216		58	172		
Outlet of primary clarifier		65	192	60					
Final Outlet of STP	7.5	6	47	10	26	Nil	72	-	0.8
Standards for discharge in Stream	5.5 - 9	30	250	100					

(iv) Location : Perungudi, Chennai
Designed Capacity/day :54 MLD
Actual treatment/day :65 MLD
Sewage Treatment Technology: ASP
Date of Inspection: 09.11.2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Chamber		
Primary Clarifiers	Vol. 3456.35 m^3 ;	2.5hrs
Aeration tanks	13819m^3 ; Aeration Capacity-16nos.;each 50HP	5.5hrs
Final Clarifiers	Vol. 4066.6 m^3 ;	3.37hrs
Sludge Thickeners	Vol. 108.5m^3	
Sludge digesters	Vol. 8835.68m^3	

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.4	135	255	232		28	104		
Outlet of primary clarifier		91	235	66					
Final Outlet of STP	7.5	25	39	16	19	Nil	36	-	0.4
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml)									

(v) Location :Avaniapuram
Designed Capacity/day: 125 MLD
Actual treatment/day : 17 MLD
Sewage Treatment Technology: SBR (Cyclic ASP)
Date of Inspection: 10.11.2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size
Aeration tank	6 nos. ;11994 m^3 ;
Process	Single Cycle of Operation
Filling ,Aeration & Recirculation	108 min.
Settling & Removing of Sludge	50 min.
Decanting	58 min.
Total	216min.

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.6	180	384	270		24	196		
Aeration tank Outlet (After settling &Decentation)		8	28	8					
Final Outlet of STP	8.4	3	28	4	2	Nil	Nil		2.6
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml)									

(vi) Location : Sakkimanglam
Designed Capacity/day: 45.70 MLD
Actual treatment/day : 10 MLD
Sewage Treatment Technology: SBR (Cyclic ASP)
Date of Inspection: 10.11.2011

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size
Aeration tank	4 nos. ;6875 m^3 ; Aeration Capacity-660 HP (220 each)
Process	Single Cycle of Operation
Filling ,Aeration & Recirculation	108 min.
Settling & Removing of Sludge	50 min.
Decanting	58 min.
Total	216min.

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.7	230	536	3940		24	196		
Aeration tank Outlet (After settling &Decentation)		4	32	28					
Final Outlet of STP	8.1	4	64	6	3	Nil	Nil		3.6
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml)									

(vii) Location :Tirunelveli
Designed Capacity/day: 24 MLD
Actual treatment/day :10 MLD
Sewage Treatment Technology: WSP
Date of Inspection: 11.11.2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size
Grit Chamber	
Anaerobic Ponds	2 ; Vol.12169 m^3 each
Facultative ponds	2 ; Vol.51620 m^3 each
Maturation ponds	2

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.6	53	176+	46		32	184		
Outlet of Anaerobic Pond-I		23	84	25					
Outlet of Anaerobic Pond-II		22	124	41					
Outlet of Facultative pond-I		14	100	40					
Outlet of Facultative pond-II		13	176	103					
Final Outlet of STP	8.2	10	72	34	29	Nil	198		3.6
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml)									

(viii) Location : Vairapalayam, Erode
Designed Capacity/day: 5.17 MLD
Actual treatment/day : ---------
Sewage Treatment Technology: UASB
Status: Not in Operation

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size
UASB Reactors	2 ; Capacity-2.585 MLD each

(ix) Location : Lakkapuram, Erode
Designed Capacity/day: 20 MLD
Actual treatment/day : ---------
Sewage Treatment Technology: WSP
Status : Not in Operation

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Chamber		
Anaerobic Ponds	Vol.18000 m^3	1day
Facultative ponds	Vol. 75000m^3	4days

(x) Location :Kumarapalayam,Namakkai
Designed Capacity/day: 6 MLD
Actual treatment/day : ---------
Sewage Treatment Technology: WSP

Status: Not in Operation

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Chamber		
Anaerobic Ponds	Vol.5376 m^3	1 day
Facultative ponds	Vol. 24018m^3	4 days

(xi) Location :Bhavani
Designed Capacity/day: 3.94 MLD
Actual treatment/day : ---------
Sewage Treatment Technology: WSP
Status: Not in Operation

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Grit Chamber		
Anaerobic Ponds	Vol.2450 m^3	1 day
Facultative ponds	Vol.14874m^3	4 days

(xii) Location :Karur
Designed Capacity/day : 15 MLD
Actual treatment/day :4 MLD
Sewage Treatment Technology: Extented Aeration

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Aeration tanks	19350m^3 ; Surface Aerators-8 nos.; Aeration Capacity-40HP	31hrs
Final Clarifiers	Vol. 1331m^3 ;	2hrs

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.9	37	152	75		Nil	192		
Aeration tank Outlet	7.7	20	160	62					
Final Outlet of STP	7.8	33	116	53	41	Nil	52	-	
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml)									

(xiii) Location :Mayiladuthurai
Designed Capacity/day: 8 MLD
Actual treatment/day : 6 MLD
Sewage Treatment Technology: WSP

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Facultative pond	Vol. (199 x 136 x 1.5)m^3	13 days
Polishing pond-I	Vol. (203 x 31 x 1.5)m^3	2 days
Polishing pond-II	Vol. (80 x31.8 x 1.5)m^3 ; Vol. (115 x 33 x 1.5)m^3	2 days

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate	Phosphate (PO4-)
Raw Sewage	7.2	40	167	108	-	-	-	-	-
Outlet of Facultative pond	8.2	16	118	67					
Outlet of Polishing pond-I	8.5	53	357	80					
Final Outlet of STP	8.3	14	149	58	20	Nil	116	0.07	1.2
Standards for discharge in Stream	5.5 - 9	30	250	100					

Remarks:

a) The STP consist of Bar screen, Water weir, distribution chambers, facultative pond& two Polishing ponds.
b) The treated water is discharged into Arupathy canal for irrigation.
c) Establishment of Laboratory is under progress.
d) Failed to appraise the sludge removal and mode of disposal, since all ponds were heavily contaminated with helminth eggs.

(xiv) Location : Kumbakonam
Designed Capacity/day: 17 MLD
Actual treatment/day : 8 MLD
Sewage Treatment Technology :Conventional ASP
Status: Partly constructed -Partly commissioned

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Primary Clarifiers	1455 m^3	4.5 hrs.
Aeration tanks	2nos. ; 2392 m^3 each; Aeration Capacity-100 HP each	7 hrs.
Final Clarifiers	2157 m^3	6.6 hrs.
Sludge digesters	3326 m^3	30 days

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Phosphate (PO4-)
Raw Sewage	6.8	433	862	199		24	152		
Outlet of Primary Clarifier	7.3	53	114	60					
Outlet of Aeration tank	7.6	18	82	29					
Final Outlet of STP	7.4	2	82	30	24	Nil	52	0.1	2.3
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml)									

(xv) Location :Panjapur,Trichy
Designed Capacity/day: 59 +29 MLD
Actual treatment/day: 45 MLD
Sewage Treatment Technology: WSP
Date of Inspection: 04.11.2011

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate-N	Phosphate (PO4-)
Inlet to STP (59 MLD)	7.2	100	286	191		Nil	76		
Anaerobic Pond Combined Outlet	7.4	20	110	70					
Combined final Outlet	7.7	18	91	41	8	10	86	2.3	16
Final Outlet of STP(29 MLD)	7.5	26	75	35	12	Nil	82	0.06	1.8
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml)									

(xvi) Location : Tanjure
Designed Capacity/day: 28 MLD
Actual treatment/day : 9 MLD
Sewage Treatment Technology: ASP
Date of Inspection: 09.11.2011

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate-Nitrogen	Phosphate (PO4-)
Raw Sewage	7	100	176	198	-		72		
Outlet of Aeration tank		35	294	280					
Final Outlet of STP	7.4	17	40	76	43	Nil	90	0	4
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml)									

12. Karnataka

(i) Location :Harihara
Designed Capacity/day: 9 MLD
Actual treatment/day : 6 MLD
Sewage Treatment Technology: OP/WSP
Date of Inspection: 07.11.2011

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate-N	Phosphate (PO4-)
Raw Sewage	7.7	36	98	14		10	116		
Maturation Pond Outlet	9.8	29	18	69					
Final Outlet of STP	8.6	23	75	44	8	Nil	116	0.06	0.9
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml)									

(ii) Location : Davangere
Designed Capacity/day: 19 MLD
Actual treatment/day : 15 MLD
Sewage Treatment Technology: OP/WSP
Date of Inspection: 07.11.2011

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate-N	Phosphate (PO4-)

Raw Sewage	7.5	429	737	201		16	127		
Final Outlet of STP	8.1	12	78	9	39	Nil	96	0.09	6.6
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml)									

Remarks:

a) The STP is located adjacent to a thickly populated area.On the day of inspection few people complained about odour nuisance from the STP during peak hours.It was observed that the inlet channels were kept open which might be leading to this problem.
b) No lining is provided to any of the pond & as STP is situated near a LIG colony, seepage may contaminate the ground water.
c) Foaming observed at the disposal point of STP.

(iii) Location : Bhadravathi
Designed Capacity/day: 6 MLD
Actual treatment/day: ---------
Sewage Treatment Technology: OP/WSP
Status : Not in Operation

(iv) Location : Shimoga
Designed Capacity/day: ---------
Actual treatment/day : ---------
Sewage Treatment Technology: WSP
Date of Inspection: 07.11.2011
Status : Under Construction

(v) Location : Kollegal, Mysore
Designed Capacity/day: 3 MLD
Actual treatment/day : 1 MLD
Sewage Treatment Technology: WSP
Date of Inspection: 07.11.2011

Unit size & Loading on main treatment units at full load condition:

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	1; Vol. 3360 m^3	1 day
Facultative Ponds	2; Vol. 15206 m^3	4 days
Maturation Ponds	1; Vol. 3300 m^3	1 days

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate-N	Phosphate (PO4-)
Raw Sewage	7.5	5	39	42		32	84		

Polishing Pond outlet	10.1	30	180	102					
Final Outlet of STP	10	27	176	63	6	Nil	10		1
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml):									

(vi) Location : Srirangapatna,Mysore
Designed Capacity/day: 1.4 MLD
Actual treatment/day : 1 MLD
Sewage Treatment Technology: WSP
Date of Inspection: 08.11.2011

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	1; Vol. 1343 m^3	1 day
Facultative Ponds	2; Vol. 4950 m^3	3.5 days
Maturation Ponds	2; Vol. 1890 m^3	1.5 days

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate-N	Phosphate (PO4-)
Raw Sewage		37	94	52		Nil	110		
Final Outlet of STP	8	21	86	36	38	-	-	0.03	2.8
Standards for discharge in Stream	5.5 - 9	30	250	100					
(All values are in mg/l except pH and Coliform (CFU/1ml):									

Remarks:

a) During inspection no flow was found, small quantity of effluent was lying in the anaerobic Ponds, facultative Ponds& maturation Ponds found totally empty.
b) Housekeeping was unsatisfactory.

(vii) Location : Kantenahalli ,K .R Nagar
Designed Capacity/day: 1.45 MLD
Actual treatment/day : 1.45 MLD
Sewage Treatment Technology: WSP
Date of Inspection: 08.11.2011

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	1; Vol. 1485 m^3	1 day
Facultative Ponds	2; Vol. 3937 m^3	2.5 days
Maturation Ponds	2; Vol. 2400 m^3	1.5 days

Results of Analysis of grab samples after different stages of treatment

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate-N	Phosphate (PO4-)
Raw Sewage	7.4	32	71	37		Nil	130		
Outlet of anaerobic Pond	7.4	60	169	261					
Outlet of facultative Pond	7.9	32	51	37					
Final Outlet of STP	8.5	31	106	38	13	10	70	0.1	1.9
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml):									

Remarks:

a) No impervious linings are provided to ponds.All ponds were found as kachha lagoons.
b) No disinfection system is available, final treated effluent is discharged without disinfection to the irrigation channels.
c) Housekeeping was satisfactory.

(viii) Location : Maduvanahalli, K.R Nagar
Designed Capacity/day: 1.45 MLD
Actual treatment/day: 1.45 MLD
Sewage Treatment Technology: WSP
Date of Inspection: 08.11.2011

Unit size & Loading on main treatment units at full load condition

Treatment Unit	Number/size	HRT/SOR/Loading
Anaerobic Ponds	1; Vol. 1640 m^3	1 day
Facultative Ponds	2; Vol. 4590 m^3	3 days

Results of Analysis of grab samples after different stages of treatment:

Sample Point	pH	BOD	COD	TSS	TKN	Faecal Coliform	Total Coliform	Nitrate-N	Phosphate (PO4-)
Raw Sewage	7.8	84	122	106		Nil	104		
Outlet of anaerobic Pond	7.5	31	129	81					
Final Outlet of STP	8.4	10	63	22	21	Nil	124	0.03	2.6
Standards for discharge in Stream	5.5 - 9	30	250	100					
All values are in mg/l except pH and Coliform (CFU/1ml):									

Remarks:

a) No impervious linings are provided to ponds. All ponds were found as kachha lagoons.
b) No disinfection system is available, final treated effluent is discharged without disinfection to the irrigation channels.
c) Housekeeping was unsatisfactory.