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**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
ORIGINAL APPLICATION NO. 220 OF 2019**

IN THE MATTER OF:

ADIL ANSARI

...APPLICANT

VERSUS

M/s CL GUPTA EXPORTS PVT LTD & Ors

...RESPONDENTS

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RESPONDENT NO.1

THROUGH



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NEW DELHI
DATE: 18.08.2021

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BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

ORIGINAL APPLICATION NO. 220 OF 2019

ADIL ANSARI
S/O MOHD. NAUSHAD ANSARI,
MOB: 9614861414
ADD: 2 NEW SILAMPUR, GARHI MEDHU,
NEW DELHI – 110053

....APPLICANT

VERSUS

1. M/S CL GUPTA EXPORTS LTD.
18 KM. STONE, DELHI ROAD,
VILLAGE – JIVAI,
JYOTIBAPHULE NAGAR (AMROHA),
UTTAR PRADESH – 244 221
2. UTTAR PRADESH POLLUTION CONTROL BOARD
THROUGH ITS CHAIRMAN/SECRETARY
BUILDING NO. TC-12V, VIBHUTI KHAND,
GOMTI NAGAR, LUCKNOW
UTTAR PRADESH – 226 010
3. CENTRAL POLLUTION CONTROL BOARD,
THROUGH ITS CHAIRMAN/SECRETARY
“PARIVESH BHAVAN” EAST ARJUN NAGAR,
NEAR – KARKARDUMA COURT,
SHAHDARA, DELHI
4. CENTRAL GROUND WATER AUTHORITY (CGWA)
WEST BLOCK -2, WING -3,
RK PURAM, SECTOR – 1,
NEW DELHI – 110 066

..... RESPONDENTS

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**REPLY ON BEHALF OF THE RESPONDENT NO. 1/ M/S CL GUPTA
EXPORTS PVT LTD, TO THE COMPLIANCE REPORT ON BEHALF
OF CPCB IN COMPLIANCE TO HON'BLE NGT ORDER DATED 04TH
FEBRUARY, 2021 IN THE MATTER OF ADIL ANSARI VS M/S C.L.
GUPTA EXPORTS PVT. LTD. & ORS, AMROHA. U.P. IN O.A. NO.**

220/2019

I, Teevra Gupta s/o Anil Gupta, aged about 50 years r/o 2, Anand Lok, Andrews Ganj, South Delhi, New Delhi – 110049, do hereby solemnly affirm and state as under:

1. That I am a Director in Respondent No.1 company, authorised to represent the Respondent No.1 and conversant with the facts of the case.
2. That the present Reply is being filed in response to the Compliance Status Report by the Central Pollution Control Board (CPCB)/Respondent No. 3 that was uploaded onto the website of the Hon'ble Tribunal on 30.07.2021, comprising, inter alia, the compliance report and the joint inspection report.
3. That the conclusions of the joint inspection report are given in section 13 of the said report. Said Joint Inspection Report demonstrates the following:

(i) No CN is being discharged by the Respondent No. 1 into the environment.

(ii) The unit has not polluted the groundwater with any discharge or by any illegal sludge disposal.



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- (iii) The inspection team did not find any effluent discharge at all, or in violation of law. Instead, it has been concluded that the output from the common-STP is being recycled into industrial process, boiler, toilet flushing and horticulture. Similarly, the output from the common-ETP is being recycled into industrial process and utility (air scrubber, air washer, cooling towers etc.) within the plant. The output the treated water from the STP/ETP systems are well within the specified norms.
- (iv) No groundwater is being used for industrial purpose whatsoever and that only treated water from STP and ETP was being used for industrial process.
- (v) The joint inspection has found that the unit is drawing significantly less amount of groundwater (113 KLD) than it is permitted to do so by law (250 KLD).
- (vi) The inspection team did not find any illegal disposal of hazardous waste or violation of any provision of the Hazardous Waste Management Rules.
- (vii) All environmental compensation demanded as per prior order/reports have been paid and there are no dues in this respect.
- (viii) all prior recommendations from the earlier joint committee inspection report dated 10.12.2020 & 16.10.2019, and all Hon'ble NGT orders including the order dated 04.02.2021 are complied with.

4. That the latest inspection report of 30.07.2021 demonstrates beyond doubt that all prior violations as alleged/indicated by the inspection team in the



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prior instances now stand fully complied with. In particular, the three directions given by this Hon'ble Tribunal in its order dated 04.02.2021 were verified by the joint inspection team, and it was found beyond doubt that the unit is in compliance with reference to the same:

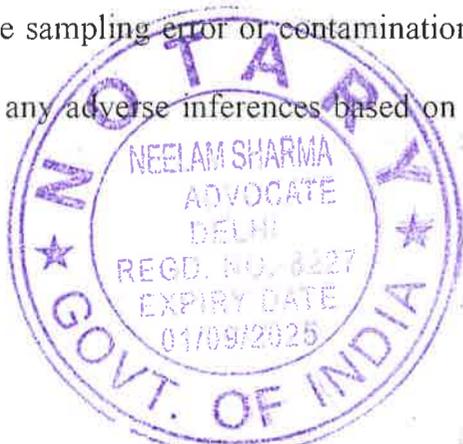
S. No.	Direction from the Hon'ble Tribunal in order dated 04.02.2021	Respondent No. 1's Reply
1)	Let the joint Committee, alongwith a representative from IIT Roorkee, further verify the compliance status including the fact that no waste water injection in the ground water is taking place so that the ground water is not contaminated by injection of any waste water, in view of the fact that cyanide and other heavy metal have been found in the samples	<p>(i) Joint inspection team has confirmed in section 6.5 and Table 6 of the report that the unit has not contaminated the groundwater;</p> <p>(ii) Joint inspection team has confirmed in Table 31 of the report that the treated water from the STP outlet is well within accepted parameters;</p> <p>(iii) Joint inspection team has confirmed in Table 29 of the report that the treated water from the ETP outlet is well within accepted parameters;</p>
2)	Water audit may be got conducted by the CPCB.	Joint inspection team has conducted a detailed water audit and confirmed in section 10 of the report that the unit is in compliance with law, and that the findings are consistent with the independent NEERI report dated 14.04.2021.
3)	Assessment of compensation may be looked into jointly by CPCB and the State PCB.	Joint inspection team has confirmed in section 12 of the report that all environmental compensation (adjusted/waived to a limited



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		extent) as per prior order/reports have been paid, and there are no dues in this respect.
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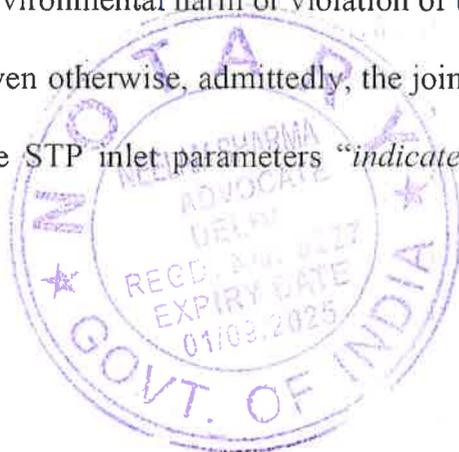
5. The unit has done everything possible to ensure compliance and in fact, has complied with requirements mentioned in the joint inspection reports, which do not even form part of the law or any of the statutory guidelines. It is submitted that almost every allegation of non-compliance against the unit stands contradicted in a subsequent report. For instance, it was alleged in the report of 10.12.2020 that there was a mismatch in the water audit, inferring the potential diversion of groundwater for industrial use. Yet, in the latest report of 30.07.2021, the joint inspection has accepted that the water audit is perfectly correct and there was no mismatch in quantum and that no industrial groundwater is being used for industrial purposes. Similarly, none of the reports of 28.03.2019, 16.10.2019, 10.12.2020 or any intervening status update reports raised any issue about the STP. Yet, it is humbly submitted that unfounded issues were raised about the STP for the first time on 30.07.2021. The *ex facie* absurdity of the new allegations are apparent from the fact that alleged non-compliances all pertain to the STP inlet water whereas what matters, in law and in fact, is whether the treated output water is within norms. As demonstrated subsequently in this Reply, the findings *qua* the STP inlet sample results are anomalous and inherently contradictory and that instead, there is a strong/credible basis for concluding that there was some sampling error or contamination in the samples drawn. It is submitted that any adverse inferences based on inlet parameters alone, are speculative



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and conjecture and ought to be rejected. Further, as demonstrated subsequently in this Reply, the unit has started complying with the direction to keep a separate logbook for the STP sludge and that in any event, this was only a technical requirement inasmuch as there is no finding of illegal STP sludge disposal. On the contrary, the TSDF facility used by the Respondent No. 1 as per law had confirmed that the sludge from the unit comprised both ETP and STP sludge, which disposal is taking place in accordance with the law. As demonstrated further subsequently in this Reply, the limited and adverse inferences and technical remarks by the joint inspection team in its report of 30.07.2021 are red herrings that unnecessarily camouflage the fact that the unit has achieved all the compliances

6. That the allegations in the report of 30.07.2021 pertaining to (i) unexplained CN and other heavy metals in the STP inlet, (ii) capability of the STP to treat/remove CN and other heavy metals, which are being highlighted for the very 1st time, nevertheless do not raise any concerns as a matter of law and/or fact, for the following reasons:
 - (i) The law does not prescribe any parameters for the input water into the STP. The very same joint inspection report confirms in table 31 that the treated water from the STP outlet does not contain any pollutants beyond the specified norms (as extracted in **Exhibit 1 (colly)**). Thus, there is no environmental harm or violation of the law.
 - (ii) Even otherwise, admittedly, the joint inspection team has only stated that the STP inlet parameters "*indicates*" the mixing of industrial effluent,

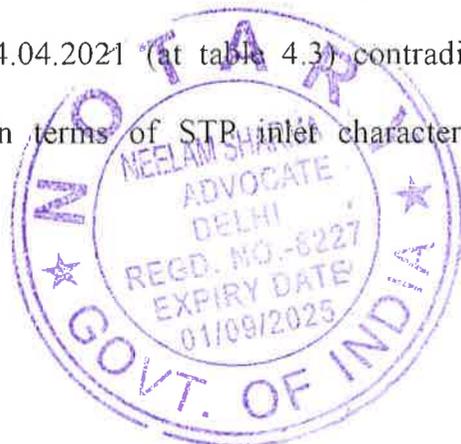


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has stated that the compliance of the STP outlet is “*doubtful*” and/or has only indicated the “*possibility*” of dilution at the STP outlet with freshwater. At best, these are ambiguous and inconclusive inferences, and are not backed by any positive finding. In particular, the joint inspection report does not positively find any piping or injection systems to redirect industrial effluent into the STP. Nor has the joint inspection report found any mismatch/imbalance in quantity during the water audit (section 10 of the report) to suggest that some freshwater is being used to dilute the STP outlet. Therefore, at best, the inferences are entirely conjectural in nature and mere speculation and cannot be the basis for any final conclusions.

(iii) The sampling and the analysis are not in accordance with the statutory procedure prescribed, inter alia, under Section 21-22 of the Water Act.

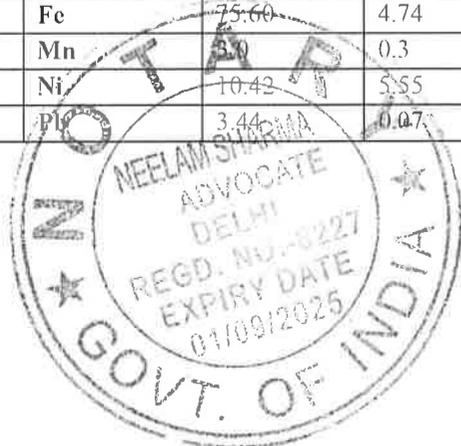
(iv) As a matter of fact, there is a credible and strong suspicion that there was a sampling error/contamination *qua* the STP inlet sample. This is because, (a) chemical oxygen demand or COD and biological oxygen demand or BOD cannot have been at such high range (5158 ppm and 1720 ppm) where the total dissolved salts (TDS) is only 676 ppm; high COD/BOD must necessarily also have very high TDS, which is not the case here, (b) all prior reports of the same joint inspection team (on 16.10.2019 and 10.12.2020) do not report CN at all or such high contamination, (b) a contemporaneous independent report from NEERI dated 14.04.2021 (at table 4.3) contradicts the latest joint inspection report in terms of STP inlet characteristics. Said NEERI report is



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Annexure-11 to the joint inspection report of 30.07.2021, and was also filed with the UPPCB in the Respondent No. 1's letter dated 05.04.2021, which is enclosed herewith as **Exhibit 2**. The relevant comparison table is extracted below for convenience:

S.N O.	PARAMETERS	COMMON STP INLET WATER AS PER 30.07.2021 JOINT INSPECTI ON REPORT	COMMON STP INLET WATER AS PER 10.12.2020 JOINT INSPECTI ON REPORT	STP INLET WATER AS PER 29.08.2019 JOINT INSPECTION REPORT (NB: UNIT MOVED TO COMMON- STP AFTER THIS 2019 INSPECTION)			STP INLET WATER AS PER 16.04.20 21 NEERI REPOR T
				GLASS DIVISI ON STP INLET	METAL DIVISI ON STP INLET	RESIDENTI AL STP INLET	
1.	pH	6.9	7.9	2.58	7.36	7.27	7.5
2.	TSS	5464	489	135	148	48	790
3.	TDS	676	(not reported)	(not reported)	(not reported)	(not reported)	1465
4.	COD	5158	676	475	356	121	736
5.	BOD	1720	291	169	134	49	370
6.	Chloride	150	252	425	643	98	207
7.	PO ₄ -P	6.13	10.15	0.12	0.89	1.90	4.4
8.	NO ₃ -N	20.6	4.4	527	19	1.4	-
9.	Color	94	147	98	96	25	(not reported)
10.	Sulphate	31	100	413	63	33	55
11.	NH ₃ -N	91	151	59	188	14	56
12.	Oil & Grease	-	-	(not reported)	(not reported)	(not reported)	(not reported)
13.	Cyanide	3.19	(not reported)	(not reported)	(not reported)	(not reported)	BDL
14.	As	0.09	0.04	BDL	0.03	0.01	(not reported)
15.	Cd	BDL	BDL	BDL	BDL	BDL	BDL
16.	Co	0.05	0.02	0.09	BDL	BDL	0.034
17.	Cr	1.45	0.16	1.02	BDL	BDL	16
18.	Cu	7.18	1.55	14.15	0.04	0.06	4.6
19.	Fe	75.60	4.74	19.37	0.54	1.41	31
20.	Mn	3.20	0.3	1.05	0.11	0.33	1.3
21.	Ni	10.42	5.55	60.10	0.03	0.13	6.3
22.	Pb	3.44	0.07	0.08	BDL	BDL	0.363



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23.	Sb	0.03	BDL	BDL	BDL	BDL	8.9
24.	Sc	BDL	BDL	BDL	BDL	BDL	(not reported)
25.	V	BDL	0.11	BDL	BDL	BDL	(not reported)
26.	Zn	17.35	3.5	93.08	0.02	0.43	8.9
27.	MLSS	-	-	(not reported)	(not reported)	(not reported)	(not reported)
28.	MLVSS	-	-	(not reported)	(not reported)	(not reported)	(not reported)
29.	Total Coliform	28×10^{11}	9.2×10^6	<1.8	33×10^6	92×10^6	18×10^8
30.	Faecal Coliform	44×10^{11}	3.5×10^6	<1.8	17×10^6	48×10^5	(not reported)

(v) The veracity of the inspection team's finding and inferences on the STP are further cast into doubt because there is no corresponding finding that the unit is in fact using CN in any process, or how such CN can be produced as a by-product in the industrial process. The unit has not used CN in its process, whether directly or indirectly, and all the raw material suppliers of Respondent No. 1 have also confirmed the same *qua* their products. And the joint inspection team has verified the industrial process used at the site at least three times, without ever observing any CN usage in the process. The joint inspection report also does not specify how the testing was done, i.e., the testing protocol followed to determine the presence of CN. It is settled law that expert reports/opinions are not always conclusive in nature, especially in the present case where the inferences have not been tested in a trial and credible questions are being raised.



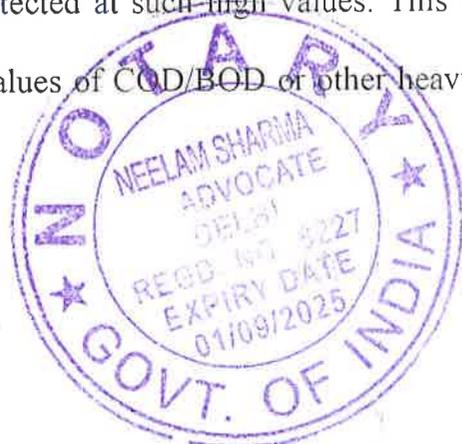


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(vi) Thus, there seems to be a clear sampling error/contamination of the sample. It is noteworthy that the representative from IIT Roorkee was not present when the samples were drawn by the joint inspection team.

(vii) It is submitted that some small amount of heavy metals (other than CN) is expected in the STP inlet because the STP also treats water from the washrooms of the manufacturing units (including metal buffing section) as confirmed by the joint inspection report at paragraph (1) of section 8.4 of said report. Such water from the toilets/washrooms of the manufacturing/industrial divisions, will necessarily contain residues from the staff's shoes, clothing, water from the washing of their PPE, washroom floor cleaning water etc., which may contain metals/contaminants/pollutants from the industrial process. Therefore, the presence of some amount of heavy metals (other than CN) in the STP inlet, as seen in the NEERI Report dated 14.04.2021, as well as the earlier joint inspection reports of 16.10.2019 and 10.12.2020, is not unreasonable or uncommon.

(viii) Out of abundant caution, further testing of the STP inlet water (among others) was undertaken by two NABL accredited independent labs, one private (Shree Ram Testing Laboratories) and the other government (RTC Laboratory, MHSC-Department of Textiles), and both reports confirm there is no CN, and COD/BOD or other heavy metals are not detected at such high values. This is annexed as **Exhibit 3 (colly)**. The values of COD/BOD or other heavy metals are within the expected



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range, given the explanation (vi) above, and well within the specified norms.

7. That the inferences of alleged dilution of STP outlet and/or mixing of industrial effluent into the STP inlet is erroneous and self-contradictory for the following reasons:

(i) The joint inspection team was present in the unit, observed the STP in operation and collected samples during live operation of the STP. They did not observe or record any dilution of freshwater or any piping systems to divert industrial effluents. Therefore, for the joint inspection team to allege dilution or mixing of industrial effluents is nothing but conjecture.

(ii) The STP outlet has 2% less water than the STP inlet as per table 37 of the report, and the water audit at section 10 of the report and in particular, the water chart at internal page 64 of the report, establish beyond doubt the closed-loop of the water cycle within the unit. If freshwater/groundwater was being used for diluting wastewater, there would be an unexplained mismatch/imbalance in quantity in the water audit, which is not the case here. There was also no such unexplained mismatch/imbalance in quantity in the water audit conducted by NEERI as well as the CII, both of which were presented to the UPPCB vide letter dated 05.04.2021, previously annexed as **Exhibit 2**. Thus, dilution at any stage of the process is completely ruled out.



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(iii) The alleged characteristics of the STP inlet showing very high contamination/pollution (table 31) seems to be *worse* than the **untreated** industrial effluent from the unit (tables 26/27 and table 29), i.e. pH, TSS, COD, CN, As, Co, Cr, Cu, Mn, as seen in the extract below:

S.No.	Parameters	COMMON STP INLET WATER AS PER 30.07.2021 JOINT INSPECTION REPORT (TABLE 31)	PRE-ETP-1 INLET WATER AS PER 30.07.2021 JOINT INSPECTION REPORT (TABLES 26/27)	COMMON-ETP INLET WATER AS PER 30.07.2021 JOINT INSPECTION REPORT (TABLE 29)
1.	pH	6.9	5.9	8.9
2.	TSS	5464	904	123
3.	TDS	676	1808	2380
4.	COD	5158	4090	136
5.	BOD	1720	2110	53
6.	Chloride	150	467	362
7.	PO ₄ -P	6.13	6.0	0.63
8.	NO ₃ -N	20.6	22.7	10.8
9.	Color	94	60	14
10.	Sulphate	31	50	336
11.	NH ₃ -N	91	(not reported)	(not reported)
12.	Oil & Grease	-	(not reported)	(not reported)
13.	Cyanide	3.19	0.23	BDL
14.	As	0.09	BDL	BDL
15.	Cd	BDL	BDL	BDL
16.	Co	0.05	0.03	0.01
17.	Cr	1.45	0.63	0.22
18.	Cu	7.18	3.02	0.63
19.	Fe	75.60	97.97	5.29
20.	Mn	3.0	1.5	0.32
21.	Ni	10.42	34.0	7.98
22.	Pb	3.44	0.24	0.02
23.	Sb	0.03	BDL	BDL
24.	Se	BDL	BDL	BDL
25.	V	BDL	BDL	BDL
26.	Zn	17.35	73.2	7.26
27.	MLSS	-	-	
28.	MLVSS	-	-	
29.	Total Coliform	28 x 10 ¹¹		
30.	Faecal Coliform	44 x 10 ¹¹		

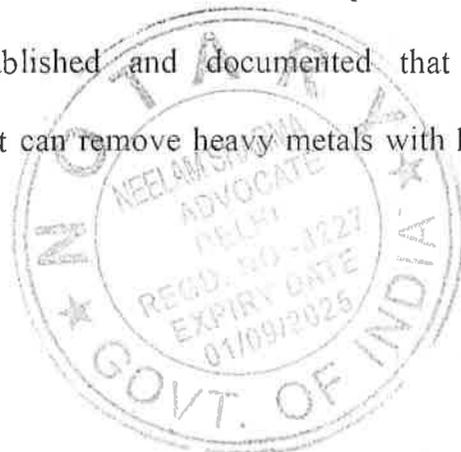


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If industrial effluent from the unit was being mixed with the STP inlet as alleged, the water parameters of such mixed water could not be *worse* than the industrial effluent. Thus, the inference of industrial effluent mixing, is not only speculative but also erroneous and specious.

- (iv) As per table 37 of this report, the average quantum of water in the STP inlet (4272 KL/month) is consistent with the STP inlet volume reported in Table 28 of the earlier report of 10.12.2020 (4028 KL/month). In said earlier report, the STP inlet was not contaminated as alleged this time. If industrial effluent was being mixed into the STP inlet as alleged, the STP inlet volume must have tremendously increased so as to have this high concentration of pollutants, which is not the case. Further, such mixing would have also led to tremendous increase in the TDS because the untreated industrial effluent has three times more TDS value (see table 29 of the report), which is also not seen in this case.
- (v) Thus, it is obvious that sampling error/contamination of the sample is a better and more credible explanation than any other unfounded inference drawn by the joint inspection team.
8. That the inference that the compliance of the STP is "*doubtful*" because STP does not have heavy metal removal unit, is not just conjecture, but also plainly incorrect and self-contradictory. The report itself notes at para (3) of section 8.4 that the STP has a Sequential Batch Reactor (SBR) unit. It is an well-established and documented that SBRs with biological aerobic treatment can remove heavy metals with high efficiency, which is precisely



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the situation in this case. Reference may be had to **Exhibit 4 (colly)**. Therefore, there is no factual basis to cast doubt on the functioning/capability of the STP. The very same STP was in operation during the previous inspection of 10.12.2020, and that report concludes without any doubt that the STP was functioning/operational without any problem.

9. That said latest inspection report also recommends that the unit start maintaining a separate logbook for STP sludge different from the ETP sludge. The unit has, w.e.f. from 15.07.2021, i.e. one day after the joint inspection team raised this query, started maintaining a separate logbook for the ETP sludge and the STP sludge. A sample of such separate logbooks are enclosed as **Exhibit 6 (colly)**. I further state that not having a separate logbook in the past does not raise any concern as a matter of law and fact, for the following reasons:

- (i) That there is no requirement in law to maintain logbooks separately for the STP sludge and ETP sludge generated from within the very same premises/unit.
- (ii) Admittedly, all the sludge is stored for disposal at only one location within the premises, and the logbook maintained by the unit records the sludge quantum in totality on a daily-basis. The unified logbook has been confirmed by the inspection unit as well. The sludge is together disposed of in accordance with the Hazardous Waste Management Rules at the specified Treatment, Storage & Disposal Facility (TSDF) of M/s Bharat Oil & Waste Management Ltd., Kanpur, as per law. This has been



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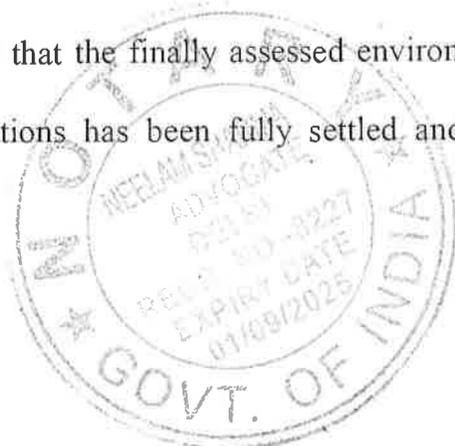
confirmed in section 9 of the joint inspection report. Said TSDF has confirmed that the unit's sludge comprises both STP and ETP sludge, this confirmation being enclosed herewith as **Exhibit 5**.

(iii) There is no finding in the report that the STP sludge is being disposed of illegally or been dumped in violation of the law. In fact, it is categorically concluded in section 9 of the report that the unit complies with the Hazardous Waste Management Rules fully. There is no finding of non-violation.

10. That accordingly, the latest inspection report does not demonstrate any violation of the law or environmental norms.

11. That in section 13.2 of the joint inspection report of 30.07.2021, it has been concluded that all required metres and log books were being maintained, and that no groundwater is being used for industrial purpose. The inspection team concluded that freshwater is being used only for residential and drinking purposes within the unit. Further, the inspection team has categorically concluded that the unit recycles the treated sewage and effluent from the STP and ETP for industrial use, and nowhere was freshwater used in industrial activities.

12. That in section 13.3 of the joint inspection report of 30.07.2021, it has been concluded that the finally assessed environmental compensation for alleged past violations has been fully settled and that there are no dues in this



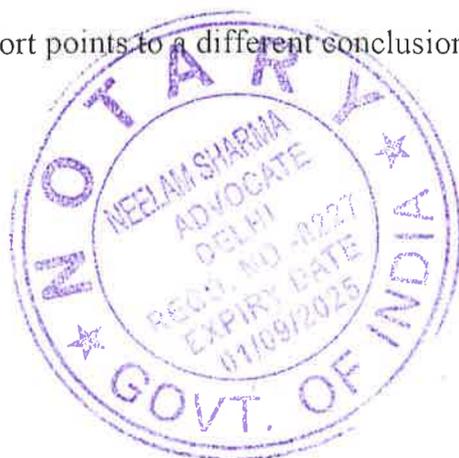
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respect. In particular, I state that the aforesaid environmental compensation was paid under protest, and Respondent No. 1 reserves its right to seek appropriate legal statutory/legal remedies in this context.

13. That in section 13.1 of the joint inspection report of 30.07.2021, it has been concluded that the unit has not discharged any CN into the environment, inasmuch as the presence of CN has not been found from the groundwater from within the unit and the surrounding areas, including nearby villages.

14. That in section 13.1 of the joint inspection report of 30.07.2021, read together with table 6 of said report, the inspection team did not find any CN or other heavy metals in the groundwater obtained from within the premises/unit. While Mn and Fe were found in the samples collected from two hand pumps, it is acknowledged in the said report (and in particular, in figure 12) that these two hand pumps are located *outside* the unit in a public area, and not at all within the control of the unit. Further, it is stated that the said two hand pumps are old and have corroded/rusted, which has resulted in the presence of residual Mn and Fe in the water samples taken out of such pumps. The quantum of such Mn and Fe is also extremely minor and well within what is expected from such corrosion/leeching. Thus, Respondent No. 1 has not contaminated the groundwater in anyway, and nothing in the joint inspection report points to a different conclusion.





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15. That in section 13.1 of the joint inspection report of 30.07.2021, the inspection team further states that there was a significant concentration of CN found in the common STP inlet and some detectable concentration in the Pre-ETP-1 inlet (0.23 mg/l) & Pre-ETP-1 outlet. It is stated that this finding is *ex facie* erroneous, anomalous and in any event, does not result in any violation of law, for the following reasons:

- (i) The law does not prescribe any parameters for the input water into the STP or the ETP or for the water in the intermediate stages. What matters is only the final treated water. The very same joint inspection report confirms in table 31 that the water from the STP outlet does not contain any CN, i.e. below detectable level (BDL). Similarly, the report acknowledges that the water from the pre-ETP-1 is further treated in the common-ETP system (para (3) of section 8.3 of the Report) and the treated output water from the common-ETP system (table 29) shows that the water is within the prescribed norms. Thus, there is no environmental harm or violation of law.
- (ii) The sampling and the analysis are not in accordance with the statutory procedure prescribed, inter alia, under Section 21-22 of the Water Act.
- (iii) The joint inspection report also does not specify how the testing was done, i.e., the testing protocol followed to determine the various parameters.
- (iv) No CN was reported in the STP inlets or in the ETP inlets as per the joint inspection teams' own reports from 10.12.2020 and 16.10.2019.
- (v) No CN was reported in the ETP inlet in the NEERI report dated 14.04.2021 (at table 4.2) or in the test reports of IIT Rourkee dated 19.03.2021, both of which were provided to the UPPCB vide letter dated 05.04.2021. A copy of the letter dated 05.04.2021 was previously enclosed herewith as **Exhibit 2**.





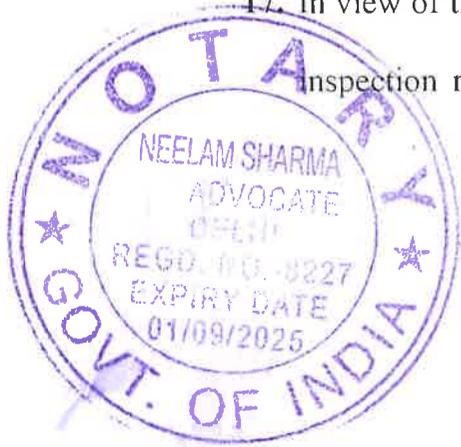
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- (vi) No CN was reported in the STP inlet in the aforesaid NEERI report of 14.04.2021 (at table 4.3), which is part of **Exhibit 2** herein.
- (vii) Thus, it is evident that there is a clear sampling error/contamination of the samples from STP inlet, Pre-ETP-1 inlet & Pre-ETP-1 outlet. It is noteworthy that the representative from IIT Roorkee was not present when the samples were drawn by the joint inspection team.
- (viii) Out of abundant caution, further testing of the STP inlet water, Pre-ETP-1 inlet & Pre-ETP-1 outlet (and all the other inlets/outlets) was undertaken by two NABL accredited independent labs, one private (Shree Ram Testing Laboratories) and the other government (RTC Laboratory, MHSC-Department of Textiles), and both reports confirm there is no CN. These have been previously annexed as **Exhibit 3 (colly)**.

16. That in section 13.1 of the joint inspection report of 30.07.2021, the inspection team has further reproduced alleged comments from the IIT-Roorkee expert on the alleged presence of CN as per the joint committee test report. However, this is contradicted by a test reports of IIT-Roorkee itself, which were placed before the UPPCB vide letter dated 05.04.2021 (already placed on record as **Exhibit 2**, above), which shows no CN. These alleged comments in section 13.1 of the joint inspection report of 30.07.2021, in fact, also acknowledge that the final treated water does not contain any CN. It is also noteworthy that the representative from IIT Roorkee was not present when the samples were drawn by the joint inspection team.

17. In view of the above, the limited adverse remarks in section 13.1 of the joint inspection report of 30.07.2021 are not credible and there exists a strong





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basis that there has been a sampling error and/or contamination of the samples. Barring these limited adverse remarks, the report as a whole establish clearly that the treated output water is well within norms and there is no illegal discharge.

18. That the Respondent No. 1's point-wise Reply to section 13.4 of the joint inspection report of 30.07.2021, under the heading "Environmental Compliance Status", is as follows:

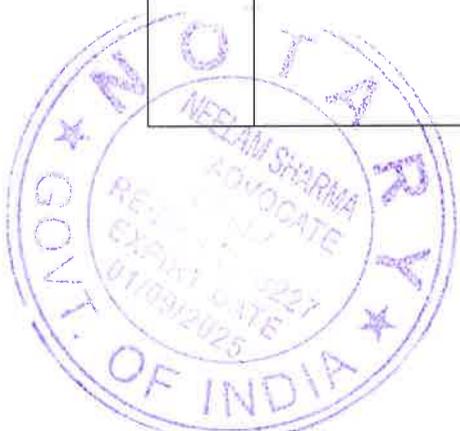
S.No.	Observation	Comments of Respondent No.1
1)	During the current joint inspection, all the manufacturing section i.e., glass art ware, metal art ware, wooden art ware, marble art ware, thermocol block, corrugated sheet & carton mfg. sections, Pre-ETP-1, Common-ETP and Common-STP were found operational.	Joint Inspection Report confirms that the unit is in compliance
2)	As per analysis results, the STP inlet is not a representative sample of sewage as it shows significant concentration of BOD (1720 mg/l), COD (5158 mg/l) and heavy metals (CN-3.19 mg/l, Cr-1.45 mg/l, Cu-7.18 mg/l, Fe-75.60 mg/l, Mn-3.0 mg/l, Ni-10.42 mg/l, Pb-3.44 mg/l, Zn-17.35 mg/l), which are not representing the characteristics of sewage and indicates the mixing of industrial effluent with the domestic sewage.	<i>Ex facie</i> , both the finding and inference is erroneous, inherently contradictory and anomalous for the reasons already provided in paras 3-8 of the present Reply.
3)	As per the analysis results of treated sewage from common-STP outlet, concentration of pH-7.2, Oil & Grease- BDL, BOD-02mg/l, COD- 21mg/l, Fe-0.08 mg/l, Mn-0.05 mg/l, Ni-0.06 mg/l, V-0.12mg/l, Pb-BDL, Cyanide-BDL, As- 0.04mg/l, Cd-BDL, Co-BDL, Cr-BDL, Cu-	Joint inspection confirms that unit is in compliance and that the treated STP water is recycled for use, inter alia, in industrial activity as well as for the residential areas. The parameters specified are all well within accepted norms.





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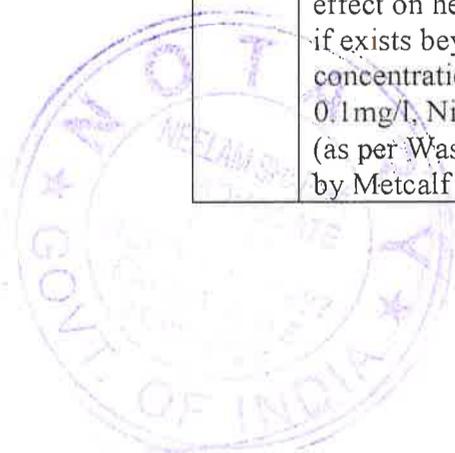
S.No.	Observation	Comments of Respondent No.1
	0.03mg/l, Sb-BDL, Se-BDL and Zn-0.02 mg/l has been found, this is being recycled for utilization in domestic and utility purpose within different manufacturing sections of unit as well as in colonies.	
4)	As per Central Public Health & Environmental Engineering Organization (CPHEEO) manual on sewage and sewage treatment systems-2013 Part A Engineering, typical process parameters for SBR configurations mentioned in Table No 5.57 at page no 5-198 (Annexure-18), MLSS concentration flow and intermittent decant is 3,500-5,000mg/l for optimum operation of SBR however, as per the analysis results of aeration tank MLSS concentration was 16141mg/l; indicating that periodic removal of sludge is not taking place thus STP is not operating properly.	<ul style="list-style-type: none">- Mixed Liquor Suspended Solids (MLSS) is a measurement of concentration of suspended solids, in the aeration tank during the activated sludge process. The aeration tank is the SBR, where beneficial microorganisms are employed to remove/breakdown/scrub the contaminants.- There is no prescribed standard by law in terms of the MLSS concentration to be maintained. The reference to the CPHEEO is actually misleading, in as much as the very same manual expressly states that the design parameters specified therein are for information purposes only. There are no mandatory guidelines specified. The complete relevant extracts of the CPHEEO manual is enclosed therewith as Exhibit 7. Such technical remarks by the joint inspection team are misleading and take away the credibility of the unfounded inferences, apart from also camouflaging the fact that the unit has achieved all the compliances.- The law only prescribes the treated wastewater effluent outlet parameters, and admittedly, the treated wastewater, in this case, is well within environmental norms.- As a matter of scientific fact, the MLSS value must be maintained/kept depending on the various climatic and other environmental conditions that affect or vary the microbiological growth. For instance, in the prior joint inspection report of 10.12.2020 (winter), the MLSS value was maintained at around 10,000, whereas in the latest inspection report (summer), the MLSS was maintained at a higher level of 16,000.- As a matter of scientific fact, an





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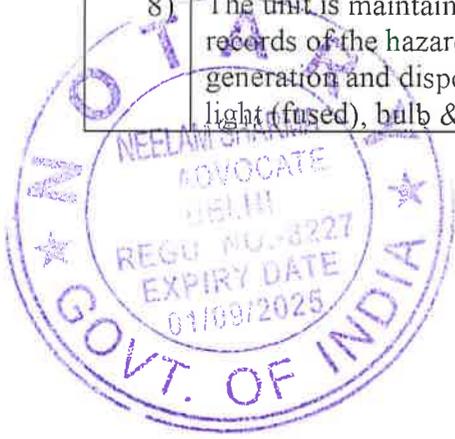
S.No.	Observation	Comments of Respondent No.1
	<p>STP inlet has significant concentration of heavy metals (CN-3.19 mg/l, Cr-1.45 mg/l, Cu-7.18 mg/l, Fe-75.60 mg/l, Mn-3.0 mg/l, Ni-10.42 mg/l, Pb-3.44 mg/l, Zn-17.35 mg/l) however no separate treatment unit for heavy metal removal exists in the existing common-STP, even though the STP-outlet shows 100% reduction in Cyanide (from 3.19mg/l to BDL), 100% reduction in Chromium (from 1.45mg/l to BDL), 100% reduction in Lead (from 3.44mg/l to BDL), 99% reduction in Nickel (from 10.42mg/l to 0.06mg/l), 99.8% reduction in Zinc (from 17.35mg/l to 0.02mg/l), 99.8% reduction in Iron (from 75.6mg/l to 0.06mg/l), 99.6% reduction in Copper (from 7.18mg/l to 0.03mg/l) indicating possibility of dilution at STP outlet can't be ruled out.</p> <p>Heavy metals have inhibitory effect on heterotrophic organisms if exists beyond the threshold concentration i.e Cu-1.0mg/l, Pb-0.1mg/l, Ni-1.0mg/l, Zn-1.0mg/l (as per Wastewater Engineering by Metcalf & Eddy, Table 2-13</p>	<p>increased MLSS value merely denotes lesser frequency in removal of sludge and an increased time period (SRT, i.e. solid retention time) where the microorganisms are kept activated for breakdown/removal of contaminants. By maintaining a higher MLSS value and higher SRT value, the unit is actually reducing the quantum of sludge generated from the STP. This is advantageous, as confirmed from the relevant extracts of the CPHEEO manual previously enclosed as Exhibit 7. There is nothing illegal in this respect, so long as the sludge is disposed off in accordance with law and the treated output water is within norms. These conditions are fulfilled by the Respondent No. 1</p> <p><i>Ex facie</i>, both the finding and inference are erroneous, inherently contradictory and anomalous for the reasons mentioned in paras 3-8 of the present Reply.</p>





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S.No.	Observation	Comments of Respondent No.1
	page no 78; Annexure 19).	
5)	As per the analysis results of treated effluent sample collected from common-ETP final treated water storage tank concentration of pH- 7.0, TSS- 10mg/l, TDS- 48mg/l, BOD- 04mg/l, COD- 27mg/l, Chloride-15mg/l, Phosphate-0.06mg/l, Nitrate- 5.8mg/l, Colour- 21Hazen, Sulphate- BDL, Cyanide- BDL, Fe-0.002 mg/l, Mn-BDL, Ni-BDL, V- 0.09mg/l, Pb-BDL, As-BDL, Cd-BDL, Co-BDL, Cr-BDL, Cu-BDL, Sb-BDL, Se-BDL and Zn-0.01 mg/l has been found, this is being recycled for utilization in industrial processes within different manufacturing sections.	Joint inspection confirms that unit is in compliance and that treated ETP water is recycled for use in industrial activity. The parameters specified are all well within the accepted norms.
6)	Analysis result of samples of recycled water used in different manufacturing sections i.e., glass, metal, wood & marble sections indicating that unit is recycling the treated waste water from common-ETP & common-STP to meet its industrial requirement.	Joint inspection confirms that unit is in compliance and that only recycled water (not freshwater) is used in industrial activity.
7)	The unit has been granted NOC from U.P.G.W.D (Ground water department (Namami Gange & Rural Water Supply Department), Ministry of Jal Shakti, Govt. of Uttar Pradesh) to abstract 250 m3/day (KLD) for 300 operational days totaling 75,000 m3/annum from 03 Borewells for industrial purpose, which is valid from 21.12.2018 to 07.04.2026. Now, the previous NOC issued by CGWA for abstraction of 155KLD ground water for domestic purpose, which was valid till 21.12.2021, stands invalid.	Joint inspection confirms that unit has the required approval as per law to draw groundwater, from 21.12.2018 to 07.04.2026. In fact, the unit is drawing significantly less groundwater (113 KLD) than it is permitted to do by law (250 KLD).
8)	The unit is maintaining daily records of the hazardous waste generation and disposal for tube light (fused), bulb & CFL (fused),	Joint inspection confirms that the unit is in compliance





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S.No.	Observation	Comments of Respondent No.1
	used rubber gloves, old battery, used face masks, used cotton gloves, empty container, used oil, empty corrugated cartons and ETP sludge. The unit has submitted daily record of the haz. waste generation as well as disposal to TSDF facility from Dec-2020 to June-2021, which has been verified.	
9)	The unit is sending the generated hazardous waste to the TSDF for which the unit is also maintaining manifest document (Form-10, as required under Rule 19 of the HOWM Rules, 2016). The unit has submitted the haz. waste disposal data (Form-10) from Feb-2021 to June-2021 and Annual return (Form-4) for year: 2020-21.	Joint inspection confirms that the unit is in compliance
10)	The Unit has not maintained separate data for STP sludge generation as well as disposal. Unit shall ensure to maintain separate logbook for STP sludge generation and considering presence of heavy metals at STP inlet, the unit shall ensure disposal of the STP sludge to TSDF.	<ul style="list-style-type: none">- The unit has, w.e.f. from 15.07.2021, i.e. one day after the joint inspection team raised this query, started maintaining a separate log book for the ETP sludge and the STP sludge. A sample of such separate logbooks are enclosed as Exhibit 6 (colly).- That there is no requirement in law to maintain logbooks separately for the STP sludge and ETP sludge generated from within the very same premises/unit.- Admittedly, all the sludge is stored for disposal at only one location within the premises, and the logbook maintained by the unit records the sludge quantum in totality on a daily-basis. The unified logbook has been confirmed by the inspection unit as well. The sludge is together disposed of in accordance with the Hazardous Waste Management Rules at the specified Treatment, Storage & Disposal Facility (TSDF) of M/s Bharat Oil & Waste Management Ltd., Kanpur, as per law. This has been confirmed in section 9 of the joint inspection report. Said TSDF has confirmed that the unit's sludge comprises both STP and ETP sludge, this confirmation being enclosed





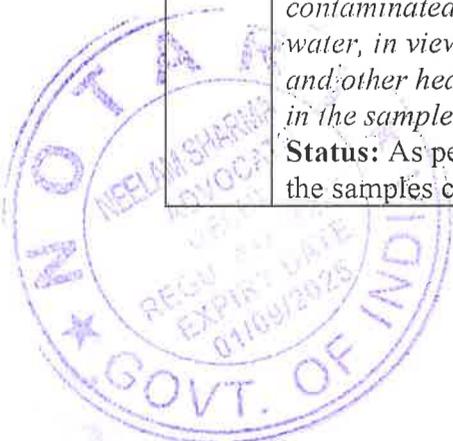
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S.No.	Observation	Comments of Respondent No.1
		herewith as Exhibit 5. - There is no finding in the report that the STP sludge is being disposed of illegally or been dumped in violation of the law. In fact, it is categorically concluded in section 9 of the report that the unit complies with the Hazardous Waste Management Rules fully. There is no finding of non-violation.
11)	The unit has submitted a copy of report prepared by NEERI, Nagpur on "Water Quality Audit Report for M/s C.L. Gupta Exports Pvt. Ltd., Amroha, U.P." based on the study conducted by NEERI during the month of March-2021, which contains the assessment of water quantity used in various sections followed by water quality analysis, ensuring sustained operation of treatment systems and making water suitable. [... not redpocued for sake of brevity]	Joint inspection confirms that the unit is in compliance and that only treated water (not freshwater) is recycled for use in industrial activity.

19. That the Respondent No. 1's point-wise Reply to the "Status summary in compliance to Hon'ble NGT order dated 04.02.2021 in the matter of Adil Ansari Vs. M/s C. L. Gupta Exports Pvt. Ltd. & ors. (O.A. NO. 220/2019)" at pages 2-4 of the latest compliance report, are as below:

S.No.	Observation	Comments of Respondent No.1
1)	Direction by the Tribunal: " <i>Let the joint Committee, alongwith a representative from IIT Roorkee, further verify the compliance status including the fact that no waste water injection in the ground water is taking place so that the ground water is not contaminated by injection of any waste water, in view of the fact that cyanide and other heavy metal have been found in the samples.</i> " Status: As per the analysis results of the samples collected from the	- Joint Inspection Report confirms that no CN is being discharged by the Respondent No. 1 into the environment. - The Mn and Fe content being referred to in samples (by cross-reference to Table 6) admittedly pertain to water taken from handpumps located outside the Respondent No. 1's premises, which are obviously not in the control of the Respondent No. 1. In

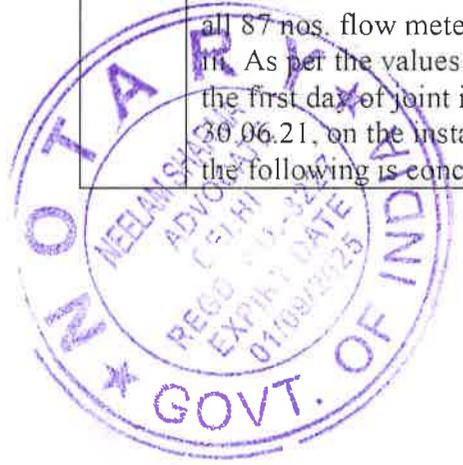




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S.No.	Observation	Comments of Respondent No.1
	<p>borewell of the unit and surroundings areas including nearby villages, presence of Cyanide has not been found. However, Manganese (0.39 mg/l against 0.3mg/l) & Iron (1.3mg/l against 0.3mg/l) and Iron (0.86mg/l against 0.3 mg/l) were found in the samples collected from the hand pump located near labour gate and borewell located behind the unit respectively. Table 6 may be referred for characteristics of collected ground water samples.</p> <p>However, significant concentration of Cyanide was found in samples collected from common-STP inlet (3.19 mg/l) and detectable concentration was found in Pre-ETP-1 inlet (0.23 mg/l) & Pre-ETP-1 outlet (0.16 mg/l). Pre-ETP-1 effluent is further treated in common ETP.</p>	<p>any event, such Mn and Fe content in such hand pump water arises because the handpumps are iron based pumps that are very old and have rusted. The minute quantity of MN and Fe found is consistent with corrosion/leaching and not from any industrial pollution.</p> <ul style="list-style-type: none">- No such Mn or Fe or other content was found in the water taken out from the pumps within the unit as per Table 6.- <i>Ex facie</i>, the finding of CN in the STP inlet and pre-ETP-1 inlet is erroneous, inherently contradictory, and anomalous for the reasons already detailed in paras 3-8 of the present Reply.
2)	<p>Direction by the Tribunal: "<i>Water audit may be got conducted by the CPCB.</i>"</p> <p>Status: As directed, Joint Committee also carried out the Water Audit of the unit. The observations on Water Audit (based on information and logbooks provided by the unit) are summarised below:</p> <p>i. The unit has installed total 87 nos. of electromagnetic flow meters (with totaliser) at all the points of water/waste water i.e., ground water extraction points, water distribution lines to all the different sections of the unit, inlet, outlet and other different locations of Pre-ETPs/Common-ETP/Common-STP, treated waste water utilisation points from Pre-ETPs/Common-ETP/Common-STP to all the different sections of the unit and waste water generation points of different sections of the unit.</p> <p>ii. The unit is maintaining logbook for all 87 nos. flow meters installed.</p> <p>iii. As per the values observed during the first day of joint inspection i.e., 30.06.21, on the installed flow meters, the following is concluded:</p>	<p>Joint inspection confirms that unit is in compliance and that no groundwater is being used for industrial activity. The unit has spent more than Rs 5 Crores in installing 87 water flow meters, new common-STP, new-Pre-ETP and common-EP, with the latest technology.</p>



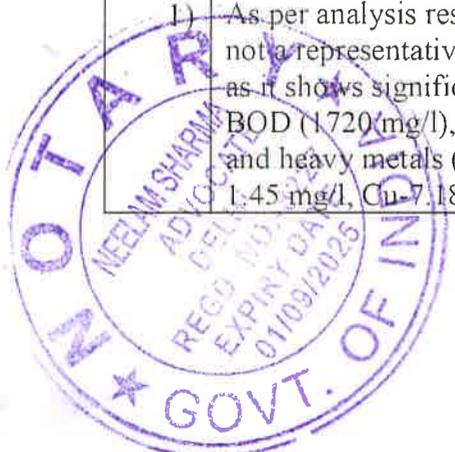


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S.No.	Observation	Comments of Respondent No.1
	<p>...[not reproduced for the sake of brevity]</p> <p>8) The unit is recycling the treated sewage & treated trade effluent (from common-STP & common-ETP) for industrial purpose and nowhere it was found using fresh water in industrial activities. Fresh water is only being used for drinking purpose in various manufacturing divisions.</p>	
3)	<p>Direction by the Tribunal: <i>Assessment of compensation may be looked into jointly by CPCB and the State PCB.</i></p> <p>Status: ... [not reproduced for the sake of brevity]</p> <p>Hence, the unit has deposited total Rs. 1,16,39,727/- against the total imposed EC amount of Rs. 1,90,17,727/-. The remaining EC amount of Rs. 73,78,000/-, which was imposed for the period of 21.12.2018 to 30.05.2020 (Year: 2018-19) beyond the expiry of CGWA NOC considered to be waived off, as the unit has now been granted NOC from U.P.G.W.D (Ground water department (Namami Gange & Rural Water Supply Department), Ministry of Jal Shakti, Govt. of Uttar Pradesh) to abstract 250 m³/day (KLD) for 300 operational days totaling 75,000 m³/annum from 03 Borewells for industrial purpose, having validity from 21.12.2018 to 07.04.2026.</p>	<p>Confirms that unit has paid all compensation imposed, without any dues. Respondent No. 1 notes that the compensation has been paid under protest, and the Respondent No. 1 reserves its right to seek appropriate statutory/legal remedies in this context.</p>

20. That the Respondent No. 1's point-wise Reply to the "Compliance status of the unit may be summarised as follows" at pages 5-6 of the latest compliance report, are as below:

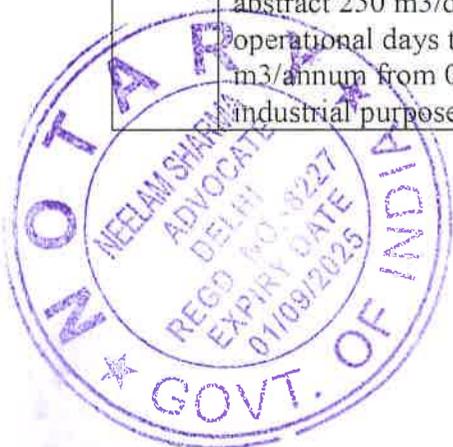
S.No.	Observation	Comments of Respondent No.1
1)	<p>As per analysis results, the STP inlet is not a representative sample of sewage as it shows significant concentration of BOD (1720 mg/l), COD (5158 mg/l) and heavy metals (CN-3.19 mg/l, Cr-1.45 mg/l, Cu-7.18 mg/l, Fe-75.60</p>	<p><i>Ex facie</i>, both the finding and inference is erroneous, inherently contradictory, anomalous and requires further investigation for the reasons detailed in paras 3-8 of the present Reply.</p>





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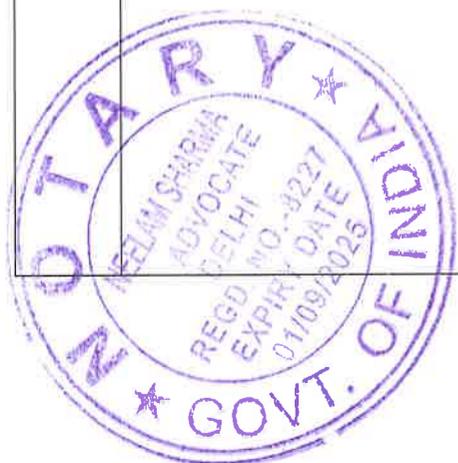
S.No.	Observation	Comments of Respondent No.1
	<p>mg/l, Mn-3.0 mg/l, Ni-10.42 mg/l, Pb-3.44 mg/l, Zn-17.35 mg/l), which are not representing the characteristics of sewage and indicates the mixing of industrial effluent with the domestic sewage. The average characteristics are similar to the untreated effluent of the industry at Pre-ETP-1 which indicates that it mostly constitutes of industrial effluent.</p>	
2)	<p>STP inlet has significant concentration of heavy metals. Whereas, 100% reduction in Cyanide (from 3.19mg/l to BDL), 100% reduction in Chromium (from 1.45mg/l to BDL), 100% reduction in Lead (from 3.44mg/l to BDL), 99% reduction in Nickel (from 10.42mg/l to 0.06mg/l), 99.8% reduction in Zinc (from 17.35mg/l to 0.02mg/l), 99.8% reduction in Iron (from 75.6mg/l to 0.06mg/l), 99.6% reduction in Copper (from 7.18mg/l to 0.03mg/l) in absence of any specific heavy metal removal unit indicates that the compliance of STP outlet is doubtful.</p>	<p><i>Ex facie</i>, the finding is erroneous, anomalous and requires further investigation for the reasons mentioned above in paras 3-8 of the present Reply.</p>
3)	<p>As per the analysis results of treated sewage from common-STP outlet, concentration of pH- 7.2, Oil & Grease- BDL, BOD- 0.2mg/l, COD- 21mg/l, Fe-0.08 mg/l, Mn-0.05 mg/l, Ni-0.06 mg/l, V- 0.12mg/l, Pb-BDL, Cyanide- BDL, As- 0.04mg/l, Cd-BDL, Co-BDL, Cr-BDL, Cu-0.03mg/l, Sb-BDL, Se-BDL and Zn-0.02 mg/l has been found, this is being recycled for utilization in domestic and utility purpose within different manufacturing sections of unit as well as in colonies.</p>	<p>This is well within the norms.</p>
4)	<p>The unit has been granted NOC from U.P.G.W.D (Ground water department (Namami Gange & Rural Water Supply Department), Ministry of Jal Shakti, Govt. of Uttar Pradesh) to abstract 250 m³/day (KLD) for 300 operational days totaling 75,000 m³/annum from 03 Borewells for industrial purpose, which is valid from</p>	<p>Joint inspection confirms that unit has the required approval as per law to draw groundwater, from 21.12.2018 to 07.04.2026. In fact, the unit is drawing significantly less groundwater (113 KLD) than it is permitted to do by law (250 KLD).</p>





1503

S.No.	Observation	Comments of Respondent No.1
	21.12.2018 to 07.04.2026. Now, the previous NOC issued by CGWA for abstraction of 155KLD ground water for domestic purpose, which was valid till 21.12.2021, stands invalid.	
5)	The Unit has not maintained separate data for STP sludge generation as well as disposal. Unit shall ensure to maintain separate logbook for STP sludge generation and considering presence of heavy metals at STP inlet, the unit shall ensure disposal of the STP sludge to TSDF.	<ul style="list-style-type: none">- The unit has, w.e.f. from 15.07.2021, i.e. one day after the joint inspection team raised this query, started maintaining a separate log book for the ETP sludge and the STP sludge. A sample of such separate logbooks are enclosed as Exhibit 6 (colly).- That there is no requirement in law to maintain logbooks separately for the STP sludge and ETP sludge generated from within the very same premises/unit.- Admittedly, all the sludge is stored for disposal at only one location within the premises, and the logbook maintained by the unit records the sludge quantum in totality on a daily-basis. The unified logbook has been confirmed by the inspection unit as well. The sludge is together disposed of in accordance with the Hazardous Waste Management Rules at the specified Treatment, Storage & Disposal Facility (TSDF) of M/s Bharat Oil & Waste Management Ltd., Kanpur, as per law. This has been confirmed in section 9 of the joint inspection report. Said TSDF has confirmed that the unit's sludge comprises both STP and ETP sludge, this confirmation being enclosed herewith as Exhibit 5.- There is no finding in the report that the STP sludge is being disposed of illegally or been dumped in violation of the law. In fact, it is categorically concluded in section 9 of the report that the unit complies with the Hazardous Waste Management Rules fully. There is no finding of non-violation.





1504

S.No.	Observation	Comments of Respondent No.1
6)	The unit has submitted a copy of report prepared by NEERI, Nagpur on "Water Quality Audit Report for M/s C.L. Gupta Exports Pvt. Ltd., Amroha, U.P." based on the study conducted by NEERI during the month of March-2021, which contains the assessment of water quantity used in various sections followed by water quality analysis, ensuring sustained operation of treatment systems and making water suitable	NEERI confirms that treated STP and ETP water is recycled for use in industrial activity and that the water quality of such treated water is suitable for industrial use.
7)	The unit has deposited total Rs. 1,16,39,727/- against the total imposed EC amount of Rs. 1,90,17,727/-. The remaining EC amount of Rs. 73,78,000/-, which was imposed for the period of 21.12.2018 to 30.05.2020 (Year: 2018-19) beyond the expiry of CGWA NOC considered to be waived off as the unit has now been granted NOC from U.P.G.W.D (Ground water department (Namami Gange & Rural Water Supply Department), Ministry of Jal Shakti, Govt. of Uttar Pradesh) to abstract 250 m ³ /day (KLD) for 300 operational days totaling 75,000 m ³ /annum from 03 Borewells for industrial purpose, having validity from 21.12.2018 to 07.04.2026.	Confirms that the unit has paid all compensation imposed, without any dues. Respondent No. 1 notes that the compensation has been paid under protest, and Respondent No. 1 reserves its right to seek appropriate statutory/legal remedies in this context.
8)	Considering the observations on Water Audit of the unit, it can be concluded that, average value of fresh water withdrawal & supply to different sections, treated waste water recycled from Common STP in toilet flushing, treated waste water recycled from Common ETP, total sewage generation/ sent to Common STP and Total trade effluent (industrial effluent) generation/sent to Common ETP for the month of March-2021 (as per NEERI report), average values of 05 months (from Feb-21 to June-21) and values observed on the first day of joint inspection i.e., 30.06.21 by joint committee are indicating the same trend. Some marginal difference is	Joint inspection team confirms that treated STP and ETP water is recycled for use in industrial activity and that the water quality of such treated water is suitable for industrial use. The report confirms that no groundwater is being used for industrial purpose.



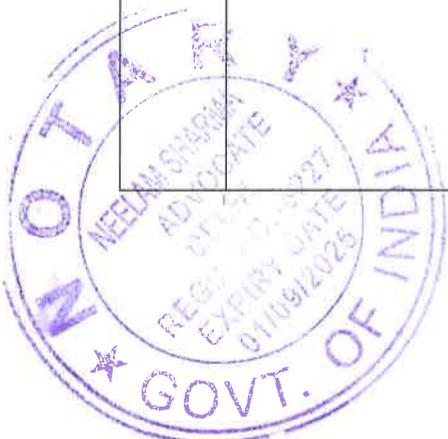


1505

S.No.	Observation	Comments of Respondent No.1
	may be due to variation of worker's strength or season.	

21. That the Respondent No. 1's point-wise Reply to the "Status of Recommendations of the joint committee as per Previous Joint inspection dated 10.12.2020; Table 1: Compliance status of recommendations of previous joint inspection dated 10.12.2020" at pages 6-11 of the latest compliance report, is as below:

S.No.	Recommendations as per previous Joint inspection dated 10.12.2020	Status as per Joint inspection dated 30.06.2021 to 02.07.2021	Comments of Respondent No.1
1)	The unit shall obtain common consent to operate for all 06 manufacturing sections i.e., Metal Art ware, Glass Art ware, Wood Art ware, Thermocol blocks, Marble Art ware & Corrugated Paper & Carton under the Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from UP Pollution Control Board.	<ul style="list-style-type: none"> - The unit obtained common Consent to Operate (CTO) under the Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 issued by UPPCB dated 18.06.2021, valid for trial operation of the unit for production of Metal Artware-200 MT/month, Glass Artware-250 MT/Month, Wood Artware-150 MT/Month, Marble Artware-345 MT/Month, Corrugated Boxes-500 MT/Month and Thermocol Slab-345 MT/Month. - CTO under the Water (Prevention & Control of Pollution) 	<ul style="list-style-type: none"> - Respondent has already filed a letter with the UPPCB for extending the CTOs since all compliances stand completed. Said letter is annexed herewith as Exhibit 8 (colly).





1506

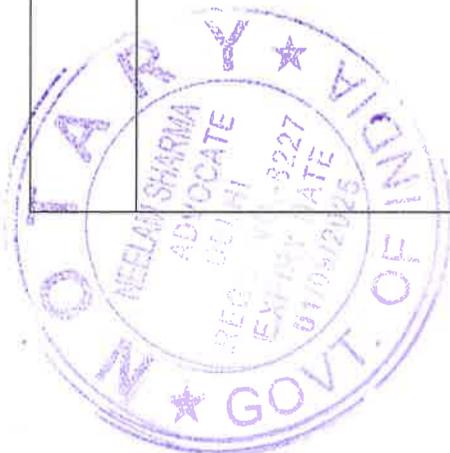
S.No.	Recommendations as per previous Joint inspection dated 10.12.2020	Status as per Joint inspection dated 30.06.2021 to 02.07.2021	Comments of Respondent No.1
		<p>Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 were granted for trial operation of the unit and were valid from 09.06.2021 to 30.06.2021.</p> <ul style="list-style-type: none">- The unit has again obtained amended common CTO under the Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 dated 30.06.2021.- As per the amended common CTO, "2. The unit shall cease to operate with effect from 03.07.2021. The validity of consent to operate only be considered for extension based upon the compliance status found by the joint committee and also the observations, conclusions & recommendations of the committee."- CTO dated 18.06.2021 is attached at Annexure-2 & Annexure-3 and amended common CTO dated 30.06.2021 under the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention &	





1507

S.No.	Recommendations as per previous Joint inspection dated 10.12.2020	Status as per Joint inspection dated 30.06.2021 to 02.07.2021	Comments of Respondent No.1
		Control of Pollution) Act, 1981 is attached at Annexure-4.	
2)	Unit shall ensure no fresh water is used for industrial process and comply with the conditions laid down in NOC of CGWA.	<ul style="list-style-type: none">- From the data of water consumption, effluent generation, quantity of treated effluent of common ETP and sewage treatment plant, it is indicated that fresh water is not used in industrial process. Fresh water is used for domestic purpose in residential colony & industry area for drinking purpose.- As per the latest NOC issued by U.P.G.W.D (Ground water department (Namami Gange & Rural Water Supply Department), Ministry of Jal Shakti, Govt. of Uttar Pradesh) via Certificate No: NOC019504 under {UIS10(1) of Uttar Pradesh Ground Water Management and Regulation Act, 2019}, which is valid from 21.12.2018 to 07.04.2026. As per the NOC, the project proponent is allowed to abstract 250m³/day (KLD) for 300 operational days totaling 75,000 m³/annum from 3 Borewells for industrial purpose.- Unit is abstracting	Joint inspection team confirms the unit's stand that no groundwater is used or industrial purpose. Joint inspection confirms that unit is in compliance. In fact, the unit is drawing significantly less groundwater (113 KLD) than it is permitted to do by law (250 KLD).





1508

S.No.	Recommendations as per previous Joint inspection dated 10.12.2020	Status as per Joint inspection dated 30.06.2021 to 02.07.2021	Comments of Respondent No.1
		<p>113.54 KLD of fresh water to meet the daily requirement for domestic purposes against the allowed capacity of 250 KLD.</p> <ul style="list-style-type: none">- Previous NOC issued by CGWA for abstraction of 155KLD ground water for domestic purpose, which was valid till 21.12.2021, now stands invalid.- Analysis result of samples of water being used in different manufacturing sections i.e., glass, metal, wood & marble sections indicating that unit is recycling the treated waste water from common-ETP & common-STP and not using fresh water for industrial purpose, however, the unit has obtained NOC for abstraction of ground water for industrial purpose, which is valid from 21.12.2018 to 07.04.2026 (as mentioned above).	
3)	The unit shall engage an expert institute to carry out detailed water audit of the unit for detailed study of total actual water consumption & recycling of treated waste water	<ul style="list-style-type: none">- The unit has submitted a copy of report prepared by NEERI, Nagpur on "Water Quality Audit Report for M/s C.L. Gupta Exports Pvt. Ltd., Amroha, U.P."	Joint inspection confirms that unit has complied





1509

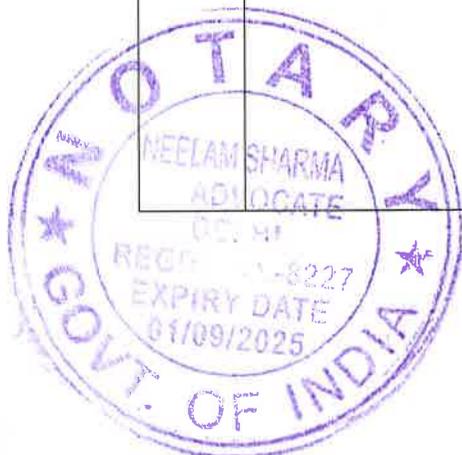
S.No.	Recommendations as per previous Joint inspection dated 10.12.2020	Status as per Joint inspection dated 30.06.2021 to 02.07.2021	Comments of Respondent No.1
		<p>based on the study conducted by NEERI during the month of March-2021.</p> <ul style="list-style-type: none">- This report contains the assessment of water quantity used in various sections followed by water quality analysis, ensuring sustained operation of treatment systems and making water suitable.- Copy of this water quality audit report is placed at Annexure-11.- Water quality audit report has been examined and comparison of average value for the month of March-2021, as mentioned in the submitted report (prepared by NEERI) and average values of 05 months (as per submitted logbook data from Feb-21 to June-21) & values observed on the first day of joint inspection i.e., 30.06.21 has been prepared and placed at sr. no. 13 of conclusions section.	
4)	For carrying out factual water audit, unit shall ensure metering at all and individual treated waste water consumption points at each manufacturing	<ul style="list-style-type: none">- The unit has installed electromagnetic flow meters (with totaliser) at all and individual treated waste water consumption points at each manufacturing	Joint inspection confirms that unit has complied





1510

S.No.	Recommendations as per previous Joint inspection dated 10.12.2020	Status as per Joint inspection dated 30.06.2021 to 02.07.2021	Comments of Respondent No.1
	section to ascertain actual water consumption in each process as well as for domestic purpose and maintain logbook for the same	section as well as for domestic purpose.	
5)	The unit shall install flow meters at inlet and outlet of both Pre-ETPs i.e., for treatment of effluent generating from electrophoretic, lacquering and paint booth processes and for treatment of floor washing effluent.	- The unit has installed electromagnetic flow meter (with totaliser) at inlet and outlet of both Pre-ETPs i.e., for treatment of effluent generating from electrophoretic, lacquering and paint booth processes and for treatment of floor washing effluent.	
6)	For common-ETP, the unit shall install flow meters at outlet of secondary biological treatment system, permeate of RO, MEE condensate and ATFD condensate.	- The unit has installed electromagnetic flow meter (with totaliser) at outlet of secondary biological treatment system, permeate of RO, MEE condensate and ATFD condensate. - The unit has installed total 87 nos. of electromagnetic flow meter (with totaliser) at all the points of waste/waste water i.e., ground water extraction points, water distribution lines to all the different sections of the unit, inlet, outlet and other different locations of Pre-ETPs/Common-ETP/Common-STP, treated waste water utilisation points from Pre-ETPs/Common-ETP/Common-STP to all the different sections of the unit and waste water	





1511

S.No.	Recommendations as per previous Joint inspection dated 10.12.2020	Status as per Joint inspection dated 30.06.2021 to 02.07.2021	Comments of Respondent No.1
		<p>generation points of different sections of the unit.</p> <ul style="list-style-type: none">- The unit is also maintaining logbook for all the installed flow meters.- List of all the installed 87 nos. of flow meter along with locations and totaliser reading (with instantaneous flow rate) observed during current joint inspection is placed at Annexure-1.- As per the logbook data of fresh water and treated waste water utilisation in different sections from common-STP & common-ETP, submitted from Feb-21 to June-21.<ol style="list-style-type: none">1. Total 2786 KL of fresh water & total 4737 KL of treated sewage from common-STP (for domestic purpose) & total 9288.40 KL of treated effluent from common-ETP (for industrial purpose) has been used in glass division.2. Total 3576 KL of fresh water & total 3904 KL of treated sewage from common-	





1512

S.No.	Recommendations as per previous Joint inspection dated 10.12.2020	Status as per Joint inspection dated 30.06.2021 to 02.07.2021	Comments of Respondent No.1
		<p>STP (for domestic purpose) and total 6929.8 KL of treated effluent from common-ETP (for industrial purpose) has been used in metal division.</p> <p>3. Total 2306.5KL of fresh water, which is common for wood and marble sections & total 2324 KL of treated sewage from common-STP (for domestic purpose) and total 952 KL of treated effluent from common-ETP (for industrial purpose) has been used in wood division.</p> <p>4. Total 182.6 KL of treated effluent from common-ETP (for industrial purpose) has been used in marble division.</p> <p>- Total 209.5 KL of treated effluent from common-ETP (for industrial purpose) has been used in corrugation section for preparation of adhesives.</p>	
	7). The unit shall dispose off the sludge from sludge drying bed of the	- The unit has disposed off the sludge from sludge drying bed of	Joint inspection confirms that unit has complied





1513

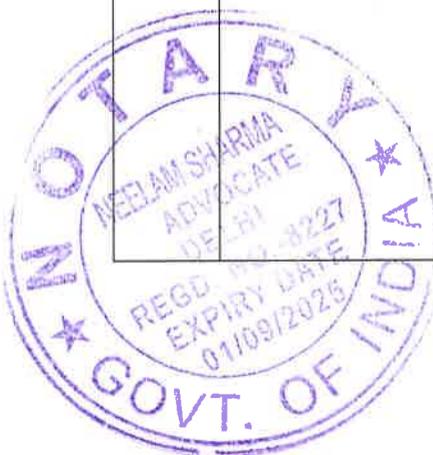
S.No.	Recommendations as per previous Joint inspection dated 10.12.2020	Status as per Joint inspection dated 30.06.2021 to 02.07.2021	Comments of Respondent No.1
	previous ETP at wooden art ware manufacturing division, to TSDF site.	<p>the previous ETP at wooden art ware manufacturing division, to TSDF site (M/s Bharat Oil & Waste Management Ltd., Kanpur).</p> <ul style="list-style-type: none"> - No sludge was found in the tank during current joint inspection. - As per Hazardous waste disposal data (form-10) from Feb-21 to June-21, the unit has sent total 5115 Kg of ETP sludge to TSDF site (M/s Bharat Oil & Waste Management Ltd., Kanpur). 	
8)	Presence of cyanide upto 5.0 mg/l in treated effluent from common-ETP is observed; hence, human contact shall be strictly avoided during the recycle/re-use of common ETP treated effluent.	<ul style="list-style-type: none"> - As per the analysis result of sample collected from the final treated water storage tank of common-ETP, cyanide value has been found Below Detectable Limit (BDL). - However, significant concentration of Cyanide was found in sample collected from common-STP inlet (3.19 mg/l) and detectable concentration was found in Pre ETP-1 inlet (0.23 mg/l) & Pre-ETP-1 outlet (0.16 mg/l). 	<ul style="list-style-type: none"> - Joint inspection confirms that unit has no CN in the output of the ETP and no CN is being discharged. Thus, no environmental harm is being caused and there is no violation of any law. - This finding is <i>ex facie</i> erroneous, inherently contradictory and anomalous for the reasons detailed in paras 3-8 of the present Reply.
9)	The unit shall check pH	- As per analysis	- <i>Ex facie</i> , both the





1514

S.No.	Recommendations as per previous Joint inspection dated 10.12.2020	Status as per Joint inspection dated 30.06.2021 to 02.07.2021	Comments of Respondent No.1
	<p>of treated sewage and maintain it in the range of 6.5-8.5 before pumping for horticulture use and FC concentration should be brought down below 1000 MPN/100 mL.</p>	<p>results, the STP inlet is not a representative sample of sewage as it shows significant concentration of BOD (1720 mg/l), COD (5158 mg/l) and heavy metals (CN-3.19 mg/l, Cr-1.45 mg/l, Cu-7.18 mg/l, Fe-75.60 mg/l, Mn-3.0 mg/l, Ni-10.42 mg/l, Pb-3.44 mg/l, Zn-17.35 mg/l), which are not representing the characteristics of sewage and indicates the mixing of industrial effluent with the domestic sewage.</p> <ul style="list-style-type: none">- As per the analysis result of common-STP outlet, pH value has been found 7.2, which is complying w.r.t the prescribed domestic effluent discharge standard of pH-6.5-9.0 (for on land application) as per the Consent to Operate granted by UPPCB.- FC concentration of sample of treated sewage has been found 9.1 MPN/100 ml.- As per the analysis results of treated sewage from	<p>finding and inference is erroneous, inherently contradictory and anomalous for the reasons detailed in paras 3-8 of the present Reply.</p> <ul style="list-style-type: none">- Joint inspection confirms that unit has complied w.r.t pH value- Joint inspection confirms that unit has complied w.r.t FC concentration- While this is a new observation, the



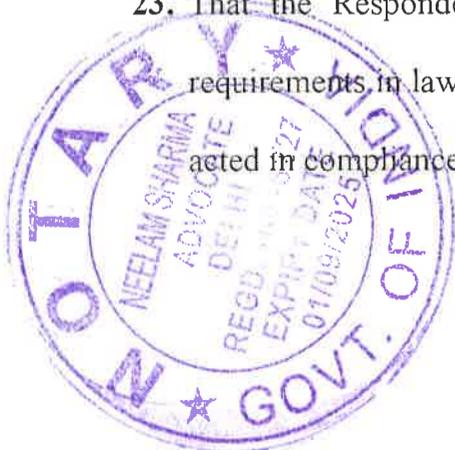


1515

S.No.	Recommendations as per previous Joint inspection dated 10.12.2020	Status as per Joint inspection dated 30.06.2021 to 02.07.2021	Comments of Respondent No.1
		common-STP to treated sewage used in horticulture, concentration of Fe-0.08 mg/l to 0.62 mg/l, Mn-0.05 mg/l to 0.17 mg/l, Ni-0.06 mg/l to 0.07 mg/l, Pb-BDL to 0.02 mg/l and Zn-0.02 mg/l to 0.08 mg/l has been found.	concentrations mentioned are well within the standards prescribed by law, as extracted in Exhibit 1 (colly.).

22. That the joint inspection report of 30.07.2021 was uploaded only on 30.07.2021 (a Friday) after office hours, and a copy provided to the Respondent No. 1 at that time only. I state that had the joint inspection report of 30.07.2021 been served on the Respondent No. 1 for a reply, these appropriate clarifications could have been provided beforehand and could have been duly addressed by the CPCB/joint inspection team in the final report filed with this Hon'ble NGT. It is reiterated that in any event, the latest report confirms all compliances are done, and even the limited new issues raised in the report lack a factual foundation. Even otherwise, these do not amount to a violation of the law. The contents of paras 3-9 of the present Reply are reiterated.

23. That the Respondent No. 1 company has otherwise complied with all requirements in law as well as this Hon'ble Tribunal's orders and has always acted in compliance with the law.



1516

23. That the Respondent No. 1 company has otherwise complied with all requirements in law as well as this Hon'ble Tribunal's orders and has always acted in compliance with the law.
24. That, accordingly, our consents to operate be renewed in accordance with law.
25. That the present reply is being filed *bona fide*.
26. That the documents being filed with the present reply are the true and correct copies of the original.
27. That the contents of this affidavit are true to the best of my knowledge and belief as per the records maintained by the Respondent No. 1 company.

Identify the Deponent who has signed/put T. in my presence!



VERIFICATION

I, Teevra Gupta, the deponent, do hereby verify that the contents of this Affidavit from Paragraph 1 to 27 are true to my personal knowledge and belief.

Signed and verified on this 10.8.2021 day of August 2021 at Delhi.



ATTESTED
NOTARY (Govt. of India)
Neelam Sharma
Advocate
Ch. No. 1500, Gate No. No. 11,
Paliya House Courts,
New Delhi-110001
Mr. 9899408301



10 AUG 2021

¹[SCHEDULE – VI]
(See rule 3A)

**GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENTAL
POLLUTANTS PART-A : EFFLUENTS**

S. No.	Parameter	Standards			
		Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	2	3			
		(a)	(b)	(c)	(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 percent above total suspended matter of influent.
3.	Particulate size of suspended solids	Shall pass 850 micron IS Sieve	--	--	(a) Floatable solids, max. 3 mm. (b) Settleable solids, max. 850 microns.
² 4.	***	*	--	***	--
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

¹ Schedule VI inserted by Rule 2(d) of the Environment (Protection) Second Amendment Rules, 1993 notified vide G.S.R. 422(E) dated 19.05.1993, published in the Gazette No. 174 dated 19.05.1993.

² Omitted by Rule 2(d)(i) of the Environment (Protection) Third Amendment Rules, 1993 vide Notification No.G.S.R.801(E), dated 31.12.1993.

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S. No.	Parameter	Standards			
		Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	2	3			
		(a)	(b)	(c)	(d)
7.	Oil and grease mg/l Max.	10	20	10	20
8.	Total residual chlorine mg/l Max.	1.0	--	--	1.0
9.	Ammonical nitrogen (as N), mg/l Max.	50	50	--	50
10.	Total Kjeldahl Nitrogen (as NH ₃) mg/l, Max.	100	--	--	100
11.	Free ammonia (as NH ₃) mg/l, Max.	5.0	--	--	5.0
12.	Biochemical Oxygen demand ¹ [3 days at 27°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

¹ Substituted by Rule 2 of the Environment (Protection) Amendment Rules, 1996 notified by G.S.R.176, dated 2.4.1996 may be read as BOD (3 days at 27°C) wherever BOD 5 days 20°C occurred.

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S. No.	Parameter	Standards			
		Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	2	3			
		(a)	(b)	(c)	(d)
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
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
¹ 24.	***	*	*	*	*
¹ 25.	***	*	*	*	*
¹ 26.	***	*	*	*	*
27.	Cyanide (as CN) mg/l Max.	0.2	2.0	0.2	0.2
¹ 28.	***	*	*	*	*
29.	Fluoride (as F) mg/l Max.	2.0	15	--	15
30.	Dissolved Phosphates (as P), mg/l Max.	5.0	--	--	--
² 31.	***	*	*	*	*
32.	Sulphide (as S) mg/l Max.	2.0	--	--	5.0
33.	Phenoile compounds (as C ₆ H ₅ OH) mg/l, Max.	1.0	5.0	--	5.0

¹ Omitted by Rule 2(d)(i) of the Environment (Protection) Third Amendment Rules, 1993 vide Notification No.G.S.R.801(E), dated 31.12.1993.

S. No.	Parameter	Standards			
		Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	2	3			
		(a)	(b)	(c)	(d)
34.	Radioactive materials :				
	(a) Alpha emitter micro curie/ml.	10^{-7}	10^{-7}	10^{-8}	10^{-7}
	(b) Beta emitter micro curie/ml.	10^{-6}	10^{-6}	10^{-7}	10^{-6}
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.	***	*	*	*	*

¹ Omitted by Rule 2(d)(i) of the Environment (Protection) Third Amendment Rules, 1993 vide Notification No. G.S.R. 801(E) dated 31.12.1993

WASTE WATER GENERATION STANDARDS - PART-B

S.No.	Industry	Quantum
1.	Integrated Iron & Steel	16 m ³ /tonne of finished steel
2.	Sugar	0.4 m ³ /tonne of cane crushed
3.	Pulp & Paper Industries	
	(a) Larger pulp & paper	
	(i) Pulp & Paper	175 m ³ /tonne of paper produced
	(ii)Viscose Staple Fibre	150 m ³ /tonne of product
	(iii)Viscose Filament Yarn	500 m ³ /tonne of product
	(b) Small Pulp & Paper :	
	(i) Agro residue based	150 m ³ /tonne of paper produced
	(ii) Waste paper based	50 m ³ /tonne of paper produced
4.	Fermentation Industries :	
	(a) Maltry	3.5 m ³ /tonne of grain produced
	(b) Brewery	0,.25 m ³ /KL of beer produced
	(c) Distillery	12 m ³ /KL of alcohol produced
5.	Caustic Soda	
	(a) Membrane cell process	1 m ³ /tonne of caustic soda produced excluding cooling tower blowdown
	(b) Mercury cell process	4 m ³ /tonne of caustic soda produced (mercury bearing) 10% blowdown permitted for cooling tower
6.	Textile Industries : Man-made Fibre	
	(i) Nylon & Polyester	120 m ³ /tonne of fibre produced
	(ii) Vixcose rayon	150 m ³ /tonne of product
7.	Tanneries	28 m ³ /tonne of raw hide
8.	Starch. Glucose and related products	8 m ³ /tonne of maize crushed
9.	Dairy	3 m ³ /KL of Milk

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- 10. Natural rubber processing industry 4 m³/tonne of rubber
- 11. Fertilizer
 - (a) Straight nitrogenous fertilizer 5 m³/tonne of urea or equivalent produced
 - (b) Straight phosphatic fertilizer (SSP & TSP) excluding manufacture of any acid 0.5 m³/tonne of SSP/TSP
 - (c) Complex fertilizer Standards of nitrogenous and phosphatic fertilizers are applicable depending on the primary product

LOAD BASED STANDARDS - PART-C

¹[1. Petroleum Oil Refinery:

Parameter 1	Standard 2
	Quantum limit in Kg/l 1,000 tonne of crude processed
1. Oil & Grease	2.0
2. BOD _{3 days, 27° C}	6.0
3. COD	50
4. Suspended Solids	8.0
5. Phenols	0.14
6. Sulphides	0.2
7. CN	0.08
8. Ammonia as N	6.0
9. TKN	16
10. P	1.2
11. Cr (Hexavalent)	0.04
12. Cr(Total)	0.8
13. Pb	0.04
14. Hg	0.004
15. Zn	2.0
16. Ni	0.4
17. Cu	0.4
18. V	0.8
19. Benzene	0.04
20. Benzo (a) – Pyrene	0.08

¹ Substituted by Rule 2(ii)(a) of the Environment (Protection) Amendment Rules, 2008 notified by G.S.R.186(E), dated 18.3.2008

Notes:

- (i) Quantum limit shall be applicable for discharge of total effluent (process effluent, cooling water blow down including sea cooling water blow down, washings, etc.) to receiving environment (excluding direct application on land for irrigation/horticulture purposes within the premises of refinery).
- (ii) In order to measure the quantity of effluent (separately for discharge to receiving environment, application for irrigation/horticulture purposes within the premises of refinery & blow-down of cooling systems), appropriate flow measuring devices (e.g. V-notch, flow meters) shall be provided with.
- (iii) Quantum of pollutants shall be calculated on the basis of daily average of concentration values (one 24-hourly composite sample or average of three grab samples, as the case may be), average flow of effluent during the day and crude throughput capacity of the refinery.
- (iv) Limit for quantity of effluent discharged (excluding blow-down from seawater cooling) shall be 400 m³/1000 tonne of crude processed. However, for refineries located in high rain fall area, limit of quantity of effluent only during rainy days shall be 700 m³/1000 tonne of crude processed].

- 2. Large Pulp & Paper, News Print/ Rayon grade Plants of capacity above 24000 tonne/ Annum

Parameter	Quantum
Total Organic Chloride (TOCI)	2 kg/tonne of product.

GENERAL EMISSION STANDARDS - PART-D

I. Concentration Based Standards

Sl. No.	Parameter	Standard Concentration not to exceed (in mg/Nm ³)
1.	Particulate Matter (PM)	150
2.	Total Fluoride	25
3.	Asbestos	4 Fibres/cc and dust should not be more than 2 mg/Nm ³

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4.	Mercury	0.2
5.	Chlorine	15
6.	Hydrochloric acid vapour and mist	35
¹ 7.	***	*
8.	Sulphuric acid mist	50
9.	Carbon monoxide	1% max. (v/v)
¹ 10.	***	*
11.	Lead	10 mg/Nm ³
¹ 12.	***	*

II. Equipment based Standards

²[For dispersal of sulphur dioxide, in minimum stack height limit is accordingly prescribed as below]

Sl. No.	Parameter	Standard
1.	Sulphur dioxide	Stack-height limit in metre
	(i) Power generation capacity :	
	- 500 MW and more	275
	- 200/210 MW and above to less than 500 MW	220
	- less than 200/210 MW	$H=14(Q)^{0.3}$
	(ii) Steam generation capacity	
	- Less than 2 tonne/h	Less than 8.5 MT 9
	- 2 to 5 tonne/h	8.5 to 21 MT 12
	- 5 to 10 tonne/h	21 to 42 MT 15
	- 10 to 15 tonne/h	42 to 64 MT 18
	- 15 to 20 tonne/h	64 to 104 MT 21
	- 20 to 25 tonne/h	104 to 105 MT 24
	- 25 to 30 tonne/h	105 to 126 MT 27
	- More than 30 tonne/h	More than 126 MT 30
		or using the formula $H=14(Q)^{0.3}$

¹ Omitted by Rule 2 (g) (iv) of the Environment (Protection) Third Amendment Rules, 1993 vide G.S.R. 801(E) dated 31.12.1993.

² Substituted by Rule 2(h)(i), *ibid.*

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Note : H – Physical height of the stack in metre
Q – Emission rate of SO₂ in kg/hr.

III. Load/Mass based Standards

Sl. No.	Industry	Parameter	Standard	
1.	Fertiliser (Urea)	Particulate Matter (PM)	2 kg/tonne of product	
	Commissioned Prior to 1.1.82			
	Commissioned after 1.1.82	Particulate Matter (PM)	0.5 kg/tonne of product	
2.	Copper, Lead and Zinc Smelter/converter	Sulphur dioxide	4 kg/tonne of concentrated (100% acid produced)	
3.	Nitric Acid	Oxides of Nitrogen	3 kg/tonne of weak acid (before concentration) produced	
¹ [4.	Sulphuric Acid Plant		Quantum Limit in kg/tonne Plant capacity for 100% Existing Unit New Unit concentration of	
		Sulphuric Acid (tonne/day)		
		Sulphur dioxide (SO ₂)	Upto 300	2.5 2.0
			Above 100	2.0 1.5]
5.	Coke Oven	Carbon Monoxide	3 kg/tonne of coke produced.	
² [6.	Petroleum Oil Refinery (Sulphur Recovery)	Installed Capacity of SRU* (tonne/day)	Kg/tonne of sulphur in the feed to SRU	
		Sulphur Dioxide	Above 20	Existing SRU New SRU 26 10
			5 to 20	80 40
			Upto 5	120 80

* SRU – Sulphur Recovery Unit]

¹ Substituted by Rule 2(ii) of the Environment (Protection) Third Amendment Rules, 2008 notified by G.S.R.344(E), dated 7.5.2008.

² Substituted by Rule 2 of the Environment (Protection) Fifth Amendment Rules, 2009 notified by G.S.R.595(E), dated 21.8.2009.

7. Aluminium Plants :

(i)	Anode Bake Oven Total Fluoride		0.3 Kg/MT of Aluminium
(ii)	Pot room		
(a)	VSS	-do-	4.7 Kg/MT of Aluminium
(b)	HSS	-do-	6 Kg/MT of Aluminium
(c)	PBSW	-do-	2.5 Kg/MT of Aluminium
(d)	PBCW	-do-	1.0 Kg/MT of Aluminium

Note :	VSS =	Vertical Stud Soderberg
	HSS =	Horizontal Stud Soderberg
	PBSW =	Pre Backed Side Work
	PBCW =	Pre Backed Centre Work

8. Glass Industry :

(a)	Furnace Capacity		
(i)	Up in the product draw Particulate matter 2 Kg/hr ca capacity of 60 MTD/Day		
(ii)	Product draw capacity more than 60 MT/Day	-do-	0.8 Kg/MT of Product drawn

***NOISE STANDARDS - PART-E**

A.	Noise Limits for Automobiles (Free Field Distance at 7.5 Metre in dB(A) at the manufacturing Stage	
(a)	Motorcycle, Scooters & Three Wheelers	80
(b)	Passenger Cars	82
(c)	Passenger or Commercial vehicles upto 4 MT	85
(d)	Passenger or Commercial vehicles above 4 MT and upto 12 MT	89
(e)	Passenger or Commercial vehicles exceeding 12MT	91

* Standards notified at S. No. 46 may also be referred.

¹[AA. Noise limits for vehicles at manufacturing stage

The test method to be followed shall be IS:3028-1998.

(1) Noise limits for vehicles applicable at manufacturing stage from the year 2003

Serial Number	Type of vehicle	Noise limits dB(A)	Date of implementation
(1)	(2)	(3)	(4)
1.	Two wheeler		1 st January, 2003
	Displacement upto 80 cm ³	75	
	Displacement more than 80 cm ³ but upto 175 cm ³	77	
	Displacement more than 175 cm ³	80	
2.	Three wheeler		1 st January, 2003
	Displacement upto 175 cm ³	77	
	Displacement more than 175 cm ³	80	
3.	Passenger Car	75	1 st January, 2003
4.	Passenger or Commercial Vehicles		1 st July, 2003
	Gross vehicle weight upto 4 tonnes	80	
	Gross vehicle weight more than 4 tonnes but upto 12 tonnes.	83	
	Gross vehicle weight more than 12 tonnes.	85	

(2) Noise limits for vehicles at manufacturing stage applicable on and from 1st April, 2005

Serial Number	Type of vehicles	Noise limits dB(A)
1.0	Two wheelers	
1.1	Displacement upto 80 cc	75
1.2	Displacement more than 80 cc but upto 175 cc	77
1.3	Displacement more than 175 cc	80
2.0	Three wheelers	
2.1	Displacement upto 175 cc	77
2.2	Displacement more than 175 cc	80
3.0	Vehicles used for the carriage of passengers and capable of having not more than nine seats, including the driver's seat	74

¹ Substituted by Rule 2 of the Environment (Protection) Fourth Amendment Rules, 2002 notified vide Notification G.S.R. 849(E), dated 30.12.2002 (Earlier 'AA - Noise limits for vehicles w.e.f. 1st January 2003' inserted by Rule 2 (2) of the Environment (Protection) Amendment Rules, 2000 notified vide Notification G.S.R. 742(E), dated 25.9.2000.)

4.0	Vehicles used for the carriage of passengers having more than nine seats, including the driver's seat, and a maximum Gross Vehicle Weight (GVW) of more than 3.5 tonnes	
4.1	With an engine power less than 150 KW	78
4.2	With an engine power of 150 KW or above.	80
5.0	Vehicles used for the carriage of passengers having more than nine seats, including the driver's seat : vehicles used for the carriage of goods.	
5.1	With a maximum GVW not exceeding 2 tonnes	76
5.2	With a maximum GVW greater than 3 tonnes but not exceeding 3.5 tonnes	77
6.0	Vehicles used for the transport of goods with a maximum GVW exceeding 3.5 tonnes.	
6.1	With an engine power less than 75 KW	77
6.2	With an engine power of 75 KW or above but less than 150 KW.	78
6.3	With an engine power of 150 KW or above.	80]

¹[Provided that for vehicles mentioned at serial numbers 3.0 to 6.3, the noise limits for the following States shall be applicable on and from the date specified against that State,-

- (i) Himachal Pradesh with effect from 1st October, 2005
- (ii) Jammu and Kashmir with effect from 1st October, 2005
- (iii) Madhya Pradesh with effect from 1st September, 2005
- (iv) Punjab with effect from 1st October, 2005
- (v) Rajasthan with effect from 1st June, 2005
- (vi) Uttar Pradesh (Mathura, Kannauj, Muzaffarnagar, Aligarh, Farukkabad, Saharanpur, Badaun, Barreily, Moradabad, Hathras, Rampur, Bijnor, Agra, Pilibhit, J.P. Nagar, Mainpuri, Lalitpur, Hardio, Ferozabad, Jhansi, Shahjahanpur, Etawah, Jalon, Lakhimpur, Kheri, Etah, Mahoba, and Sitapur) with effect from 1st June, 2005.
- (vii) Uttranchal with effect from 1st July, 2005.]

B. Domestic appliances and construction equipments at the manufacturing stage to be achieved by 31st December, 1993.

- | | |
|---|------|
| (a) Window Air Conditioners of 1 ton to 1.5 ton | 68 |
| (b) Air Coolers | 60 |
| (c) Refrigerators | 46 |
| ² [(d) * * * | ...] |
| (e) Compactors (rollers), Front Loaders, Concrete mixers, Cranes (moveable), Vibrators and Saws | 75 |

¹ Inserted by the Environment (Protection) Amendment Rules, 2005 notified vide Notification G.S.R.272 (E), dated 5.5.2005.

² Entry (d) relating to 'Diesel Generator of Domestic Purposes.....85 - 90' omitted by Rule 3 of the Environment (Protection) Second Amendment, Rules, 2002 notified vide Notification G.S.R. 371(E), dated 17.5.2002.

ANNEXURE-I

(For the purposes of Parts – A, B and C)

The State Boards shall following guide-lines in enforcing the standards specified under the schedule VI :

- (1) the waste waters and gases are to be treated with the best available technology (BAT) in order to achieve the prescribed standards.
- (2) the industries need to be encouraged for recycling and reuse, of waste materials as far as practicable in order to minimize the discharge of wastes into the environments.
- (3) the industries are to be encouraged for recovery of biogas, energy and reusable materials.
- (4) while permitting the discharge of effluent and emission into the environment, State Boards have to take into account the assimilative capacities of the receiving bodies, especially water bodies so that quality of the intended use of the receiving waters is not affected. Where such quality is likely to be effected discharges should not be allowed into water bodies.
- (5) the Central and State Boards shall put emphasis on the implementation of clean technologies by the industries in order to increase fuel efficiency and reduce the generation of environmental pollutants.
- (6) All efforts should be made to remove colour and unpleasant odour as far as practicable.
- (7) The standards mentioned in the Schedule shall also apply to all other effluents discharged such as industrial mining, and mineral processing activities and sewage.
- (8) the limit given for the total concentration of mercury in the final effluent of caustic soda industry, is for the combined effluent from (a) Cell house, (b) Brine Plant, (c) Chlorine handling, (d) hydrogen handling and (e) hydro choleric acid plant.
- (9) ¹[(a)...(f)]
- (10) All effluents discharge including from the industries such as cotton textile, composite woolen mills, synthetic rubber, small pulp & paper, natural rubber, petro-chemicals, tanneries, point dyes,

¹ Omitted by Rule 4 of the Environment (Protection) Rules, 1996 notified by notification G.S.R. 176(E), dated 2.4.1996.

slaughter houses, food & fruit processing and diary industries into surface waters shall conform to be BOD limit specified above, namely 30 mg/l. For discharge an effluent having a BOD more than 30 mg./l, the standards shall conform to those given, above for other receiving bodies, namely, sewers, coastal waters, and land for irrigation.

- (11) ¹[***]
- (12) In case of fertilizer industry the limits in respect of chromium and fluoride shall be complied with at the outlet of chromium and fluoride removal units respectively.
- (13) In case of pesticides :
- (a) The limits should be complied with at the end of the treatment plant before dilution.
 - (b) Bio-assay test should be carried out with the available species of fish in the receiving water, the COD limits to be specified in the consent conditions should be correlated with the BOD limits.
 - (c) In case metabolites and isomers of the Pesticides in the given list are found in significant concentration, standards should be prescribed for these also in the same concentration as the individual pesticides.
 - (d) Industries are required to analyze pesticides in waste water by advanced analytical methods such as GLC/HPLC.
- (²14) The chemical oxygen demands (COD) concentration in a treated effluent, if observed to be persistently greater than 250 mg/l before disposal to any receiving body (public sewer, land for irrigation, inland surface water and marine coastal areas), such industrial units are required to identify chemicals causing the same. In case these are found to be toxic as defined in the Schedule I of the Hazardous Rules 1989 the State Board in such cases shall direct the industries to install tertiary treatment stipulating time limit.
- (15) Standards specified in Part A of Schedule – VI for discharge of effluent into the public sewer shall be applicable only if such sewer leads to a secondary treatment including biological treatment system, otherwise the discharge into sewers shall be treated as discharge into inland surface waters].

¹ Omitted by Rule. 2(k) (vii) of the Environment (Protection) Third amendment Rules, 1993 vide G.S.R. 801 (E), dated 31.12.1993.

² Inserted by rule 2(k) (ix), *ibid.*

ANNEXURE-II

(For the purpose of Part-D)

The State Boards shall follow the following guidelines in enforcing the standards specified under Schedule VI:

- (a) In case of cement plants, the total dust (from all sections) shall be within 400 mg/Nm³ and 250 mg/Nm³ for the plants upto 200 t/d and more than 200 t/d capacities respectively.
- (b) In respect of calcinations process (e.g. Aluminum Plants) Kilns. and step Grate Bagasse fired-Boilers. Particulate Matter (PM) emissions shall be within 250 mg/Nm³.
- (c) In case of thermal power plants commissioned prior to 01.01.1982 and having generation capacity less than 62.5 MW, the PM emission shall be within 350 mg/Nm³.
- (d) In case of Lime Kilns of capacity more than 5 t/day and upto 40 t/day, the PM emission shall be within 500 mg/Nm³.
- (e) In case of horse shoe/pulsating Grate and Spreader Stroker Bagasse-fired-Boilers, the PM emission shall be within 500 (12% CO₂) and 800 (12% CO₂) mg/Nm³ respectively. In respect of these boilers, if more than attached to a single stack, the emission standards shall be fixed, based on added capacity of all the boilers connected with the stack.
- (f) In case of asbestos dust, the same shall not exceed 2mg/Nm³.
- (g) In case of the urea plants commissioned after 01.01.92, coke ovens and lead glass units, the PM emission shall be within 50 mg/Nm³.
- (h) In case of small boilers of capacity less than 2 tons/hour and between 2 to 5 tons/ hour, the PM emissions shall be within 1000 and 1200 mg/Nm³.
- (i) In case of integrated Iron and Steel Plants, PM emission upto 400 mg/Nm³ shall be allowed during oxygen lancing.

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- (j) In case of stone crushing units, the suspended PM contribution value at a distance of 40 meters from a controlled, isolated as well as from a unit located in cluster should be less than 600 micrograms/Nm³.¹[* * *] These units must also adopt the following pollution control measures :
- (i) Dust containment cum suppression system for the equipment;
 - (ii) Construction of wind breaking walls;
 - (iii) Construction of the metalled roads within the premises;
 - (iv) Regular cleaning and wetting of the ground within the premises;
 - (v) Growing of a green belt along with periphery.
- (k) In case of Ceramic industry, from the other sources of pollution, such as basic raw materials and processing operations, heat recovery dryers, mechanical finishing operation, all possible preventive measures should be taken to control PM emission as far as practicable.
2. The total fluoride emission in respect of Glass and Phosphatic Fertilizers shall not exceed 5 mg/Nm³ and 25 mg/Nm³ respectively.
- ²3. [In case of copper, lead and zinc smelting, the off-gases may, as far as possible, be utilized for manufacturing sulphuric acid]
- ³4. [In case of cupolas (Foundries) having capacity (melting rate) less than 3 tonne/hour, the particulate matter emission shall be within 450 mg/Nm³. In these cases it is essential that stack is constructed over the cupolas beyond the charging door and the emissions are directed through the stack, which should be at least six times the diameter of cupola. In respect of Arc Furnaces and Induction Furnaces, provision has to be made for collecting the fumes before discharging the emissions through the stack].

[No. Q-15017/24/89-CPW]
MUKUL SANWAL, Jt. Secy.

¹ Omitted by Rule 2(i)(iii) of the Environment (Protection) Third Amendment Rules, 1993, vide G.S.R. 801(E) dated 31.12.1993.

² Substituted by Rule 2(1)(i); Ibid.

³ Added by Rule 2(1)(ii), Ibid.


भारत का राजपत्र
The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)

PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित

PUBLISHED BY AUTHORITY

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पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 1 जनवरी, 2016

का.आ. 4(अ).-- केन्द्रीय सरकार, पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 6 और धारा 25 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, पर्यावरण (संरक्षण) नियम, 1986 का और संशोधन करने के लिए निम्नलिखित नियम बनाती है, अर्थात् :-

1. संक्षिप्त नाम और प्रारम्भ.—(1) इन नियमों का संक्षिप्त नाम (पर्यावरण) संशोधन नियम, 2015 है।

(2) ये राजपत्र में प्रकाशन की तारीख को प्रवृत्त होंगे।

2. पर्यावरण (संरक्षण) नियम, 1986 की अनुसूची 1 में,-

(क) क्रम संख्या 41 और उससे संबंधित प्रविष्टियों का लोप किया जाएगा;

(ख) क्रम संख्या 55 और उससे संबंधित प्रविष्टियों के स्थान पर, निम्नलिखित क्रम संख्या और प्रविष्टियां रखी जाएंगी:-

क्रम संख्या	उद्योग	पैरामीटर	मानक
(1)	(2)	(3)	(4)
"55.	सामान्य बहिःस्त्राव उपचार संयंत्र (सीईटीपी)		
	क. अंतर्गम क्वालिटी मानक	प्रत्येक सामान्य बहिःस्त्राव उपचार संयंत्र (सीईटीपी) के लिए, राज्य बोर्ड सामान्य बहिःस्त्राव उपचार संयंत्र (सीईटीपी) तथा स्थानीय आवश्यकताओं और दशाओं की अभिकल्पना के अनुसार साधारण पैरामीटर, अमोनियम - नाइट्रोजन और भारी धातुओं के लिए अंतर्गम क्वालिटी मानक विहित करेगा।	

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ख. उपचारित बहिःस्राव क्वालिटी मानक	अधिकतम अनुज्ञेय मान (पीएच और तापमान के सिवाय मिलीग्राम/लीटर में)		
	अंतर्देशीय भूपृष्ठ-जल में	सिंचाई के लिए भूमि पर	समुद्र में
साधारण पैरामीटर			
पीएच	6-9	6-9	6-9
जैव आक्सीजन मांग, बीओडी ₃ , 27 ⁰ सेंटीग्रेड	30	100	100
रासायनिक आक्सीजन मांग (सीओडी)	250	250	250*
कुल निलंबित ठोस पदार्थ (टीएसएस)	100	100	100
नियत विघटित ठोस पदार्थ (एफडीएस)	2100*	2100*	एनएस*
विनिर्दिष्ट पैरामीटर			
तापमान, ⁰ सेंटीग्रेड	परिवेशी जल तापमान के ऊपर 5 ⁰ सेंटीग्रेड से अधिक नहीं होगा	परिवेशी जल तापमान के ऊपर 5 ⁰ सेंटीग्रेड से अधिक नहीं होगा	परिवेशी जल तापमान के ऊपर 5 ⁰ सेंटीग्रेड से अधिक नहीं होगा
तेल और ग्रीज	10	10	10
अमोनियामय नाइट्रोजन	50	एनएस*	50
कुल जेलडेहल नाइट्रोजन (टीकेएन)	50	एनएस*	50
नाइट्रेट नाइट्रोजन	10	एनएस*	50
फास्फेट, पी के रूप में	5	एनएस*	एनएस*
क्लोराइड	1000	1000	एनएस*
सल्फेट एसओ ₄ के रूप में	1000	1000	एनएस*
फ्लोराइड	2	2	15
सल्फाइट, एस के रूप में	2	2	5
फैनोलिक यौगिक मिश्रण	1	1	5

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(सी ₆ एच ₅ ओएच) के रूप में				
योग अवशिष्ट क्लोरीन	1	1	1	1
जस्त	5	15	15	15
लौहा	3	3	3	3
तांबा	3	3	3	3
त्रिसंयोजक क्रोमियम	2	2	2	2
मैगनीज	2	एनएस*	2	2
निकिल	3	एनएस*	3	3
आर्सेनिक	0.2	एनएस*	0.2	0.2
साइनाइड सीएन के रूप में	0.2	एनएस*	0.2	0.2
वेनेडियम	0.2	एनएस*	0.2	0.2
सीसा	0.1	एनएस*	0.1	0.1
हैक्सावैलेंट क्रोमियम	0.1	एनएस*	0.1	0.1
सेलेनियम	0.05	एनएस*	0.05	0.05
कैडमियम	0.05	एनएस*	0.05	0.05
पारा	0.01	एनएस*	0.01	0.01
जैव आमापन परीक्षण	उद्योग विनिर्दिष्ट मानकों के अनुसार			
<p>एनएस* विनिर्दिष्ट नहीं है टिप्पणः</p> <p>1. *समुद्र में उपचारित बहिःस्राव का निस्सरण उचित समुद्री मुहाने के माध्यम से होगा। विद्यमान अपतट निस्सरण समुद्री मुहाने में संपरिवर्तित किया जाएगा। उन मामलों में जहां निस्सरण के बिंदु पर समुद्री मुहाना 150 गुणा न्यूनतम आरंभिक तनुकरण का और निस्सरण बिंदु से 100 मीटर दूर किसी बिंदु पर 1500 गुणा न्यूनतम तनुकरण का उपबंध करता है वहां राज्य बोर्ड सीओडी सीमा में छूट दे सकेगा :</p> <p>परंतु उपचारित बहिःस्राव में रासायनिक आक्सीजन मांग के लिए अधिकतम अनुज्ञेय मान 500 मिलिग्राम/लीटर से अधिक नहीं होगा।</p> <p>2. *सामान्य बहिःस्राव उपचार संयंत्र (सीईटीपी) की संघटक यूनिटों द्वारा अधिकतम अनुज्ञेय योगदान नियत विघटित ठोस पदार्थ (एफडीएस) 1000 मिली ग्राम/लीटर होगा। उन मामलों में जहां संघटक यूनिटों द्वारा प्रयोग किए गए कच्चे पानी में नियत विघटित ठोस पदार्थ (एफडीएस) पहले से ही अधिक है (अर्थात् यह 1100 मिली ग्राम/लीटर से अधिक है) वहां उपचारित बहिःस्राव में नियत विघटित ठोस पदार्थ (एफडीएस) के लिए अधिकतम अनुज्ञेय मान राज्य बोर्ड द्वारा तदनुसार उपांतरित किया जाएगा।</p> <p>3. सिंचाई के लिए भूमि पर उपचारित बहिःस्राव के निस्सरण की दशा में, मृदा और भूजल क्वालिटी पर समाघात सामान्य बहिःस्राव उपचार संयंत्र (सीईटीपी) प्रबंध द्वारा वर्ष में दो बार (मानसून से पूर्व और उसके पश्चात्) मानीटर किया जाएगा। सिंचाई के लिए भूमि पर उपचारित बहिःस्राव और मल जल के संयुक्त निस्सरण के लिए, मलजल के साथ मिश्रण अनुपात राज्य बोर्ड द्वारा विहित किया</p>				

जाएगा।	
4. सेक्टर विनिर्दिष्ट मानकों से चयनित कुछ महत्वपूर्ण सेक्टरों के लिए विनिर्दिष्ट पैरामीटर।	
सेक्टर	विनिर्दिष्ट पैरामीटर
टैक्सटाइल	जैव आपन परीक्षण, कुल क्रोमियम, सल्फाइड, फैनोलिक यौगिक मिश्रण
इलैक्ट्रोप्लेटिंग उद्योग	तेल और ग्रीज, अमोनिया, नाइट्रोजन, निकिल, हैक्सावैलेंट क्रोमियम, कुल क्रोमियम, तांबा, जस्त, सीसा, लोहा, कैडमियम, सायनाइड, फ्लोराइड, सल्फाइड, फास्फेट, सल्फेट
चर्म शोधनशाला	सल्फाइड, कुल क्रोमियम, तेल और ग्रीज, क्लोराइड
रंजक और रंजक इंटरमिडिएट	तेल और ग्रीज, फैनोलिक यौगिक मिश्रण, कैडमियम, तांबा, मैगनीज, सीसा, पारा, निकिल, जस्त, हैक्सावैलेंट क्रोमियम, कुल क्रोमियम, जैव-आमापन परीक्षण, क्लोराइड, सल्फेट
जैविक रासायनिक विनिर्माण उद्योग	तेल और ग्रीज, जैव-आमापन परीक्षण, नाइट्रेट, आर्सेनिक, हैक्सावैलेंट क्रोमियम, कुल क्रोमियम, सीसा, साइनाइड, जस्त, पारा, तांबा, निकिल, फैनोलिक यौगिक मिश्रण, सल्फाइड
भेषजी उद्योग	तेल और ग्रीज, जैव-आमापन परीक्षण, पारा, आर्सेनिक, हैक्सावैलेंट क्रोमियम, सीसा, साइनाइड, फैनोलिक यौगिक मिश्रण, सल्फाइड, फास्फेट

[फा.सं. क्यू-15017/18/2014-सीपीडब्ल्यू]

डा. राशिद हसन, सलाहकार

टिप्पण: मूल नियम भारत के राजपत्र, असाधारण, भाग II, खंड 3, उपखंड (i) में का.आ. सं. 844(अ), तारीख 19 नवंबर, 1986 द्वारा प्रकाशित किए गए थे और तत्पश्चात उनमें निम्नलिखित अधिसूचनाओं के द्वारा संशोधन किए गए :

का.आ. सं. 433(अ), तारीख 18 अप्रैल, 1987; सा.का.नि. सं. 176(अ), तारीख 2 अप्रैल, 1996; सा.का.नि. सं. 97(अ), तारीख 18 फरवरी, 2009; सा.का.नि. सं. 149(अ), तारीख 4 मार्च, 2009; सा.का.नि. सं. 543(अ), तारीख 22 जुलाई, 2009; सा.का.नि. सं. 739(अ), तारीख 9 सितंबर, 2010; सा.का.नि. सं. 809(अ), तारीख 4 अक्टूबर, 2010; सा.का.नि. सं. 215(अ), तारीख 15 मार्च, 2011; सा.का.नि. सं. 221(अ), तारीख 18 मार्च, 2011; सा.का.नि. सं. 354(अ), तारीख 2 मई, 2011; सा.का.नि. सं. 424(अ), तारीख 1 जून, 2011;

सा.का.नि. सं. 446(अ), तारीख 13 जून, 2011; सा.का.नि. सं. 152(अ), तारीख 16 मार्च, 2012; सा.का.नि. सं. 266(अ), तारीख 30 मार्च, 2012; सा.का.नि. सं. 277(अ), तारीख 31 मार्च, 2012; सा.का.नि. सं. 820(अ), तारीख 9 नवंबर, 2012; सा.का.नि. सं. 176(अ), तारीख 18 मार्च, 2013; सा.का.नि. सं. 535(अ), तारीख 7 अगस्त, 2013; सा.का.नि. सं. 771(अ), तारीख 11 दिसंबर, 2013; सा.का.नि. सं. 2(अ), तारीख 2 जनवरी, 2014; सा.का.नि. सं. 229(अ), तारीख 28 मार्च, 2014; सा.का.नि. सं. 232(अ), तारीख 31 मार्च, 2014; सा.का.नि. सं. 325(अ), तारीख 7 मई, 2014; सा.का.नि. सं. 612(अ), तारीख 25 अगस्त, 2014; सा.का.नि. सं. 789(अ), तारीख 11 नवंबर, 2014; और अंत में अधिसूचना का.आ. सं. 3305(अ), तारीख 7 दिसंबर, 2015 द्वारा संशोधन किए गए थे।

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 1st January, 2016

S.O. 4(E).—In exercise of the powers conferred by sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986, namely:—

1. **Short title and Commencement.**—(1) These rules may be called the Environment (Protection) Amendment Rules, 2015.
(2) They shall come into force on the date of their publication in the Official Gazette.
2. In the Environment (Protection) Rules, 1986, in Schedule-I,—
 - (a) the serial number 41 and the entries relating thereto, shall be omitted;
 - (b) for serial number 55 and the entries relating thereto, the following serial number and entries shall be substituted, namely:—

S. No.	Industry	Parameter	Standards		
(1)	(2)	(3)	(4)		
“55.	Common Effluent Treatment Plants (CETP)				
	A. Inlet Quality Standards	For each Common Effluent Treatment Plant (CETP), the State Board will prescribe Inlet Quality Standards for General Parameters, Ammonical-Nitrogen and Heavy metals as per design of the Common Effluent Treatment Plant (CETP) and local needs & conditions.			
	B: Treated Effluent Quality Standards		Max. permissible values (in milligram/litre except for pH and Temperature)		
			Into inland surface water	On land for irrigation	Into sea
		General Parameters			
		pH	6 - 9	6 - 9	6 - 9
		Biological Oxygen Demand, BOD ₃ , 27 °C	30	100	100
		Chemical Oxygen Demand (COD)	250	250	250 *
Total Suspended Solids (TSS)	100	100	100		
Fixed Dissolved Solids (FDS)	2100*	2100*	NS*		

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Specific parameters				
Temperature, °C	Shall not exceed more than 5°C above ambient water temperature	Shall not exceed more than 5°C above ambient water temperature	Shall not exceed more than 5°C above ambient water temperature	Shall not exceed more than 5°C above ambient water temperature
Oil & Grease	10	10	10	10
Ammonical –Nitrogen	50	NS*	50	50
Total Kjeldahl Nitrogen (TKN)	50	NS*	50	50
Nitrate- Nitrogen	10	NS*	50	50
Phosphates, as P	5	NS*	NS*	NS*
Chlorides	1000	1000	NS*	NS*
Sulphates, as SO ₄	1000	1000	NS*	NS*
Flouride	2	2	15	15
Sulphides, as S	2	2	5	5
Phenolic compounds (as C ₆ H ₅ OH)	1	1	5	5
Total Res. Chlorine	1	1	1	1
Zinc	5	15	15	15
Iron	3	3	3	3
Copper	3	3	3	3
Trivalent Chromium	2	2	2	2
Manganese	2	NS*	2	2
Nickel	3	NS*	3	3
Arsenic	0.2	NS*	0.2	0.2
Cyanide, as CN	0.2	NS*	0.2	0.2
Vanadium	0.2	NS*	0.2	0.2
Lead	0.1	NS*	0.1	0.1
Hexavalent Chromium	0.1	NS*	0.1	0.1
Selenium	0.05	NS*	0.05	0.05
Cadmium	0.05	NS*	0.05	0.05
Mercury	0.01	NS*	0.01	0.01
Bio-assay test	As per industry-specific standards			

*NS-Not specified

Notes:

1. *Discharge of treated effluent into sea shall be through proper marine outfall. The existing shore discharges shall be converted to marine outfalls. In cases where the marine outfall provides a minimum initial dilution of 150 times at the point of discharge and a minimum dilution of 1500 times at a point 100 m away from discharge point, then, the State Board may relax the Chemical Oxygen Demand (COD) limit:

<p>Provided that the maximum permissible value for Chemical Oxygen Demand (COD) in treated effluent shall be 500 milligram/litre.</p> <p>2. *Maximum permissible Fixed Dissolved Solids (FDS) contribution by constituent units of a Common Effluent Treatment Plant (CETP), shall be 1000 milligram/litre. In cases where Fixed Dissolved Solids (FDS) concentration in raw water used by the constituent units is already high (i.e. it is more than 1100 milligram/litre) then the maximum permissible value for Fixed Dissolved Solids (FDS) in treated effluent shall be accordingly modified by the State Board.</p> <p>3. In case of discharge of treated effluent on land for irrigation, the impact on soil and groundwater quality shall be monitored twice a year (pre- and post-monsoon) by Common Effluent Treatment Plants (CETP) management. For combined discharge of treated effluent and sewage on land for irrigation, the mixing ratio with sewage shall be prescribed by State Board.</p>	
4. Specific parameters for some important sectors, selected from sector-specific standards	
Sector	Specific Parameters
Textile	Bio-assay test, Total Chromium, Sulphide, Phenolic compounds
Electroplating Industries	Oil & Grease, Ammonia-Nitrogen, Nickel, Hexavalent Chromium, Total Chromium, Copper, Zinc, Lead, Iron, Cadmium, Cyanide, Fluorides, Sulphides, Phosphates, Sulphates,
Tanneries	Sulphides, Total Chromium, Oil & Grease, Chlorides
Dye & Dye Intermediate	Oil & Grease, Phenolic compounds, Cadmium, Copper, Manganese, Lead, Mercury, Nickel, Zinc, Hexavalent Chromium, Total Chromium, Bio-assay test, Chlorides, Sulphates,
Organic chemicals manufacturing industry	Oil & Grease, Bio-assay test, Nitrates, Arsenic, Hexavalent Chromium, Total Chromium, Lead, Cyanide, Zinc, Mercury, Copper, Nickel, Phenolic compounds, Sulphides
Pharmaceutical industry	Oil & Grease, Bio-assay test, Mercury, Arsenic, Hexavalent Chromium, Lead, Cyanide, Phenolic compounds, Sulphides, Phosphates."

[F. No. Q-15017/18/2014-CPW]

Dr. RASHID HASAN, Advisor

Note- The principal rules were published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i) *vide* number S.O. 844(E), dated the 19th November, 1986 and subsequently amended *vide* the following notifications:—

S.O. 433(E), dated the 18th April 1987; G.S.R. 176(E) dated the 2nd April, 1996; G.S.R. 97(E), dated the 18th February, 2009; G.S.R. 149(E), dated the 4th March, 2009; G.S.R. 543(E), dated the 22nd July, 2009; G.S.R. 739(E), dated the 9th September, 2010; G.S.R. 809(E), dated the 4th October, 2010, G.S.R. 215(E), dated the 15th March, 2011; G.S.R. 221(E), dated the 18th March, 2011; G.S.R. 354(E), dated the 2nd May, 2011; G.S.R. 424(E), dated the 1st June, 2011; G.S.R. 446(E), dated the 13th June, 2011; G.S.R. 152(E), dated the 16th March, 2012; G.S.R. 266(E), dated the 30th March, 2012; and G.S.R. 277(E), dated the 31st March, 2012; and G.S.R. 820(E), dated the 9th November, 2012; G.S.R. 176(E), dated the 18th March, 2013; G.S.R. 535(E), dated the 7th August, 2013; G.S.R. 771(E), dated the 11th December, 2013; G.S.R. 2(E), dated the 2nd January, 2014; G.S.R. 229 (E), dated the 28th March, 2014; G.S.R. 232(E), dated the 31st March, 2014; G.S.R. 325(E), dated the 07th May, 2014, G.S.R. 612(E), dated the 25th August, 2014; G.S.R. 789(E), dated the 11th November, 2014 and lastly amended *vide* notification S.O. 3305(E), dated the 7th December, 2015.



भारत का राजपत्र

The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (i)

PART II—Section 3—Sub-section (i)

प्राधिकार से प्रकाशित

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पर्यावरण और वन मंत्रालय

अधिसूचना

नई दिल्ली, 30 मार्च, 2012

सा.का.नि. 266(अ).—केन्द्रीय सरकार, पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 6 और धारा 25 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, पर्यावरण (संरक्षण) नियम, 1986 का और संशोधन करने के लिए निम्नलिखित नियम बनाती है, अर्थात्:-

- (1) इन नियमों का संक्षिप्त नाम पर्यावरण (संरक्षण) (द्वितीय संशोधन) नियम, 2012 है।
(2) ये राजपत्र में प्रकाशन की तारीख को प्रवृत्त होंगे।
- पर्यावरण (संरक्षण) नियम, 1986 की अनुसूची-1 में, "इलेक्ट्रोप्लेटिंग उद्योग" से सम्बन्धित क्रम संख्या 9 और उससे संबंधित प्रविष्टियों के स्थान पर निम्नलिखित संख्याक और प्रविष्टियां रखी जाएंगी, अर्थात् :-

क्र.सं.	उद्योग	पैरामीटर	मानक	
(1)	(2)	(3)	(4)	
"9.	इलेक्ट्रोप्लेटिंग, एनोडाइजिंग उद्योग	अ. बहिःस्राव मानक		
		सान्द्रण सीमा मि.ग्रा./लीटर में, pH और तापमान को छोड़कर		
		(i) अनिवार्य पैरामीटर		
		pH	6.0 से 9.0	
		तापमान	प्रापक निकाय के परिवेशी तापमान से 5° सेंटीग्रेड से अधिक नहीं	
		तेल व ग्रीस	10	
		निलम्बित ठोस कण	100	
कुल धातु	10			
ट्राइक्लोरोइथेन	0.1			
ट्राइक्लोरोइथाईलीन	0.1			

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(1)	(2)	(3)	(4)
		(ii) प्रक्रिया के अनुरूप निर्धारित पैरामीटर	
		क. निकल व क्रोम प्लेटिंग	
		अमोनिकल नाइट्रोजन यथा N	50
		निकल यथा Ni	3
		हेक्जावैलेंट क्रोमियम, यथा Cr	0.1
		कुल क्रोमियम, यथा Cr	2
		सल्फाइड्स, यथा S	2
		सल्फेट्स, यथा SO ₄ ²⁻	400
		फास्फेट्स, यथा P	5
		ताँबा, यथा Cu	3
		ख. जिंक प्लेटिंग	
		साइनाइड्स, (यथा CN ⁻)	0.2
		अमोनिकल नाइट्रोजन यथा N	50
		कुल अवशिष्ट क्लोरीन, यथा Cl	1
		हेक्जावैलेंट क्रोमियम, यथा Cr	0.1
		कुल क्रोमियम, यथा Cr	2
		जिंक, यथा Zn	5
		सीसा, यथा Pb	0.1
		लौह, यथा Fe	3
		ग. कैडमियम प्लेटिंग	
		साइनाइड्स, (यथा CN ⁻)	0.2
		अमोनिकल नाइट्रोजन यथा N	50
		कुल अवशिष्ट क्लोरीन, यथा Cl	1
		हेक्जावैलेंट क्रोमियम, यथा Cr	0.1
		कुल क्रोमियम, यथा Cr	2
		कैडमियम यथा Cd	2
		घ. ऐनोडाइजिंग	
		अमोनिकल नाइट्रोजन, यथा N	50
		कुल अवशिष्ट क्लोरीन, यथा Cl	1
		एलुमिनियम	5
		फ्लोराइड्स यथा F	15
		सल्फेट्स, यथा SO ₄ ²⁻	400
		फास्फेट्स, यथा P	5
		ड. ताँबा, टिन प्लेटिंग	
		साइनाइड्स, (यथा CN ⁻)	0.2
		ताँबा, यथा Cu	3
		टिन	2
		च. बहुमूल्य धातु प्लेटिंग	
		साइनाइड्स, (यथा CN ⁻)	0.2
		कुल अवशिष्ट क्लोरीन, यथा Cl	1
		चांदी	1.2
		सोना	1.0

(1)	(2)	(3)	(4)
		आ. उत्सर्जन*	
		(i) अनिवार्य पैरामीटर	
		अम्ल मिस्ट (HCl & H ₂ SO ₄)**	50
		(ii) प्रक्रिया के अनुरूप निर्धारित पैरामीटर	
		क. निकल व क्रोमियम प्लेटिंग	
		निकल**	5
		हैक्सावैलेंट क्रोमियम**	0.5
		ख. जिंक, ताँबा व कैडमियम प्लेटिंग	
		सीसा**	10
		साइनाइड्स (यथा CN)**	5
		* 'कुल धातु' की गणना बहिस्साव में Zn+Cu+Ni+Al+Fe+Cr+Cd+Pb+Sn+Ag की संयुक्त सांद्रता से की जायेगी।	
		** विद्यमान इकाईयाँ तारांकित प्रदूषकों के मानकों का अनुपालन 1 जनवरी, 2013 तक सुनिश्चित करेंगी। तथापि नई इकाईयाँ मानकों का अनुपालन संयंत्र के प्रचालन की तिथि से करेंगी।	
		+ उत्सर्जन मानक उन इलेक्ट्रोप्लेटिंग इकाईयाँ पर लागू होंगे जिनकी जल की खपत कम से कम 5 घन मीटर/दिन है। ये इकाईयाँ अपने उत्सर्जन को, सतह से कम से कम 10 मीटर या इकाई के शेड/भवन से 3 मीटर, जो भी अधिक हो, ऊँचे चिमनी के माध्यम से	
		इ. वर्षा जल	
		टिप्पणः	
		(i) किसी इकाई (जिसके प्लाट का आकार कम से कम 200 वर्ग मीटर हो) के वर्षा जल को मार्जक जल, बहिस्साव और/अथवा तलथुलाई अपजल के साथ मिलाने के लिये अनुमति नहीं दी जाएगी।	
		(ii) इकाई की अंतसीमा के वर्षा जल को वर्षा के 10 मिनट की संग्रहण क्षमता (घंटे के औसत) के एच.डी.पी.ई. परत वाले गर्त के माध्यम से अलग नाली के द्वारा बहाया जाएगा।"	

[फा. सं. क्यू-15017/44/2009-सीपीडब्ल्यू]

रजनीश दुबे, संयुक्त सचिव

टिप्पणी : मूल नियम भारत के राजपत्र में सं. का.आ. 844(अ) दिनांक 19 नवम्बर, 1986 के द्वारा प्रकाशित किये गए थे और इसके पश्चात सं. का.आ. 433 (अ), तारीख 18 अप्रैल 1987 और अभी हाल में: सा.का.नि. 512(अ) तारीख 9 जुलाई 2009: सा.का.नि. 543(अ) तारीख 22 जुलाई 2009: सा.का.नि. 595(अ) तारीख 21 अगस्त 2009: सा.का.नि. 794(अ) तारीख 4 नवम्बर 2009: सा.का.नि. 826(अ) तारीख 16 नवम्बर 2009: सा.का.नि. 01(अ) तारीख 1 जनवरी 2010: सा.का.नि. 61(अ) तारीख 5 फरवरी 2010: सा.का.नि. 485(अ) तारीख 9 जून 2010: सा.का.नि. 608(अ) तारीख 21 जुलाई 2010: सा.का.नि. 739(अ) तारीख 9 सितम्बर 2010 और सा.का.नि. 809(अ) तारीख 4 अक्टूबर 2010: सा.का.नि. 215(अ) तारीख 15 मार्च, 2011: सा.का.नि. 221(अ), तारीख 18 मार्च, 2011: सा.का.नि. 354(अ) तारीख, 02 मई, 2011: सा.का.नि. 424(अ), तारीख, 01 जून, 2011: सा.का.नि. 446(अ), 13 जून, 2011; सा.का.नि. 152(अ), 16 मार्च, 2012 के द्वारा संशोधित किए गए।

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MINISTRY OF ENVIRONMENT AND FORESTS

NOTIFICATION

New Delhi, the 30th March, 2012

G.S.R. 266(E).—In exercise of the powers conferred by sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986, namely:-

1. (1) These rules may be called the Environment (Protection) (Second Amendment) Rules, 2012.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Environment (Protection) Rules, 1986, in Schedule I, for serial number 9 relating to "Electroplating Industry" and entries relating thereto, the following serial number and entries shall be substituted, namely:-

S. No.	Industry	Parameter	Standard
(1)	(2)	(3)	(4)
"9.	Electroplating, Anodizing Industry	A.- Effluent Standards	
		Limiting concentration in mg/l, except for pH and Temperature	
		(i) Compulsory Parameters	
		pH	6.0 to 9.0
		Temperature	shall not exceed 5°C above the ambient temperature of the receiving body
		Oil & Grease	10
		Suspended Solids	100
		Total Metal*	10
		Trichloroethane	0.1
		Trichloroethylene	0.1
		(ii) Specific Parameter as per process	
		a. Nickel and Chrome plating	
		Ammonical Nitrogen, as N	50
		Nickel, as Ni	3
		Hexavalent Chromium, as Cr	0.1
		Total Chromium, as Cr	2
		Sulphides, as S	2
		Sulphates, as SO ₄ ²⁻	400
		Phosphates, as P	5
		Copper as Cu	3
b. Zinc plating			

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(1)	(2)	(3)	(4)
		Cyanides, (as CN ⁻)	0.2
		Ammonical Nitrogen, as N	50
		Total Residual Chlorine, as Cl	1
		Hexavalent Chromium, as Cr	0.1
		Total Chromium, as Cr	2
		Zinc, as Zn	5
		Lead, as Pb	0.1
		Iron, as Fe	3
		c. Cadmium plating	
		Cyanides, (as CN ⁻)	0.2
		Ammonical Nitrogen, as N	50
		Total Residual Chlorine, as Cl	1
		Hexavalent Chromium, as Cr	0.1
		Total Chromium, as Cr	2
		Cadmium, as Cd	2
		d. Anodizing	
		Ammonical Nitrogen, as N	50
		Total Residual Chlorine, as Cl	1
		Aluminium	5
		Flourides, as F	15
		Sulphates, as SO ₄ ²⁻	400
		Phosphates, as P	5
		e. Copper, Tin plating	
		Cyanides, (as CN ⁻)	0.2
		Copper, as Cu	3
		Tin	2
		f. Precious Metal plating	
		Cyanides, (as CN ⁻)	0.2
		Total Residual Chlorine, as Cl	1
		B.- Emission Standards*	
		Limiting concentration in mg/m ³ , unless stated	
		(i) Compulsory parameters	
		Acid mist (HCl & H ₂ SO ₄)**	50
		(ii) Specific parameters as per process	
		a. Nickel & Chromium plating	
		Nickel**	5
		Hexavalent Chromium**	0.5
		b. Zinc, Copper or Cadmium plating	
		Lead**	10
		Cyanides, (Total)**	5
		* 'Total Metal' shall account for combined concentration of Zn+Cu+Ni+Al+Fe+Cr+Cd+Pb+Sn+Ag in the effluent.	
		+ Emission standards shall be applicable to electroplating units having water consumption atleast 5 m ³ /day. These units shall	

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(1)	(2)	(3)	(4)
		<p>channelize their emission through a stack or chimney having height at least 10 metres above ground level or 3 metres above top of shed or building of the unit, whichever is more.</p> <p>** The existing units shall comply with the norms of asterisked pollutants by 1st January 2013. However, new units shall comply with the norms with effect from commissioning of plant.</p>	
		<p>C. Stormwater</p>	
		<p>Note:</p> <p>(i) Stormwater for a unit (having plot size atleast 200 square metres) shall not be allowed to mix with scrubber water, effluent and/or floor washings.</p> <p>(ii) Stormwater within the battery limits of a unit shall be channelized through separate drain/pipe passing through a High Density Polyethylene (HDPE) lined pit having holding capacity of ten minutes (hourly average) of rainfall."</p>	

[F.No. Q-15017/44/2009-CPW]
 RAJNEESH DUBE, Jt. Secy.

Note:- The principal rules were published in the Gazette of India vide number S.O. 844 (E), 19th November, 1986; subsequently amended vide S.O. 433 (E), dated 18th April 1987; G.S.R. 512 (E), dated the 9th July, 2009; G.S.R. 543 (E), dated the 22nd July, 2009; G.S.R. 595 (E), dated the 21st August, 2009; G.S.R. 794 (E), dated the 4th November, 2009; G.S.R. 826 (E), dated the 16th November, 2009; G.S.R. 01 (E), dated the 1st January, 2010; G.S.R. 61 (E), dated 5th February, 2010; G.S.R. 485 (E), dated 9th June, 2010; G.S.R. 608 (E), dated 21st July, 2010; G.S.R. 739 (E), dated the 9th September, 2010; and G.S.R. 809(E), dated, 4th October, 2010, G.S.R. 215 (E), dated, the 15th March, 2011; G.S.R. 221(E), dated, the 18th March, 2011; G.S.R. 354 (E), dated, the 2nd May, 2011; G.S.R. 424 (E), dated, the 1st June, 2011; G.S.R. 446 (E), 13th June, 2011; and GSR 152 (E), dated the 16th March, 2012.

EXHIBIT- 2



C.L. Gupta Exports Ltd.

18 km Before Moradabad, Delhi Highway,
vill. Jivai, Amroha-244221, India
Cin :- U74999 DL2004 PLC 125090

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Tel. : +91-591-2477000
Fax : +91-591-2477300
e-mail : mail@clgupta.com

CLG/HR-31/2021-22/03

05.04.21

The Chief Environment Officer(Circle-7)
Uttar Pradesh Pollution Control Board
Building.No. TC-12V, Vibhuti Khand,
Gomti Nagar, Lucknow-226010

Sub: Air and Water Consents.

Sir,

Kindly refer to above subject and VC held on 08.01.2021.

The status as on 16.03.2021 was communicated to you vide our letter No. CLG/HR-31/20-21/165 dated 16.03.2021 (copy attached).

The present status is as under:

1. **Water Audit Report** Done by CII. Report dated 26.03.2021 attached.
2. **Existences of CN**
 - a. The testing done by IIT Roorkee (as advised) reveals that CN content is ND.
 - b. Report of NEERI, New Delhi Mail dated 02.04.2021 also indicates CN as Below Detectable Limit/(BDL).
All reports are attached in support.
3. The permission for industrial water has also been approved by the U.P. Government Competent Authority (copy attached).

The consents, as such, be renewed as our buyers are demanding it urgently and our business is suffering very badly.

Thanking You

Yours faithfully

For C. L. Gupta Exports Ltd.

(A. K. Johri)

GM(HR/Admin)

Encl: aa

Cc: RO, Bijnore for kind information and recommendations please.

Manufacturer & Exporters

Brass Art Ware • E.P.N.S. Ware • Wrought Iron Ware • Glass & Crystal Ware • Iron & Steel Ware • Wooden Furniture & Accessories

Regd. Office : DPT 337, DLF PRIME TOWER, OKHLA, NEW DELHI-110020



C.L. Gupta Exports Ltd.

18 km. Before Moradabad, Delhi Highway,
vill. Jivai, Amroha-244224, India
Cin :- U74999 DL2004 PLC 125090

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Tel. : +91-591-2477000
Fax : +91-591-2477300
e-mail : mail@clgupta.com

CLG/HR(31)/20-21/165

The CEO-7
Uttar Pradesh Pollution Control Board
Lucknow

16.03.2021

Sub: Air and Water Consents

Sir,

Kindly refer to the VC held with your kind self on 8.1.21 on the subject. We had already achieved the followings.

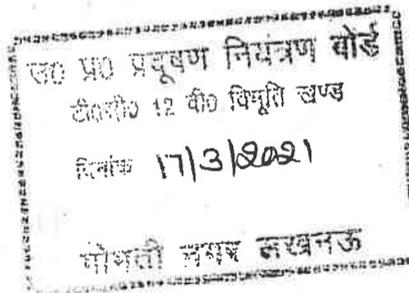
1. Adequacy and feasibility study of NEERI wrt use of treated waste water in our processes.
2. Consents of CGWA for 155 KLD which was further increased to 290 KLD vide application No. AMRH112ORDO0004 dated 4.11.20 as per revised act processed through Ground Water Department, Ministry of Jal Shakti, Govt. of U.P. Lucknow
3. Analysis report of IIT, Roorkee confirming the upto date status as acceptable with in norms.
4. The renewal of consents under provision of section 21 of the General Clause Act wrt our representations dated 14.10.20, 27.10.20 and 28.11.20 be ~~renewed~~ and fee deposition of 1,00,000/= made a fresh.

As such, you are humbly prayed the application in respect of renewal of consents under the relevant provisions of the Water Act 1974 and the Air Act 1981 as well as under the rules framed there under as quoted in our application dated 15.12.2020 may kindly be approved in order to meet the ends of justice

Thanks and Regards

A.K. Jhri
GM (HR/Admin)

Encl.: aa



Manufacturer & Exporters

Brass Art Ware • E.P.N.S. Ware • Wrought iron Ware • Glass & Crystal Ware • Iron & Steel Ware • Wooden Furniture & Accessories

Regd. Office : DPT 337, DLF PRIME TOWER, OKHLA, NEW DELHI-110020



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भारतीय प्रौद्योगिकी संस्थान रुड़की
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

सिविल अभियांत्रिकी विभाग
DEPARTMENT OF CIVIL ENGINEERING
रुड़की - 247-667, उत्तराखण्ड, भारत
ROORKEE-247 667, UTTARAKHAND, INDIA

Fax/फैक्स: 01332-275568, 273560
Tele/फोन: 01332-284319, 285219
E-mail/ई-मेल: civil@iitr.ac.in

No.CED/Env-PK/CLG/Testing/
Dated: March 19, 2021

Dr. Pramod Kumar
Associate Professor

TEST REPORT OF WATER SAMPLE

Authority : M/S C. L. Gupta Exports Ltd.
Vill : Jivai, 18th K.M. Stone, Delhi Road
Distt : Amroha, Uttar Pradesh
Sample Collected by : Environmental Engineering Lab., CED IIT Roorkee Team
Date & Time of Sample Collection : 17-02-2021
Source of Sample/Sample description : (3.) Common -ETP inlet-Equalization Tank (Untreated)

Characteristic	Analysis Result	Characteristic	Analysis Result
pH	6.27	Chromium, Cr, mg/L	ND
TSS, mg/L	399	Copper, Cu, mg/L	1.385
TDS, mg/L	1975	Iron, Fe, mg/L	2.103
COD, mg/L	399.7	Manganese, Mn, mg/L	ND
BOD, mg/L	113	Nickel, Ni, mg/L	7.376
Chloride, Cl mg/L	470	Lead, Pb, mg/L	0.012
Phosphate, PO ₄ , mg/L	2.3	Selenium, Se, mg/L	ND
Ammonical-N, NH ₃ -N, mg/L	24.2	Mercury, Hg, mg/L	ND
Nitrate-N, NO ₃ -N, mg/L	20.5	Zinc, Zn, mg/L	0.53
Color, Hazen Unit, HU	680	Vanadium, V, mg/L	ND
Sulphate, SO ₄ , mg/L	735	Cyanide, CN, mg/L	ND
Oil & Grease, mg/L	ND	Antimony, Sb, mg/L	0.051
Arsenic, As, mg/L	0.072	--	--
Cadmium, Cd, mg/L	ND	--	--
Cobalt, Co, mg/L	ND	--	--

ND : Not Detected

Prc
29, 2021
(Dr. Pramod Kumar)

Dr. Pramod Kumar
Associate Professor
Department of Civil Engineering
Indian Institute of Technology Roorkee
Roorkee - 247667, Uttarakhand, India

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भारतीय प्रौद्योगिकी संस्थान रुड़की INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

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TEST REPORT OF WATER SAMPLE

Authority : M/S C. L. Gupta Exports Ltd.
Vill : Jivai, 18th K.M. Stone, Delhi Road
Distt : Amroha, Uttar Pradesh

Sample Collected by : Environmental Engineering Lab., CED IIT Roorkee Team

Date & Time of Sample Collection : 17-02-2021

Source of Sample/Sample description : (4.) Common ETP Before RO

Characteristic	Analysis Result	Characteristic	Analysis Result
pH	6.94	Chromium, Cr, mg/L	ND
TSS, mg/L	63	Copper, Cu, mg/L	0.171
TDS, mg/L	2153	Iron, Fe, mg/L	ND
COD, mg/L	112.3	Manganese, Mn, mg/L	ND
BOD, mg/L	21	Nickel, Ni, mg/L	0.229
Chloride, Cl mg/L	353	Lead, Pb, mg/L	0.01
Phosphate, PO ₄ , mg/L	1.7	Selenium, Se, mg/L	ND
Ammonical-N, NH ₃ -N, mg/L	40.3	Mercury, Hg, mg/L	ND
Nitrate-N, NO ₃ -N, mg/L	35.6	Zinc, Zn, mg/L	0.086
Color, Hazen Unit, HU	96	Vanadium, V, mg/L	ND
Sulphate, SO ₄ , mg/L	343.7	Cyanide, CN, mg/L	ND
Oil & Grease, mg/L	ND	Antimony, Sb, mg/L	ND
Arsenic, As, mg/L	ND	--	--
Cadmium, Cd, mg/L	ND	--	--
Cobalt, Co, mg/L	ND	--	--

ND : Not Detected

P.K.
(Dr. Pramod Kumar)
Mar 19 2021

Dr. Pramod Kumar
Associate Professor
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Roorkee - 247667, Uttarakhand, India

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TEST REPORT OF WATER SAMPLE

Authority : M/S C. L. Gupta Exports Ltd.
Vill : Jivai, 18th K.M. Stone, Delhi Road
Distt : Amroha, Uttar Pradesh
Sample Collected by : Environmental Engineering Lab., CED IIT Roorkee Team
Date & Time of Sample Collection : 17-02-2021
Source of Sample/Sample description : (5.) Common ETP RO-1 (Permeate)

Characteristic	Analysis Result	Characteristic	Analysis Result
pH	7.34	Chromium, Cr, mg/L	ND
TSS, mg/L	11	Copper, Cu, mg/L	ND
TDS, mg/L	123	Iron, Fe, mg/L	ND
COD, mg/L	8.7	Manganese, Mn, mg/L	ND
BOD, mg/L	3.7	Nickel, Ni, mg/L	ND
Chloride, Cl mg/L	76	Lead, Pb, mg/L	ND
Phosphate, PO ₄ , mg/L	0.4	Selenium, Se, mg/L	ND
Ammonical-N, NH ₃ -N, mg/L	2.3	Mercury, Hg, mg/L	ND
Nitrate-N, NO ₃ -N, mg/L	8.4	Zinc, Zn, mg/L	ND
Color, Hazen Unit, HU	18	Vanadium, V, mg/L	ND
Sulphate, SO ₄ , mg/L	59	Cyanide, CN, mg/L	ND
Oil & Grease, mg/L	ND	Antimony, Sb, mg/L	ND
Arsenic, As, mg/L	ND	--	--
Cadmium, Cd, mg/L	ND	--	--
Cobalt, Co, mg/L	ND	--	--

ND : Not Detected

Pmc
19, 2021
(Dr. Pramod Kumar)

Dr. Pramod Kumar
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Dated: March 19, 2021

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Associate Professor

TEST REPORT OF WATER SAMPLE

Authority : M/S C. L. Gupta Exports Ltd.
Vill : Jivai, 18th K.M. Stone, Delhi Road
Distt : Amroha, Uttar Pradesh
Sample Collected by : Environmental Engineering Lab., CED IIT Roorkee Team
Date & Time of Sample Collection : 17-02-2021
Source of Sample/Sample description : (6.) Common ETP RO-1 Reject

Characteristic	Analysis Result	Characteristic	Analysis Result
pH	7.21	Chromium, Cr, mg/L	ND
TSS, mg/L	79	Copper, Cu, mg/L	0.457
TDS, mg/L	5041	Iron, Fe, mg/L	ND
COD, mg/L	270	Manganese, Mn, mg/L	ND
BOD, mg/L	71	Nickel, Ni, mg/L	0.7456
Chloride, Cl mg/L	840	Lead, Pb, mg/L	0.035
Phosphate, PO ₄ , mg/L	1.76	Selenium, Se, mg/L	ND
Ammonical-N, NH ₃ -N, mg/L	60.4	Mercury, Hg, mg/L	ND
Nitrate-N, NO ₃ -N, mg/L	56.5	Zinc, Zn, mg/L	0.596
Color, Hazen Unit, HU	73	Vanadium, V, mg/L	ND
Sulphate, SO ₄ , mg/L	240	Cyanide, CN, mg/L	ND
Oil & Grease, mg/L	ND	Antimony, Sb, mg/L	ND
Arsenic, As, mg/L	0.062	--	--
Cadmium, Cd, mg/L	ND	--	--
Cobalt, Co, mg/L	ND	--	--

ND : Not Detected

Pmc
Mar 19, 2021
(Dr. Pramod Kumar)

Dr. Pramod Kumar
Associate Professor
Department of Civil Engineering
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भारतीय प्रौद्योगिकी संस्थान रुड़की
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

सिविल अभियांत्रिकी विभाग
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Dated: March 19, 2021

Dr. Pramod Kumar
Associate Professor

TEST REPORT OF WATER SAMPLE

Authority : M/S C. L. Gupta Exports Ltd.
Vill : Jivai, 18th K.M. Stone, Delhi Road
Distt : Amroha, Uttar Pradesh
Sample Collected by : Environmental Engineering Lab., CED IIT Roorkee Team
Date & Time of Sample Collection : 17-02-2021
Source of Sample/Sample description : (7.) Common ETP RO-3 (Permeate)

Characteristic	Analysis Result	Characteristic	Analysis Result
pH	7.50	Chromium, Cr, mg/L	ND
TSS, mg/L	5	Copper, Cu, mg/L	ND
TDS, mg/L	183	Iron, Fe, mg/L	ND
COD, mg/L	162.5	Manganese, Mn, mg/L	ND
BOD, mg/L	3.5	Nickel, Ni, mg/L	ND
Chloride, Cl mg/L	19	Lead, Pb, mg/L	ND
Phosphate, PO ₄ , mg/L	0.5	Selenium, Se, mg/L	ND
Ammonical-N, NH ₃ -N, mg/L	12.1	Mercury, Hg, mg/L	ND
Nitrate-N, NO ₃ -N, mg/L	8.3	Zinc, Zn, mg/L	ND
Color, Hazen Unit, HU	17	Vanadium, V, mg/L	ND
Sulphate, SO ₄ , mg/L	10.6	Cyanide, CN, mg/L	ND
Oil & Grease, mg/L	ND	Antimony, Sb, mg/L	ND
Arsenic, As, mg/L	ND	--	--
Cadmium, Cd, mg/L	ND	--	--
Cobalt, Co, mg/L	ND	--	--

ND : Not Detected

Pmc
Mar 19, 2021
(Dr. Pramod Kumar)

Dr. Pramod Kumar
Associate Professor
Department of Civil Engineering
Indian Institute of Technology Roorkee
Roorkee - 247667, Uttarakhand, India

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AK Johri

From: Sanjeev Goyal <sk_goyal@neeri.res.in>
Sent: Friday, April 02, 2021 10:51 PM
To: ajaijohri@clgupta.com
Subject: Re: Water Audit Report

Dear Johri Saheb,

Water meter readings of borewells, ETP inlet & outlet, STP inlet & outlet, and other units alongwith chemical dosings etc. for the month of Feb & March are also required, as it was shared for the month of January.

Cyanide has been analysed and it was found below detectable limits.

Regards,

SK Goyal

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GROUND WATER DEPARTMENT

(Namami Gange & Rural Water Supply Department)

Ministry of Jal Shakti

Government of Uttar Pradesh

Form 8 (C)

AUTHORIZATION/ NO-OBJECTION CERTIFICATE FOR SINKING OF NEW WELL FOR INDUSTRIAL/ COMMERCIAL/ INFRASTRUCTURAL OR BULK USER OF GROUND WATER

[Under Section 14 of the Uttar Pradesh Ground Water Management and Regulation Act, 2019.]

AUTHORIZATION/ NO-OBJECTION CERTIFICATE NO:

VALID UP TO : 07/04/2026

Name of the Applicant	TEEVRA GUPTA	0	
Address of the Applicant:	Vill- Jivai, NH -24 Delhi Road Amroha		
Company Name:	C. L. Gupta Exports Ltd.	Company Address	Vill-Jivai, 18 Km Before Moradabad-Delhi Highway
Serial No. of Application Form	AMRH0421NIN0017	Date of Submission	03/04/2021
Specimen Signature of the User:			
Location particulars:			
District	Amroha (J.P.Nagar)	Block	ZOYA
J.L. No		Plot No.	260
Municipality/Corporation	Joya	Ward No.	N/A
Holding No.			N/A
Rate of Withdrawal (m3/hr.)	25.00	Date of Energization (In Case of Electric Pump)	01/04/2016
Particulars of the Proposed Well and Pumping Device:			
Type of the Well	Tube Well/Boring	Purpose of the Well	Industrial
Assembly Size (For Tube Well)	0.00	Approx. Strainer Length (For Tube Well)	0.00
Diameter (For Dug Well)	0.00	Type of Pump to be Used:	Submersible
H.P. of the Pump:	15.00	Operational Device	Electric Motor
Maximum Allowable Rate of Withdrawal (m3/hr.):	25.00	Maximum Allowable Running Hours Per Day:	10.00
Maximum Allowable Annual Extraction of Ground Water:			75000

This No-Objection certificate authorizes the owner applicant (user) to sink a well in the location specified at Sl. (2) for extraction of ground water at a rate not exceeding that as shown at Sl. (3j), for Running Hours 1 day as shown at Sl. (3k), and for maximum allowable annual extraction of ground water as shown at Sl. (3k) and is valid subject to the observance of the conditions stated overleaf.

Place:

Date:

Yours Faithfully,
Signature of the Issuing Authority
and Designation

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GENERAL CONDITIONS

- In case of any change of ownership of the proposed well, fresh authorization has to be obtained.
- No change of location, design, rate of withdrawal and pumping device in respect of the proposed well as indicated at SL (2) and (3) of this certificate shall be made without prior permission of the Competent Authority. Any deviation in this regard shall lead to cancellation of this authorization
- For the purpose of measuring and recording the quantity of ground water extracted, every said user shall affix digital water flow meters (conforming to BIS/ IS standards) having telemetry system in the abstraction structure, which record rate and quantum of extraction, at outlet of pumping devices and it shall be presumed that the quantity recorded by the meter has been extracted by the said user, until the contrary is proved. The rate of extraction of ground water from the well as shown in item 3(k) shall not exceed to the recorded rate from water meters
- The concerned Authority reserves the right to stop extraction of ground water from the well due to quality hazards or any other reasons, if the situation so demands
- In case of any change of ownership of the existing well, fresh registration has to be obtained.
- No change of location, design, rate of withdrawal and pumping device in respect of the existing well as indicated at SL (2) and (3) of this certificate shall be made without prior permission of the Competent Authority. Any deviation in this regard shall lead to cancellation of this registration
- In case, any of the particulars I information furnished by the applicant in his application for issuance of this registration is found to be incorrect during verification at any subsequent stage, this registration is liable for cancellation.
- The Certificate of Authorization/ NOC shall be valid for a period of five years from the date of issue. The applicant shall have to apply for renewal through a fresh application, at least ninety days prior to expiry of its validity.
- Construction of piezometers and installation of digital water level recorders with telemetry shall be mandatory for user. Depth and zone tapped of piezometer should be commensurate with that of the pumping well. The data, obtained from digital water level recorders shall be made available to this office on monthly basis
- **Guidelines for Installation of Piezometers and their Monitoring**

Piezometer is a borewell /tubewell used only for measuring the water level by lowering the tape/ sounder or automatic water level measuring equipment. It is also used to take water sample for water quality testing when ever needed. General guidelines for installation of piezometers are as follows:

- The piezometer is to be installed/constructed at the minimum of 50 m distance from the pumping well through which ground water is being withdrawn. The diameter of the piezometer should be about 4" to 6".
- The depth of the piezometer should be same as is case of the pumping well from which ground water is being abstracted. If, more than one piezometers are installed the second piezometer should monitor the shallow ground water regime. It will facilitate shallow as well as deeper ground water aquifer monitoring.
- No. of piezometers to be constructed & Type of water level monitoring mechanism shall be as per below table:

S.No	Quantum of Ground water withdrawal (cum/day)	No.of piezometers required	Monitoring Mechanism	
			Manual	DWLR with Telemetry
1	< 10	0	0	0
2	11 - 50	1	1	0
3	50- 500	1	0	1
4	> 500	2	0	2

- The measuring frequency should be monthly and accuracy of measurement should be up to cm, the reported measurement should be given in meter upto two decimal.
- For measurement of water level sounder or automatic water level recorder (AWLR)/ Digital Automatic water level recorder (DWLR) with telemetry system should be used for accuracy.
- The measurement of water level in piezometer should be taken, only after the pumping from the surrounding tube wells has been stopped for about four to six hours.
- All the details regarding coordinates, reduced level (with respect to mean level), depth, zone taped and assembly lowered should be provided for bringing the piezometer into the Hydrograph Monitoring System for Ground Water Department, Uttar Pradesh, and for its validation.
- The ground water quality has to be monitored twice in a year during pre-monsoon (May/June) and post-monsoon (October/November) periods. Quality may be got analyzed from NABL approved lab. Besides, one sample (1 lt capacity bottle) to the concerned Director, Ground Water Department, Uttar Pradesh, for chemical analysis.
- A Permanent display board should be installed at piezometer/Tube wells site for providing the location, piezometer/ tube well number, depth and zone tapped of piezometer/tube well for standard referencing and identification.
- Any other site specific requirement regarding safety and access for measurement may be taken care off.
- Any other condition(s) that may be imposed by the concerned Authority.
- In case, any of the particulars I information furnished by the applicant in his application for issuance of this permit is found to be incorrect during verification at any subsequent stage, this permit is liable for cancellation.
- Any other condition imposed by the concerned Authority.
- In case, any of the particulars I information furnished by the applicant in his application for issuance of this permit is found to be incorrect during verification at any subsequent stage, this permit is liable for cancellation.

• **SPECIFIC CONDITIONS:**

- (A) For Industrial User: No Objection Certificate for ground water extraction by industries shall be granted subject to the following specific conditions:
 - i) No Objection Certificate shall be granted only in such cases where local government water supply agencies are not able to supply the desired quantity of water.
 - ii) All industries shall be required to adopt latest water efficient technologies so as to reduce dependence on ground water resources.
 - iii) All industries abstracting ground water in excess of 100 m³/d shall be required to undertake annual water audit through Confederation of Indian Industries (CII)/ Federation Indian Chamber of Commerce and Industry (FICCI)/ National Productivity Council (NPC) certified auditors and submit audit reports within three months of completion of the same to CGWA. All such industries shall be required to reduce their ground water use by at least 20% over the next three years through appropriate means.
 - iv) Construction of observation well(s) (piezometer)(s) within the premises and installation of appropriate water level monitoring mechanism as mentioned in General Condition no.10 shall be mandatory for industries drawing/ proposing to draw more than 10 m³

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4/8/2021

NOC Application Form

- /day of ground water and. Monitoring of water level shall be done by the project proponent. The piezometer (observation well) shall be constructed at a minimum distance of 15 m from the bore well/production well. Depth and aquifer zone tapped in the piezometer shall be the same as that of the pumping well/ wells. Monthly water level data shall be submitted online to the Ground Water Department, UP.
- v) The proponent shall be required to adopt roof top rain water harvesting/ recharge in the project premises. Industries which are likely to pollute ground water (chemical, pharmaceutical, dyes, pigments, paints, textiles, tannery, pesticides/ insecticides, fertilizers, slaughter house, explosives etc.) shall store the harvested rain water in surface storage tanks for use in the industry.
- vi) Injection of treated/ untreated waste water into aquifer system is strictly prohibited.
- vii) Industries which are likely to cause ground water pollution e.g. Tanning, Slaughter Houses, Dye, Chemical/ Petrochemical, Coal washeries, other hazardous units etc. (as per CPCB list) need to undertake necessary well head protection measures to ensure prevention of ground water pollution.
-
- **(B) Infrastructural User:** The No Objection Certificate for ground water abstraction will be granted subject to the following specific conditions:
 - i) In case of infrastructure projects that require dewatering, proponent shall be required to carry out regular monitoring of dewatering discharge rate (using a digital water flow meter) and submit the data online to Ground Water Department, UP as applicable. Monitoring records and results should be retained by the proponent for two years, for inspection or reporting as required by District Ground Water Management Council.
 - ii) Installation of Sewage Treatment Plants (STP) shall be mandatory for new projects, where ground water requirement is more than 20 m³ /day. The water from STP shall be utilized for toilet flushing, car washing, gardening etc

This NOC is not authorized by any Official. This should only be used for Preview purpose.

यह अनापत्ति प्रमाणपत्र किसी प्राधिकारी द्वारा प्रमाणित नहीं है। इसे मात्र पूर्ववलोकन के उद्देश्य से प्रयोग किया जाना चाहिए।

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Water Audit Report
C L Gupta Exports Limited, Amroha

WATER AUDIT REPORT

As per the guidelines of CGWA

MINISTRY OF JAL SHAKTI

At

C L Gupta Exports Limited, Amroha

Prepared by

**Confederation of Indian Industry
CII-Triveni Water Institute**



March 2021

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C L Gupta Exports Limited, Amroha

WATER AUDIT REPORT

As per the guidelines of CGWA

MINISTRY OF JAL SHAKTI

At

C L Gupta Exports Limited, Amroha

Prepared by

**Confederation of Indian Industry
CII-Triveni Water Institute**



March 2021

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Water Audit Report
C L Gupta Exports Limited, Amroha

Acknowledgement

CII- Triveni Water Institute acknowledges the co-operation, hospitality and support extended to their audit team during the detailed water audit at C L Gupta Exports Limited, Amroha.

The team would like to convey sincere thanks to Mr. Teevra Gupta (Managing Director) for providing an opportunity to undertake the water audit study at C L Gupta Exports Limited, Amroha.

We are also extremely thankful to those who have helped in facilitating the survey and providing information, especially;

- ❖ Mr. Rahul Vohra, GM
- ❖ Mr. P N Sahu, AGM, HR & Admin
- ❖ Mr. Pankaj Sharma, Manager HR
- ❖ Mr. Brij Pal Singh, HR Executive

Finally, the team acknowledges the plant management, senior executives and coordinators from all departments and staff who provided their support for successful execution of the water audit at C L Gupta Exports Limited, Amroha.

It is well worthy to mention that the efforts being taken, and the enthusiasm shown by all the personnel towards water conservation are really admirable.



Sanjay Gupta

Sanjay Gupta
Senior Counsellor & Head Advisory Services
Confederation of Indian Industry
CII-Triveni Water Institute

Abbreviations

ACF	Activated Carbon Filter
ATFD	Agitated Thin Film Dryer
CGWB	Central Ground Water Board
DM	Demineralization
DMF	Dual Media Filter
DWLR	Digital Water Level Recorder
ETP	Effluent Treatment Plant
IMD	Indian Meteorological Department
KLD	Kilo Liter Per Day
LPCD	Liter Per Capita Per Day
MEE	Multi Effect Evaporator
MGF	Multi Grade Filter
MM	Millimeter
NOC	No Objection Certificate
RO	Reverse Osmosis
RWH	Rainwater Harvesting
STP	Sewage Treatment Plant
TDS	Total Dissolved Solid
TPH	Ton Per Hour
UF	Ultrafiltration
UFM	Ultrasonic Flow Meter
WTP	Water Treatment Plant

Executive Summary

C L Gupta Exports Ltd. has a unique set up in the handicraft industry with in-house, vertically integrated facilities for processing metal, glass and wood in the same campus. The company provides home decor products. The Company offers metal, glass, and wooden candle and kitchen accessories, wall decor, server-ware, hurricanes, bowls, lanterns, pillar holders, tumblers, decanters, vases, photo frames, and furniture and desk sets.

C L Gupta Exports Ltd. is situated in Amroha district of Uttar Pradesh. The plant expands over an area of 157000 m². Currently, the plant has NOC for consent to withdraw 300 KLD of water from 2 borewells (Rate of withdrawal 30 KL/hr each & running hours 5 hrs each) available in the plant for domestic applications. At present, approximately 110 KLD (average per day consumption Jan - Feb 2021) of water is used for plant domestic applications from borewells.

The average water consumption for the year 2018, 2019 & 2020 is 247 KLD, 226 KLD & 121 KLD respectively.

The plant does not have NOC to use borewell water for industrial operations. So, at present STP & ETP RO treated water is being used for industrial applications. However, the plant has applied for NOC to use 50 KLD water for industrial operations and its approval is under progress.

Industrial wastewater generated in the plant is treated in effluent treatment plant (Capacity 150 KLD) followed by 3 stage RO system & MEE system and reused in process areas.

Domestic wastewater (sewage) generated in the plant is treated in sewage treatment plant (capacity 250 KLD) and used for toilet flushing, ETP RO feed (process) & gardening.

The stage of groundwater extraction as reported by CGWB (assessment year: 2017) is 104.58 % which puts Amroha district in the category of overexploited zone.

Given the above scenario of prevailing resource challenge, accelerating over time progressive management C L Gupta Exports Ltd. is very keen to do water audit of premises. To get benefit of water saving projects, management of C L Gupta Exports Ltd., Amroha. awarded the task of water audit of its premises to CII Triveni Water Institute.

The audit is focused on improving water usage efficiency and identifying water conservation opportunities. Accordingly, the field study and data collection for the said water audit was carried out by CII team. This report discusses the water balance and various water saving options derived on the basis of observation made, data collected and their analysis.

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Summary of Water Audit findings are presented in the following table shown below:

Proposed Schemes		Water Savings (KLD)	Water Savings (KL/annum)	Cost Saving Lakh/annum
I	Total Water Intake	110		
II	Savings Achievable	7	2555	1.1
1	Reduce domestic water consumption in the colony & plant by installing water saving devices	7	2555	1.1
Observations				
1	Collection & utilization of condensate water as boiler feed			
2	Discontinue the practice of using STP-UF treated water for gardening			
3	Explore utilization of wastewater generated from handwash to aeration tank			

- Water balance across the plant has been successfully achieved.
- Total consumption: 110 KLD (Average consumption Jan - Feb 2021).
- Rainwater harvesting has been done in the plant (12 structure) to recharge groundwater.
- Water saving of 7 KLD (6.3%) is achievable.
- In monetary terms ~ Rs. 1.12 Lakh/annum cost savings are achieved.
- Priority areas where immediate savings can be achieved include:
 - ❖ Priority areas where immediate savings can be achieved include Reduction in domestic water consumption in the colony & plant by installing water saving devices
 - ❖ Need to adopt schemes for water management and conservation (Recycle, Reuse and Reduce options)
 - ❖ Identification of key resource person from concerned departments to lead the water conservation and management activities along with the Water Management department. (*immediate*)
 - ❖ Plan implementation with time and target (management decisions) (strategically to continue)
 - ❖ Monitor proposal-by-proposal
- Undertake regular water audit for streamlining the activity and sustaining benefits of the study in long run.

1. Introduction and background

1.1 Introduction

Water is a core element of natural capital, underpinning many business activities. Water risks cut across most industry sectors. As per the World Economic Forum Global Risks report, water crisis is the third most impactful global risks to business (WEF 2017). The risk continues to rise given the increasing demands and rising pressures. Safeguarding water and ensuring its availability in sufficient quantity and quality is therefore subject of vital interest to business.

The present study focuses on C L Gupta Exports Ltd., Amroha for water audit at the plant level that would help in identification of appropriate water management and conservative strategies to minimize the risks to operations.

The first step towards efficiently managing and conserving water resources is monitoring and mapping water consumption under various processes. This involves conducting a regular water audit that identifies and quantifies water uses and losses from a water system.

A comprehensive water audit gives a detailed profile of the distribution system and water users, thereby facilitating easier and effective management of the resources with improved reliability. It helps in correct diagnosis of the problems faced in order to suggest optimum solutions.

Good Initiatives Taken by the plant

- Installation of flowmeters at all the major locations
- Colour coding system for pipelines
- Use of ETP RO treated water for process application
- Use of STP treated water for toilet flushing, boiler makeup and gardening,
- Push type taps for handwash in some areas of plant
- 12 number of rainwater structures inside the plant for recharging the groundwater

2. Scope

The main objective of the study was to identify the water uses & water saving opportunities and to demonstrate water conservation at C L Gupta Exports Ltd., Amroha.

Scope of work of the study includes the following:

- Water system analysis
- Quantification of baseline water map
- Monitoring and measurements using flow meters and various other devices
- Quantification of inefficiencies and leaks
- Quantification of water quality loads and discharges
- Quantification of variability in flows and quality parameters
- Strategies for water treatment and reuse or direct use
- Water balance of the whole System
- Mapping of Water quality requirement at various user areas

The detailed water audit report contains the following:

- Water consumption and wastewater generation pattern
- Specific water use and conservation
- Complete water balance of the facility
- Water saving opportunities
- Method of implementing the proposals
- Full description and figures

3. Methodology of the Study

A team of two engineers were involved in carrying out the study. The study methodology involved the following steps:

- Preliminary discussions with plant personnel and observations in all water consuming areas
- Data collection through discussions, past records, specifications
- Identification of water conservation options on short, medium & long terms
- Identification of Investment grade projects in the plant for detailed analysis towards implementation
- Preparation, discussion and submission of report to the management

The study focused on improving water use efficiency and identifying water saving opportunities. The analysis included simple payback calculations where investments are required to be made to implement recommendations, to establish their economic viability.

The audit study made use of portable instruments for carrying out various measurements and analyses. CIL has a wide array of latest, sophisticated, portable, diagnostic and measuring instruments to support water audit investigations and analyses. The specialized instruments that were used during the water audit include Ultrasonic water flow meter.

During the audit, there was continuous interaction between the audit team and facility personnel, to ensure that the suggestions made are realistic, practical and implementable to allow for possible concurrent implementation.

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4. Assessment of Present Water Usage

4.1 Plant Water Consumption Trends

The source of water to the plant is borewell. The water consumption varies from 110 KLD to 140 KLD (based on Avg consumption from Jun 2020 – Feb 2021. March, April & May 2020 months was not considered in the analysis because plant was not in full operation due to Covid 19)

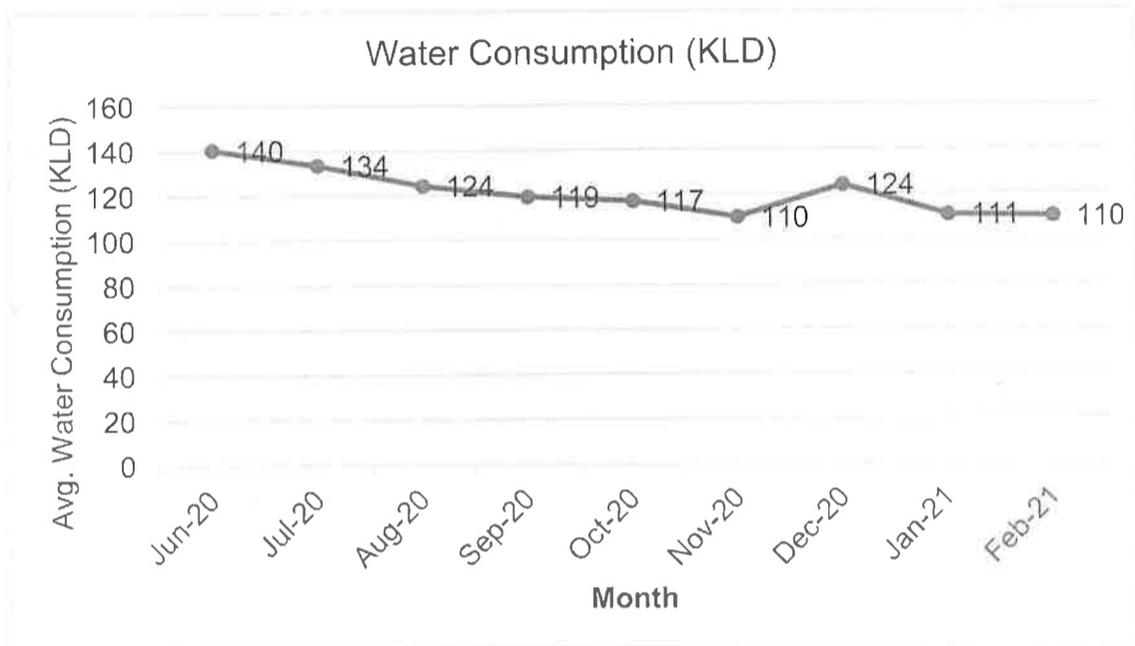


Figure 4.1 Water consumption trend Jun 2020 – Feb 2021

Water Consumption Trend for last 3 years:

The average water consumption for the year 2018, 2019 & 2020 is 247 KLD, 226 KLD & 121 KLD respectively. Refer figure 4.2.

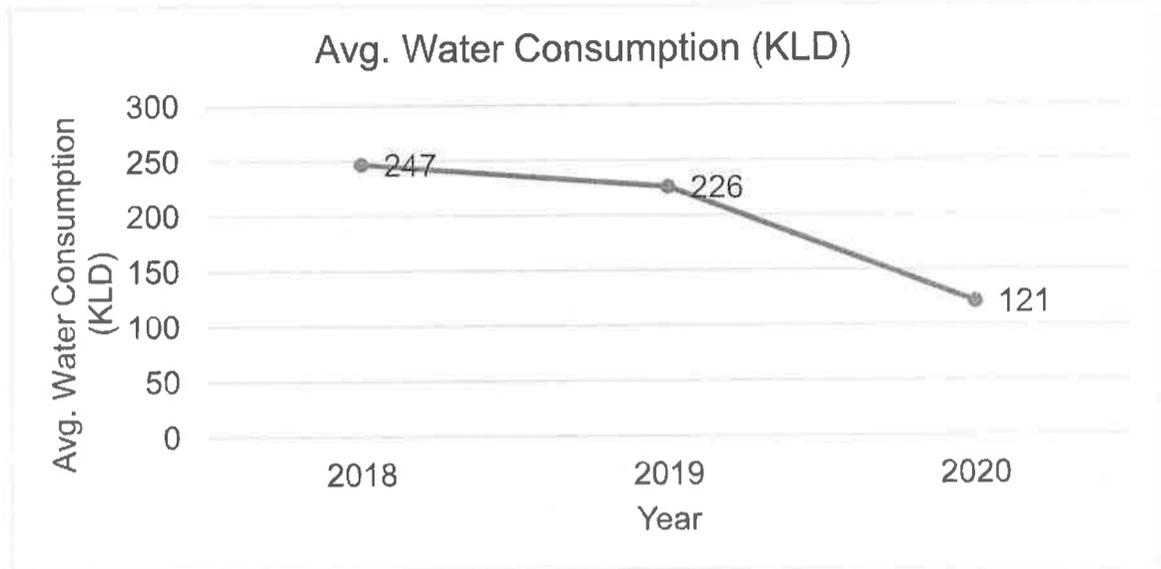


Figure 4.2 Water consumption trend 2018 - 2020

The plant has reduced its water consumption from 247 KLD to 121 KLD from 2018 to 2020. (49% reduction in freshwater)

Specific Water Consumption (Year 2020)

The specific water consumption is 6.44 KL/ton of production based on the data (Jun 2020 - Feb 2021) provided by the C L Gupta Exports Ltd., Amroha.

4.2 Water Sources

The source of water to the plant is borewell. The plant has 2 borewells in its campus. Water is utilized for domestic application in plant and colony. The average per day water consumption through borewells is 110 KLD (considering Jan - Dec 2021).

The detailed description about the water source is provided in the table below:

Table 4.1 Borewell Details

S. No.	Description	Depth (m)	Year of construction	TDS (ppm)	Pumping capacity
1	Borewell 3	75	2016	290	15 HP
2	Borewell 4	75	2016	495	15 HP

Rainfall Pattern in last 5 years as per IMD

Total rainfall received at the plant site based on IMD datasets shows that average rainfall is around 692.3 mm. The rainfall varies between 499.8 mm to 829.5 mm in last 5 years (2014 to 2018).

Presently the plant has constructed 12 rainwater recharge structures inside the plant for recharging groundwater.

Table 4.2 Average annual rainfall in last 5 years as per IMD data

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	Average Annual rainfall in mm
	R/F	R/F	R/F	R/F	R/F	R/F	R/F	R/F	R/F	R/F	R/F	R/F	
2014	44	32	56	0	14.5	3.5	238.5	25	58.3	18	0	10	499.8
2015	13.5	25	46.5	45	11	78	259.1	167	25	0	2.5	0	672.6
2016	0	0.5	24	0	36	50.5	418.5	239.5	60.5	0	0	0	829.5
2017	23.5	0	16.5	0.5	26	49.5	280.5	185.5	233	0	0	1.1	816.1
2018	1	0	0	0	0	9.5	234	228	166	5	0	0	643.5
Average	16.4	11.5	28.6	9.1	17.5	38.2	286.1	169	108.6	4.6	0.5	2.22	692.3

Groundwater situation at the plant site

The stage of groundwater extraction as reported by CGWB (assessment year: 2017) is 104.58% which puts Amroha district in the category of overexploited zone.

4.3 Water Supply & Distribution Details

The water from borewell is utilized for domestic applications in plant and colony. Water from borewell is collected into storage tank and from storage tanks it is being supplied for domestic application in plant as well as colony.

The clear and vivid illustration of water supply and distribution of water in plant is shown below in figure 4.3

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4.4 Water Balance

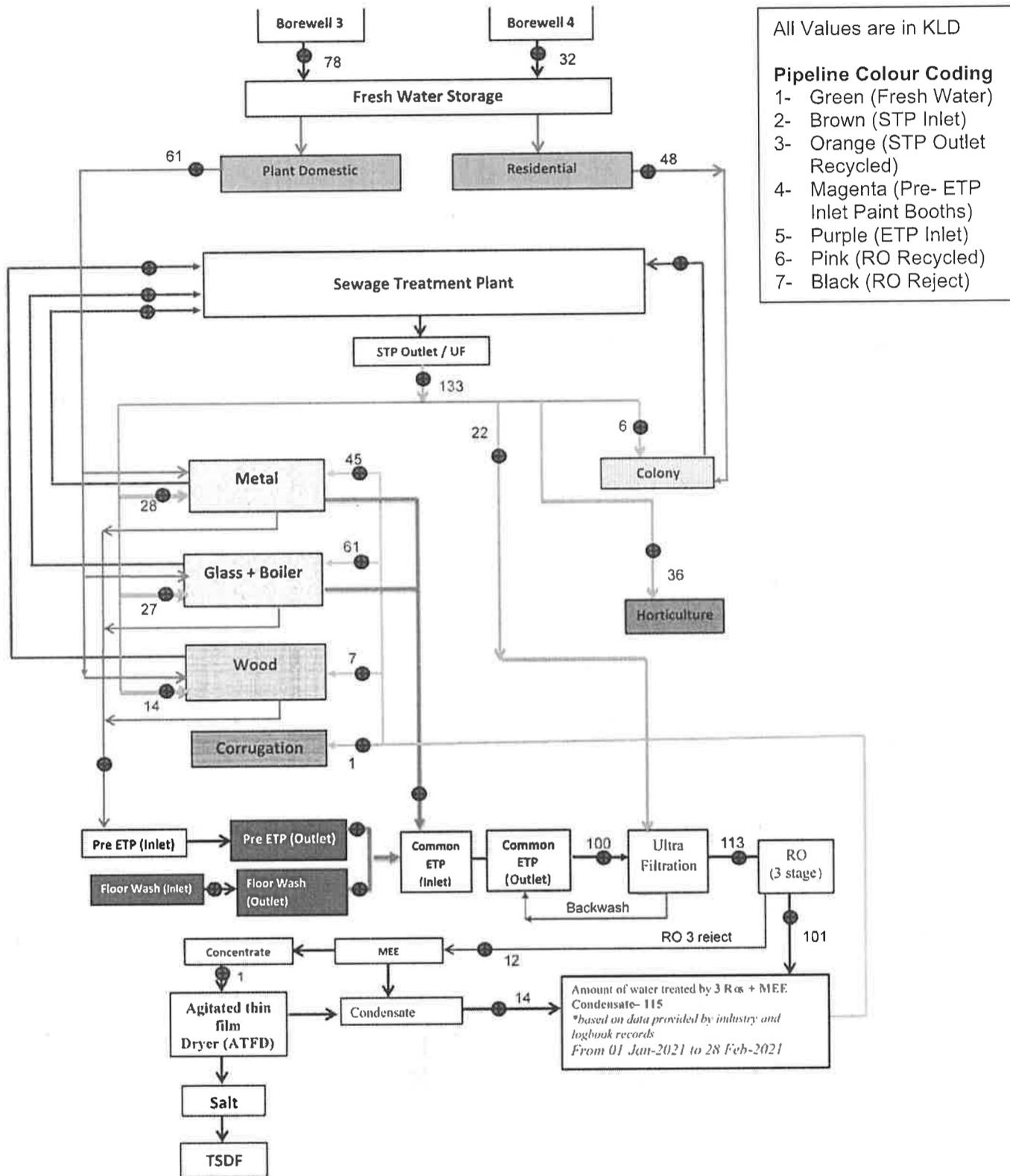


Figure 4.3 Water Distribution network diagram

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Overall Fresh water balance is shown below in tabular form in table 4.3

Table 4.3 Fresh Water Balance

S. No.	Description	Average Consumption Jan - Feb 2021 (KLD)	Remarks
1	Borewell 3	78	Flowmeter Validated
2	Borewell 4	32	Flowmeter Validated
	Total Borewell Water	110	
Distribution of Borewell Water			
i	Plant Domestic	61	Flowmeter Validated
ii	Residential	48	Flowmeter Validated

Note:

- ❖ Most of the flowmeters were installed in mid Dec 2020. So, for preparing the water balance, average water consumption data of Jan – Feb 2021 was considered.
- ❖ Refer annexure I for wastewater balance

4.5 Water consumption patterns

- 56% of water is used for domestic application in the plant.
- 44% of water is used for domestic applications in colony.

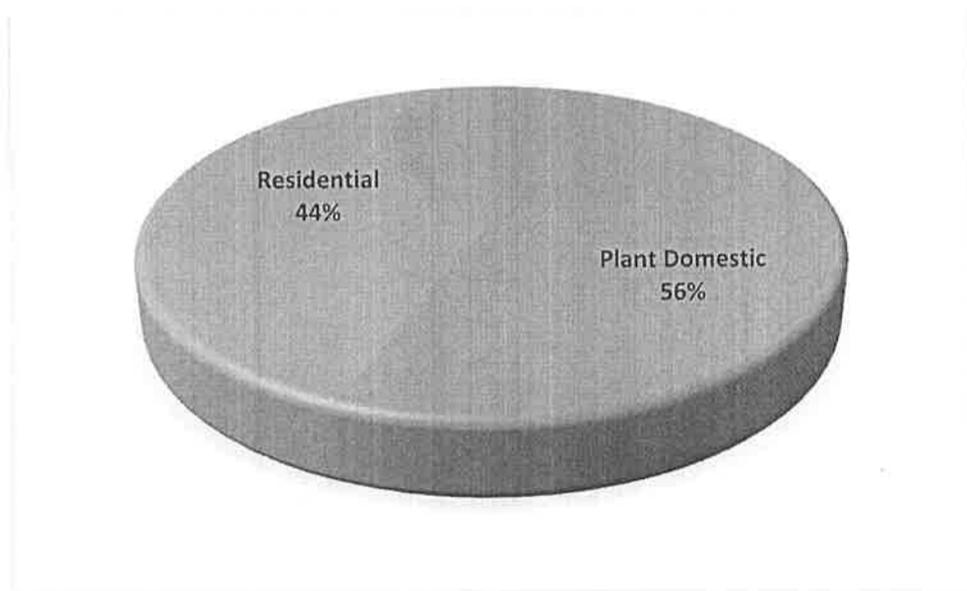


Figure 4.4 Overall freshwater consumption for plant

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4.6 Water Metering & Monitoring System

Monitoring is the most important prerequisite for efficient water management. Thus, in the water supply network, it is necessary to have a robust system of monitoring. The presence and regular monitoring of flow meters ensures that the flows in the plant are well accounted. During the audit, the available flow meters were identified, and their working conditions were checked. The plant has installed flowmeters at all the major locations:

Table 4.4 Present Metering Status

Water Flow measurement at C L Gupta Exports Ltd., Amroha				
SI No.	Description	Plant Flowmeter reading (KL/hr)	CII UFM reading (KL/hr)	% Variation wrt to UFM
1	Borewell 3	28.5	30	5.00
2	Borewell 4	38.5	42	8.33
3	Residential domestic	9.5	10	5.00
4	Plant domestic	7.4	7	-5.71
5	STP Wood division	21.5	20.5	-4.88
6	STP treated water for process	11	10.2	-7.84
7	STP treated water for Metal division	1.05	1.1	4.55
8	STP treated water for Gardening	9.4	10	6.00
9	STP treated water for Glass division	8.2	7.7	-6.49
10	ETP Outlet	6.5	7	7.14

Additional metering points were also explored for installation of meters to have better monitoring of the water consumption. Refer table below for additional metering points.

Table 4.5 Additional metering points

Sl. No.	Locations
1	Domestic water line for wood division
2	Domestic water line for Glass division
3	Domestic water line for Metal division
4	STP Treated water for Boiler make up
5	ETP RO water for DM plant feed

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4.7 Water Costing

The cost of the different types of water is illustrated given below in table:

Table 4.6 Water Cost

S. No.	Description	Cost (Rs./KL)
1	Borewell Water	3
2	RO Water	55
3	Filter Water	18.6
4	ETP Treated Water	60
5	STP treated Water	35
6	MEE treated water	150

5. Water & Wastewater Treatment Practices

This section provides the detailed treatment practices along with the key findings.

Table 5.1 Wastewater Discharge Status

S. No.	Description	Mode of Disposal
1	Sewage from Plant	STP followed by UF
2	Effluent from process areas	ETP followed by 3 stage RO units & MEE
3	Boiler blowdown	
4	DM plant regeneration	
5	Boiler blowdown	
6	Scrubbed water	
7	Cooling Tower Blowdown	

5.1 Raw/Fresh water Treatment

The water from borewell is utilized for domestic applications in plant and colony.

Water from borewell is collected into storage tank and from storage tanks it is being supplied for domestic application in plant as well as colony.

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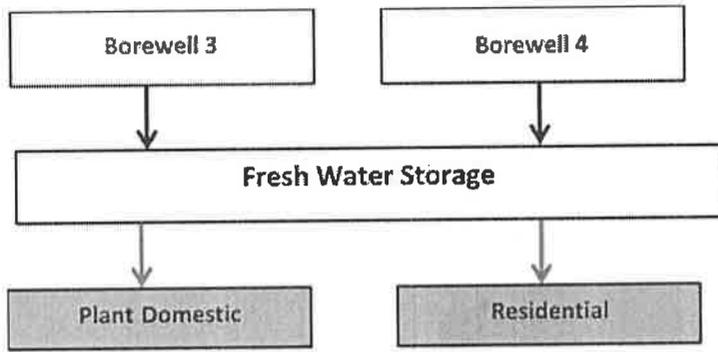


Figure 5.1 Schematic of WTP

5.2 Waste Treatment & Disposal

Effluent Treatment Plant

Schematic of effluent treatment and disposal is shown below.

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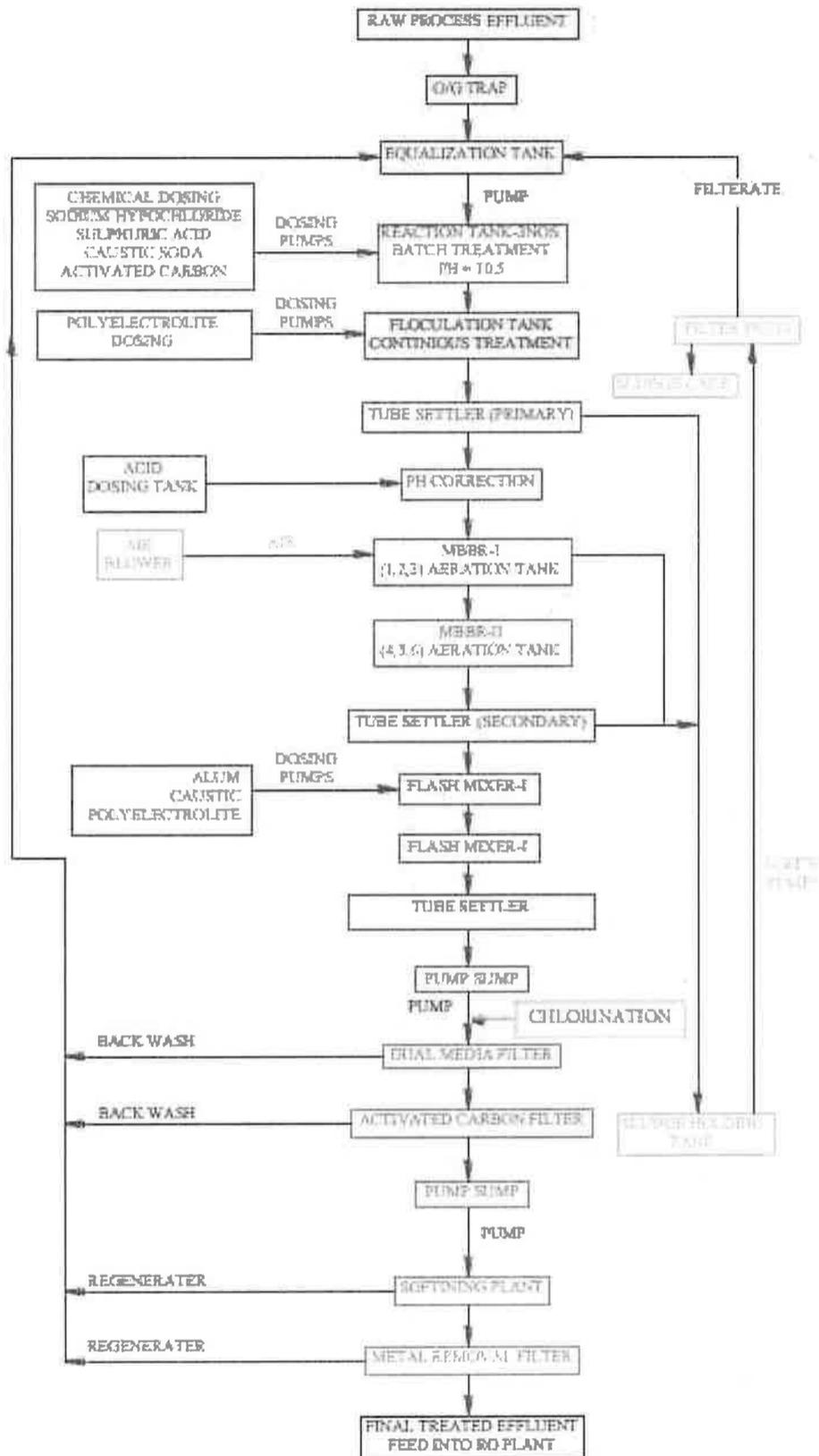


Figure 5.2 Schematic of Effluent Treatment plant

The wastewater generated in the plant is treated in effluent treatment plant (having capacity of 150 KLD) followed by 3 stage RO & MEE. The treated water is used in process areas.

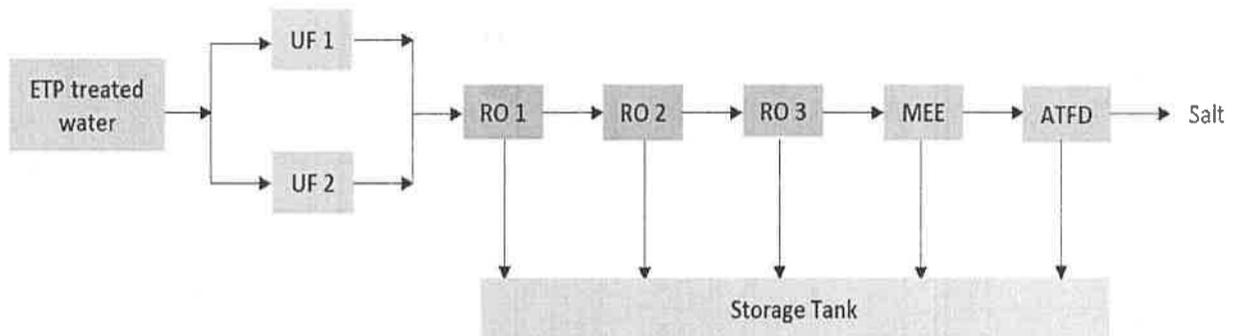


Figure 5.3 Schematic of RO MEE plant

Sewage Treatment:

Sewage generated from the plant is treated in sewage treatment plant having capacity of 250 KLD. STP treated water is passed through MGF, ACF followed by ultrafiltration. The UF treated water is used for toilet flushing, Boiler feed, ETP RO feed (process) & gardening.

The schematic of sewage treatment and disposal is shown below

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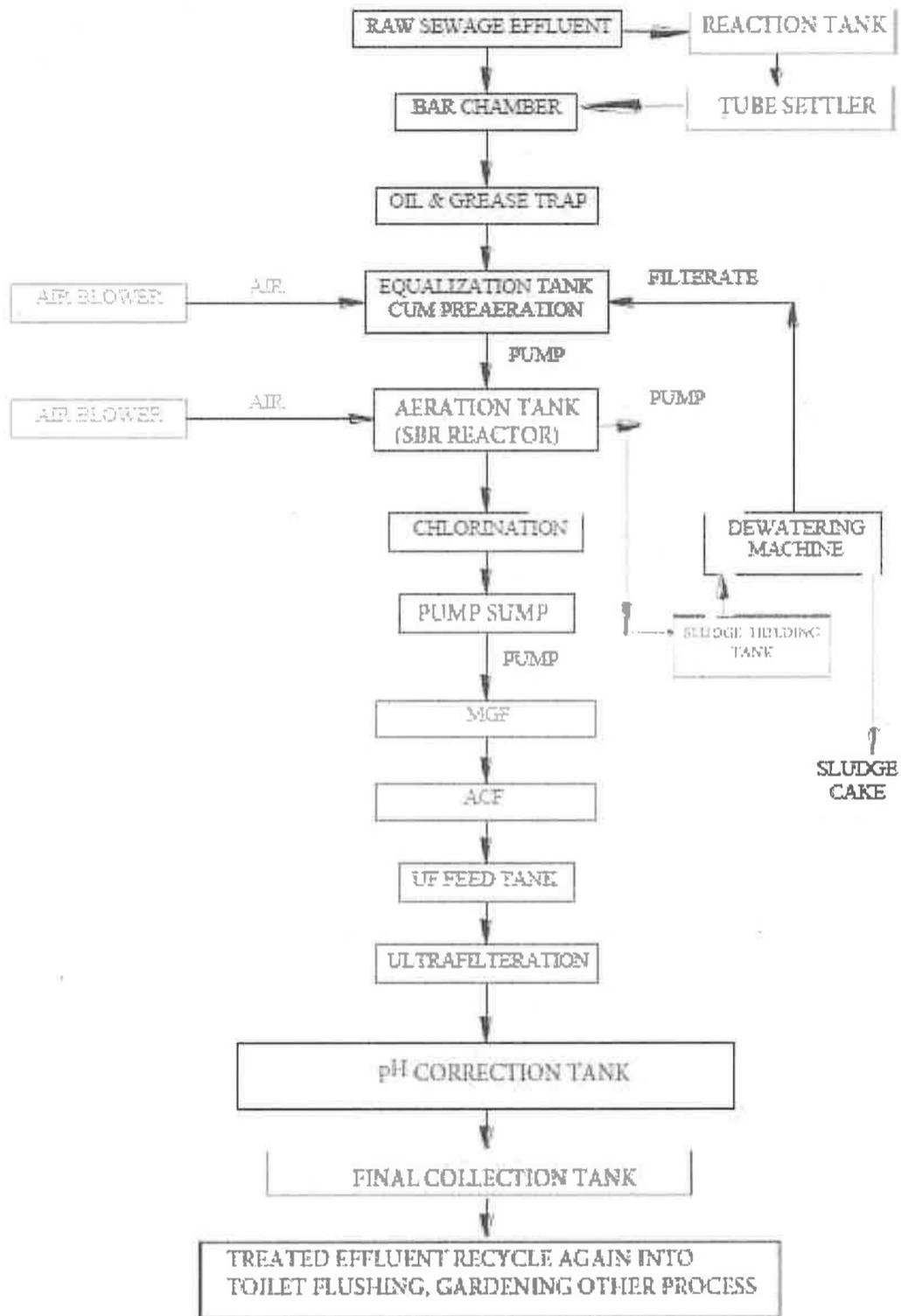


Figure 5.4 Schematic of Sewage Treatment plant

5.3 Environmental Compliance related to Water

- Currently, the plant has NOC for consent to withdraw 300 KLD of water from 2 borewells (Rate of withdrawal 30 KL/hr each & running hours 5 hrs each) available in the plant for domestic applications. At present, approximately 110 KLD (average per day consumption Jan - Feb 2021) of water is used for the plant operations, from borewells.
- The plant does not have NOC to use borewell water for industrial operations. So, at present STP & ETP RO treated water is being used for industrial applications. However, the plant has applied for NOC to use 50 KLD water for industrial operations and its approval is under progress.
- Industrial wastewater generated in the plant is treated in effluent treatment plant (Capacity 150 KLD) followed by 3 stage RO & MEE and reused in process areas.
- Domestic wastewater (sewage) generated in the plant is treated in sewage treatment plant (capacity 250 KLD) and used for toilet flushing, Boiler feed, ETP RO feed & gardening.
- Firm has already installed flow meters at the borewells and other major water consuming areas.
- Plant has 12 rainwater harvesting structures inside the plant for recharging the groundwater.
- 2 Piezometer is installed in the plant premises having DWLR system.

6. Water Conservation Opportunities

6.1 Water Saving Proposal 1: Reduce domestic water consumption in the colony & plant by installing water saving devices

6.1.1 Present Status

Plant

Present domestic water consumption at plant is estimated to be 112 KLD (61 KLD fresh water and 51 KLD STP treated water). Domestic water consumption in the plant is accounted for applications like drinking, hand wash & toilet flushing.

- ❖ Total number of employees (Permanent+ Contractual) = 5500
- ❖ Water Consumption = 112 KLD
- ❖ Per capita Consumption = 20 LPCD

As per IS 1172:1993, the recommended Industrial water requirement is 30 liters/person/day for industries. (Refer Annexure III)

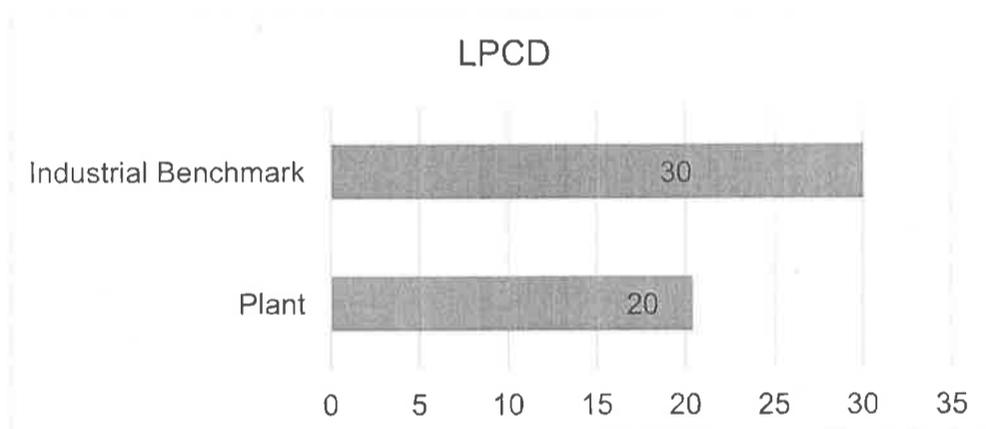


Figure 6.1 Per Capita Water Consumption in Plant

From the above it is clear that the plant per capita water consumption is already well within the recommended industrial water consumption.

CII congratulates the plant team for this achievement.

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Colony

Present domestic water consumption at colony is estimated to be 54 KLD (48 KLD fresh water and 6 KLD STP treated water).

❖ Total Population	=	350
❖ Water Consumption	=	54 KLD
❖ Per capita Consumption	=	154 LPCD

The water supply and usage patterns were discussed with plant personnel and the observations are as follows:

- ❖ Water closets in the colony are single flush type as well as Indian type
- ❖ Water taps in colony are of conventional type
- ❖ Taps do not have flow restrictors

As per IS 1172:1993, the recommended household water requirement is 135 liters/person/day. (Refer Annexure III)

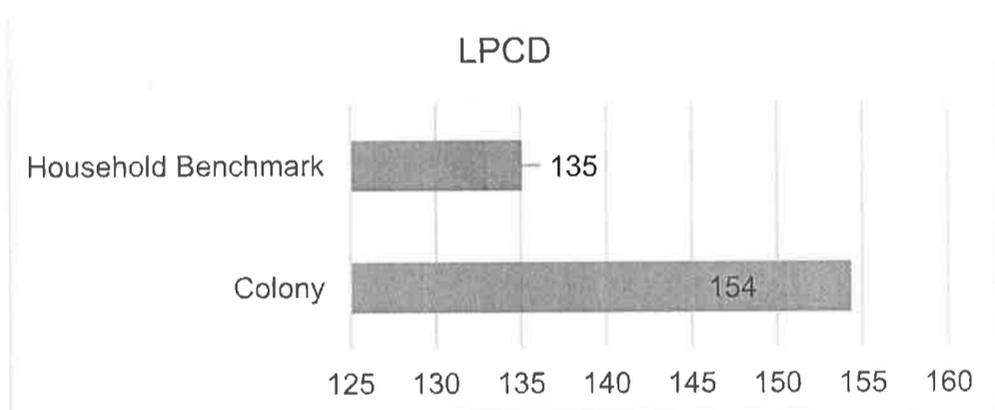


Figure 6.2 Per Capita Water Consumption in Colony

- ❖ Recommended household water requirement = 135 LPCD
- ❖ Potential water saving will be $= (154 - 135) * 350/1000$
= 6.65 KLD

Thus, 7 KLD of water can be saved through implementation of recommended strategies.

6.1.2 Recommendation

Efficient water saving equipment and devices are now available in the market, which if installed can result in significant water savings. These devices could be installed in phases at plant to optimize/reduce domestic water consumption. Some of the water saving gadgets is explained in Annexure V.

Thus, the total saving potential in water consumption for domestic uses is 7 KLD.

We recommend installing the following water saving gadgets in the plant:

- Install float valves in overhead tanks
- Dual flush type water closets in place of Indian style & single flush water closets.
- Switch to mist type taps or foam type taps with aerators and shower mode.
- Conduct Awareness Programmes for employees and Educate team on water scarcity issues

Continuous awareness is a key factor for successful water conservation program. We recommend creating awareness on water conservation through training, bulletins, posters, competition and other means at periodic intervals to maintain the momentum on water conservation.

6.1.3 Benefits

The water saving potential of about 7 KLD with cost benefit analysis as below.

Table 6.1 Cost – Benefits: Reduce domestic water consumption in the plant by installing water saving devices

Estimated Parameters	Units	Based on Borewell water cost @ Rs. 3/KL, STP treated water @ Rs. 35/KL & Ground water abstraction charges @ Rs. 6/KL
Daily water savings	KLD	7
Annual water savings	KL/year	2555
Annual cost Savings	Rs. Lakhs	1.12

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6.2 Observation 1: Collection & utilization of condensate water as boiler feed

6.2.1 Present Status

Presently the plant has a boiler having capacity of 4 TPH.

- ❖ Average steam production from the boiler is around 50 TPD.
- ❖ Present condensate recovery is around 60% (30 TPD)

There is a potential exist to enhance the collection efficiency for condensate upto 75% and reuse is as a boiler feed.

6.2.2 Recommendation

It is recommended to collect the entire condensate throughout the plant and use it as a boiler feed water. It will reduce the STP treated water consumption.

The potential water saving would be 7.5 KLD (considering 15% more recovery of total steam generation, 60% is already recovered).

6.3 Observation 2: Discontinue the practice of using STP-UF treated water for gardening

6.3.1 Present Status

Presently sewage generated in the plant is treated through sewage treatment plant. The STP treated water is passed through MGF, ACF followed by ultrafiltration and used for gardening & toilet flushing.

So, there is a good potential exist to save the operational cost of UF by discontinuing the utilization of UF treated water for gardening.

6.3.2 Recommendation

It is recommended to discontinue the practice of using UF treated water for gardening. The water quality requirement for gardening does not require removal of colloidal silica. So, STP treated water after filtration is adequate to use for gardening.

6.3.3 Benefits

Operation cost of UF will reduce.

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6.4 Observation 3: Explore utilization of wastewater generated from hand wash area to aeration tank

6.4.1 Present Status

Presently the plant has an arrangement to collect the wastewater generated from handwash area into a tank. From the tank it is pumped to the sewage treatment plant and treated along with sewage. The STP treatment comprises reaction tank followed by tube settler, bar chamber, oil & grease trap, equalization tank, aeration tank, MGF, ACF and UF system.

Since the wastewater generated through handwash does not contain any biological impurity, So, there is a potential exist to pump the handwash wastewater directly to aeration tank.

6.4.2 Recommendation

It is recommended to explore the utilization of wastewater generated from hand wash to aeration tank directly. It will reduce the treatment cost to some extent.

Note: It is recommended to analyse the quality parameter (Biological impurities) of the wastewater before implementing this scheme.

7. Implementation Plan

To better understand and comprehensively assess the water usage in the various processes and explore possibilities of water saving, C L Gupta Exports Ltd., Amroha and CII- Water Institute partnered to undertake a detailed water audit of the plant.

The previous chapter detailed out the water saving proposals along with the key recommendations and, costs and benefits to the plant from their adoption. This chapter summarizes the key points emerging along with the way forward towards formulation of a Water Efficiency Plan.

The summary of total water savings emanating from proposed water saving proposals is shown in table 7.1.

Table 7.1 Water saving projects: summary for recommendations

Proposed Schemes		Water Savings (KLD)	Water Savings (KL/annum)	Cost Saving Lakh/annum
I	Total Water Intake	110		
II	Savings Achievable	7	2555	1.1
1	Reduce domestic water consumption in the colony & plant by installing water saving devices	7	2555	1.1
Observations				
1	Collection & utilization of condensate water as boiler feed			
2	Discontinue the practice of using STP-UF treated water for gardening			
3	Explore utilization of wastewater generated from handwash to aeration tank			

7.1 Conclusions

7.1.1 Conclusion 1

- Water balance across the plant has been successfully achieved
- Total consumption: 110 KLD (Average consumption Jan - Feb 2021)

7.1.2 Conclusion 2

Strategies identified for reduction, reuse and recycle show:

- Around 6.3% saving can be achieved in borewell water
- In monetary terms ~ Rs. 1.1 lakh/annum cost savings can be achieved

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7.1.3 Way Forward

- ❖ Prioritize projects
 - Priority areas where immediate savings can be achieved include Reduction in domestic water consumption in the colony & plant by installing water saving devices
 - Need to adopt schemes for water management and conservation (Recycle, Reuse and Reduce options)
 - Identification of key resource person from concerned departments to lead the water conservation and management activities along with the Water Management department. (*immediate*)
 - Plan implementation with time and target (management decisions) (strategically to continue)
 - Monitor proposal-by-proposal
- ❖ Undertake regular water audit for streamlining the activity and sustaining benefits of the study in long run.

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Annexure I: Data Received from Plant Team

Water Consumption data

Borewell 3 & 4 - Water Consumption (KL)			
Month	2018	2019	2020
January	9601	5702	6312
February	8826	7358	4002
March	9112	6423	2621
April	8005	6560	1657
May	7950	7125	3160
June	7110	7470	4214
July	7730	7036	4139
August	6908	6727	3851
September	6464	7825	3575
October	6233	6069	3633
November	5970	5868	3293
December	6409	8226	3842

Water Consumption at Water Treatment Plant

Description	Unit	Jan-21	Feb-21
STP Inlet	KL	4206	3717
STP Outlet	KL	4083	3633
Metal Division	KL	965	696
Glass division	KL	817	758
Wood division	KL	473	377
Process Water	KL	651	648
Green Belt	KL	1150	979
Colony	KL		171
ETP Inlet	KL	2754.8	2847
ETP Outlet	KL	2853.0	3031
UF 1 Inlet	KL	826	921.1
UF1 Outlet	KL	730	828.8
UF 2 Inlet	KL	2653	2762.4
UF 2 Outlet	KL	2449	2618.9
RO feed Meter reading	KL	3179	3450.7
RO 1 permeate	KL	2074	2312
RO 2 permeate	KL	538	544
RO 3 permeate	KL	234	241

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RO 3 reject	KL	325	353.2
MEE Feed	KL	322.2	354.2
Condensate	KL	388.0	432
ATFD feed	KL	28.7	28.3
Corrugation	KL	0	40.5
Glass	KL	1740	1869
Metal	KL	1266	1395
Wood	KL	196	219

Wastewater Balance

S. No.	Description	Average Consumption Jan - Feb 2021 (KLD)	Remarks
Total Water Supply			
a	STP Outlet	133	
ai	Metal Division	28	
aii	Glass Division	27	
aiii	Wood Division	14	
aiv	Process Water	22	
av	Green Belt	36	
avi	Colony	6	
b	ETP Outlet	100	Additional 22 KLD added from STP plant
	UF 1 Inlet	30	
	UF 2 Inlet	92	
	UF 1 Outlet	27	
	UF 2 Outlet	86	
	RO Feed	113	
	RO 1 Permeate	75	
	RO 2 Permeate	18	RO1 reject is used as RO 2 feed
	RO 3 Permeate	8	RO2 reject is used as RO 3 feed
	RO 3 Reject	12	RO3 reject is used as MEE Feed
	Condensate (MEE & ATFD)	14	Steam is also being added
RO permeate & MEE condensate distribution			
	Corrugation	1	
	Glass	61	
	Metal	45	
	Wood	7	

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Specific Water Consumption data

SI No.	Description	Total Quantity (KL) Jun 2020 - Feb 2021
1	Total water consumption (KL)	33048
2	Total Production (Ton)	5130
3	Specific Water Consumption (KL/Ton)	6.44

Production Data

Monthly Production data				
Month	Metal (TPM)	Glass (TPM)	Wood (TPM)	Production (TPM)
Jun-20	189	236	137	562
Jul-20	191	239	138	568
Aug-20	194	241	141	576
Sep-20	193	238	142	573
Oct-20	190	242	137	569
Nov-20	182	231	133	546
Dec-20	195	241	146	582
Jan-21	193	243	147	583
Feb-21	190	237	144	571

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Metering Status

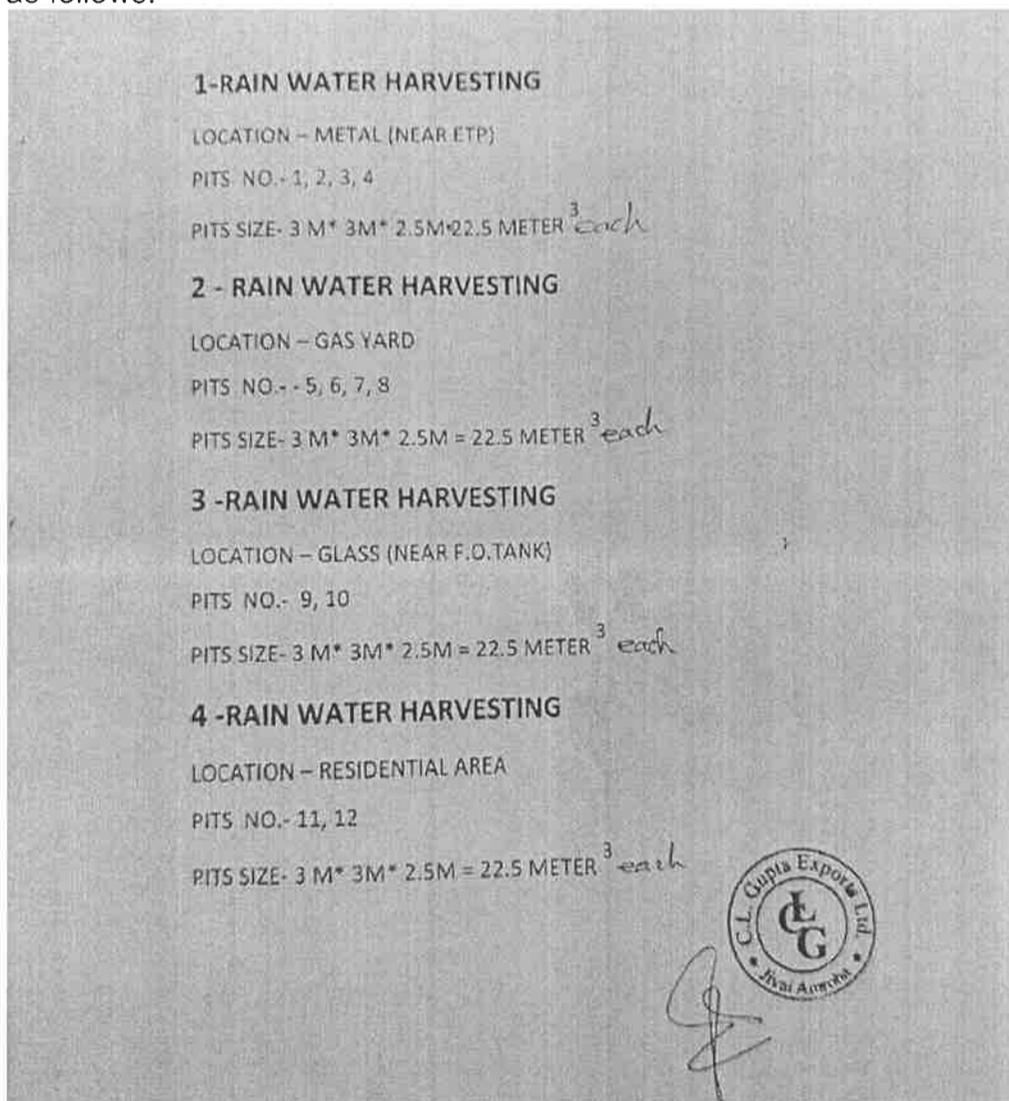
S. No.	Meter Location	Type of Meter	Meter Status (Running/ Faulty/disfunctional)
1	Borewell#3	Electromagnetic	Running
2	Borewell#4	Electromagnetic	Running
3	Res. Domestic	Electromagnetic	Running
4	Plant Domestic	Electromagnetic	Running
5	STP Inlet Wood Div	Electromagnetic	Running
6	STP Inlet Metal Div	Electromagnetic	Running
7	STP Inlet Glass Div	Electromagnetic	Running
8	STP Inlet Res. Area Div	Electromagnetic	Running
9	STP Inlet	Electromagnetic	Running
10	STP Outlet	Electromagnetic	Running
11	STP Treated Metal	Dizital Flow Meter	Running
12	STP Treated Wood	Dizital Flow Meter	Running
13	STP Treated Glass	Dizital Flow Meter	Running
14	STP Treated Process	Dizital Flow Meter	Running
15	STP Treated Horticulture	Dizital Flow Meter	Running
16	STP Res. Area	Dizital Flow Meter	Running
17	Pre- ETP Inlet Wood	Electromagnetic	Running
18	Pre ETP Inlet Metal	Electromagnetic	Running
19	Pre ETP Inlet Glass	Electromagnetic	Running
20	Pre ETP Inlet Corrugation	Electromagnetic	Running
21	Pre ETP Inlet	Electromagnetic	Running
22	Pre ETP Outlet	Electromagnetic	Running
23	Floor Wash Inlet	Electromagnetic	Running
24	Floor Wash Outlet	Electromagnetic	Running
25	CETP Inlet	Electromagnetic	Running
26	CETP Outlet	Electromagnetic	Running
27	UF1- Inlet	Electromagnetic	Running
28	UF1-Outlet	Electromagnetic	Running
29	UF2- Inlet	Electromagnetic	Running
30	UF2-Outlet	Electromagnetic	Running
31	RO Feed(Inlet)	Electromagnetic	Running
32	RO 1- Permeate	Electromagnetic	Running
33	RO 2- Permeate	Electromagnetic	Running
34	RO 3- Permeate	Electromagnetic	Running
35	RO 3- Reject	Electromagnetic	Running
36	RO Distrubtion Wood	Dizital Flow Meter	Running
37	RO Distrubtion Metal	Dizital Flow Meter	Running
38	RO Distrubtion Glass	Dizital Flow Meter	Running
39	MEE Feed	Electromagnetic	Running
40	MEE Condensate+ATFD	Electromagnetic	Running
41	Condenseate	Electromagnetic	Running

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Rainwater Harvesting Potential

Description	Area (m ²)	Runoff coefficient	Annual Rainfall (mm)	RWH Potential (m ³)
Rooftop area (m ²)	107292	0.85	692.3	63137
Paved Area (m ²)	17000	0.65		7650
Green Area (m ²)	31121	0.15		3232
Total				74018

The plant has constructed 12 rainwater recharge structures inside the plant. Only the roof top rainwater is connected to existing recharge structures. The details of structures are as follows:



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Piezometer details (Ground Water Level Data)

Depth to Water Level Details (Mbg) of the Piezometer 1 in the plant premises for the period Feb 2018 To Dec 2020:

PIEZOMETER NO.-1	
DATE	GROUND WATER LEVEL (In meter)
05-02-2018	18.32
28-02-2018	18.69
01-03-2018	18.71
31-03-2018	19.05
01-04-2018	19.05
30-04-2018	19.63
01-05-2018	19.61
31-05-2018	20.19
01-06-2018	20.41
30-06-2018	20.71
01-07-2018	20.91
31-07-2018	20.16
01-08-2018	21.11
31-08-2018	20.71
01-09-2018	20.8
30-09-2018	20.25
01-10-2018	Under maintenance
31-10-2018	Under maintenance
01-11-2018	Under maintenance
25-11-2018	15.71
30-11-2018	15.82
31-12-2018	Under maintenance

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PIEZOMETER NO.-1	
DATE	GROUND WATER LEVEL (In meter)
31-01-2019	15.92
28-02-2019	15.9
11-03-2019	15.66
01-04-2019	15.83
01-05-2019	15.86
01-06-2019	16.09
01-07-2019	16.32
01-08-2019	16.38
03-09-2019	16.4
03-10-2019	15.93
16-10-2019	15.92
04-11-2019	15.97
03-12-2019	15.78

PIEZOMETER NO.-1	
DATE	GROUND WATER LEVEL (In meter)
01-01-2020	15.81
01-02-2020	15.34
16-03-2020	15.09
01-04-2020	15.27
10-05-2020	15.51
01-06-2020	16.02
01-07-2020	16.21
01-08-2020	16.64
01-09-2020	16.55
01-10-2020	16.96
01-11-2020	16.8
01-12-2020	17.01

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Annexure II: Drinking water standard IS 10500 (2012)

IS 10500 : 2012

Indian Standard

DRINKING WATER — SPECIFICATION (Second Revision)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for drinking water.

2 REFERENCES

The standards listed in Annex A contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

For the purpose of this standard the following definition shall apply.

3.1 Drinking Water — Drinking water is water intended for human consumption for drinking and cooking purposes from any source. It includes water (treated or untreated) supplied by any means for human consumption.

4 REQUIREMENTS

Drinking water shall comply with the requirements given in Tables 1 to 4. The analysis of pesticide residues given in Table 3 shall be conducted by a recognized laboratory using internationally established test method meeting the residue limits as given in Table 5.

Drinking water shall also comply with bacteriological requirements (*see* 4.1), virological requirements (*see* 4.2) and biological requirements (*see* 4.3).

4.1 Bacteriological Requirements

4.1.1 Water in Distribution System

Ideally, all samples taken from the distribution system including consumers' premises, should be free from coliform organisms and the following bacteriological quality of drinking water collected in the distribution system, as given in Table 6 is, therefore specified when tested in accordance with IS 1622.

4.2 Virological Requirements

4.2.1 Ideally, all samples taken from the distribution

Table 1 Organoleptic and Physical Parameters
(Foreword and Clause 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to Part of IS 3025	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Colour, Hazen units, <i>Max</i>	5	15	Part 4	Extended to 15 only, if toxic substances are not suspected in absence of alternate sources
ii)	Odour	Agreeable	Agreeable	Part 5	a) Test cold and when heated b) Test at several dilutions
iii)	pH value	6.5-8.5	No relaxation	Part 11	—
iv)	Taste	Agreeable	Agreeable	Parts 7 and 8	Test to be conducted only after safety has been established
v)	Turbidity, NTU, <i>Max</i>	1	5	Part 10	—
vi)	Total dissolved solids, mg/l, <i>Max</i>	500	2 000	Part 16	—

NOTE — It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

IS 10500 : 2012

Table 2 General Parameters Concerning Substances Undesirable in Excessive Amounts
(Foreword and Clause 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Aluminium (as Al), mg/l, <i>Max</i>	0.03	0.2	IS 3025 (Part 55)	—
ii)	Ammonia (as total ammonia-N), mg/l, <i>Max</i>	0.5	No relaxation	IS 3025 (Part 34)	—
iii)	Anionic detergents (as MBAS) mg/l, <i>Max</i>	0.2	1.0	Annex K of IS 13428	—
iv)	Barium (as Ba), mg/l, <i>Max</i>	0.7	No relaxation	Annex F of IS 13428* or IS 15302	—
v)	Boron (as B), mg/l, <i>Max</i>	0.5	1.0	IS 3025 (Part 57)	—
vi)	Calcium (as Ca), mg/l, <i>Max</i>	75	200	IS 3025 (Part 40)	—
vii)	Chloramines (as Cl ₂), mg/l, <i>Max</i>	4.0	No relaxation	IS 3025 (Part 26)* or APHA 4500-Cl G	—
viii)	Chloride (as Cl), mg/l, <i>Max</i>	250	1 000	IS 3025 (Part 32)	—
ix)	Copper (as Cu), mg/l, <i>Max</i>	0.05	1.5	IS 3025 (Part 42)	—
x)	Fluoride (as F) mg/l, <i>Max</i>	1.0	1.5	IS 3025 (Part 60)	—
xi)	Free residual chlorine, mg/l, <i>Min</i>	0.2	1	IS 3025 (Part 26)	To be applicable only when water is chlorinated. Tested at consumer end. When protection against viral infection is required, it should be minimum 0.5 mg/l
xii)	Iron (as Fe), mg/l, <i>Max</i>	0.3	No relaxation	IS 3025 (Part 53)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xiii)	Magnesium (as Mg), mg/l, <i>Max</i>	30	100	IS 3025 (Part 46)	—
xiv)	Manganese (as Mn), mg/l, <i>Max</i>	0.1	0.3	IS 3025 (Part 59)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xv)	Mineral oil, mg/l, <i>Max</i>	0.5	No relaxation	Clause 6 of IS 3025 (Part 39) Infrared partition method	—
xvi)	Nitrate (as NO ₃), mg/l, <i>Max</i>	45	No relaxation	IS 3025 (Part 34)	—
xvii)	Phenolic compounds (as C ₆ H ₅ OH), mg/l, <i>Max</i>	0.001	0.002	IS 3025 (Part 43)	—
xviii)	Selenium (as Se), mg/l, <i>Max</i>	0.01	No relaxation	IS 3025 (Part 56) or IS 15303*	—
xix)	Silver (as Ag), mg/l, <i>Max</i>	0.1	No relaxation	Annex J of IS 13428	—
xx)	Sulphate (as SO ₄) mg/l, <i>Max</i>	200	400	IS 3025 (Part 24)	May be extended to 400 provided that Magnesium does not exceed 30
xxi)	Sulphide (as H ₂ S), mg/l, <i>Max</i>	0.05	No relaxation	IS 3025 (Part 29)	—
xxii)	Total alkalinity as calcium carbonate, mg/l, <i>Max</i>	200	600	IS 3025 (Part 23)	—
xxiii)	Total hardness (as CaCO ₃), mg/l, <i>Max</i>	200	600	IS 3025 (Part 21)	—
xxiv)	Zinc (as Zn), mg/l, <i>Max</i>	5	15	IS 3025 (Part 49)	—

NOTES

1 In case of dispute, the method indicated by '*' shall be the referee method.

2 It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

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Water Audit Report
C L Gupta Exports Ltd., Amroha

IS 10500 : 2012

Table 3 Parameters Concerning Toxic Substances
(Foreword and Clause 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Cadmium (as Cd), mg/l, <i>Max</i>	0.003	No relaxation	IS 3025 (Part 41)	—
ii)	Cyanide (as CN), mg/l, <i>Max</i>	0.05	No relaxation	IS 3025 (Part 27)	—
iii)	Lead (as Pb), mg/l, <i>Max</i>	0.01	No relaxation	IS 3025 (Part 47)	—
iv)	Mercury (as Hg), mg/l, <i>Max</i>	0.001	No relaxation	IS 3025 (Part 48)/ Mercury analyser	—
v)	Molybdenum (as Mo), mg/l, <i>Max</i>	0.07	No relaxation	IS 3025 (Part 2)	—
vi)	Nickel (as Ni), mg/l, <i>Max</i>	0.02	No relaxation	IS 3025 (Part 54)	—
vii)	Pesticides, µg/l, <i>Max</i>	See Table 5	No relaxation	See Table 5	—
viii)	Polychlorinated biphenyls, mg/l, <i>Max</i>	0.000 5	No relaxation	ASTM 5175*	—
ix)	Polynuclear aromatic hydrocarbons (as PAH), mg/l, <i>Max</i>	0.000 1	No relaxation	APHA 6440	or APHA 6630 —
x)	Total arsenic (as As), mg/l, <i>Max</i>	0.01	0.05	IS 3025 (Part 37)	—
xi)	Total chromium (as Cr), mg/l, <i>Max</i>	0.05	No relaxation	IS 3025 (Part 52)	—
xii)	Trihalomethanes:				
a)	Bromoform, mg/l, <i>Max</i>	0.1	No relaxation	ASTM D 3973-85* or APHA 6232	—
b)	Dibromochloromethane, mg/l, <i>Max</i>	0.1	No relaxation	ASTM D 3973-85* or APHA 6232	—
c)	Bromodichloromethane, mg/l, <i>Max</i>	0.06	No relaxation	ASTM D 3973-85* or APHA 6232	—
d)	Chloroform, mg/l, <i>Max</i>	0.2	No relaxation	ASTM D 3973-85* or APHA 6232	—

NOTES

1 In case of dispute, the method indicated by '*' shall be the referee method.

2 It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Table 4 Parameters Concerning Radioactive Substances
(Foreword and Clause 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to Part of IS 14194	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Radioactive materials:				
a)	Alpha emitters Bq/l, <i>Max</i>	0.1	No relaxation	Part 2	—
b)	Beta emitters Bq/l, <i>Max</i>	1.0	No relaxation	Part 1	—

NOTE — It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

IS 10500 : 2012

Table 5 Pesticide Residues Limits and Test Method
(Foreword and Table 3)

SI No.	Pesticide	Limit µg/l	Method of Test, Ref to	
			USEPA (4)	AOAC/ ISO (5)
(1)	(2)	(3)		
i)	Alachlor	20	525.2, 507	—
ii)	Atrazine	2	525.2, 8141 A	—
iii)	Aldrin/ Dieldrin	0.03	508	—
iv)	Alpha HCH	0.01	508	—
v)	Beta HCH	0.04	508	—
vi)	Butachlor	125	525.2, 8141 A	—
vii)	Chlorpyrifos	30	525.2, 8141 A	—
viii)	Delta HCH	0.04	508	—
ix)	2,4- Dichlorophenoxyacetic acid	30	515.1	—
x)	DDT (<i>o, p</i> and <i>p, p</i> – Isomers of DDT, DDE and DDD)	1	508	AOAC 990.06
xi)	Endosulfan (alpha, beta, and sulphate)	0.4	508	AOAC 990.06
xii)	Ethion	3	1657 A	—
xiii)	Gamma — HCH (Lindane)	2	508	AOAC 990.06
xiv)	Isoproturon	9	532	—
xv)	Malathion	190	8141 A	—
xvi)	Methyl parathion	0.3	8141 A	ISO 10695
xvii)	Monocrotophos	1	8141 A	—
xviii)	Phorate	2	8141 A	—

NOTE — Test methods are for guidance and reference for testing laboratory. In case of two methods, USEPA method shall be the reference method.

Table 6 Bacteriological Quality of Drinking Water¹⁾
(Clause 4.1.1)

SI No.	Organisms	Requirements
(1)	(2)	(3)
i)	<i>All water intended for drinking:</i>	
a)	<i>E. coli</i> or thermotolerant coliform bacteria ^{2), 3)}	Shall not be detectable in any 100 ml sample
ii)	<i>Treated water entering the distribution system:</i>	
a)	<i>E. coli</i> or thermotolerant coliform bacteria ²⁾	Shall not be detectable in any 100 ml sample
b)	Total coliform bacteria	Shall not be detectable in any 100 ml sample
iii)	<i>Treated water in the distribution system:</i>	
a)	<i>E. coli</i> or thermotolerant coliform bacteria	Shall not be detectable in any 100 ml sample
b)	Total coliform bacteria	Shall not be detectable in any 100 ml sample

¹⁾Immediate investigative action shall be taken if either *E. coli* or total coliform bacteria are detected. The minimum action in the case of total coliform bacteria is repeat sampling; if these bacteria are detected in the repeat sample, the cause shall be determined by immediate further investigation.

²⁾Although, *E. coli* is the more precise indicator of faecal pollution, the count of thermotolerant coliform bacteria is an acceptable alternative. If necessary, proper confirmatory tests shall be carried out. Total coliform bacteria are not acceptable indicators of the sanitary quality of rural water supplies, particularly in tropical areas where many bacteria of no sanitary significance occur in almost all untreated supplies.

³⁾It is recognized that, in the great majority of rural water supplies in developing countries, faecal contamination is widespread. Under these conditions, the national surveillance agency should set medium-term targets for progressive improvement of water supplies.

Annexure III: IS 1172: 1993 Code of Basic Requirements for water supply, drainage and sanitation

IS 1172 : 1993

a general rule the following rates per capita per day may be considered minimum for domestic and non domestic needs:

- | | |
|---|-----------------|
| 1) For communities with population up to 20 000 and without flushing system | |
| a) water supply through standpost | 40 lphd (Min) |
| b) water supply through house service connection | 70 to 100 lphd |
| 2) For communities with population 20 000 to 100,000 together with full flushing system | 100 to 150 lphd |
| 3) For communities with population above 100 000 together with full flushing system | 150 to 200 lphd |

NOTE — The value of water supply given as 150 to 200 litres per head per day may be reduced to 135 litres per head per day for houses for Lower Income Groups (LIG) and Economically Weaker Section of Society (EWS), depending upon prevailing conditions.

4.1.1 Out of the 150 to 200 litres per head per day, 45 litres per head per day may be taken for flushing requirements and the remaining quantity for other domestic purposes.

4.2 Water Supply for Buildings Other Than Residences

Minimum requirements for water supply for buildings other than residences shall be in accordance with Table 1.

5 DRAINAGE AND SANITATION REQUIREMENTS

5.1 General

There shall be at least one water tap and arrangements for drainage in the vicinity of each water-closet or group of water-closets in all buildings.

5.2 Residences

5.2.1 Dwellings with individual conveniences shall have at least the following fittings:

- One bath room provided with a tap.
- One water-closet, and
- One nahani or sink either in the floor or raised from the floor with a tap.

Table 1 Water Requirements for Buildings Other than Residences

Sl No.	Type of Building	Consumption Per Day, litres
(1)	(2)	(3)
i)	Factories where bath rooms are required to be provided	45 per head
ii)	Factories where no bath rooms are required to be provided	30 per head
iii)	Hospital (including laundry)	
a)	Number of beds not exceeding 100	340 per head
b)	Number of beds exceeding 100	450 per head
iv)	Nurses' homes and medical quarters	135 per head
v)	Hostels	135 per head
vi)	Hotel	180 per head
vii)	Offices	45 per head
viii)	Restaurants	70 per seat
ix)	Cinema, concert halls and theatres	15 per seat
x)	Schools	
a)	Day schools	45 per head
b)	Boarding schools	135 per head

NOTE — For fire demand in buildings refer IS 9668 : 1981.

Where only one water-closet is provided in a dwelling, the bath and water-closet shall be separately accommodated.

NOTE — Water-closets, unless otherwise indicated, shall be of Indian style (squatting type).

5.2.2 Dwellings without individual conveniences shall have the following fittings:

- One water tap with draining arrangement in each tenement.
- One water-closet and one bath for every two tenements, and
- Water taps in common bath rooms.

5.3 Buildings Other Than Residences

The requirements for fittings for drainage and sanitation in case of buildings other than residences shall be in accordance with Tables 2 to 12.

6 WATER SUPPLY, DRAINAGE AND SANITATION REQUIREMENTS FOR RAILWAY PLATFORMS, BUS STATIONS, BUS TERMINALS AND AIRPORTS

6.1 General

The water supply, drainage and sanitation requirement specified in 6.2 to 6.4 for railway stations, bus stations, bus terminals, sea ports

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Water Audit Report
C L Gupta Exports Ltd., Amroha

Annexure IV: Borewell & Wastewater test reports



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email : etslab2012@gmail.com | Website : www.etslab.in | Ph.: 9911516076, 9811736063

TEST REPORT

TEST REPORT NO ETS/1600/03/2020

DATE OF REPORT 29/10/2020

WATER SAMPLE ANALYSIS REPORT

Name And Address of Customer : M/s. C.L GUPTA EXPORTS LTD.
18TH KM BEFORE MORADABAD ,DELHI HIGHWAY
JIVAI, AMROHA, U.P.

Date of Sampling : 24/10/2020
Analysis Start Date : 26/10/2020
Analysis End Date : 29/10/2020
Sample ID No : 1169
Sampling Done By : ETS STAFF
Sampling Description : DRINKING WATER (OUTLET FROM BOREWELL)
Sampling Location : COLONY BOREWELL (POST-MANSOONI)
Sampling Method : ETS:STPWATER-02
Sample Quantity : 2.0 x 0.5 Ltr
Packing Condition : SEALED
Packed In : P.V.C. AND GLASS BOTTLE

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per IS:10500:2012)		Test Method
				Desirable	Permissible	
1	Colour	Hazen	< 5.0	5	15	APHA 2120-B
2	Odour		Agreeable	Agreeable	Agreeable	APHA 2150-B
3	pH		7.50	6.5 - 8.5	No Relaxation	APHA 4500-H+
4	Taste		Agreeable	Agreeable	Agreeable	APHA 2160-C
5	Turbidity	NTU	<5.0	1	5	APHA 2130-B
6	Total Dissolved Solids (TDS)	mg/L	465.0	500	2000	APHA 2540-C
7	Calcium (Ca)	mg/L	52.6	75	200	APHA 3500 (Ca)-B
8	Chloride (Cl)	mg/L	39.0	250	1000	APHA 4500 (Cl)-B
9	Iron (Fe)	mg/L	0.14	0.3	No Relaxation	APHA-3120-B
10	Magnesium (Mg)	mg/L	15.2	30	100	APHA 3500 (Mg)-B
11	Sulphate (SO ₄)	mg/L	26.0	200	400	APHA 4500 (SO ₄)-F
12	Total Alkalinity (CaCO ₃)	mg/L	178.0	200	600	APHA 2320-B
13	Fluoride (F)	mg/L	0.18	1	1.5	APHA 4500 (F)-D
14	Arsenic (As)	mg/L	N.D	0.01	0.05	APHA 3120B
15	Dissolved Oxygen (DO)	mg/L	3.5	Not Specified	Not Specified	APHA 4500 (O)-C

Page 1 of 2

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CHECKED BY

For Enviro-Tech Services

AUTHORIZED SIGNATORY

Format No: ETS-LAB-TR-05, Issue No: 05, Date 01/04/2015, And, Rev: 04 Date 01/04/2015 Quality Manager

Note:-

- This test report shall not be used in any advertising media or as evidence in the court of law without prior written permission of the laboratory.
- The samples received shall be destroyed after 15 days from the date of test report issued.
- The results indicated only refer to the tested samples and listed applicable parameters.
- Our liability is limited to analytical value only.
- Head Office : G-232, M.G. Road Industrial Area, Hapur-Ghaziabad (U.P.) 201017

1601

Water Audit Report
C L Gupta Exports Ltd., Amroha



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Plot No. 1/32, South Side G.T. Road Industrial Area, Ghaziabad (U.P.) - 201001
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TEST REPORT

TEST REPORT NO : ETS/165/10/2020

DATE OF REPORT : 29.10.2020

WATER SAMPLE ANALYSIS REPORT

Sr	Parameter	Unit	Result	Specification	Standard
16	Biological Oxygen Demand(BOD ₅ 27°C)	mg/L	N.D	Not Specified	IS 3025 (Part-44)
17	Total Coliform	MPN/100mL	Absent	Shall Not Be Detectable	IS 1022
18	Escherichia coli	MPN/100mL	Absent	Shall Not Be Detectable	IS 1622

Remark-N.D-Not Detectable.

****End of Test Report****

Page 2 of 2

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Formal No:ETS/AB/TR-09 Issue No: 07, Date:01/04/2019 And No: 04 Date:01/04/2019

Quality Manager

Notes:-

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2. The samples received shall be destroyed after 15 days from the date of test report issued.
3. The results indicated only refer to the tested samples and listed applicable parameters.
4. Our liability is limited to invoice value only.
5. Head Office : G-232, G.T. Road Industrial Area, Hapur-Ghaziabad (U.P.) 201015

1602

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email : etslab2012@gmail.com | Website : www.etslab.in | Ph.: 9911516076, 9811736063

TEST REPORT

TEST REPORT NO : ETS/11/01/002269

DATE OF REPORT : 30.10.2020

WATER SAMPLE ANALYSIS REPORT

Name And Address of Customer : M/s. C L GUPTA EXPORTS LTD
18TH KM BEFORE MORADABAD DELHI HIGHWAY
JIVVA, AMROHA U.P.

Date of Sampling : 24.10.2020
Analysis Start Date : 26.10.2020
Analysis End Date : 29.10.2020
Sample ID No : 1170
Sampling Done By : ETS STAFF
Sampling Description : DRINKING WATER (OUTLET FROM BOREWELL)
Sampling Location : BOREWELL (GLASS) (POST-MANSOON)
Sampling Method : ETS/STP/WATER-02
Sample Quantity : 2.0 + 0.5 Ltr
Packing Condition : SEALED
Packed In : P.V.C. AND GLASS BOTTLE

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per IS:10500:2012)		Test Method
				Desirable	Permissible	
1	Colour	Hazen	< 5.0	5	15	APHA 2120-B
2	Odour		Agreeable	Agreeable	Agreeable	APHA 2150-B
3	pH		7.41	6.5 - 8.5	No Relaxation	APHA 4500-H+
4	Taste		Agreeable	Agreeable	Agreeable	APHA 2160-C
5	Turbidity	NTU	<5.0	1	5	APHA 2130-B
6	Total Dissolved Solids (TDS)	mg/L	422.0	500	2000	APHA 2540-C
7	Calcium (Ca)	mg/L	43.5	75	200	APHA 3500 (Ca)-B
8	Chloride (Cl)	mg/L	35.0	250	1000	APHA 4500 (Cl)-B
9	Iron (Fe)	mg/L	0.13	0.3	No Relaxation	APHA 3120-B
10	Magnesium (Mg)	mg/L	18.5	30	100	APHA 3500 (Mg)-B
11	Sulphate (SO ₄)	mg/L	21.0	200	400	APHA 4500 (SO ₄)-E
12	Total Alkalinity (CaCO ₃)	mg/L	156.0	200	500	APHA 2320-B
13	Fluoride (F)	mg/L	0.15	1	1.5	APHA 4500 (F)-D
14	Arsenic (As)	mg/L	N.D	0.01	0.05	APHA 3120-B
15	Dissolved Oxygen (DO)	mg/L	3.0	Not Specified	Not Specified	APHA 4500 (O ₂)-C

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Quality Manager

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- The samples received shall be destroyed after 15 days from the date of test report issued.
- The results indicated only refer to the tested samples and listed applicable parameters.
- Our liability is limited to service value only.
- Head Office : 2-232, M.G. Road Industrial Area, Hapur-Ghaziabad (U.P.) 201615

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Water Audit Report
C L Gupta Exports Ltd., Amroha



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TEST REPORT

TEST REPORT NO. ETS/17010/2023

DATE OF REPORT: 29/10/2023

WATER SAMPLE ANALYSIS REPORT

Sr No	Parameter	Unit	Result	Specification	Standard
16	Biological Oxygen Demand(BOD _{5@27°C})	mg/L	N D	Not Specified	IS 3025 (Part-44)
17	Total Coliform	MPN/100ml	Absent	Shall Not Be Detectable	IS 1522
18	Escherichia coli	MPN/100ml	Absent	Shall Not Be Detectable	IS 1522

Remark: N.D-not Detectable

*****End of Test Report*****

Page 2 of 2

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Format No ETS/LAB/TP-09 Issue No 05 Date 01/04/2019, Amend No 04 Date 21/04/2019

For E. Tech Services
AUTHORIZED SIGNATORY
[Signature]
Quality Manager

Note:-

1. This test report shall not be used in any advertising media or as evidence in the court of law without prior written permission of the laboratory.
2. The samples received shall be destroyed after 15 days from the date of test report issued.
3. The results indicated only refer to the tested samples and listed applicable parameters.
4. Our liability is limited to invoice value only.
5. Head Office : G-237, N.C. Road Industrial Area, Nagar-Ghaziabad (U.P.) 201015

1604

Water Audit Report
C L Gupta Exports Ltd., Amroha

LF-SC-04

अनुसंधान, परीक्षण एवं कॅलिब्रेशन प्रयोगशाला
RESEARCH, TESTING AND CALIBRATION LABORATORY
RTC
LABORATORY

(A Division of Metal Handicrafts Service Centre)
वस्त्र मंत्रालय, भारत सरकार के नियंत्रणाधीन
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Website : www.metalfinishanddesign.in

TEST REPORT

Date of TR : 18.02.2021
Date of Test Start : 12.02.2021
Date of Test End : 17.02.2021
Page 1 of : 3

TR REF. No. : RTCL - 31664 / 2020 - 21 / Q2D- 202102002005
ULR No. : TC668321000000291
Customer Ref. : NIL DATED : 11.02.2021
Customer Name : M/S C.L. GUPTA EXPORTS LTD.
Address : VILLAGE - JIVAI, DELHI ROAD
AMROHA- 244221
Tel. No. : 9410237361
Contact Person : Mr. VINOD SINHA

Sample Information

* Sample Description	: ETP INLET WATER	Order No.	: N.A.
* Qty. Submitted	: 01(ONE) NO. (5 LTRS.)	Buyer Name	: N.A.
* Date of Receipt	: 11.02.2021	Buying House	: N.A.
* Colour	: LIGHT GRAY	Country of Destination	: N.A.
* Ref. No.	: NIL	Country Origin	: INDIA
* Style No. / Article No.	: _____	SKU No./ Item No. :	_____
* Type of Test Required	: WATER PARAMETERS EXCEPT BL TEST, AS SPECIFIED BY CUSTOMER		
* Deviation if any from the standard including environmental condition	: N.A.		

Sample from : (RM / In process / Finished Product) : - N.A.

031714

Contd..2

डा० रविंद्र कुमार / Dr. Ravindra Kumar
महानिदेशक / Manager
एच. सी. एम. सी.
Moradabad (U.P.)

CERTIFICATE No. - TC-6683

[NABL ACCREDITED LABORATORY as per ISO / IEC : 17025-2017]

1605

Water Audit Report
C L Gupta Exports Ltd., Amroha**RTC**
LABORATORY

Continuation Sheet

Indian **handicrafts**
हस्तशिल्प
continuing traditionPage 2 of 3
Date of TR : 16.02.2024

TR REF. No. : RTGL - 31664 / 2020 - 21 / Q2D- 202102002005

RESULT : Type of Test Conducted : - Water Parameters Except BL Test.

Sample / Item No.	Type of Test Conducted	Ref. to Test method / Standard	Test Results
ETP INLET WATER	p ^H	IS : 3025 (11):02	7.76
	COLOUR	IS : 3025 (4):06	Light Gray
	ODOUR	IS : 3025 (5):06	Objectionable
	TURBIDITY	IS : 3025 (10):06	<5.0 NTU
	TOTAL DISSOLVED SOLIDS (T.D.S.)	IS : 3025 (15):09	2.76 ppt
	CHLORIDE	IS : 3025 (32):09	57.57 mg /L
	TOTAL HARDNESS	IS : 3025 (21):06	544.0 mg /L
	CYANIDE (CN)	IS : 3025 (26):86	<0.01 mg /L
	T.S.S.	IS : 3025 (17):99	129.0 mg /L
	LEAD (Pb)	APHA 22 nd ED12/ ASTM D:1976:12 [ICPOES]	<0.01 mg /L
	CADMIUM (Cd)	- do -	<0.01 mg /L
	IRON (Fe)	- do -	<0.01 mg /L
	NICKEL (Ni)	- do -	<0.01 mg /L
	MANGANESE (Mn)	- do -	<0.01 mg /L
	COPPER (Cu)	- do -	0.38 mg /L
	CHROMIUM (Cr)	- do -	<0.01 mg /L
	ZINC (Zn)	- do -	0.08 mg /L
BOD	IS : 3025 (44):09	12.0 mg /L	
COD	IS : 3025 (58):06	33.0 mg /L	

031714

हस्ताक्षर : Ravindra Kumar
 मंडल : Manager
 पता : H.L.C.
 Pradhatad (U.P.)

Contd..3

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Water Audit Report
C L Gupta Exports Ltd., Amroha

RTC LABORATORY
Continuation Sheet

H भारतीय
Indian handicrafts
हस्तशिल्प
continuing tradition

Page 3 of : 3
Date of TR : 18.02.2021

TR REF. No. : RTCL - 31664 / 2020 - 21 / Q2D- 202102002005

CONCLUSION / REMARKS : Except P^H, Colour, Odour, Taste & Turbidity all limits are in mg /L.
mg /L. = milligram per litre, <= Less than
: 1 mg/kg = 1 ppm (PART PER MILLION)= 0.0001%

Note :

1. The test results relate only to the items tested & we do not accept any legal liabilities.
2. This report is not to be reproduced wholly or in part and can not be used as an Evidence in the Court of Law & should not be used in any Advertising Media without prior permission of the Centre in writing.

SAMPLE NOT DRAWN BY RTCL

Authorised Signatory

डॉ. रावेन्द्र शर्मा (Dr. R. K. SHARMA)
GENERAL MANAGER
T. 011-591-246931
मुद्रावाच (3027) Moradabad
244001 / 244001
rtclindia@gmail.com

END OF REPORT

Facilities available at R.T.C.L. :-

- *Testing - Lead & Cadmium Leaching, Total Lacquer Quality Test (Salt Spray, Humidity, Pin Hole, Adhesion etc.) Metallic & Non - Metallic Coating Thickness (Silver, Copper, Nickel, Zinc & Chrome etc. and Paint, Powder & Lacquer), Metal & Metal Alloys Composition, Drop Test & Bursting Test.
- *Any Other problem in the field of Metal Finishing, Casting & Forming, Water & Waste Water Testing.
- *Consignment inspection, Expert Opinion & Handicrafts Product Test as per Buyer Protocol.

SRS -
(Under Control of Development Commissioner (Handicrafts), Ministry of Textiles, Govt. of India, New Delhi)

031714
ISO/IEC:17025:2017 Accredited Testing Laboratory by NABL vide Certificate Number TC-6683
Listed with ASTM International Directory of Testing Labs
Pls. refer the website www.nabl-india.org to view our scope of Accredited Tests.

1607

Water Audit Report
C L Gupta Exports Ltd., Amroha

LF-SC-04

अनुसंधान, परीक्षण एवं कॅलिब्रेशन प्रयोगशाला
RESEARCH, TESTING AND CALIBRATION LABORATORY

RTC
LABORATORY

(A Division of Metal Handicrafts Service Centre)
वस्त्र मंत्रालय, भारत सरकार के नियंत्रणाधीन
(Under Control of Ministry of Textiles Govt. of India.)
Peetal Nagri, Rampur Road, Moradabad -244001 (U.P.) INDIA
Website : www.metalfinishanddesign.in
e-mail : rtcindia@gmail.com

☎ : +91-591-2460864
Telefax : +91-591-2460131

TEST REPORT

TR REF. No. : RTCL - 31664 / 2020 - 21 / Q2D- 202102002006
ULR No. : TC668321000000292
Customer Ref. : NIL DATED : 11.02.2021
Customer Name : M/S C.L. GUPTA EXPORTS LTD.
Address : VILLAGE - JIVAI, DELHI ROAD
AMROHA- 244221
Tel. No. : 9410237361
Contact Person : Mr. VINOD SINHA

Date of TR : 18.02.2021
Date of Test Start : 12.02.2021
Date of Test End : 17.02.2021
Page 1 of : 3

Sample Information

* Sample Description	: ETP OUTLET WATER	Order No.	: N.A.
* Qty. Submitted	: 01(ONE) NO. (5LTRS.)	Buyer Name	: N.A.
* Date of Receipt	: 11.02.2021	Buying House	: N.A.
* Colour	: COLOURLESS	Country of Destination	: N.A.
* Ref. No.	: NIL	Country Origin	: INDIA
* Style No. / Article No.	: -----	SKU No./ Item No. :	-----
* Type of Test Required	: WATER PARAMETERS EXCEPT BL TEST, AS SPECIFIED BY CUSTOMER		
* Deviation if any from the standard including environmental condition	: N.A.		

Sample from : (RM / In process / Finished Product) : - N.A.

031715

CONTD..2

डॉ० रविन्द्र कुमार / Dr. Ravindra Kumar
महानिदेशक / General Manager
एन.एच.सी. (M.H.C.C.)
मुससबाद (उ.प्र.) / Moradabad (U.P.)
244001 / 244004

[NABL ACCREDITED LABORATORY as per ISO / IEC : 17025 : 2017]

CERTIFICATE No. - TC-6683

1608

Water Audit Report
C L Gupta Exports Ltd., Amroha**RTC**
LABORATORY

Continuation Sheet

भारतीय
indian handicrafts
हस्तशिल्प
continuing tradition

Page 2 of 3

Date of TR : 18.02.2021

TR REF. No. : RTGL - 31664 / 2020 - 21 (Q2D- 202102002006)

RESULT : Type of Test Conducted : - Water Parameters Except BL Test.

Sample / Item No.	Type of Test Conducted	Ref. to Test method / Standard	Test Results
ETP OUTLET WATER	p ^H	IS : 3025 (11):02	7.05
	COLOUR	IS : 3025 (4):06	Colourless
	ODOUR	IS : 3025 (5):06	Unobjectionable
	TURBIDITY	IS : 3025 (10):06	<5.0 NTU
	TOTAL DISSOLVED SOLIDS (T.D.S.)	IS : 3025 (15):09	97.5 mg/L
	CHLORIDE	IS : 3025 (32):09	28.3 mg /L
	TOTAL HARDNESS	IS : 3025 (21):06	220.0 mg /L
	CYANIDE (CN)	IS : 3025 (26):86	<0.01 mg /L
	T.S.S.	IS : 3025 (17):99	73.0 mg /L
	LEAD (Pb)	APHA 22 nd ED12/ ASTM D:1976:12 [ICPOES]	<0.01 mg /L
	CADMIUM (Cd)	- do -	<0.01 mg /L
	IRON (Fe)	- do -	<0.01 mg /L
	NICKEL (Ni)	- do -	<0.01 mg /L
	MANGANESE (Mn)	- do -	<0.01 mg /L
	COPPER (Cu)	- do -	<0.01 mg /L
	CHROMIUM (Cr)	- do -	<0.01 mg /L
	ZINC (Zn)	- do -	<0.01 mg /L
BOD	IS : 3025 (44):09	9.0 mg /L	
COD	IS : 3025 (58):06	23.0 mg /L	

031715

Contd..3

डॉ० रविंद्र कुमार / Dr. Ravindra Kumar
सहसंचालक, General Manager
एम०एच०एस०सी० M.H.S.C
मुजफ्फरगढ़ (U.P.) Moradabad (U.P.)

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Water Audit Report
C L Gupta Exports Ltd., Amroha

RTC
LABORATORY
Continuation Sheet

H indian handicrafts
हस्तशिल्प
continuing tradition

TR REF. No. : RTCL - 31664 / 2020 - 21 / Q2D- 202102002006

Page 3 of : 3
Date of TR : 18.02.2021

CONCLUSION / REMARKS : Except P^H, Colour, Odour, Taste & Turbidity all limits are in mg /L.
mg /L = milligram per litre, <= Less than
: 1 mg/kg = 1 ppm (PART PER MILLION)= 0.0001%

Note :

- 1.The test results relate only to the item(s) tested & we do not accept any Legal Liabilities.
- 2.This report is not to be reproduced wholly or in part and can not be used as an Evidence in the Court of Law & should not be used in any Advertising Media without prior permission of the Centre in writing.

SAMPLE NOT DRAWN BY RTCL

Authorised Signatory

END OF REPORT

(Dr. R.K. SHARMA)
डॉ. रविन्द्र कुमार
महाराष्ट्र
GENERAL MANAGER
मो. 91-591-2460864
महाराष्ट्र (30000) Maharashtra (U.P.)
742001 / 2447 rtclindia@gmail.com

Facilities available at R.T.C.L. :-

- *Testing :- Lead & Cadmium Leaching Total Lacquer Quality Test (Salt Spray, Humidity, Pin Hole, Adhesion etc.) Metallic & Non - Metallic Coating Thickness (Silver, Copper, Nickel, Zinc & Chrome etc. and Paint, Powder & Lacquer), Metal & Metal Alloys Composition, Drop Test & Bursting Test
- *Any Other problem in the field of Metal Finishing, Casting & Forming, Water & Waste Water Testing
- *Consignment Inspection, Expert Opinion & Handicrafts Product Test as per Buyer Protocol

SRS -

(Under Control of Development Commissioner (Handicrafts), Ministry of Textiles, Govt. of India, New Delhi)

031715

ISO/IEC:17025:2017 Accredited Testing Laboratory by NABL vide Certificate Number TC-6683

Listed with ASTM International Directory of Testing Labs

Pls. refer the website www.nabl-india.org to view our scope of Accredited Tests.

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Water Audit Report
C L Gupta Exports Ltd., Amroha

Intertek
Total Quality Assured.

TEST REPORT

NUMBER: DELH21001287

DATE: 06TH FEB, 2021

APPLICANT: C.L. GUPTA EXPORTS LTD.
18TH KM BEFORE MORADABAD, DELHI HIGHWAY,
VILL. JIVAL, J.P. NAGAR, MORADABAD - 244221, UTTAR PRADESH

ATTN: Mr. PANKAJ SHARMA

SAMPLE DESCRIPTION : THE SUBMITTED SAMPLES SAID TO BE - WATER SAMPLE (TTP OUTLET)

DATE RECEIVED : 28TH JAN, 2021
BUYER'S NAME : --
BUYING AGENT/ CONTACT : --
ORDER NO. : --
STYLE NO. : --
ARTICLE/REF/PART NO : --
COLOR : --
GRADE : --
MANUFACTURER'S NAME : --
RAW MATERIAL SUPPLIER : --
SUPPLIER : --

TESTS CONDUCTED: AS PER THE REQUEST BY THE APPLICANT. FOR FURTHER DETAILS PLEASE REFER TO THE ENCLOSED PAGE (S).

CONCLUSION:

TESTED SAMPLE	STANDARD	RESULT
SUBMITTED SAMPLE	CHEMICAL PARAMETERS	Refer below data
	BIOLOGICAL PARAMETER	Refer below data

NOTE: M = MEET CLIENT'S REQUIREMENT
= NO SPECIFIED REQUIREMENT

F = BELOW CLIENT'S REQUIREMENT
N/A = NOT APPLICABLE

PREPARED & CHECKED BY
For INTERTEK INDIA PVT. LTD

Sanjay Sadana
SANJAY SADANA
TECHNICAL MANAGER-HARDLINE

Page 2 of 4

Intertek India Pvt. Ltd.

290, Udyog Vihar, Phase-II, Gurgaon, Haryana -122016,
Registered Office : E-20, Block B-1, Mohan
Co-Operative Industrial Area, Mathura Road,
New Delhi -110044.

Tel: 0124-4503400,
Fax: 0124-4303592
www.Intertek.com



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Water Audit Report
C L Gupta Exports Ltd., Amrohaintertek
Total Quality Assured.**TEST REPORT**

NUMBER: DELH21001287

DATE : 06th FEB, 2021**TEST CONDUCTED:****1. CHEMICAL PARAMETERS****TEST RESULTS**

Sr. No.	Test Parameters	Units of Measurement	Result	Specification	Limit of detection	Method of testing
Chemical Parameters						
1.	Color	mg/l	Colorless	-	-	Visual
2.	SO ₄ Sulphate	mg/l	604	-	1.0	IS 3025 (P-24)
3.	Magnesium	mg/l	1.9	-	1.0	IS 3025 (P-46)
4.	NH ₃ Ammonia	mg/l	Not Detected	-	0.5	APHA 23 rd Ed 4500 NH ₃ -C
5.	Oil & Grease	mg/l	Not Detected	-	2.0	APHA 23 rd Ed 5520B
6.	Cyanide	mg/l	Not Detected	-	0.02	APHA 23 rd Ed. 4500 CN-E
7.	PH	mg/l	7.24	-	-	IS 3025 (P-11)
8.	BOD	mg/l	27.9	-	3.0	APHA 23 rd Ed. 5210B
9.	PO ₄ Phosphate	mg/l	Not Detected	-	0.02	APHA 23 rd Ed 4500 P-D
10.	TSS	mg/l	18.6	-	1.0	APHA 23 rd Ed 2540 D
11.	Chloride	mg/l	369.6	-	1.0	IS 3025(P-32)
12.	COD	mg/l	230.2	-	4.0	APHA 23 rd 5220B
13.	TDS	mg/l	2946.6	-	1.0	IS 3025(P-16)
14.	NO ₃ Nitrate	mg/l	194.7	-	0.5	APHA 23 rd 4500 NO ₃ -B
15.	Copper	mg/l	1.125	-	0.01	IS 3025(P-65) APHA 23 rd Edn
16.	Arsenic	mg/l	0.001	-	0.001	IS 3025(P-65) APHA 23 rd Edn
17.	Chromium	mg/l	Not Detected	-	0.01	IS 3025(P-65) APHA 23 rd Edn
18.	Lead	mg/l	Not Detected	-	0.001	IS 3025(P-65) APHA 23 rd Edn
19.	Cobalt	mg/l	0.008	-	-	IS 3025(P-65) APHA 23 rd Edn
20.	Cadmium	mg/l	Not Detected	-	0.001	IS 3025(P-65) APHA 23 rd Edn
21.	Iron	mg/l	Not Detected	-	0.01	IS 3025(P-65) APHA 23 rd Edn
22.	Nickel	mg/l	0.968	-	0.005	IS 3025(P-65) APHA 23 rd Edn
23.	Selenium	mg/l	0.025	-	0.001	IS 3025(P-65) APHA 23 rd Edn
24.	Antimony	mg/l	0.003	-	0.001	IS 3025(P-65) APHA 23 rd Edn
25.	Mercury	mg/l	Not Detected	-	0.0005	IS 3025(P-65) APHA 23 rd Edn

Page 3 of 4

Intertek India Pvt. Ltd.

290, Udyog Vihar, Phase-II, Gurgaon, Haryana -122016.
Registered Office : E-20, Block B-1, Mohan
Co-Operative Industrial Area, Mathura Road,
New Delhi-110044.Tel: 0124-4503400,
Fax: 0124-4303592
www.Intertek.com

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Water Audit Report
C L Gupta Exports Ltd., Amroha



TEST REPORT

NUMBER: DELH21001287

DATE : 06TH FEB, 2021

2. BIOLOGICAL PARAMETER TEST

TEST RESULTS

Sr. No.	Test Parameters	Units of Measurement	Result	Specification Environment Protection Act 1986(Max.)	Limit of detection	Method of testing
1.	Total Coliform Count	MPN/100ml	<1.8		≥1.8	APHA 23 rd Edn. 9221 B
2.	Fecal Coliform	MPN/100ml	<1.8		≥1.8	APHA 23 rd Edn. 9221 B

Note: The above results pertain only to the sample tested and applicable parameter.

END OF TEST REPORT

This report is made solely on the basis of your instructions and/or information and materials supplied by you. It is not intended to be a recommendation for any particular course of action. Intertek does not accept a duty of care or any other responsibility to any person other than the Client in respect of this report and only accepts liability to the Client insofar as is expressly contained in the terms and conditions governing Intertek's provision of services to you. Intertek makes no warranties or representations either express or implied with respect to this report save as provided for in those terms and conditions. We have aimed to conduct the Review on a diligent and careful basis and we do not accept any liability to you for any loss arising out of or in connection with this report, in contract, tort, by statute or otherwise, except in the event of our gross negligence or willful misconduct.

Page 4 of 4

Intertek India Pvt. Ltd.

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www.intertek.com



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Water Audit Report
C L Gupta Exports Ltd., Amroha

LF-SC-04

अनुसंधान, परीक्षण एवं कॅलिब्रेशन प्रयोगशाला
RESEARCH, TESTING AND CALIBRATION LABORATORY

RTC
LABORATORY

(A Division of Metal Handicrafts Service Centre)
वस्त्र मंत्रालय, भारत सरकार के नियंत्रणाधीन
(Under Control of Ministry of Textiles Govt. of India.)
Peetal Nagri, Rampur Road, Moradabad -244001 (U.P.) INDIA

Website : www.metalfinishanddesign.in

e-mail : rtclindia@gmail.com

☎ : +91-591-2460864
Telefax : +91-591-2460131

TEST REPORT

TR REF. No. : RTCL - 31664 / 2020 - 21 / Q2D- 202102002007
ULR No. : TC668321000000293
Customer Ref. : NIL DATED : 11.02.2021
Customer Name : M/S C.L. GUPTA EXPORTS LTD.
Address : VILLAGE - JIVAI, DELHI ROAD
AMROHA- 244221
Tel. No. : 9410237361
Contact Person : Mr. VINOD SINHA

Date of TR : 18.02.2021
Date of Test Start : 12.02.2021
Date of Test End : 17.02.2021
Page 1 of : 3

Sample Information

* Sample Description	: STP INLET WATER	Order No.	: N.A.
* Qty. Submitted	: 01(ONE) NO. (5 LTRS.)	Buyer Name	: N.A.
* Date of Receipt	: 11.02.2021	Buying House	: N.A.
* Colour	: COLOULESS	Country of Destination	: N.A.
* Ref. No.	: NIL	Country Origin	: INDIA
* Style No. / Article No.	: _____	SKU No./ Item No. :	_____
* Type of Test Required	: WATER PARAMETERS EXCEPT BL TEST, AS SPECIFIED BY CUSTOMER		
* Deviation if any from the standard including environmental condition	: N.A.		

Sample from : (RM / In process / Finished Product) : - N.A.

031716

Contd..2

NABI ACCREDITED LABORATORY as per ISO / IEC : 17025

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Water Audit Report
C L Gupta Exports Ltd., Amroha**RTC**
LABORATORY

Continuation Sheet



Page 2 of : 3

Date of TR : 18.02.2021

TR REF. No. : RTCL - 31664 / 2020 - 21 / Q2D- 202102092007

RESULT : Type of Test Conducted : - Water Parameters Except BL Test.

Sample / Item No.	Type of Test Conducted	Ref. to Test method / Standard	Test Results
STP INLET WATER	p ^H	IS : 3025 (11):02	7.40
	COLOUR	IS : 3025 (4):06	Colourless
	ODOUR	IS : 3025 (5):06	Unobjectionable
	TURBIDITY	IS : 3025 (10):06	<5.0 NTU
	TOTAL DISSOLVED SOLIDS (T.D.S.)	IS : 3025 (15):09	905.0 mg/L
	CHLORIDE	IS : 3025 (32):09	28.36 mg /L
	TOTAL HARDNESS	IS : 3025 (21):06	140.0 mg /L
	CYANIDE (CN)	IS : 3025 (26):86	<0.01 mg /L
	T.S.S.	IS : 3025 (17):99	88.0 mg /L
	LEAD (Pb)	APHA 22 nd ED12/ ASTM D:1976:12 [ICPOES]	<0.01 mg /L
	CADMIUM (Cd)	- do -	<0.01 mg /L
	IRON (Fe)	- do -	<0.01 mg /L
	NICKEL (Ni)	- do -	<0.01 mg /L
	MANGANESE (Mn)	- do -	<0.01 mg /L
	COPPER (Cu)	- do -	<0.01 mg /L
	CHROMIUM (Cr)	- do -	<0.01 mg /L
	ZINC (Zn)	- do -	<0.01 mg /L
BOD	IS : 3025 (44):09	11.0 mg /L	
COD	IS : 3025 (58):06	28.0 mg /L	

031716

Contd..3

डॉ. रावेंद्र कुमार / Dr. Ravindra Kumar
 प्रमुख / Manager
 एम. ए. सी. ए. / M. A. S. E.
 मोरदाद (उ.प्र.) / Moradabad (U.P.)
 201004

1615

Water Audit Report
C L Gupta Exports Ltd., Amroha

RTC
LABORATORY
Continuation Sheet

H **Indian handicrafts**
हस्तशिल्प
continuing tradition

Page 3 of : 3
Date of TR : 18.02.2021

TR REF. No. : RTCL - 31664 / 2020 - 21 / Q2D- 202102002007

CONCLUSION / REMARKS : Except P^H, Colour, Odour, Taste & Turbidity all limits are in mg /L.
mg /L = milligram per litre, <= Less than
: 1 mg/kg = 1 ppm (PART PER MILLION)= 0.0001%

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SAMPLE NOT DRAWN BY RTCL

Authorized Signatory

(Signature)
Dr. R.K. SHARMA
GENERAL MANAGER
एम.एच.सी.सी.
244/01, Moradabad (U.P.)
244001
rtclindia@gmail.com

END OF REPORT

Facilities available at R.T.C.L. :-

- *Testing - Lead & Cadmium Leaching, Total Lacquer Quality Test (Salt Spray, Humidity, Pin Hole, Adhesion etc.) Metallic & Non - Metallic Coating Thickness (Copper, Nickel, Zinc & Chrome etc.) and Paint, Powder & Lacquer, Metal & Metal Alloys Composition, Drop Test & Bursting Test
- *Any Other problem in the field of Metal Finishing, Casting & Forming, Water & Waste Water Testing.
- *Consignment Inspection, Expert Opinion & Handicrafts Product Test as per Buyer Protocol

SRS -

(Under Control of Development Commissioner (Handicrafts), Ministry of Textiles, Govt. of India, New Delhi)

031716

ISO/IEC:17025:2017 Accredited Testing Laboratory by NABL vide Certificate Number TC-6683

Listed with ASTM International Directory of Testing Labs

Pls. refer the website www.nabl-india.org to view our scope of Accredited Tests.

1616

Water Audit Report
C L Gupta Exports Ltd., Amroha

LF-SC-04

अनुसंधान, परीक्षण एवं कॅलिब्रेशन प्रयोगशाला
RESEARCH, TESTING AND CALIBRATION LABORATORY
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Website : www.metalfinishanddesign.in

e-mail : rtcindia@gmail.com

☎ : +91-591-2460864
Telefax : +91-591-2460131

TEST REPORT

TR REF. No. : RTCL - 31664 / 2020 - 21 / Q2D- 202102002008
ULR No. : TC668321000000294
Customer Ref. : NIL DATED : 11.02.2021
Customer Name : M/S C.L. GUPTA EXPORTS LTD.
Address : VILLAGE - JIVAI, DELHI ROAD
AMROHA- 244221
Tel. No. : 9410237361
Contact Person : Mr. VINOD SINHA

Date of TR : 18.02.2021
Date of Test Start : 12.02.2021
Date of Test End : 17.02.2021
Page 1 of : 3

Sample Information

* Sample Description	: STP OUTLET WATER	Order No.	: N.A.
* Qty. Submitted	: 01(ONE) NO. (5 LTRS)	Buyer Name	: N.A.
* Date of Receipt	: 11.02.2021	Buying House	: N.A.
* Colour	: COLOURLESS	Country of Destination	: N.A.
* Ref. No.	: NIL	Country Origin	: INDIA
* Style No. / Article No.	: ———	SKU No./ Item No.	: ———
* Type of Test Required	: WATER PARAMETERS EXCEPT BL TEST, AS SPECIFIED BY CUSTOMER		
* Deviation if any from the standard including environmental condition	: N.A.		



CERTIFICATE No. - TC-6681

Sample from : (RM / In process / Finished Product) : - N.A.

031717

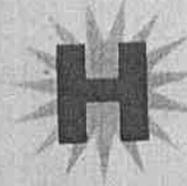
Contd..

डा० रविन्द्र कुमार / Dr. Ravindra Kumar
महानिदेशक / General Manager
एन.एच.सी., M.H.S.C.
मुरादाबाद (उ.प्र.) / Moradabad (U.P.)
244001 / 244001

031717

[NABL ACCREDITED LABORATORY as per ISO / IEC : 17025-2017]

1617

Water Audit Report
C L Gupta Exports Ltd., Amroha**RTC**
LABORATORY
Continuation Sheet **Indian** भारतीय
handicrafts हस्तशिल्प
continuing tradition

Page 2 of 3

Date of TR : 18/02/2024

TR REF. No. : RTCL - 31664 / 2020 - 21 / Q2D- 202102002008

RESULT : Type of Test Conducted :- Water Parameters Except BL Test.

Sample / Item No.	Type of Test Conducted	Ref. to Test method / Standard	Test Results
STP OUTLET WATER	p ^H	IS : 3025 (11):02	6.59
	COLOUR	IS : 3025 (4):06	Colourless
	ODOUR	IS : 3025 (5):06	Unobjectionable
	TURBIDITY	IS : 3025 (10):06	<5.0 NTU
	TOTAL DISSOLVED SOLIDS (T.D.S.)	IS : 3025 (15):09	77.9 mg/L
	CHLORIDE	IS : 3025 (32):09	21.27 mg/L
	TOTAL HARDNESS	IS : 3025 (21):06	124.0 mg/L
	CYANIDE (CN)	IS : 3025 (26):86	<0.01 mg/L
	T.S.S.	IS : 3025 (17):99	76.0 mg/L
	LEAD (Pb)	APHA 22 nd ED12/ ASTM D:1976:12 [ICPOES]	<0.01 mg/L
	CADMIUM (Cd)	- do -	<0.01 mg/L
	IRON (Fe)	- do -	<0.01 mg/L
	NICKEL (Ni)	- do -	<0.01 mg/L
	MANGANESE (Mn)	- do -	<0.01 mg/L
	COPPER (Cu)	- do -	<0.01 mg/L
	CHROMIUM (Cr)	- do -	<0.01 mg/L
	ZINC (Zn)	- do -	<0.01 mg/L
	BOD	IS : 3025 (44):09	8.0 mg/L
COD	IS : 3025 (58):06	23.0 mg/L	

031717

Contd..3

डॉ० विवेक कुमार / Dr. P. Vindra Kumar
 मो० नं० / Contact No. / 9896111811
 एम० एच० सी० / M.H.S.C.
 मो० नं० / 0529 / Moradabad (U.P.)
 241001 / 244001

1618

Water Audit Report
C L Gupta Exports Ltd., Amroha



Page 3 of : 3
Date of TR : 18.02.2021

TR REF. No. : RTCL - 31664 / 2020 - 21 / Q2D- 202102002008

CONCLUSION / REMARKS : Except P^H, Colour, Odour, Taste & Turbidity all limits are in mg /L.
mg /L. = miligram per litre, <= Less than
: 1 mg/kg = 1 ppm (PART PER MILLION)= 0.0001%

Note :

1. The test results relate only to the item(s) tested & we do not accept any Legal Liabilities.
2. This report is not to be reproduced wholly or in part and can not be used as an Evidence in the Court of Law & should not be used in any Advertising Media without prior permission of the Centre in writing.

SAMPLE NOT DRAWN BY RTCL

Authorised Signatory

END OF REPORT

(Signature)
 डॉ. रावेंद्र कुमार / Dr. Ravendra Kumar
 GENERAL MANAGER
 एम.ए.सी.ए. / M.H.C.G.
 अमरोहा (उ.प्र.) / Amroha (U.P.)
 244001 / rtclindia@gmail.com

Facilities available at R.T.C.L. :-

- *Testing - Lead & Cadmium Leaching, Total Leachate Quality Test (Salt Spray, Humidity, Pin Hole, Adhesion etc.) Metallic & Non - Metallic Coating Thickness (Silver, Copper, Nickel, Zinc & Chrome etc.) and Paint, Powder & Lacquer), Metal & Metal Alloys Composition, Drop Test & Busting Test
- *Any Other problem in the field of Metal Finishing, Casting & Forming, Water & Waste Water Testing.
- *Consignment inspection, Expert Opinion & Handicrafts Product Test as per Buyer Protocol.

SRS -

(Under Control of Development Commissioner (Handicrafts), Ministry of Textiles, Govt. of India, New Delhi)

031717

ISO/IEC:17025:2017 Accredited Testing Laboratory by NABL vide Certificate Number TC-6683

Listed with ASTM International Directory of Testing Labs

Pls. refer the website www.nabl-india.org to view our scope of Accredited Tests.

1620

Water Audit Report
C L Gupta Exports Ltd., Amroha

intertek
Total Quality Assured.

NUMBER: DELH21001286

TEST REPORT

DATE : 06TH FEB, 2021

APPLICANT: C.L. GUPTA EXPORTS LTD.
18TH KM BEFORE MORADABAD, DELHI HIGHWAY,
VILL. JIVAL, J.P. NAGAR, MORADABAD - 244221, UTTAR PRADESH

ATTN: Mr. PANKAJ SHARMA

SAMPLE DESCRIPTION : THE SUBMITTED SAMPLES SAID TO BE - WATER SAMPLE (STP OUTLET)

DATE RECEIVED : 28TH JAN, 2021
BUYER'S NAME : ---
BUYING AGENT/ CONTACT : ---
ORDER NO. : ---
STYLE NO. : ---
ARTICLE/REF/PART NO : ---
COLOR : ---
GRADE : ---
MANUFACTURER'S NAME : ---
RAW MATERIAL SUPPLIER : ---
SUPPLIER : ---

TESTS CONDUCTED: AS PER THE REQUEST BY THE APPLICANT. FOR FURTHER DETAILS PLEASE REFER TO THE ENCLOSED PAGE (S).

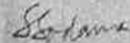
CONCLUSION:

TESTED SAMPLE	STANDARD	RESULT
SUBMITTED SAMPLE	CHEMICAL PARAMETERS	Refer below data
	BIOLOGICAL PARAMETER	Refer below data

NOTE: M = MEET CLIENT'S REQUIREMENT
= NO SPECIFIED REQUIREMENT

F = BELOW CLIENT'S REQUIREMENT
N/A = NOT APPLICABLE

PREPARED & CHECKED BY
For INTERTEK INDIA PVT. LTD



SANJAY SADANA
TECHNICAL MANAGER-HARDLINE

Intertek India Pvt. Ltd.

290, Udyog Vihar, Phase-II, Gurgaon, Haryana -122016.
Registered Office : E-20, Block B-1, Mohan
Co-Operative Industrial Area, Mathura Road,
New Delhi -110044.

Tel: 0124-4503400,
Fax: 0124-4303592
www.intertek.com



Page 2 of 4

1621

Water Audit Report
C L Gupta Exports Ltd., Amrohaintertek
Total Quality Assured

NUMBER: DELH21001286

TEST REPORT

DATE: 30/01/2021

TEST CONDUCTED:**1. CHEMICAL PARAMETERS****TEST RESULTS**

Sr. No.	Test Parameters	Units of Measurement	Result	Specification	Limit of detection	Method of testing
Chemical Parameters						
1.	Color	mg/l	Colorless	-	-	Visual
2.	So4 Sulphate	mg/l	55.96	-	1.0	IS 3025 (P-24)
3.	Magnesium	mg/l	33.1	-	1.0	IS 3025 (P-46)
4.	NH3 Ammonia	mg/l	Not Detected	-	0.5	APHA 23 rd Ed. 4500NH ₃ -C
5.	Oil & Grease	mg/l	Not Detected	-	2.0	APHA 23 rd Ed. 5520B
6.	Cyanide	mg/l	Not Detected	-	0.02	APHA 23 rd Ed. 4500 CN-E
7.	PH	mg/l	6.66	-	-	IS 3025 (P-11)
8.	BOD	mg/l	3.3	-	3.0	APHA 23 rd Ed. 5210B
9.	PO4 Phosphate	mg/l	Not Detected	-	0.02	APHA 23 rd Ed. 4500 P-D
10.	TSS	mg/l	9.6	-	1.0	APHA 23 rd Ed. 2540 D
11.	Chloride	mg/l	175.4	-	1.0	IS 3025(P-32)
12.	COD	mg/l	22.0	-	4.0	APHA 23 rd Ed. 5220B
13.	TDS	mg/l	797.0	-	1.0	IS 3025(P-16)
14.	NO3 Nitrate	mg/l	224.7	-	0.5	APHA 23 rd Ed. 4500NO ₃ -B
15.	Copper	mg/l	0.048	-	0.01	IS 3025(P-65) APHA 23 rd Edn
16.	Arsenic	mg/l	0.038	-	0.001	IS 3025(P-65) APHA 23 rd Edn
17.	Chromium	mg/l	Not Detected	-	0.01	IS 3025(P-65) APHA 23 rd Edn
18.	Lead	mg/l	Not Detected	-	0.001	IS 3025(P-65) APHA 23 rd Edn
19.	Cobalt	mg/l	0.004	-	-	IS 3025(P-65) APHA 23 rd Edn
20.	Cadmium	mg/l	Not Detected	-	0.001	IS 3025(P-65) APHA 23 rd Edn
21.	Iron	mg/l	Not Detected	-	0.01	IS 3025(P-65) APHA 23 rd Edn
22.	Nickel	mg/l	0.564	-	0.005	IS 3025(P-65) APHA 23 rd Edn
23.	Selenium	mg/l	Not Detected	-	0.001	IS 3025(P-65) APHA 23 rd Edn
24.	Antimony	mg/l	0.002	-	0.001	IS 3025(P-65) APHA 23 rd Edn
25.	Mercury	mg/l	Not Detected	-	0.0005	IS 3025(P-65) APHA 23 rd Edn

Intertek India Pvt. Ltd.

290, Udyog Vihar, Phase-II, Gurgaon, Haryana - 122016.
Registered Office: E-2D, Block B-1, Mohan
Co-Operative Industrial Area, Mathura Road,
New Delhi - 110044.Tel: 0124-4503400.
Fax: 0124-4303592
www.intertek.com

Page 3 of 4

1622

Water Audit Report
C L Gupta Exports Ltd., Amroha

intertek
Total Quality Assured.

NUMBER: DELH21901286

TEST REPORT

DATE: 06TH FEB, 2021

2. BIOLOGICAL PARAMETER TEST

TEST RESULTS

Sr. No.	Test Parameters	Units of Measurement	Result	Specification Environment Protection Act 1986(Max.)	Limit of detection	Method of testing
1.	Total Coliform Count	MPN/100ml	<1.8	-	≥1.8	APHA 23 rd Edn. 9221 B
2.	Fecal Coliform	MPN/100ml	<1.8	-	≥1.8	APHA 23 rd Edn. 9221 B

Note: The above results pertain only to the sample tested and applicable parameter.

END OF TEST REPORT

This report is made solely on the basis of your instructions and/or information and materials supplied by you. It is not intended to be a recommendation for any particular course of action. Intertek does not accept a duty of care or any other responsibility to any person other than the Client in respect of this report and only accepts liability to the Client insofar as is expressly contained in the terms and conditions governing Intertek's provision of services to you. Intertek makes no warranties or representations either express or implied with respect to this report save as provided for in those terms and conditions. We have aimed to conduct the Review on a diligent and careful basis and we do not accept any liability to you for any loss arising out of or in connection with this report, in contract, tort, by statute or otherwise, except in the event of our gross negligence or willful misconduct.

Page 4 of 4

Intertek India Pvt. Ltd.

230, Udyog Vihar, Phase-II, Gurgaon, Haryana-122016
Registered Office: E-20, Block B-1, Mohan
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New Delhi-110044

Tel: 0124-4503400,
Fax: 0124-4303592
www.Intertek.com



1623

Water Audit Report
C L Gupta Exports Ltd., Amroha

अनुसंधान, परीक्षण एवं कैलिब्रेशन प्रयोगशाला RESEARCH, TESTING AND CALIBRATION LABORATORY

RTCL
LABORATORY

(A Division of Metal Handicrafts Service Centre)
वस्त्र मंत्रालय, भारत सरकार के नियन्त्रणाधीन
(Under Control of Ministry of Textiles Govt. of India.)
Peetal Nagri, Rampur Road, Moradabad -244001 (U.P.) INDIA
Website : www.metalhandfinishanddesign.in



☎ : +91-591-2460864
Telefax : +91-591-2460131

e-mail : rtclindia@gmail.com

TEST REPORT

TR REF. No. : RTCL - 31685 / 2020 - 21 / Q2D- 202103002182
ULR No. : TC668321000000446
Customer Ref. : NIL DATED : 15.02.2021
Customer Name : M/S C.L. GUPTA EXPORTS LTD.
Address : VILL. - JIVAI, DELHI ROAD
AMROHA - 242001
Tel. No. : 9410237361
Contact Person : Mr. VINOD SINHA

Date of TR : 09.03.2021
Date of Test Start : 01.03.2021
Date of Test End : 08.03.2021
Page 1 of : 3

Sample Information

* Sample Description	: COMMON ETP R.O. -1, (PERMEATE) WATER	Order No.	: N.A.
* Qty. Submitted	: 01(ONE) NO. (5 LTRS.)	Buyer Name	: N.A.
* Date of Receipt	: 15.02.2021	Buying House	: N.A.
* Colour	: COLOURLESS	Country of Destination	: N.A.
* Ref. No.	: NIL	Country Origin	: INDIA
* Style No. / Article No.	: _____	SKU No./ Item No.	: _____
* Type of Test Required	: WATER PARAMETERS EXCEPT BL TEST, AS SPECIFIED BY CUSTOMER		
* Deviation if any from the standard including environmental condition	: N.A.		



CERTIFICATE No. - TC-6683

Sample from : (RM / In process / Finished Product) :- N.A.

031875

Contd..2

डा० रविन्द्र कुमार/Dr. Ravindra Kumar
महाप्रबन्धक/General Manager
एम०एच०एल०सी०/M.H.L.C.
मुग़ाशबाद (उ०प्र०)/Moradabad (U.P.)
244001 / 244001

031875/

[NABL ACCREDITED LABORATORY as per ISO / IEC : 17025-2017]

1624

Water Audit Report
C L Gupta Exports Ltd., Amroha

RTC
LABORATORY
Certification Sheet

Indian handicrafts
हस्तशिल्प
continuing tradition

Page 2 of : 3
Date of TR : 09.03.2021

TR REF. No. : RTCL - 31685 / 2020 - 21 / Q2D- 202103002182
RESULT : Type of Test Conducted :- Water Parameters Except BL Test.

Sample / Item No.	Type of Test Conducted	Ref. to Test method / Standard	Test Results
COMMON ETP R.O. 1, (PERMEATE) WATER	p ^H	IS : 3025 (11):02	7.38
	COLOUR	IS : 3025 (4):06	15 Hazan
	ODOUR	IS : 3025 (5):06	Unobjectionable
	TURBIDITY	IS : 3025 (10):06	<5.0 NTU
	TOTAL DISSOLVED SOLIDS (T.D.S.)	IS : 3025 (15):09	89.5 mg/L
	CHLORIDE	IS : 3025 (32):09	56.0 mg /L
	TOTAL HARDNESS	IS : 3025 (21):06	—
	CYANIDE (CN)	IS : 3025 (27):86	<0.01 mg /L
	T.S.S.	IS : 3025 (17):99	9.9 mg /L
	LEAD (Pb)	APHA 23 rd ED17/ ASTM D:1976:12 [ICPOES]	<0.01 mg /L
	CADMIUM (Cd)	- do -	<0.01 mg /L
	ANTOMANY(Sb)	- do -	<0.01 mg /L
	IRON (Fe)	- do -	<0.01 mg /L
	SELENIUM (Se)	- do -	<0.01 mg /L
	NICKEL (Ni)	- do -	<0.01 mg /L
	MANGANESE (Mn)	- do -	<0.01 mg /L
	COPPER (Cu)	- do -	<0.01 mg /L
	CHROMIUM (Cr)	- do -	<0.01 mg /L
	ARSENIC (As)	- do -	<0.01 mg /L
	ZINC (Zn)	- do -	<0.01 mg /L
	COBALT (Co)	- do -	<0.01 mg /L
	MERCURY (Hg)	- do -	<0.01 mg /L
	VANADIUM (V)	- do -	<0.01 mg /L
	SULPHATE	- do -	49.3 mg /L
	AMMONICAL -N	- do -	2.0 mg /L
	NITRATE -N	- do -	7.5 mg /L
	PHOSPHATE	- do -	0.5 mg /L
OIL & GREASE	APHA 23 rd ED17	<0.01 mg /L	
BOD	IS : 3025 (44):09	10.0 mg /L	
COD	IS : 3025 (58):06	81.5 mg /L	

031875 Contd...3

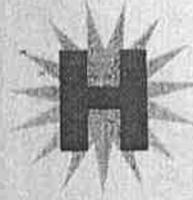
डॉ० रविन्द्र कुमार / Dr. Ravindra Kumar
महाप्रबन्धक / General Manager
एम०एच०एन०सी० / M.H.C.C.
मुरादाबाद (उ०प्र०) / Moradabad (U.P.)
244001 / 244001

1625

Water Audit Report
C L Gupta Exports Ltd., Amroha

RTC
LABORATORY

Continuation Sheet



भारतीय
handicrafts
हस्तशिल्प
continuing tradition

Page 3 of : 3

TR REF. No. : RTCL - 31685 / 2020 - 21 / Q2D- 202103002182

Date of TR : 09.03.2021

CONCLUSION / REMARKS : Except P^H, Colour, Odour, Taste & Turbidity all limits are in mg /L.
mg /L = milligram per litre, <= Less than
: 1 mg/kg = 1 ppm (PART PER MILLION)= 0.0001%
: LESS THEN - BELOW DETECTION LIMIT

Note :

- 1.The test results relate only to the item(s) tested & we do not accept any Legal Liabilities.
- 2.This report is not to be reproduced wholly or in part and can not be used as an Evidence in the Court of Law & should not be used in any Advertising Media without prior permission of the Centre in writing.

SAMPLE DRAWN BY RTCL

Authorized Signatory

डा. रवि कुमार शर्मा
(Dr. R.K. SHARMA)
सामान्य प्रबन्धक
GENERAL MANAGER
मुंबई
91 - 591 - 2460131
rtclindia@gmail.com

END OF REPORT

Facilities available at R.T.C.L. :-

- *Testing :- Lead & Cadmium Leaching / Total Lacquer Quality Test / Salt Brine Immosity / Pin Hole / Adhesion etc. / Metallic & Non - Metallic Coating Thickness (Silver, Copper, Nickel, Zinc & Chrome etc. and Paint, Powder & Lacquer), Metal & Metal Alloys Composition, Drop Test & Busting Test
- *Any Other problem in the field of Metal Finishing, Casting & Forming, Water & Waste Water Testing.
- *Consignment Inspection, Expert Opinion & Handicrafts Product Test as per Buyer Protocol.

SRS -

(Under Control of Development Commissioner (Handicrafts), Ministry of Textiles, Govt. of India, New Delhi)

031875

ISO/IEC:17025:2017 Accredited Testing Laboratory by NABL vide Certificate Number TC-6683

Listed with ASTM International Directory of Testing Labs

Pls. refer the website www.nabl-india.org to view our scope of Accredited Tests.

1626

Water Audit Report
C L Gupta Exports Ltd., Amroha

अनुसंधान, परीक्षण एवं कॅलिब्रेशन प्रयोगशाला
RESEARCH, TESTING AND CALIBRATION LABORATORY

RTC
LABORATORY

(A Division of Metal Handicrafts Service Centre)
वस्त्र मंत्रालय, भारत सरकार के नियन्त्रणाधीन
(Under Control of Ministry of Textiles Govt. of India.)
Peetal Nagri, Rampur Road, Moradabad -244001 (U.P.) INDIA



☎ : +91-591-2460864
Telefax : +91-591-2460131

Website : www.metalfinishanddesign.in

e-mail : rtcindia@gmail.com

TEST REPORT

TR REF. No. : RTCL - 31686 / 2020 - 21 / Q2D- 202103002183
ULR No. : TC668321000000447
Customer Ref. : NIL DATED : 15.02.2021
Customer Name : M/S C.L. GUPTA EXPORTS LTD.
Address : VILL. - JIVAI, DELHI ROAD
AMROHA - 242001
Tel. No. : 9410237361
Contact Person : Mr. VINOD SINHA

Date of TR : 09.03.2021
Date of Test Start : 01.03.2021
Date of Test End : 08.03.2021
Page 1 of : 3

Sample Information

* Sample Description	: COMMON ETP R.O. 3, (PERMEATE) WATER	Order No.	: N.A.
* Qty. Submitted	: 01(ONE) NO. (5 LTRS.)	Buyer Name	: N.A.
* Date of Receipt	: 15.02.2021	Buying House	: N.A.
* Colour	: COLOURLESS	Country of Destination	: N.A.
* Ref. No.	: NIL	Country Origin	: INDIA
* Style No. / Article No.	: _____	SKU No./ Item No.	: _____
* Type of Test Required	: WATER PARAMETERS EXCEPT BL TEST, AS SPECIFIED BY CUSTOMER		
* Deviation if any from the standard including environmental condition	: N.A.		



CERTIFICATE No. - TC-6683

Sample from : (RM / In process / Finished Product) : - N.A.

031876

Contd..2

डा० रविन्द्र कुमार / Dr. Ravindra Kumar
महानिदेशक, General Manager
एम्प्लॉयर्स, जेसीसी, M.H.C.C
मुआलका (3996) / Moradabad (U.P.)
244001 / 244001

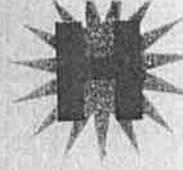
031876/

[NABL ACCREDITED LABORATORY as per ISO / IEC : 17025-2017]

1627

Water Audit Report
C L Gupta Exports Ltd., Amroha**RTC**
LABORATORY

Continuation Sheet

भारतीय
handicrafts
हस्तशिल्प
continuing tradition

Page 2 of : 3

Date of TR : 09.03.2021

TR REF. No. : RTCL - 31686 / 2020 - 21 / Q2D- 202103002183

RESULT : Type of Test Conducted :- Water Parameters Except BL Test.

Sample / Item No.	Type of Test Conducted	Ref. to Test method / Standard	Test Results
COMMON ETP R.O. 3, (PERMEATE) WATER	p ^H	IS : 3025 (11):02	7.36
	COLOUR	IS : 3025 (4):06	13 Hazan
	ODOUR	IS : 3025 (5):06	Unobjectionable
	TURBIDITY	IS : 3025 (10):06	<5.0 NTU
	TOTAL DISSOLVED SOLIDS (T.D.S.)	IS : 3025 (15):09	119.0 mg/L
	CHLORIDE	IS : 3025 (32):09	14.18 mg/L
	TOTAL HARDNESS	IS : 3025 (21):06	---
	CYANIDE (CN)	IS : 3025 (27):86	<0.01 mg/L
	T.S.S.	IS : 3025 (17):99	5.0 mg/L
	LEAD (Pb)	APHA 23 rd ED17/ ASTM D:1976:12 [ICPOES]	<0.01 mg/L
	CADMIUM (Cd)	- do -	<0.01 mg/L
	ANTOMANY(Sb)	- do -	<0.01 mg/L
	IRON (Fe)	- do -	<0.01 mg/L
	SELENIUM (Se)	- do -	<0.01 mg/L
	NICKEL (Ni)	- do -	<0.01 mg/L
	MANGANESE (Mn)	- do -	<0.01 mg/L
	COPPER (Cu)	- do -	<0.01 mg/L
	CHROMIUM (Cr)	- do -	<0.01 mg/L
	ARSENIC (As)	- do -	<0.01 mg/L
	ZINC (Zn)	- do -	<0.01 mg/L
	COBALT (Co)	- do -	<0.01 mg/L
	MERCURY (Hg)	- do -	<0.01 mg/L
	VANADIUM (V)	- do -	<0.01 mg/L
	SULPHATE	- do -	<10.0 mg/L
	AMMONICAL -N	- do -	10.8 mg/L
	NITRATE -N	- do -	8.0 mg/L
	PHOSPHATE	- do -	0.3 mg/L
OIL & GREASE	APHA 23 rd ED17	<0.01 mg/L	
BOD	IS : 3025 (44):09	8.0 mg/L	
COD	IS : 3025 (58):06	150.0 mg/L	

031876

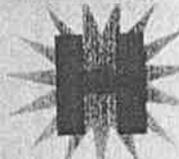
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डॉ०. रविंद्र कुमार / Dr. Ravindra Kumar
महाराष्ट्र / Maharashtra
एम्प्लॉयर्स एजेंसी, W.H.O.
मुंबई (पश्चिम) / Mumbai (W.P.)
244001 / 244001

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Water Audit Report
C L Gupta Exports Ltd., Amroha

RTC LABORATORY
Continuation Sheet

 **Indian handicrafts**
हस्तशिल्प
continuing tradition

Page 3 of : 3
Date of TR : 09.03.2021

TR REF. No. : RTCL - 31686 / 2020 - 21 / Q2D- 202103002183

CONCLUSION / REMARKS : Except P^{II}, Colour, Odour, Taste & Turbidity all limits are in mg /L.
mg /L = miligram per litre, <= Less than
: 1 mg/kg = 1 ppm (PART PER MILLION)= 0.0001%
: LESS THEN - BELOW DETECTION LIMIT

Note :
1. The test results relate only to the item(s) tested & we do not accept any Legal Liabilities.
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SAMPLE DRAWN BY RTCL

Authorised Signatory


Dr. R.K. SHARMA
GENERAL MANAGER
91 - 591 - 2460131
rtcindia@gmail.com

END OF REPORT

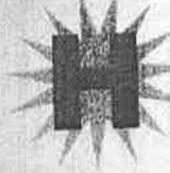
Facilities available at R.T.C.L. :-
*Testing : Lead & Cadmium Leaching, Total Lacquer Quality Test (Salt Spray, Humidity, Pin Hole, Adhesion etc.) Metallic & Non - Metallic Coating
Thickness (Silver, Copper, Nickel, Zinc & Chrome etc. and Paint, Powder & Lacquer), Metal & Metal Alloys Composition, Drop Test & Bursting Test
*Any Other problem in the field of Metal Finishing, Casting & Forming, Water & Waste Water Testing.
*Consignment Inspection, Expert Opinion & Handicrafts Product Test as per Buyer Protocol.

SRS -
(Under Control of Development Commissioner (Handicrafts), Ministry of Textiles, Govt. of India, New Delhi)
031876
ISO/IEC:17025:2017 Accredited Testing Laboratory by NABL vide Certificate Number TC-6683
Listed with ASTM International Directory of Testing Labs
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Water Audit Report
C L Gupta Exports Ltd., Amroha**RTC**
LABORATORY

Continuation Sheet

भारतीय
handicrafts
हस्तशिल्प
continuing tradition

Page 2 of : 3

Date of TR : 09.03.2021

TR REF. No. : RTCL - 31686 / 2020 - 21 / Q2D- 202103002187

RESULT : Type of Test Conducted :- Water Parameters Except BL Test.

Sample / Item No.	Type of Test Conducted	Ref. to Test method / Standard	Test Results
MME CONDENSATE WATER	pH	IS : 3025 (11):02	8.03
	COLOUR	IS : 3025 (4):06	---
	ODOUR	IS : 3025 (5):06	Unobjectionable
	TURBIDITY	IS : 3025 (10):06	<5.0 NTU
	TOTAL DISSOLVED SOLIDS (T.D.S.)	IS : 3025 (15):09	859.0 ppm
	CHLORIDE	IS : 3025 (32):09	127.6 mg /L
	TOTAL HARDNESS	IS : 3025 (21):06	---
	CYANIDE (CN)	IS : 3025 (27):86	<0.01 mg /L
	T.S.S.	IS : 3025 (17):99	135.0 mg /L
	LEAD (Pb)	APHA 23 rd ED17/ ASTM D:1976:12 [ICPOES]	0.03 mg /L
	CADMIUM (Cd)	- do -	<0.01 mg /L
	ANTOMANY(Sb)	- do -	<0.01 mg /L
	IRON (Fe)	- do -	<0.01 mg /L
	SELENIUM (Se)	- do -	<0.01 mg /L
	NICKEL (Ni)	- do -	1.18 mg /L
	MANGANESE (Mn)	- do -	0.055 mg /L
	COPPER (Cu)	- do -	1.23 mg /L
	CHROMIUM (Cr)	- do -	<0.01 mg /L
	ZINC (Zn)	- do -	<0.01 mg /L
	COBALT (Co)	- do -	<0.01 mg /L
	ARSENIC (As)	- do -	0.093 mg/L
	MERCURY (Hg)	- do -	<0.01 mg /L
	VANADIUM (V)	- do -	<0.01 mg /L
	SULPHATE	- do -	---
	AMMONICAL -N	- do -	---
	NITRATE -N	- do -	---
	PHOSPHATE	- do -	---
OIL & GREASE	APHA 23 rd ED17	---	
BOD	IS : 3025 (44):09	13.0 mg /L	
COD	IS : 3025 (58):06	103.0 mg /L	

031880

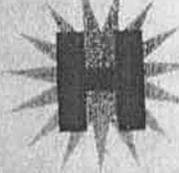
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डा० रविन्द्र कुमार / Dr. Ravindra Kumar
 सहायक / General Manager
 एम.एच.सी. / M.H.C.
 मुहदपुर (उ०प्र०) / Mohadpur (U.P.)
 244001 / 244001

1631

Water Audit Report
C L Gupta Exports Ltd., Amroha

RTC
LABORATORY
Continuation Sheet

 **Indian handicrafts**
हस्तशिल्प
continuing tradition

Page 3 of : 3
Date of TR : 09.03.2021

TR REF. No. : RTCL - 31686 / 2020 - 21 / Q2D- 202103002187

CONCLUSION / REMARKS : Except P¹¹, Colour, Odour, Taste & Turbidity all limits are in mg /L.
mg /L = milligram per litre, <= Less than
: 1 mg/kg = 1 ppm (PART PER MILLION)= 0.0001%
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Authorised Signatory


Dr. R.K. SHARMA
GENERAL MANAGER
91 - 591 - 2460131
rclindia@gmail.com

END OF REPORT

Facilities available at R.T.C.L. :-
*Testing :- Lead & Cadmium Leaching, Total Lacquer Quality Test (Salt/Spray, Humidity, Pin Hole, Adhesion etc.) Metallic & Non - Metallic Coating Thickness (Silver, Copper, Nickel, Zinc & Chrome etc.) and Paint, Powder & Lacquer), Metal & Metal Alloys Composition, Drop Test & Bursting Test
*Any Other problem in the field of Metal Finishing, Casting & Forming, Water & Waste Water Testing.
*Consignment Inspection, Expert Opinion & Handicrafts Product Test as per Buyer Protocol.

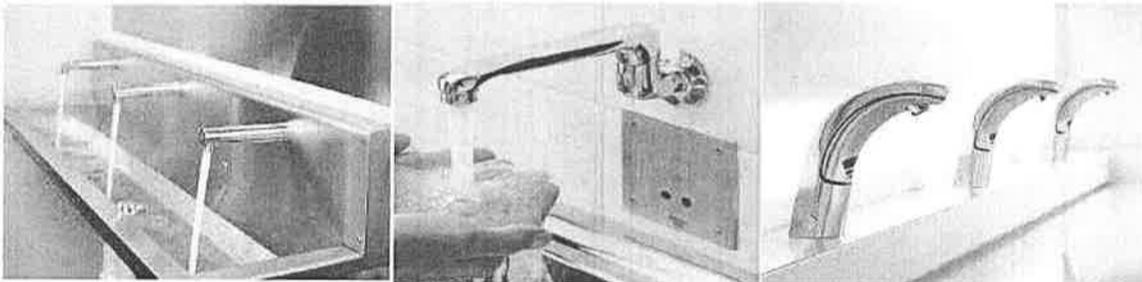
SRS -
(Under Control of Development Commissioner (Handicrafts), Ministry of Textiles, Govt. of India, New Delhi)
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ISO/IEC:17025:2017 Accredited Testing Laboratory by NABL vide Certificate Number TC-6683
Listed with ASTM International Directory of Testing Labs
Pls. refer the website www.nabl-india.org to view our scope of Accredited Tests.

Annexure V: Water Saving Gadgets

Electronic Taps (e-taps)

The latest trend in industries is to install electronic taps (e-taps). The advantages of using e-taps are as mentioned below:

- ❖ Unlike conventional taps, there is no twisting or turning in e-taps. They have a sensor, which cuts off water supply completely when not in use. This helps in saving up to 70% water during hand wash
- ❖ E-taps enable hands free operation. No fear of cross contamination or contact with germs. E-taps score very high on hygiene. It is the most ideal choice for multipurpose and multiuser washrooms.
- ❖ E-taps can work efficiently up to raw water TDS of 1800 ppm. The raw water TDS of plant is less than 500 ppm.
- ❖ The touch free electronic taps, available in AC and DC models consume minimal power only. The AC model has an efficient battery back-up, while the DC model runs on just 4 alkaline batteries.



Operation of Electronic Taps

This has been successfully implemented in several hotels & restaurants. Of late, several industries have also started implementing this proposal.

Thus, there is a good potential to optimize the freshwater consumption by replacing the existing taps with e-taps.

Electronic flush (e-flush) urinals

The latest trend in industries is to install e-flush urinals. The advantages of using e-flush urinals are as mentioned below:

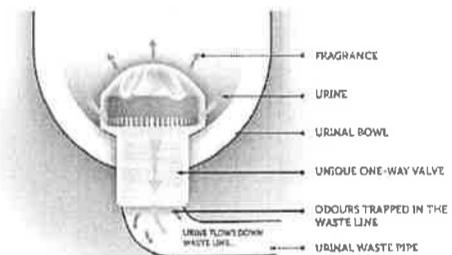
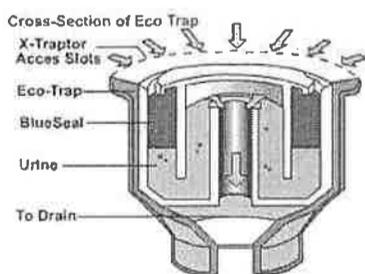
- ❖ E-flush urinals are fitted with a sensor, which senses the usage and flush with water for few seconds after use. This helps in saving 70% water during urinal flush
- ❖ E-flush urinals enable hands free operation and score very high on hygiene. It is the most ideal choice for multipurpose and multiuser washrooms.
- ❖ E-flush urinals can work efficiently up to raw water TDS of 1800 ppm. The raw water TDS of plant is less than 500 ppm.
- ❖ The touch free e-flush urinals available in AC and DC models consume minimal power only. The AC model has an efficient battery back-up, while the DC model runs on just 4 alkaline batteries.



Photographs: Electronic flush urinals

Waterless urinals

Waterless urinals eliminate 100% water usage in urinal flush. The concept is based on blue seal technology. The patented blue seal density is lesser than urine and hence allows the passage of urine and acts as a protective layer. The blue seal also eliminates odour emanating from urine. The blue seal is bio-degradable and has to be replaced once in 5000-7000 usages.



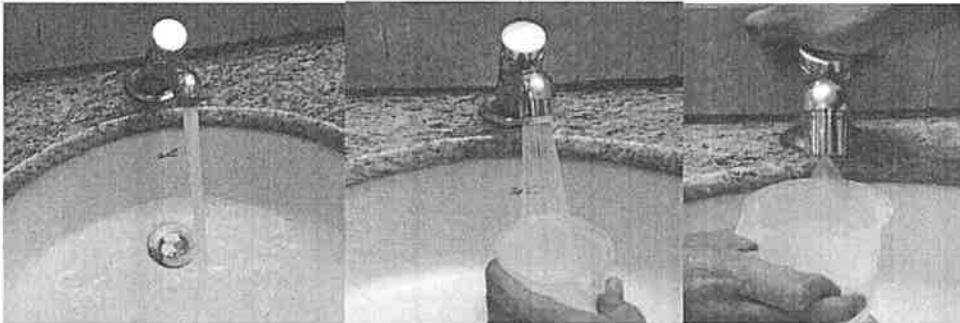
Photographs: waterless urinals
Hand wash

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Water Audit Report
C L Gupta Exports Ltd., Amroha

NEERR nozzles

Demonstration conducted at a site showed a water saving of 92.18% in the mist mode, 85% in the foam mode and 60% with the normal aerator nozzle.



Photographs: Basic Aerator, NEERR nozzle: Foam Mode and NEERR nozzle: Mist Mode

Thus, 85% water saving can be assumed through installation of these NEERR nozzles.

Technical details about the product: NEERR¹ nozzles are based on water A.R.T. (Atomizer Reduction Technology)², which atomizes the water and creates a heavy mist, hence reducing the consumption in any washing application by up to 95%. There are two modes available in the same nozzle:

Mist Mode: Saves up-to 95% water (at 3 bar pressure). It is perfect for daily utility activities like brushing, washing dishes etc.

Normal Mode: With a twist, Neerr switches to normal mode, which still saves up to 75% water (at 3 bar pressure). It is more useful while filling glasses, pots etc.

Installation: Retrofits into the existing tap; Unscrew the existing aerator and insert the Neerr Nozzle.

Dimensions: Fits Standard (20.8 mm), Junior (18.1 mm) and Tom Thumb (15 mm) sized taps (inner socket dimension)

Material: Lead Free Brass (Chromed Handles)

Water Pressure: 1.2 – 8bar. (Suitable for low pressure water systems).

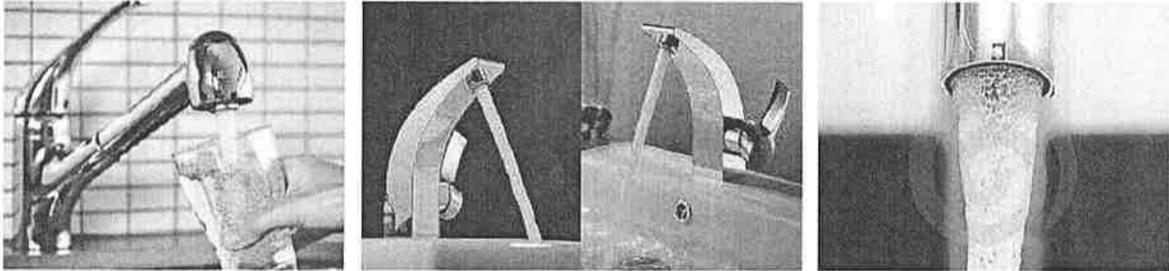
Water Temperature: Max 192 degree F / 89 degree C

¹ NEERR™ is a product innovated by ZeFi Labs with RETAS as Marketing Partner

² It is a patent pending technology by ZeFi Labs

Foam taps

Conventional taps are used in the hand wash areas which results in large quantity of fresh water. Foam taps are a better fit in these high consumption areas. They consume 25-30% less than the conventional taps.



Photographs: Foam taps

Spring loaded Push taps

Spring loaded push type tap is an alternate device for minimizing hand wash Water. The spring-loaded push taps operate with the simple mechanism of pressing the knob for water. The knob automatically released back to close position in 5-7 seconds. This saves about 30-40% of water compared to the conventional taps



Photographs: Spring loaded push taps

Low flush cistern

The latest model closets are water efficient and operate in dual mode with single flush releases 2 liters and dual flush releases 4 liters per flush. This results in large quantity of water savings.



Photographs: Low flush cisterns

Annexure VI: Suggestive List of Vendors for providing water saving equipment/technology/consultancy

a. Supplier Addresses of Water & Waste Water Treatment Systems and Water Saving Devices

1. **Hitech Enviro Engineers & Consultants Pvt. Ltd.**

Address: Plot No : A-1, Ground Floor,
Kaushambi, Ghaziabad – 201010
Tel: 0120– 4294461-63,
Fax: 0120- 4294462
Email: projects@heecpl.com
Website: www.heecpl.com
Contact Person: Mr. Hitesh Mittal (Director)

2. **Arvind Envisol Ltd.,**

Contact Person: Mr Vivek Vishal
Contact Number: 9643406635
E-mail ID: vivek.vishal@arvind.in

3. **HYDROLOG ENGINEERS**

Contact Person: Gundeep Singh (CEO)
Contact Number: 9891011096
E-mail ID: gundeep.singh@hydrologengineers.org

4. **Ion Exchange India Ltd**

Contact Person: Mr Manish Gandhi (VP-North & East)
Contact Number: 9350474255
E-mail ID: manish.gandhi@ionexchange.co.in

b. Water Saving Devices

1. **Retas Infra Solutions**

Address: Mayur Vihar Phase 1 Extension, Mayur Vihar Phase 1, New Delhi, Delhi
110091
M + 91 97110 74119
Email: retasinfra@gmail.com
Contact Person: Mr Ankit Magan

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Water Audit Report
C L Gupta Exports Ltd., Amroha

c. Flow Meters (Fixed/Portable)

1. Forbes Marshall Pvt. Ltd.

Address: A-34/35, MIDC, H Block,
Pimpri, Pune-411018, Maharashtra
Telephone: 020-2744 2020
Fax: 020-2744 2420, 2040
Mobile: 98505 67714
E-mail: rmishra@forbesmarshall.com
Website: www.forbesmarshall.com
Contact Person: Mr Rakesh Mishra,
Head - Water Business

2. Iota Flow Systems Pvt Ltd

Address: A-2/13 Phase II ,Industries Area,
Maya Puri, New Delhi - 1100 064
Tel.: 91-11-46254601-08 Extn 17
Moblie: 09958609393
Fax: 91-11-46880020
Email: sunil@iotaflow.com
Contact Person: Mr Sunil Yadav

3. GE India Industrial Pvt. Ltd

Address: Building No 7A, 5th Floor DLF Cyber City,
DLF Phase III, Sector 25A, Gurgaon
Haryana – 122002
Tel: 0124 4808016
Email: Srikanth.Kommu@ge.com
Contact Person: Mr Srikanth Kommu

1638



सी.एस.आई.आर.- राष्ट्रीय पर्यावरण अभियांत्रिकी अनुसन्धान संस्थान
दिल्ली क्षेत्रीय केंद्र, ए - 93, 94, फेज -1
नारायणा औद्योगिक क्षेत्र, नई दिल्ली - 110 028, भारत
मुख्यालय: नेहरू मार्ग, नागपुर - 440020, महाराष्ट्र

From:
Dr. S.K. Goyal
Chief Scientist & Head

**CSIR-National Environmental Engineering Research
Institute, Delhi Zonal Centre**, A-93/94, Phase-I,
Naraina Industrial Area, **New Delhi - 110 028, India**
Headquarter: Nehru Marg, Nagpur - 440020, Maharashtra

NEERI-DZC/CLG/2021/ 26

April 16, 2021

To,
Shri A.K. Johri
GM (HR/Admn)
M/s C.L. Gupta Exports Ltd.,
18th km Stone Moradabad-Delhi Road
Amroha, UP 244221

Sub: Submission of "Water Quality Audit Report for M/s C.L. Gupta Exports
Ltd., Amroha, UP"

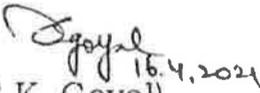
Dear Sir,

Please find attached herewith a copy of the "Water Quality Audit Report"
based on the study conducted by NEERI during the month of March 2021.

Kindly acknowledge receipt of the report.

With best wishes and regards,

Yours sincerely,


(S.K. Goyal) 16.4.2021

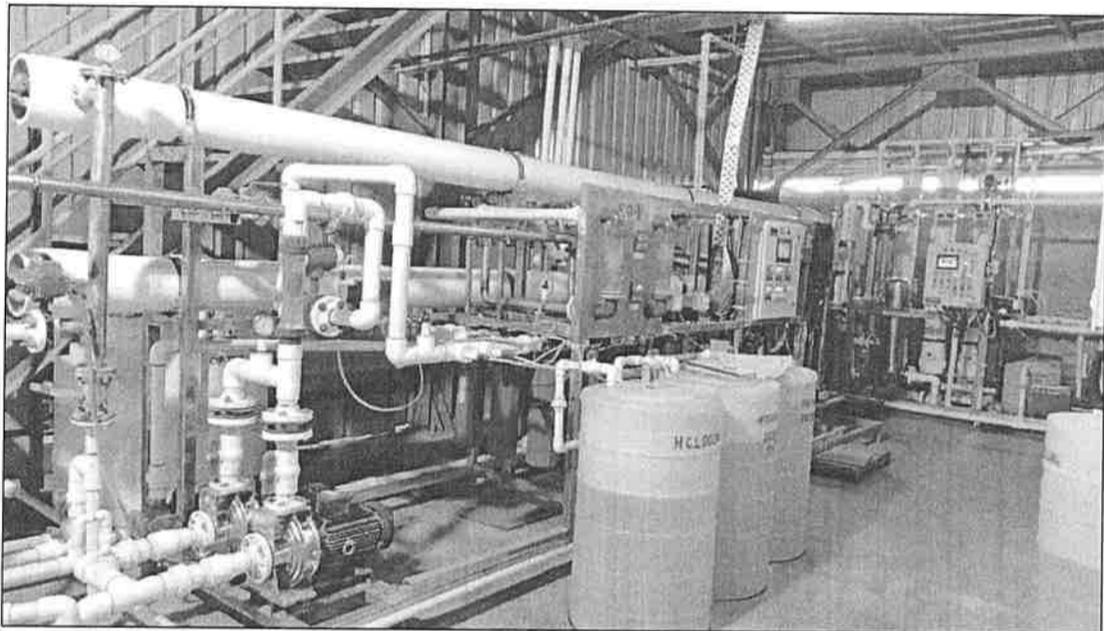
1639

Final Report

Water Quality Audit Report

For

**M/s C.L. Gupta Exports Ltd. Amroha,
Uttar Pradesh**



**CSIR-National Environmental Engineering Research
Institute (NEERI), Delhi Zonal Centre,
Naraina, New Delhi 110028**

April 2021

1640

*Water Quality Audit Report
for M/s C.L. Gupta Ltd. Amroha, Uttar Pradesh
CSIR-NEERI-DZC, April 2021*



NEERI Study Team

Project Leaders

Dr. S.K. Goyal

*Chief Scientist & Head,
CSIR-NEERI Delhi Zonal Centre, New Delhi*

Dr. Noor A. Khan, Sr. Scientist

Team Members

Ms. Priyanka , *Sr. Scientist*

Mr. Deepchand Chaurasia, *Project Assistant III*

Mr. Sarvesh Dixit, *Project Assistant II*

Mr. Naveen Kumar, *Project Assistant II*

Ms. Anita, *Project Assistant III*

Ms. Neha Yadav, *Project Assistant II*

Dr. Renu Daulta, *Research Associate I*

Mr. Pardeep Chouhan, *Project Assistant II*

Acknowledgement

Management of M/s C.L. Gupta Exports Ltd.

Mr. A.K. Johri, GM (HR/Admn)

Mr. Brajpal Singh & Other Staff

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	<i>Annexure II</i>	<i>30 pages</i>

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1.0 Introduction

M/s C.L. Gupta Exports Ltd. is mainly engaged in the production of handicrafts of metal, wood, glass and marble. The Industry is situated at the village Jivai, Amroha, 18th km stone on Moradabad-Delhi road (NH-24). There are few other manufacturing units of similar or different end products in the region.

To make-up their water requirement for different industrial processes, M/s. CLG Exports Ltd. proposed UPPCB to utilize Industrial wastewater and Sewage after proper treatment. In response, UPPCB suggested that the Industry is required to submit a feasibility report from a reputed institution regarding use of domestic treated effluent in the process. Accordingly, M/s C.L. Gupta Exports Ltd. approached CSIR-NEERI to undertake the required study. The study was taken-up by Delhi Zonal Centre of CSIR-NEERI with the objective to assess the suitability of use of treated domestic wastewater and also treated industrial effluent as the process water in the industry.

Details of various processes used in the preparation of different items/products of metal, glass, wood and marble as well as wastewater generation and treatment facility available at M/s C.L. Gupta Exports Ltd. are given in **Annexure 1**.

The process of electroplating and other Metal finishing processes are being carried out in the Industry. The Industry has a fully equipped Laboratory with well qualified staff for conducting various tests qualitatively and also quantitatively. M/s C.L. Gupta Exports Ltd. had been getting their plating baths tested quarterly in a NABL approved Laboratory and thereafter since October 19, 2020, the company has started testing in-house on day to day basis.

The industry has installed an ultra-filtration and RO system to make the ETP & STP wastewater suitable for various applications in the industry at a cost of more than Rs. 5.4 Cr. treating about 400 KLD wastewater.

The first assessment report was submitted in December 2020, and this report contains the assessment of water quantity used in various units followed by water quality analysis, ensuring sustained operation of treatment systems and making water suitable.

The report covers the following aspects:

- Status of Fresh Water: Quantity & Quality
- Status of Sewage Generation, Treatment and Treated Water Utilization: Quantity & Quality
- Status of Effluent Generation, Treatment and Treated Water Utilization: Quantity & Quality
- Overall Summary

2.0 Water Requirement, Wastewater Generation, Treatment and Utilization with Quality Characteristics

2.1 Status of Water Requirement and Consumption

The industry has water requirement mainly for the following purposes:

- For Industrial process having different divisions like metal, glass and wood section
- For the workers deployed in the industry (drinking purposes and toilet usage). About 6500 employees work on daily basis in the industry, thus having a substantial water requirement for the purpose.
- For the residential colony of the staff.
- For maintaining greenbelt and other green spaces in the industry premises
- For Fire-fighting unit etc.

The industry has taken permission from CGWB to withdraw ground water for non-industrial purpose, i.e. for the utilization by staff in the colony and the industry, for which two borewells are installed in the industry premises.

The industry uses treated wastewater generated from the industrial process and also from the treatment of sewage generated from the industry and the staff colony. For treatment of industrial effluent, an effluent treatment plant (ETP) having pre-treatment unit, equalization tank, physio-chemical units, ultra-filtration system, reverse osmosis (3 stage RO), followed by disinfection unit has been installed.

For treatment of sewage from industry units and staff colony, sewage treatment plant (STP) having primary treatment units including biological system and ultra-filtration unit followed by chlorine disinfection unit has been installed.

The treated water from the ETP and STP is utilized for the industrial purposes and other non-potable applications like toilet flushing in industry & colony, green belt & lawn maintenance, fire-fighting etc.

The industry has installed meters at all the key locations/units of water/wastewater flow. Flow data for the month of March 2021 has been collected from all the meters (Borewells, ETP units, STP units etc.) and analysed to

understand the overall water requirement, treatment and consumption in the industry.

Further, water/wastewater quality has been assessed at key locations of the industry as:

- Ground water at Borewells (# 3 & # 4)
- ETP Units (Inlet, Outlet, Final RO treated water)
- STP Units (Inlet, Outlet and Final UF treated water)

The sampling was done on March 17, 2021 by the NEERI team and samples were analysed at NEERI, Delhi laboratory for various physico-chemical, demand parameters, heavy metals, and biological parameters to ensure its suitability for the proposed end use in the industry.

Based on the flow mete readings/water consumption values, water balance for the entire plant is depicted in **Figure 2.1**. Schematic/process flow diagram of ETP and STP is shown in **Figure 2.2 and 2.3** respectively.

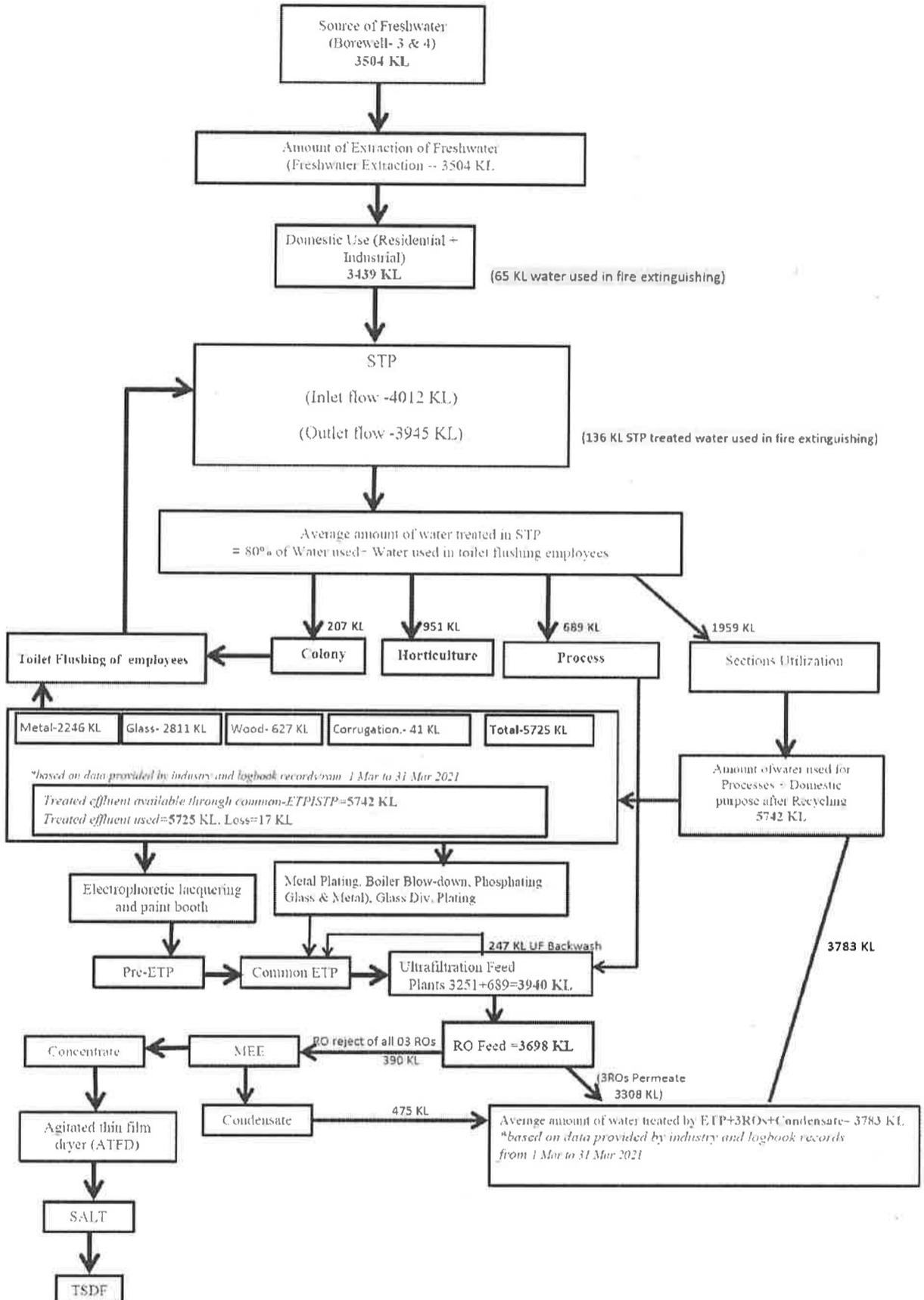


Figure 2.1: Overall Water Distribution/ Water Balance Diagram of M/s C.L. Gupta Pvt. Ltd. (Values are for March 2021)

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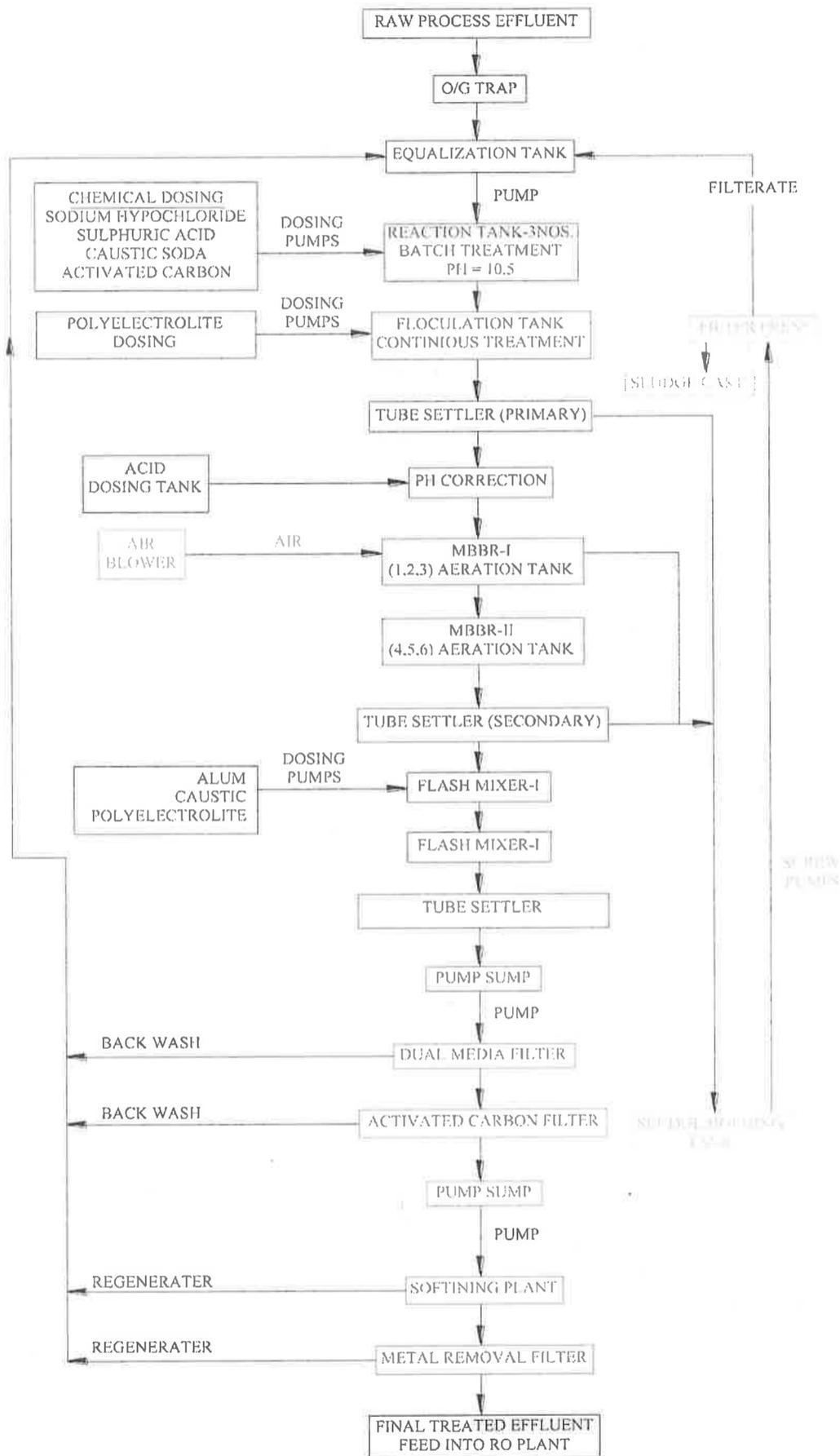


Figure 2.2: Process Flow Diagram of Effluent Treatment Plant

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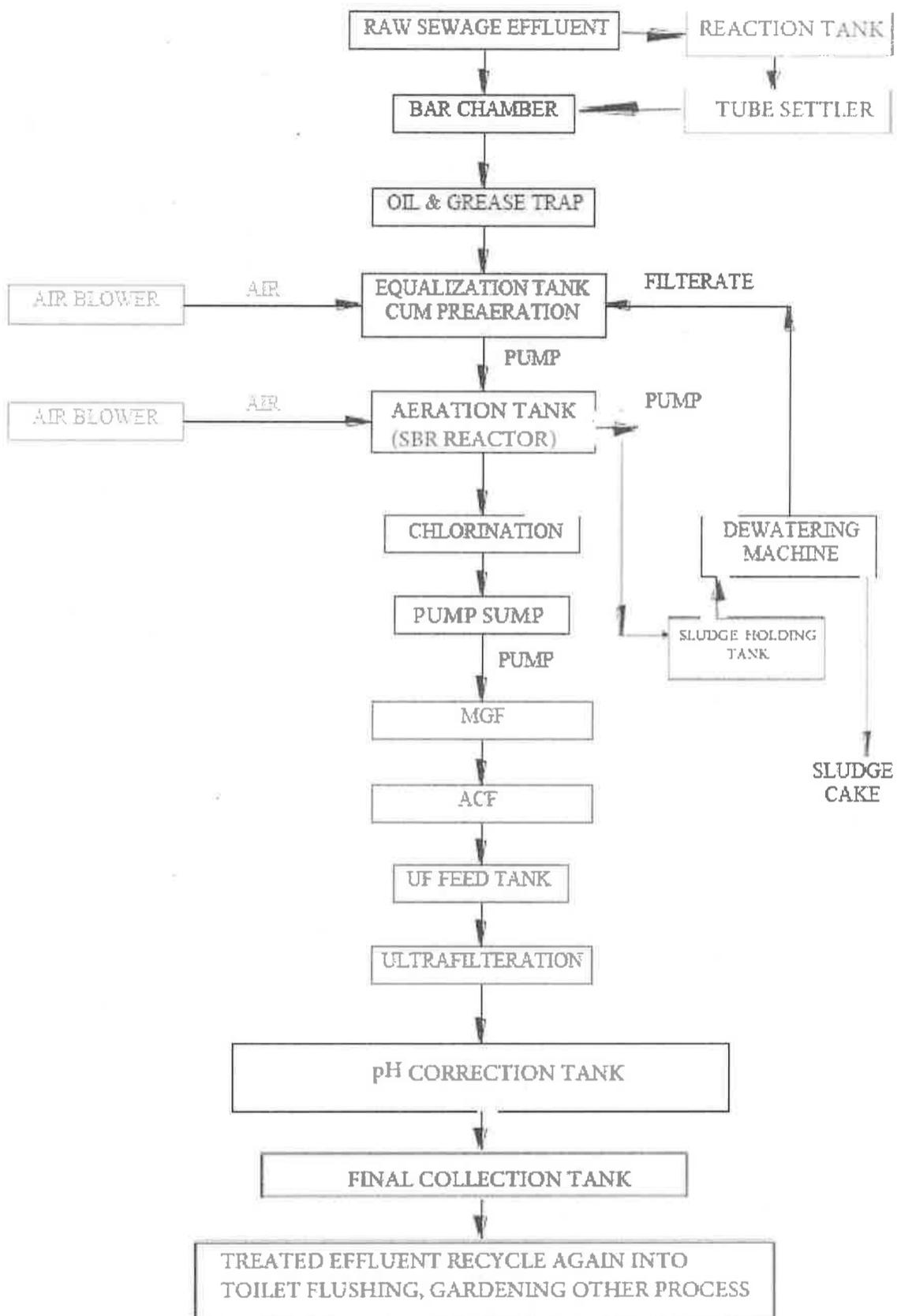


Figure 2.3: Process Flow Diagram of Sewage Treatment Plant



3.0 Observations

3.1 Fresh water withdrawal

There are two Borewells in the industry, and total ground water withdrawn during March 2021 was 3504 KL (2605 KL from Borewell # 3 and 899 KL from Borewell # 4). This freshwater is mainly used in the staff colony and for the workers in the industry. Water withdrawal details are given in **Table 3.1**.

Table 3.1: Status of Fresh Water Withdrawal during March 2021

Sr. No.	Source	Initial Reading of Flow meter, KL	Final Reading of Flow meter, KL	Total Quantity, KL
1.	Bore well # 3	32679	35284	2605
2.	Bore well # 4	13612	14511	899
	Total			3504

3.2 Industrial Water Sources and Water Consumption

The industry has installed ultra-filtration unit for treatment of STP treated water and ultra-filtration unit followed by 3 stage RO units for treatment of ETP treated water, making it suitable for the industrial purposes. The water requirement in different divisions of industry for the month of March 2021 is summarized in **Table 3.2**.

Total water requirement of 5725 KL has been met from ETP-RO (3766 KL, 65.8%) and 1959 KL from STP-UF (34.2%). Metal and Glass divisions consumed nearly 88% of the total water requirement of the industry. The wastewater from different divisions goes for treatment in the ETP, and this cycle continues.

Table 3.2: Water Requirement and Source of Water for Various Industrial Processes during March 2021

Sr. No.	Division	Fresh Water (Bore Well), KL	Recycled Water from ETP-RO, KL	Recycled Water from STP-UF, KL	Total Quantity, KL
1.	Metal Division	0	1503	743	2246
2.	Glass Division	0	2011	800	2811
3.	Wood Division	0	211	416	627
4.	Corrugation	0	41	0	41
	Total	0	3766	1959	5725

3.3 Details of Industrial Effluent Generation, Treatment and Utilization

Details of effluent generation from different divisions of the industrial processes, its treatment in ETP facility and utilization of treated water during March 2021 is summarized in **Table 3.3**.

Table 3.3: Details of Effluent Generation, Treatment in ETP Facility and Utilization during March 2021

Sr. No.	Description	Initial Reading of Flow meter, KL	Final Reading of Flow meter, KL	Total Quantity, KL
A.	Effluent Treatment Plant			
1.	ETP Inlet	10736	13813	3077
2.	ETP Outlet including UF Backwash (247 KL)	11040	14291	3251
	Total ETP Outlet			3251
B.	UF System (ETP Outlet+ STP Process)			
	UF Feed (ETP Outlet – 3251 + STP Process Make up Water – 689), Treated in UF – 2 Units in Parallel			3940
1.	UF-1 Inlet	2225	3212	987
2.	UF-2 Inlet	6698	9655	2957
	Total UF Inlet			3944
3.	UF-1 Outlet	1997	2884	887
4.	UF-2 Outlet	6256	9066	2810
	Total UF Outlet			3697
	Backwash (sent to ETP)			247
C.	RO Plant (3 Stage)			
1.	RO Feed (Total UF Outlet)	8256	11954	3698
2.	RO-1 Permeate	5432	7910	2478
3.	RO-2 Permeate	1372	1944	572
4.	RO-3 Permeate	592	850	258
5.	Total Permeate (2+3+4)			3308
	RO Reject			390
6.	MEE Condensate (including some steam water)	1026	1501	475
7.	Total Treated Water Available from RO Plant (5+6)			3783
D.	RO Treated Water Utilization			
1.	Metal Division	4893	6396	1503
2.	Glass Division	7061	9072	2011
3.	Wood Division	747	958	211
4.	Corrugation	41	82	41
5.	Total (1+2+3+4)			3766

Note: There may be some difference in water balance due to some evaporation losses and rounding off the water meter readings.

As per the flow meters installed at various points, the total quantity of wastewater generation, reaching at ETP was 3077 KL, whereas total treated water from ETP was 3251 KL, which included 247 KL of backwash from UF of ETP. Further, make up water (689 KL) from UF of STP process is added, thus total UF feed became 3940 KL. This ETP treated water is passed through Ultra-filtration system (2 units installed in parallel), and total of 3697 KL is obtained from UF units (about 94% recovery). This water is further treated in 3-stage RO units, wherein a 3308 KL RO treated water was obtained (about 89.5% recovery). Total rejects quantity was 390 KL (10.5%). RO rejects are sent to MEE for complete drying. About 475 KL condensate was generated in the MEE, thus total 3783 KL treated water was available for utilization for various purposes. Nearly entire quantity of ETP-RO treated water was utilized in the different divisions of the industry.

3.4 Details of Sewage Generation, Treatment and Utilization

Details of sewage generation from staff colony and used by employees in different divisions of the industrial processes, its treatment in STP facility and utilization of treated water during March 2021 is summarized in **Table 3.4**.

As per the flow meters installed at various points, the total quantity of sewage generation, reaching at STP was 4012 KL, whereas total treated water from STP (after UF) was 3945 KL (98.3% recovery). The treated water is mainly used for toilet flushing in the industry (1233 KL) and colony (207 KL), and also for boiler feed and cooling towers in the industry (726 KL). Thus, a total of 2166 KL of treated water was used in the industry and colony.

Besides, 1776 KL treated water was used for other applications as process water (689 KL), green belt (951 KL) and fire-fighting (136 KL). Thus, a total of 3942 KL treated water was utilized (almost 100% of available STP treated water) by the industry for various purposes. The industry has about 3.1 ha of green belt and about 1.7 ha of lawns area.

Table 3.4: Sewage Generation, Treatment and Utilization in STP during March 2021

Sr. No.	Description	Initial Reading of Flow meter, KL	Final Reading of Flow meter, KL	Total Quantity, KL
A.	Sewage Treatment Plant			
1.	STP Inlet	28913	32925	4012
2.	STP Outlet (after UF)	28308	32253	3945
B.	STP Treated Water Utilization			
B.1	In Industry Divisions			
1.	Metal Division	6796	7539	743*
1a.	Water used in Metal Division Utilities (Cooling Towers)	125	256	131
1b.	Water used in Metal Division Flushing			612
2.	Glass Division	5499	6299	800*
2a.	Includes *Glass Division - Boiler	449	906	457
2b.	Water used in Glass Division Utilities(Cooling Towers)	53	120	67
2c.	Water used in Glass Division Flushing			276
3.	Wood Division	3045	3461	416*
3a.	Water used in Glass Division Utilities(Cooling Towers)	72	143	71
3b.	Water used in Wood Division Flushing			345
4.	Net Water Used for Flushing in Divisions (1b + 2c + 3b)			1233
5.	Used in Colony for Flushing	198	405	207
6.	Total water returned to STP again (4 + 5)			1440
7.	Total water consumed through utilities again (1a +2a+2b+3a)			726
B.2	Other Uses (fully Consumed)			
8.	Process Water	5352	6041	689
9.	Green Belt	7266	8217	951
10.	Fire Extinguishing	3806	3942	136
11.	Total (8+9+10)			1776
	Total water used (1 to 7 + 10)			3942

Note: There may be some difference in water balance due to some evaporation loses and rounding off the water meter readings.

4.0 Water Quality Characteristics of Ground water, at STP and ETP Facility

4.1 Ground Water Quality Characteristics

Sample of ground water were collected from both the borewells and analysed for different parameters and compared with BIS-Drinking Water Quality Standards (IS 10500:2012). The results are given in **Table 4.1**.

Analysis of parameters indicate all the parameters within the permissible limits of BIS except for total coliforms for both the borewells and E.coli for Bore well #3, and shall require disinfection prior to use for drinking purpose. Difference in some of the parameters in both the bore wells water indicate different aquifers in the industry premises.

4.2 Status of ETP Facility

Samples were collected from the inlet & outlet of the ETP, followed by RO outlet and RO rejects. The results are given in **Table 4.2**. Analysis of results of RO outlet indicate all the parameters are within the drinking water quality standards. However, disinfection shall be required due to detection of some coliforms.

4.3 Status of STP Facility

Samples were collected from the inlet and outlet of STP, and also final treated water from Ultra-filtration system. The results are given in **Table 4.3**, perusal of which indicates the Outlet of Ultra-filtration unit meets drinking water quality norms (permissible limit) for all the parameters. However, further disinfection shall be required for presence of total coliforms.

4.4 Overall Summary: Fresh Water Vs Final Treated Water from STP & ETP

Comparison of ground water quality with the final treated water from ETP (post RO) and STP (post UF) is presented in **Table 4.4**, which indicates the suitability of treated water for the various purposes in the industry.

Table 4.1: Water Quality Characteristics of Ground Water (Bore Wells)

S. No.	Parameter	Bore Well # 3	Bore Well # 4	BIS-DWQS (IS 10500:2012)
A.	Physical Parameters			
1.	pH	7.5	7.7	6.5-8.5
2.	EC ($\mu\text{S}/\text{cm}$)	600	1160	-
3.	T.S.S, mg/L	4	4	-
4.	TDS, mg/L	306	558	500/2000
B.	Chemical Parameters (mg/L)			
5.	Chloride	42	127	250/1000
6.	Sulphate	7	17	200/400
7.	Fluoride	0.37	0.20	1.0/1.5
8.	Nitrate	-	-	45/NR
9.	Phosphate	0.6	0.05	-
10.	Ammonia	Nil	Nil	0.5/NR
C.	Demand Parameters (mg/L)			
11.	BOD	Nil	Nil	-
12.	COD	8.8	7.2	-
D.	Heavy Metals (mg/L)			
13.	Al	-	-	0.03/0.2
14.	Cd	BDL	BDL	0.003/NR
15.	Cr	BDL	BDL	0.05/NR
16.	Co	BDL	BDL	-
17.	Cu	0.008	BDL	0.05/1.5
18.	Fe	0.09	BDL	1.0/NR
19.	Pb	BDL	BDL	0.01/NR
20.	Mn	0.033	0.2	0.1/0.3
21.	Ni	BDL	BDL	0.02/NR
22.	Sr	0.107	0.149	-
23.	Zn	0.106	BDL	5/15
24.	CN	BDL	BDL	0.05/NR
E.	Bacteriological Parameters (CFU/100 mL)			
25.	Total Coliform	28	260	Nil
26.	E. Coli	18	Nil	

BDL – Below Detection Limit; NR – No Relaxation

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Table 4.2: Water Quality Characteristics of at ETP (March 2021)

S. No.	Parameter	ETP Inlet	ETP Outlet	RO Outlet	RO Rejects	BIS-DWQS (IS 10500:2012)
A.	Physical Parameters					
1.	pH	6.7	7.4	7.5	7.5	6.5-8.5
2.	EC ($\mu\text{S}/\text{cm}$)	5300	6380	300	38250	-
3.	T.S.S, mg/L	126	316	6	136	-
4.	TDS, mg/L	3040	3648	288	25414	500/2000
B.	Chemical Parameters (mg/L)					
5.	Chloride	380	515	20	4478	250/1000
6.	Sulphate	975	875	3.8	7150	200/400
7.	Fluoride	14	20	0.41	85	1.0/1.5
8.	Nitrate	-	-	-	-	45/NR
9.	Phosphate	2.5	4.6	0.01	5.0	-
10.	Ammonia	9.1	17.3	0.5	93	0.5/NR
C.	Demand Parameters (mg/L)					
11.	BOD	50	NIL	NIL	NIL	-
12.	COD	320	80	NIL	540	-
D.	Heavy Metals (mg/L)					
13.	Al	-	-	-	-	0.03/0.2
14.	Cd	BDL	BDL	BDL	BDL	0.003/NR
15.	Cr	5.1	BDL	BDL	BDL	0.05/NR
16.	Co	0.006	BDL	BDL	0.02	-
17.	Cu	0.328	0.109	BDL	0.813	0.05/1.5
18.	Fe	2.6	BDL	BDL	BDL	1.0/NR
19.	Pb	0.367	0.114	BDL	0.843	0.01/NR
20.	Mn	0.226	0.019	BDL	0.34	0.1/0.3
21.	Ni	2.7	0.268	BDL	1.9	0.02/NR
22.	Sr	0.082	0.081	BDL	0.799	-
23.	Zn	4	0.006	BDL	0.073	5/15
24.	CN	BDL	BDL	BDL	BDL	0.05/NR
E.	Bacteriological Parameters (CFU/100 mL)					
25.	Total Coliform	46x10 ⁷	12 x10 ⁴	44	28 x10 ³	Nil
26.	E.Coli	320	44	NIL	54	

BDL – Below Detection Limit; NR – No Relaxation

Table 4.3: Water Quality Characteristics of STP Facility (March 2021)

S. No.	Parameter	STP Inlet	STP Outlet	UF Outlet	BIS-DWQS (IS 10500:2012)
A.	Physical Parameters				
1.	pH	7.5	6.9	7.2	6.5-8.5
2.	EC ($\mu\text{S}/\text{cm}$)	2230	1830	2010	-
3.	T.S.S, mg/L	790	4	20	-
4.	TDS, mg/L	1465	1292	980	500/2000
B.	Chemical Parameters (mg/L)				
5.	Chloride	207	211	245	250/1000
6.	Sulphate	55	53	53	200/400
7.	Fluoride	1.3	1.1	1.2	1.0/1.5
8.	Nitrate	-	-	-	45/NR
9.	Phosphate	4.4	4.6	5.2	-
10.	Ammonia	56	1.2	2.5	0.5/NR
C.	Demand Parameters (mg/L)				
11.	BOD	370	<5	NIL	-
12.	COD	736	40	12	-
D.	Heavy Metals (mg/L)				
13.	Al	-	-	-	0.03/0.2
14.	Cd	BDL	BDL	BDL	0.003/NR
15.	Cr	16	BDL	BDL	0.05/NR
16.	Co	0.034	BDL	BDL	-
17.	Cu	4.6	0.038	0.004	0.05/1.5
18.	Fe	31	BDL	BDL	1.0/NR
19.	Pb	3.7	0.016	BDL	0.01/NR
20.	Mn	1.3	0.147	0.121	0.1/0.3
21.	Ni	6.3	0.173	0.013	0.02/NR
22.	Sr	0.363	0.113	0.099	-
23.	Zn	8.9	0.131	0.053	5/15
24.	CN	BDL	BDL	BDL	0.05/NR
E.	Bacteriological Parameters (CFU/100 mL)				
25.	Total Coliform	18×10^8	74×10^3	38	Nil
26.	E.Coli	46×10^6	16×10^2	NIL	

BDL – Below Detection Limit; NR – No Relaxation

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Table 4.4: Water Quality Characteristics of Fresh Water, Final Treated Water from ETP and STP (March 2021)

S. No.	Parameter	Ground Water from Bore well		Final Treated Water from		BIS-DWQS (IS 10500:2012)
		BW-1	BW-2	ETP-RO	STP-UF	
A. Physical Parameters						
1.	pH	7.5	7.7	7.5	7.2	6.5-8.5
2.	EC ($\mu\text{S}/\text{cm}$)	600	1160	300	2010	-
3.	T.S.S, mg/L	4	4	6	20	-
4.	TDS, mg/L	306	558	288	980	500/2000
B. Chemical Parameters (mg/L)						
5.	Chloride	42	127	20	245	250/1000
6.	Sulphate	7	17	3.8	53	200/400
7.	Fluoride	0.37	0.20	0.41	1.2	1.0/1.5
8.	Nitrate	-	-	-	-	45/NR
9.	Phosphate	0.6	0.05	0.01	5.2	-
10.	Ammonia	Nil	Nil	0.5	2.5	0.5/NR
C. Demand Parameters (mg/L)						
11.	BOD	Nil	Nil	Nil	Nil	-
12.	COD	8.8	7.2	Nil	12	-
D. Heavy Metals (mg/L)						
13.	Al	-	-	-	-	0.03/0.2
14.	Cd	BDL	BDL	BDL	BDL	0.003/NR
15.	Cr	BDL	BDL	BDL	BDL	0.05/NR
16.	Co	BDL	BDL	BDL	BDL	-
17.	Cu	0.008	BDL	BDL	0.004	0.05/1.5
18.	Fe	0.09	BDL	BDL	BDL	1.0/NR
19.	Pb	BDL	BDL	BDL	BDL	0.01/NR
20.	Mn	0.033	0.2	BDL	0.121	0.1/0.3
21.	Ni	BDL	BDL	BDL	0.013	0.02/NR
22.	Sr	0.107	0.149	BDL	0.099	-
23.	Zn	0.106	BDL	BDL	0.053	5/15
24.	CN	BDL	BDL	BDL	BDL	0.5/NR
E. Bacteriological Parameters (CFU/100 mL)						
25.	Total Coliform	28	260	44	38	Nil
26.	E.Coli	18	Nil	NIL	NIL	

BIS Drinking Water Quality Standards (10500:2012); NR – No Relaxation



5.0 Conclusion and Recommendations

The study conducted at M/s C.L. Gupta Exports Ltd. can be summarized as:

- Analysis of results indicate that M/s C.L. Gupta Exports Ltd. has adequate facility/ system for the treatment of process effluent and sewage separately. Thus making the treated water suitable for use in various processes of the industry.
- Overall analysis of samples indicates that the treated water from RO outlet of ETP and from the outlet of Ultra-filtration (UF) unit of STP can be used for different processes in the industry. Further, strict monitoring of treated water is required on regular basis to ensure continued desired quality of treated water.
- Installation of reverse osmosis (RO) unit in ETP and ultra-filtration (UF) unit in STP has helped in achieving the desired quality of water. Analysis of treated water also confirms the suitability of use of treated water for the industrial purpose. Thereby meeting the fresh water requirement of M/s C.L. Gupta Exports Ltd., as the region is become water scarce for ground water withdrawal.
- It is suggested to optimise the use of chemicals used in treatment process units in the ETP as well STP. This will help not only result in reduction of chemical use, but also reduce hazardous sludge/waste generation and expected to improve the quality of treated water further.
- It is suggested to strengthen laboratory facilities at the industry with more infrastructure and technically qualified manpower.
- Further, detailed Audit study including analysis of final treated water should be carried out 2-3 times in a year, ensuring the sustained performance of the treatment facility, and suggest modifications required, if any.

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Annexures

Annexure 1**A. Processes Details at M/s C.L. Gupta Exports Pvt. Ltd.**

The company's manufacturing details wrt Metal, Glass, Wood and Marble items are as under:

Wooden Art wares

Timber is purchased in the shape of logs. The logs are cut into planks of desired sizes in the sawing section. These pieces are properly treated in a process known as chemical Treatment process. The treated timber is adequately seasoned in seasoning plant. The seasoned wood is sent to machine shop for suitable sizes/Machined Pieces. Thereafter such pieces are taken into the fabrication section for conversion into required designs. These fabricated pieces are sent to the finishing department for final finish. There-after these finally finished pieces are checked as per specifications and sent to packing department where these are packed for dispatches.

Metal Art wares

Iron Artwares: - Square and round rods of different sizes are purchased from the market. These are cut into proper sizes and after conversion into the different designs they are sent for phosphating. For phosphating Hydro chloric Acid, Casustic Soda, Phosphating chemicals, and calcide powders are mainly used. After phosphating these pieces are sent to the Electroplating/ Powder coating/ antique finishing / Electrophoretic department for finishing. These finished items are suitably packed for export.

Metal Artwares: - Brass, Copper, Aluminium and zinc purchased from the market are the major raw materials. These casted/ sheet products are cleaned and machined with various tools and machines and are smoothened. Then their cost addition is done by imparting different finishes like electrophoretic, electro plating, lacquering, powder coating and antiquing etc. Brass, Copper and Aluminium are procured mostly in form of sheets and wires. Sheets are further processed by forming and piercing etc. As regards Zinc ingots are made to shape by melting/ moulding/ casting.

MARBLE WARES: - Table tops, boxes, slates, and bates are new additions to add up in our variety of products. Marble flats are procured and then are shaped and designed as per requirements.

Glass & Crystal Art wares

Glass tank furnace is a conventional melting furnace for glass articles like table wares of different shapes & designs, bottles, tumblers etc. This is an End-Fired regenerative furnace with

four to six working-bays (with a distributor in between) of which three are currently under operation. The melter is fired for smelting and refining purpose whereas the distributor is for conditioning and refining purpose. The working bays and the distributors are fired by Propane / PNG Gas for a better control of temperature. The major ingredients like Quartz, Soda Ash, Calcite etc., and the minor ingredients like potassium Nitrate, Sodium Sulphate etc. are mixed in appropriate proportion in a Pan-Type mixture.

The mix and the broken glass (Technically termed as cullet) received from various inspection points and process rejections are put into the trolleys. These trolleys are lifted to the Furnace Topper by a hoist and thus charged periodically with the help of a vibrator and a mechanical pusher into the furnace through the dog house (i.e. entry point) to maintain a constant molten glass level inside the furnace. The melting at about 1450-1500 C is a very complex set of reactions. As the temperature increases variety of Physico-chemical reactions occur like Evaporation of free water, Formation of loss of gaseous constituents, formation of liquid phases where all major constituents are transferred into complex silicates. This molten form of glass is refined in the distributors as stated above at 1250-1260° C and distributed to different working bays. Mouth blowers collect the glass from the working bay by a pipe and then blow in the mould to attain full size & shape of the article. While blowing with pipe, precautions are taken that the surfaces are uniform and polished. Moulds have a coating of red lead & carbon to avoid metal contact. Sometimes they are pressed by a mechanical device having a die and plunger fitted with the pressing machine.

The blown and pressed items are quickly transferred to a chamber called Annealing Lehr for removing the stresses and strains developed in these articles during the process. This is called Annealing and the temperature is maintained at about 530 ° C (fired by H.S.D.) in the annealing zone and structure checked under polars scope. The exit point of the Lehr is kept at ambient temperature. The articles are inspected for physical defects and then transferred to wire cutting where the extra glass is cut off with the help of electrically heated filaments. The edges are grounded by the grinding wheel and itched if required before sending to the packing department. For colored glass we make the clear glass and then painted by mixture of Dye and special quality of lacquer. The items are then baked at around 150 ° C and the paint so generated passes all necessary tests including water repellence test. The lacquer used is a special Glass-clear.

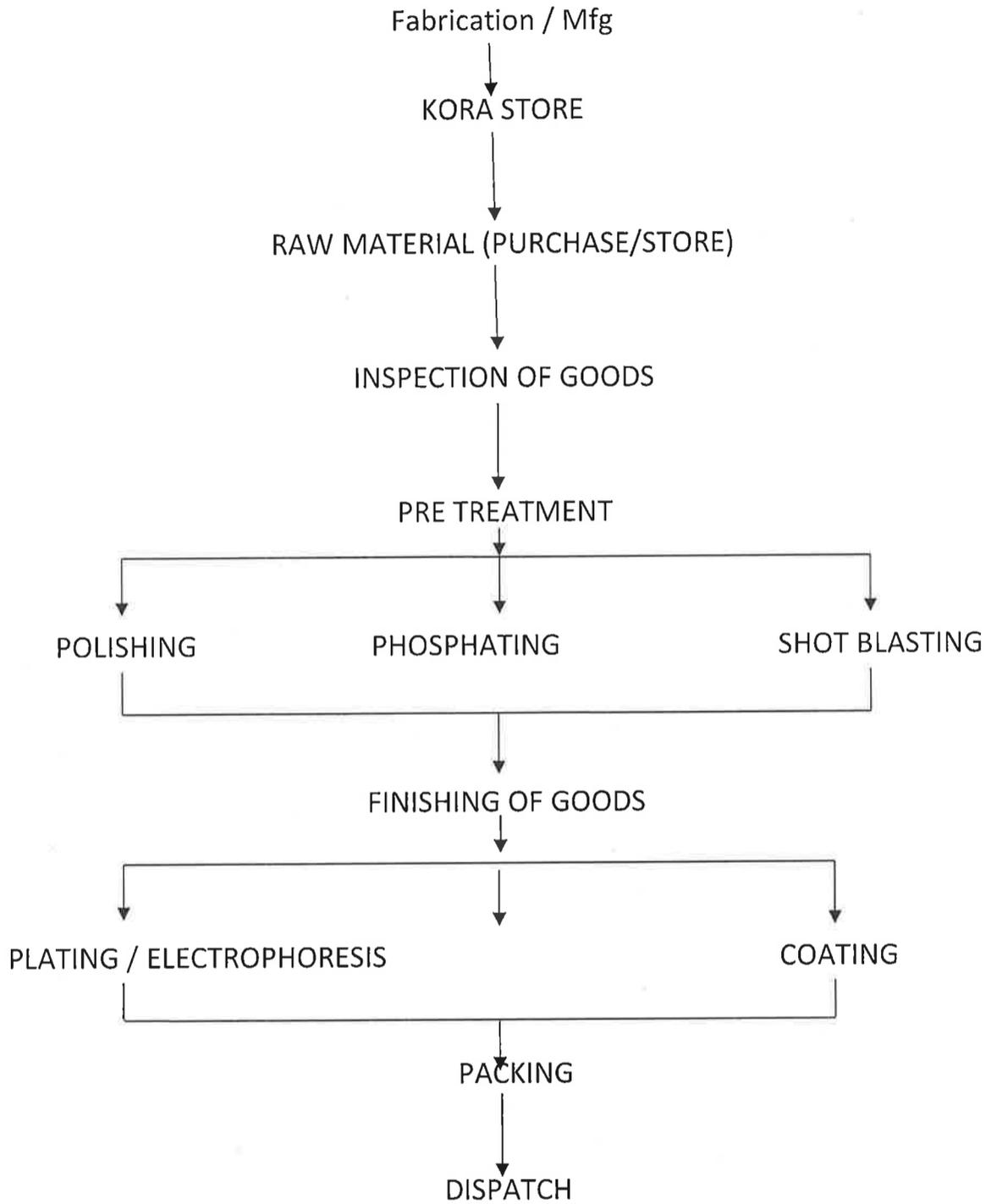
Production Flow Charts

1. For Wooden Art wares



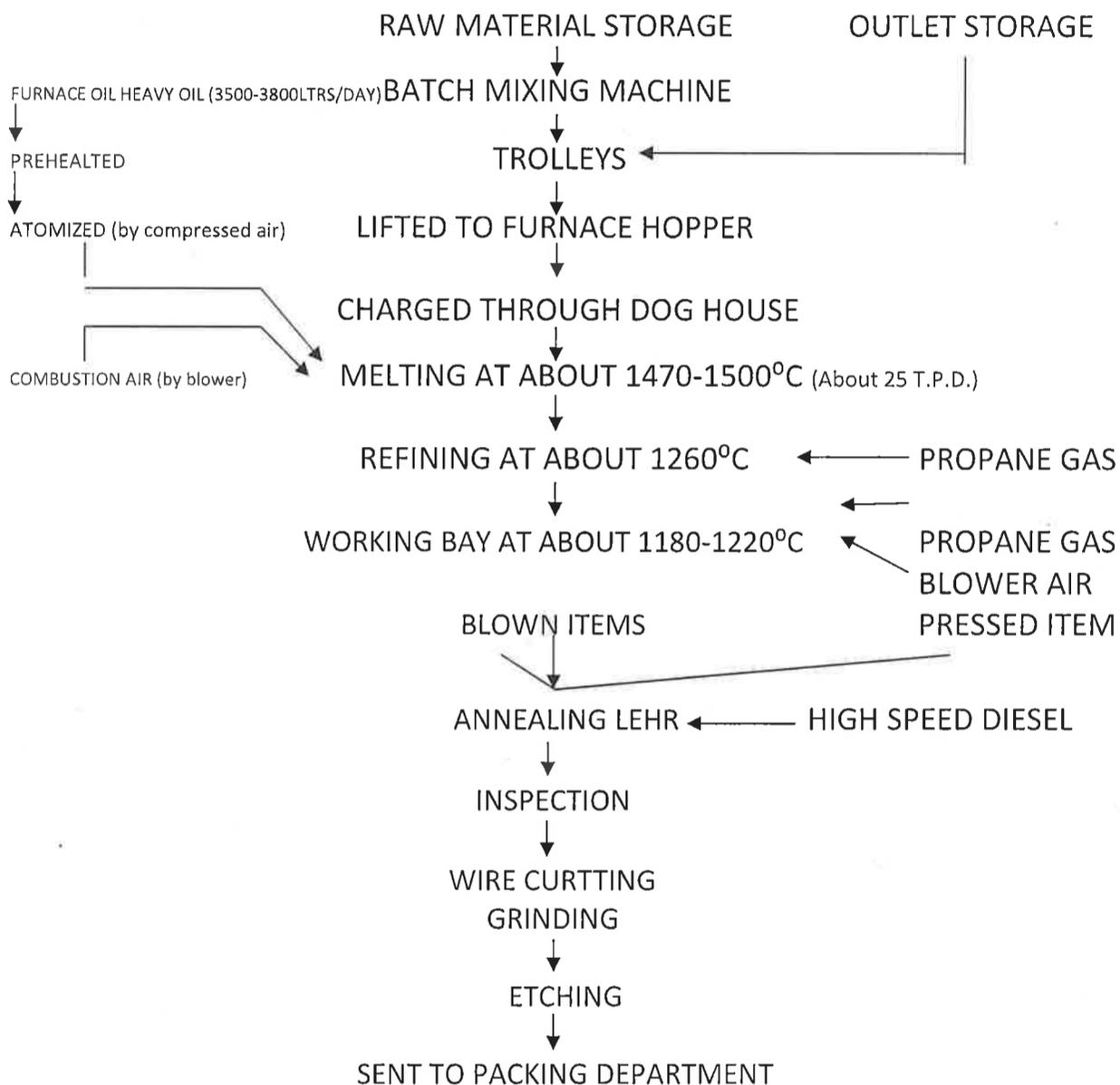
1665

2. For Metal Art Wares



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3. For Glass Art Wares



4. Marble Wares

Sorting of slabs as per Texture / Streaks

↓
Sizing

↓
Shaping

↓
Grinding/Polishing

B. Wastewater Generation and Treatment Facility

Total effluents are broadly defined as: STP and ETP.

B.1 Details of Common Sewage Treatment Plant (STP)-

1. Names of Area from Which this STP receives raw effluent-Kitchen, Toilets & Bathrooms
2. Design Capacity of STP – 10.5 KL/hour or 250 KLD
3. Name of Chemical Use in STP- Urea, D.A.P., Effective microorganism, Sodium Hypochlorite.
4. Treatment Scheme/Technology and Operational status of each unit- SBR (Sequence Batch Reactor)

Sewage Treatment Facility-

Primary Treatment-

- Primary treatment of metal division sewage effluent by dosing alum & polyelectrolyte to remove the suspended load added due to buffing hand washing. The suspended load in the form of sludge slurry is separated from tube settler (Clarifier). The sludge slurry from tube settler is transferred to Sludge holding tank and then through sludge dewatering machine as explained in flow diagram.
- Removal of grit, suspended solids from coarse & fine screen is done to prevent the submersible pump use for feed effluent into sequence batch reactor.
- Removal of oil & grease manually from oil & grease chamber, so that oil as grease will not enter into equalization tank.

Biological Treatment-

Sequence Batch Reactor-

The Sequence Batch Reactor provides highest treatment efficiency possible in a single step biological process.

The Sequence Batch Reactor System is operated in a batch mode in sequence which eliminates all inefficiencies of the continuous processes. A batch reactor is a perfect reactor, which ensures 100% treatment.

Operation Sequence Explains as Under:

A basic cycle sequence

- .Filling-45 Minutes

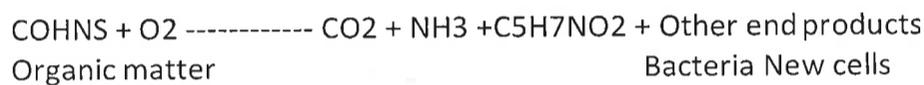
- Aeration – 180 Minutes
- Settling -45 Minutes
- Decanting -30 Minutes
- Idle (I)- 15 Minutes

Total Duration of Each Cycle is 5.25 hrs

BOD removal:-

The following reactions describe the organic substrate utilization by the aerobic bacteria:

Oxidation



Endogenous respiration



Synthesis



Nitrification



Denitrification in Anoxic Zone



Chlorination Treatment-

Chlorination arrangement done for disinfection of treated sewage for reduction of fecal coli form level as desired with the help of sodium hypochlorite. The dosing is dosing by metering pump to adjust the dosing as per the flow of sewage plant.

Dual Media & Activated Adsorption) Filtration:- Reduces the suspended load and some part of oil & grease, etc.

Ultra filtration Plant- Removed of bacteria, coli form, Influenza Virus, organic matters, suspended load etc.

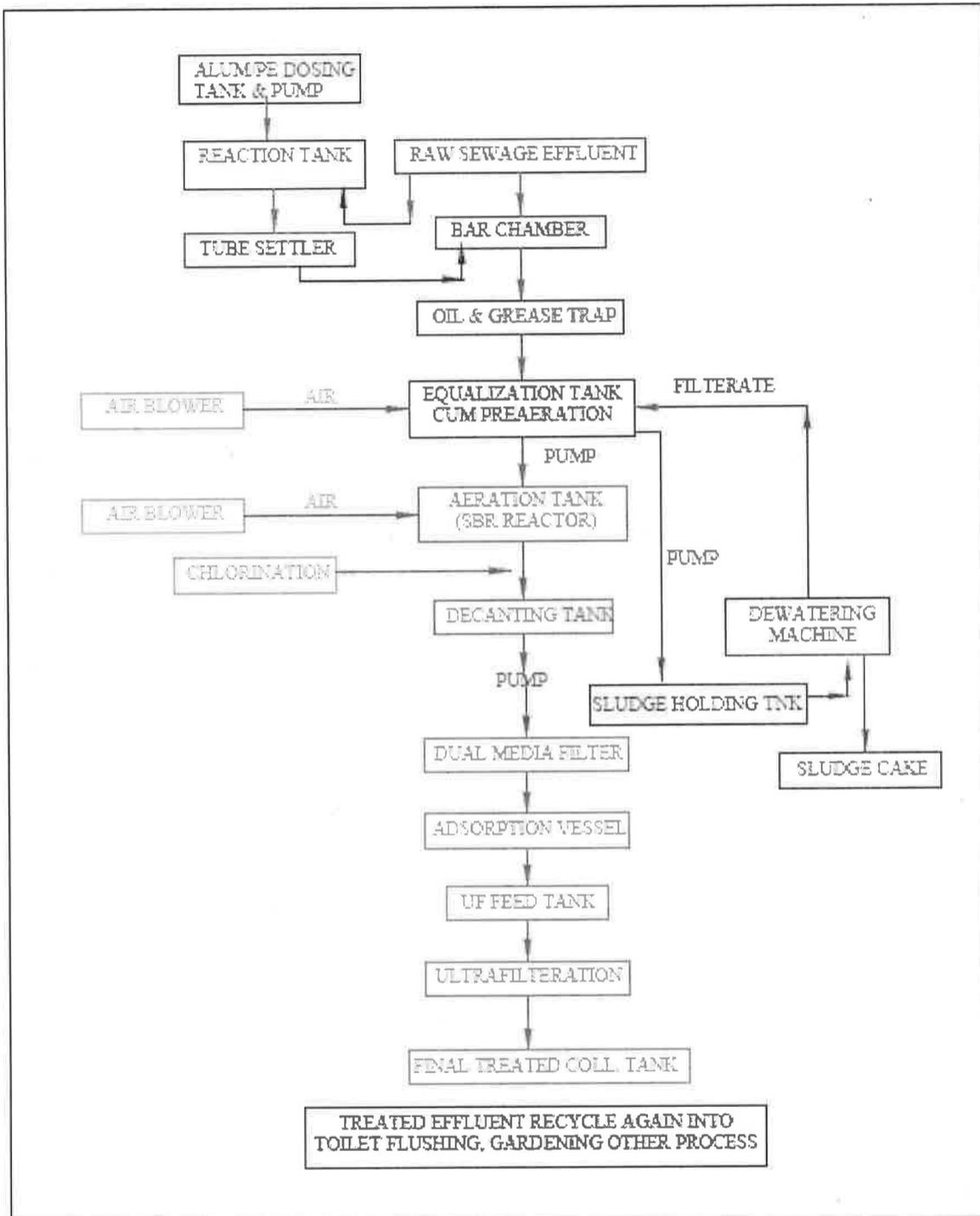
The treated water after ultra filtrations are fit for recycling into process and flushing purpose

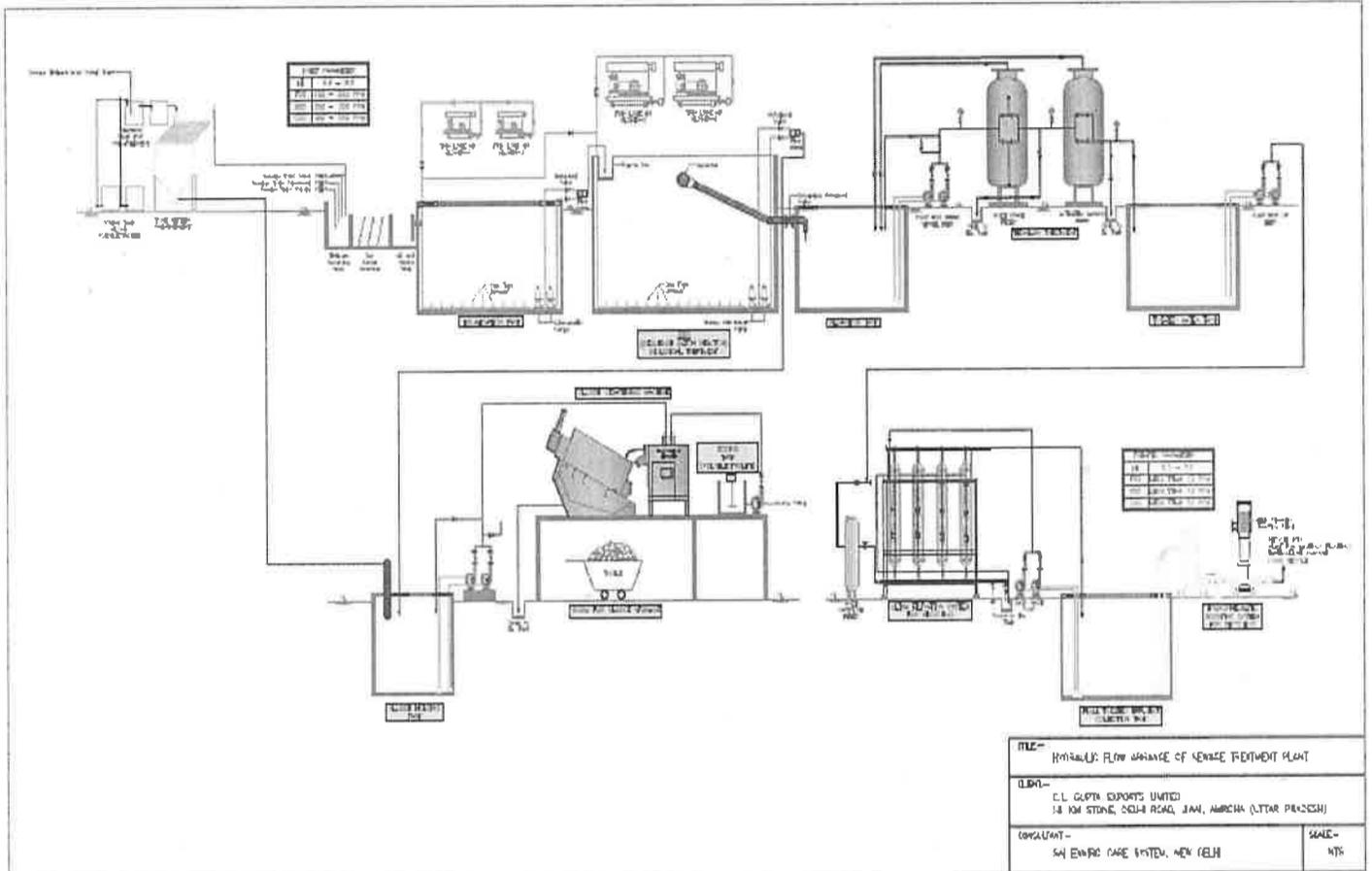
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CHARACTERISTICS OF TREATED SEWAGE:-

S.No	Parameter	Value
1.	pH Value	6.5-9.0
2.	Temperature	Ambient
3.	Appearance	Crystal Clear
4.	BOD ₅ in mg/l	less than 10
5.	COD ,, mg/l	Less than 50
6.	TSS in mg/l	less than 10
7.	TN in mg/l	less than 10
8.	HN ₄ -N in mg/l	Less than 5
9.	TP Phosphorus as p in mg/l	less than 10
10.	Fecal Coliforms, MPN/100ml	less than 230
11.	Total Phosphorus, mg/l	less than 1

STP FLOW Diagram



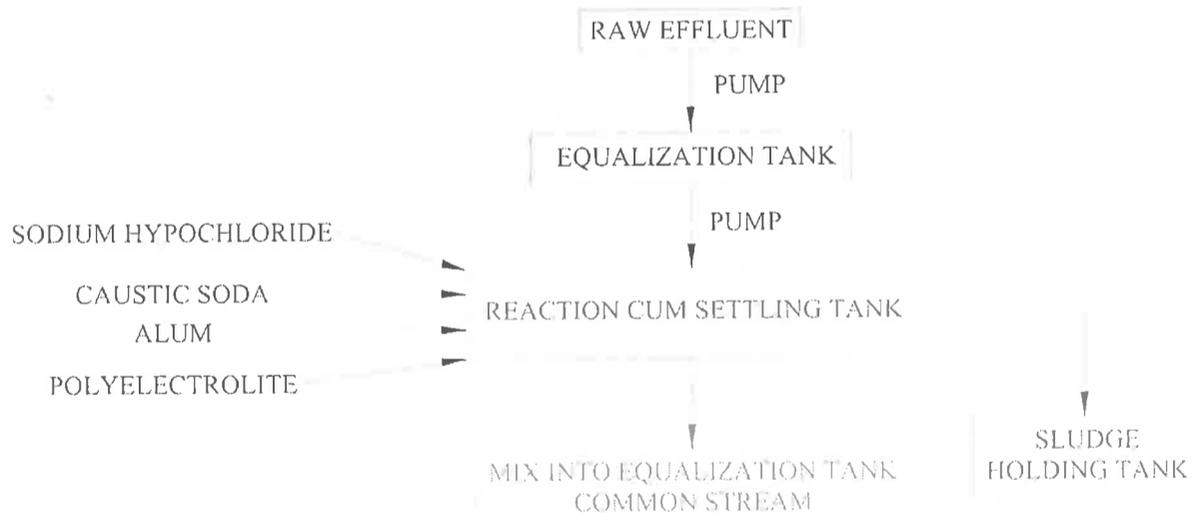


Effluent Treatment Plant (ETP):

Since the plating/coating/ionic processes are based on inorganic substances and organic substances the organic effluents out of electrophoretic lacquering and paint booths effluents are subjected to pretreatment before they are mixed to inorganic effluent treatments thereby maintaining alkaline, acidic and organic elements.

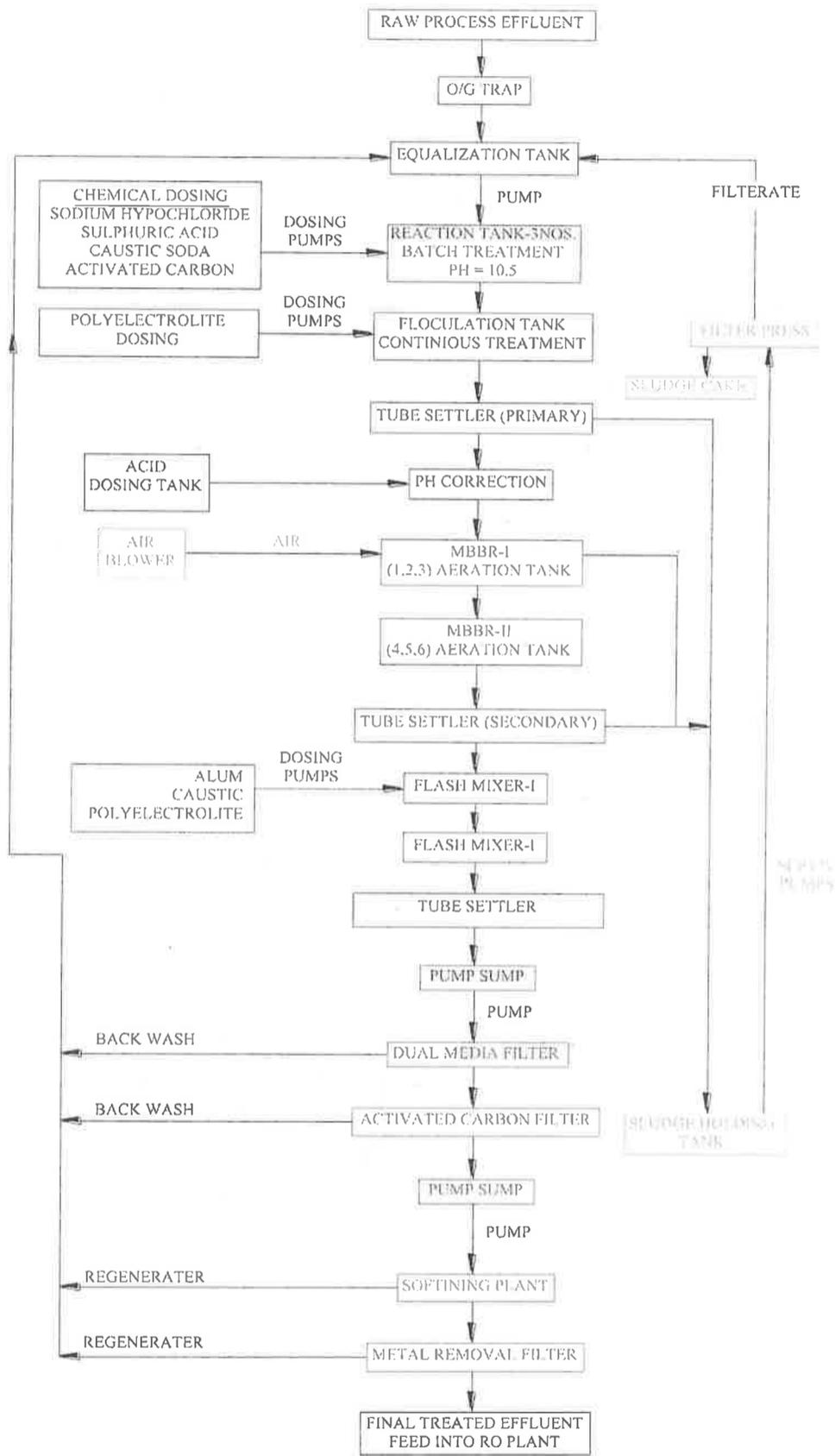
The details of ETP are:-

1. Names of Area from which this ETP receives raw effluent - Processes waste water
2. Design Capacity of ETP - 6.25 KL/hour or 150 KLD
3. Chemical Use in Common Effluent Treatment Plant
 - a. Sodium Hypochlorite
 - b. Polyelectrolyte
 - c. Sulphuric Acid
 - d. Sodium Sulphate
 - e. Caustic Soda
 - f. Lime Water
 - g. Activated carbon
 - h. Ferric Chloride.



PRE-TREATMENT OF FLOOR WASHING EFFLUENT

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EFFLUENT TREATMENT PLANT FLOW SEQUENCE

PROCESSES OF EFFLUENT TREATMENT:-

The effluent generated from plating plant would be segregated into following streams-

1. Rinsing effluent from Electro electrophoretic lacquering, plating and paint booth effluent



Pre Treated in Pre Treated Effluent Plant & Mix with Common Effluent Treatment Plant

2. Floor washing effluent
3. Rinsing & concentrate effluent generated from nickel plating, zinc plating, copper plating, aluminum plating & . + Pre -treated para1 + Pre- treated above para-2

PRE- EFFLUENT TREATMENT PLANT ELECTROPHORETIC LACQUERING & PAINTH BOOTH EFFLUENT**Ist Stage Treatment**
(Batch Treatment)

The effluent from equalization tank is transfer to reaction cum settling tank and treating batch method by dosing bio buster with caustic soda dosing to resulting in reduce the COD from 6000 PPM-8000PPM to 1000 PPM maintaining pH 9.0 and the stirring would do for 1.5-2.0 hrs. The Polyelectrolyte dosing would carry out to build up the size of the floc. This stirring would do for 20-30 minutes. The retention time in reaction tank cum clarifier is around 2.0 hour. The effluent contains mostly soluble and colloidal impurities in soluble form will bring about the precipitation in insoluble form and settle at bottom of reaction cum settling tank. The insoluble settled sludge at the bottom of the reaction cum setting would be transferred to sludge holding tank. The supernatant in reaction tank will further treated as under.

Pre treatment- IInd Stage
(Batch Treatment)

In the IInd stage treatment basic aim to achieve COD level below 500PPM. The dosing of ferric chloride, sodium hypochlorite, alum and activated carbon power for removing soluble impurity and reduce the COD from 1000 PPM to below 500 PPM maintaining pH 7.50 by dosing caustic soda and the stirring would do for 1.5-2.0 hrs. The Polyelectrolyte dosing would carry out to build up the size of the floc. This stirring would do for 20-30 minutes. The retention time in reaction tank cum clarifier is around 2.0 hour. The effluent contains mostly soluble and colloidal impurities in soluble form will oxidize and then bring about the precipitation in insoluble form and settle at bottom of reaction cum

settling tank. The insoluble settled sludge at the bottom of the reaction cum setting would be transferred to sludge holding tank. The supernatant will further treated by biological treatment into sequence batch reactor.

Biological Treatment-

Explanation of cyclic operation in sequence batch reactor:

A basic cycle comprises:

- Filling(F)-0.50 HOUR

Aeration (A) – 22.0 Hrs

- Settling (S) 1.0 .Hrs

- Decanting (D) -0.5 .Hrs

Idle (I)-0.250 Hour

Typically total Duration of Each Cycle is 2425 hrs

SLUDGE DEWATERING SYSTEM-

The settled sludge at the bottom of tube settler and excess sludge from sequence batch reactor would transfer to the sludge slurry collection tank and feed into filter press for sludge dewatering and filtered will again transfer into equalization tank for further treatment.

The sludge cake from sludge drying beds having moisture approximate 30% would be disposed off as per the advice of authority

FILTRATION THROUGH DMF & ACV ARRANGEMENT:-

The treated effluent then feed into multi grade and adsorption column i.e. activated carbon filter for polishing purpose which would marginally reduce the pollution parameter like COD, BOD, iron contains and oil & grease etc and collected into pump sump

ULTRAFILTRATION ARRANGEMENT:-

ULTRAFILTRATION arrangement is proposed for disinfection & Fine filtration of treated effluent.

The effluent then mix with electroplating plating & phosphating effluent at common effluent treatment plant.

Pre treatment of Electro Floor Washing Effluent (Above para-2)-

The effluent from equalization tank is transferred to reaction cum settling tank and treating batch method by dosing of sodium hypochlorite, caustic soda, activated carbon powder maintaining pH 9.0 and the stirring would do for 1.5-2.0 hrs. The Polyelectrolyte dosing would carry out to build up the size of the floc. This stirring would do for 20-30 minutes. The retention time in reaction tank cum clarifier is around 2.0 hour. The effluent contains mostly soluble and colloidal impurities in soluble form will bring about the precipitation in insoluble form and settle at bottom of reaction cum settling tank. The insoluble settled sludge at the bottom of the reaction cum setting would be transferred to sludge holding tank. The supernatant will further treated by mixing into common para-3.

Common Treatment of Common Effluent (Above para-3)-

The effluent from rinsing & concentrate effluent generated from nickel plating, zinc plating, copper plating, etc . + Pretreatedpara1 + Pretreatedpara-2 treated as under.

The effluent treatment plant consists of the following units.

1. Equalization tank. – Other Stream
2. Batch type Reaction tank- 3 Nos
3. Flocculation Tank- 1No
4. Dosing tank- 6 Nos.
5. Tube settler-I-2 Nos
6. pH correction Tan-2 Nos
7. Aeration Tank (MBBR Tank-6 Nos)
8. Tube settler-II-3 Nos
9. Flash Mixer - 2No
10. Dosing tank- 3 Nos.
11. Tube settler-III
12. Sludge Slurry Collection Tank.
13. Filter Press
14. Dosing Pumps
15. Pumps for effluent transfer & Sludge transfer
16. Dual Media Filter
17. Adsorption Vessel
18. Softening plant
19. Metal Removal Filter

The effluent from equalization tank would be transferred to the reaction tank 3 nos for batch

treatment. The batch treated effluent after assuring that the metal concentrations are within the limit as per CPCB/UPPCB norms. This is batch treatment and after discharging from reaction tank is treated in continuous method.

The chemical dosing of alum and sulphuric acid is done to bring down pH at 4.0-4.5. The dosing of sodium hypo chloride use for oxidizing the impurities and activated carbon used to adsorb the impurities and also maintain free chlorine present into effluent. The suitable retention time i.e 30 minutes approximate is to be maintained for proper reaction.

The dosing of caustic soda and sodium sulphide enhanced the pH in to the alkaline range from pH 4.0-4.50 to pH 10.0 – 10.50. Since the effluent contains mostly iron, nickel, copper, zinc ions and other heavy metals in soluble form, the alkaline pH will bring about the precipitation in insoluble hydroxide. The lime is added for dosing here so that there is no adverse effect on the total dissolved solids during the treatment process. From reaction tank the effluent would pass through flocculation tank for the agglomeration of floc where requisite dosing of polyelectrolyte (flocculent) is done. The effluent enters into tube settler for separation of insoluble hydroxide and supernatant.

The three reaction tanks are working on the principle of batch cum continuous treatment, i.e. one tank under service condition, one tank under chemically reaction condition and one tank under effluent loading condition.

The clear effluent from the top of tube settler shall enter in aeration tank .The aeration zone is provided with diffused aeration system to oxidize the organic matter by activated sludge. The activated sludge in aeration zone is capable of converting most organic wastes to stable inorganic forms or to cellular mass. In this process, the soluble and colloidal organic material is metabolized by a diverse group of microorganisms to carbon dioxide and water. At the same time, a sizeable fraction of incoming organic matter is converted to cellular mass that can be separated from the effluent by settling.

The mixed liquor then flows into the tube settler II for biomass separation and MLSS is again recirculated again into aeration tank for maintaining MLSS level and excess sludge will transfer into sludge holding tank.

The supernatant from tube settler-II would transfer to again post physicochemical treatment system which is non-operational during treatment and comes operational when we found any impurities or turbidity in to secondary treated effluent.

The supernatant from tube settler- II enters into flash mixer-3 Nos with the help of pump where

the pH will bring down by sulphuric acid if required at 4.0-4.5, the dosing is carry by metering pump and then PH is enhanced in to the alkaline range from pH 4.0-4.50 to pH 9.0 – 9.50 with the addition of lime. Since the effluent contains mostly iron, nickel, copper ions and other heavy metals in soluble form, the alkaline pH will bring about the precipitation in insoluble hydroxide. The lime is added here so that there is no adverse effect on the total dissolved solids during the treatment process. From flash mixer the effluent would pass through flocculation tank for the agglomeration of floc where requisite dosing of polyelectrolyte (flocculent) id done. The effluent enters into tube settler for separation of insoluble hydroxide and supernatant.

collected into pump sump and feed into multi grade and adsorption column i.e. activated carbon filter for polishing purpose which would marginally reduce the pollution parameter like COD, BOD, iron contains and oil & grease etc and collected into pump sump.

The effluent pump sump and feed into softening plant for removal of hardness and into metal removal vessel for removal of heavy metal through ion exchange treatment. The treated collected into pump sump and feed into ultra filtration plan.

The settled sludge at the bottom of tube settler I & II would transfer to the sludge slurry collection tank and feed into filter press for sludge dewatering and filtrate will again transfer into equalization tank for father treatment.

The sludge cake from sludge drying beds having moisture approximate 30% would be disposed off as per the advice of authority

RECOVERY PLANT-

ULTRAFILTRATION WITH TWO STAGE REVERSE OSMOSIS PLANT

The treated effluent then passes through & ultra filtration @4M³/hour & 8 M³/Hour. The treated water after ultra filtration module are stored in the UF treated storage tank and pumped through the First Stage RO system through high pressure pump @ 10 M³/hour, anti-scalant dosing is provided in order to prevent scaling of membranes owing to the dissolved salts, and micron cartridge filter for fine filtration, wherein the total dissolved solids shall be reduced by the principle of Reverse Osmosis. The membrane system consists of an epoxy painted structural steel skid for mounting of high pressure FRP tubes with spiral wound membrane elements in tube and necessary control valves at feed, product & reject pipes provided with required instruments for safe & proper operation.

Low pressure Switch at the suction & high-pressure switch at the discharge is provided for safe operation of high-pressure pump under specified operating conditions. Pressure gauges, pressure switches, on-line flow indicator, conductivity indicator are provided for controlling desired flow rate & recovery. The product water shall be given a pH correction to be used.

Second Stage RO system through high pressure pump @ 5 M³/hour, the anti-scalant dosing is provided in order to prevent scaling of membranes owing to the dissolved salts, and micron cartridge filter for fine filtration, wherein the total dissolved solids shall be reduced by the principle of Reverse Osmosis. The membrane system consists of an epoxy painted structural steel skid for mounting of high pressure FRP tubes with spiral wound membrane elements in tube and necessary control valves at feed, product & reject pipes provided with required instruments for safe & proper operation.

Third Stage RO system through high pressure pump @ 3M³/hour, the anti-scalant dosing is provided in order to prevent scaling of membranes owing to the dissolved salts, and micron cartridge filter for fine filtration. where in the total dissolved solids shall be reduced by the principle of Reverse Osmosis. The membrane system consists of an epoxy painted structural steel skid for mounting of high pressure FRP tubes with spiral wound membrane elements in tube and necessary control valves at feed, product & reject pipes provided with required instruments for safe & proper operation.

- *RO RECOVERY- 90%*
- *REJECTION- 10%*

MULTI EFFECT EVAPORATOR WITH AGIATED THIN FILM DRYER:

The TDS of recovery is approximate 400-500ppm & TDS of rejection is approximate 20000 ppm 25000PPM feed into three multi effect evaporator and concentrated will feed into multi effect evaporator for recovery of balance water.

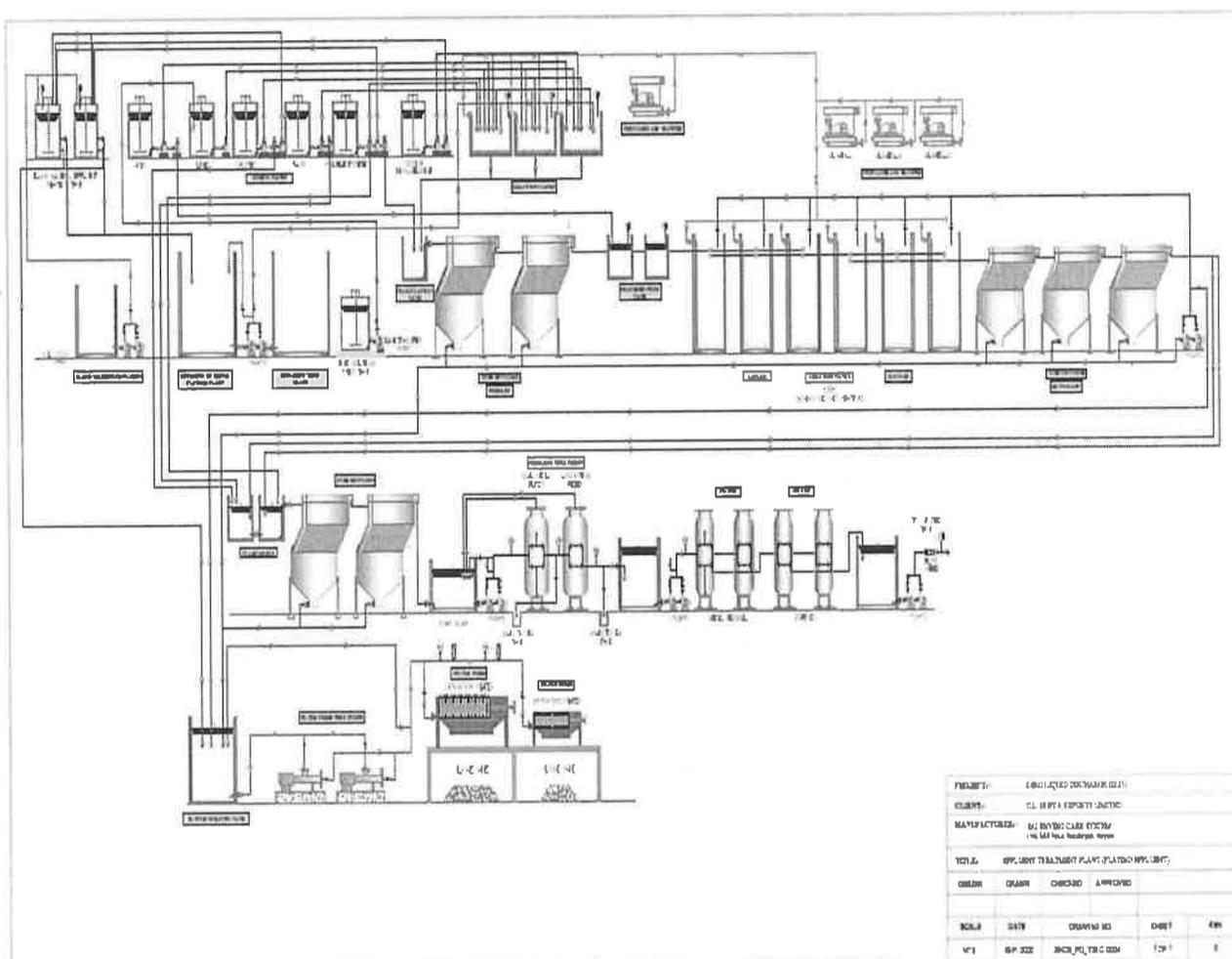
The condensate water will recycle again into process with RO permeate water. The salt containing moisture 10% would be disposed off as per the advice of authority.

Chemical list for Treatment with Ratio in Dosing Tank:

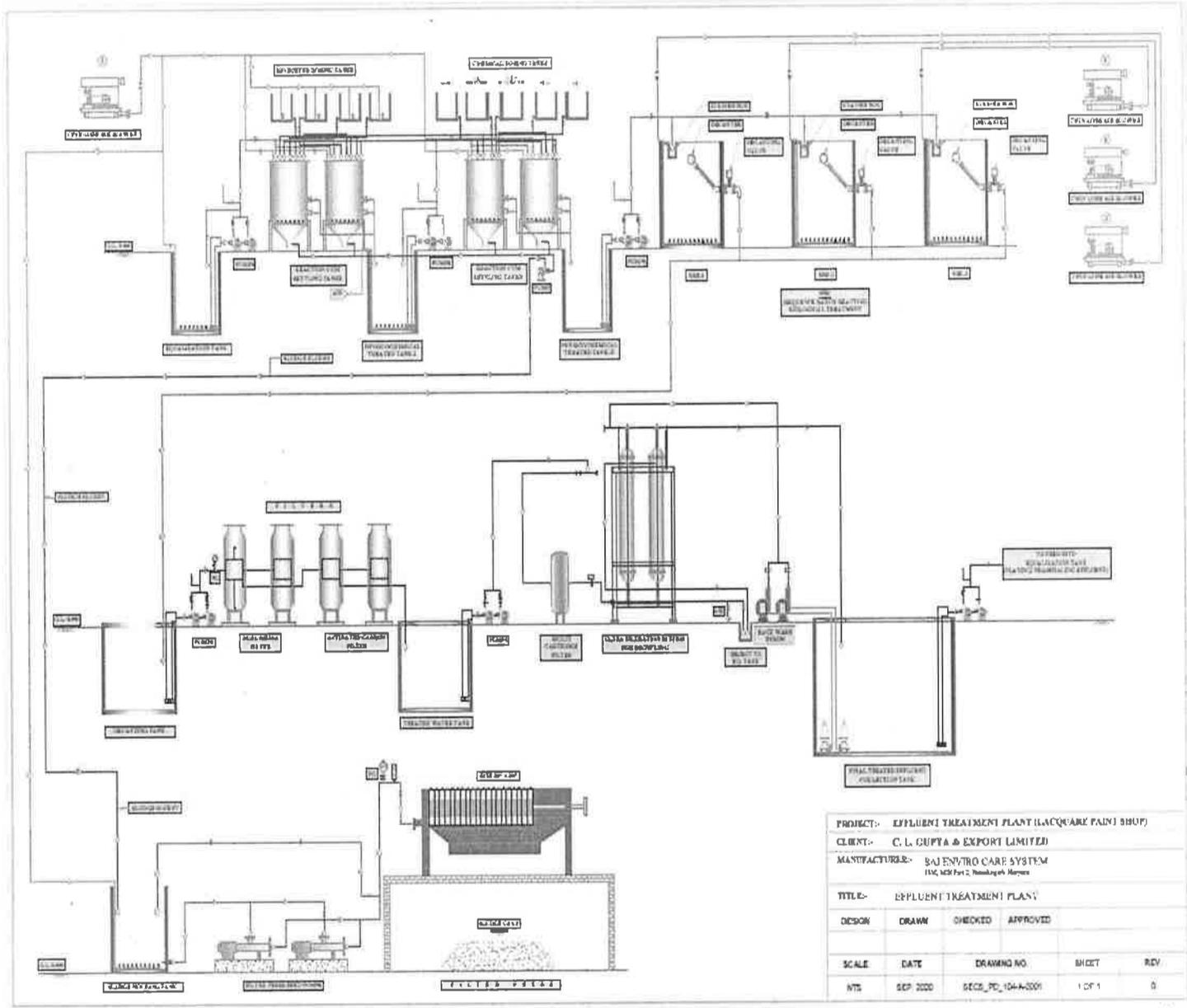
- Sodium Hypochlorite - 6% Solution
- Polyelectrolyte- 0.5% Solution
- Sulphuric Acid -10% Solution
- Sodium Sulphate--10% Solution
- Caustic Soda- 0.5%Solution

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- Lime Water- 5%Solution
- Activated carbon-200 gram per batch
- Ferric Chloride-5% Solution



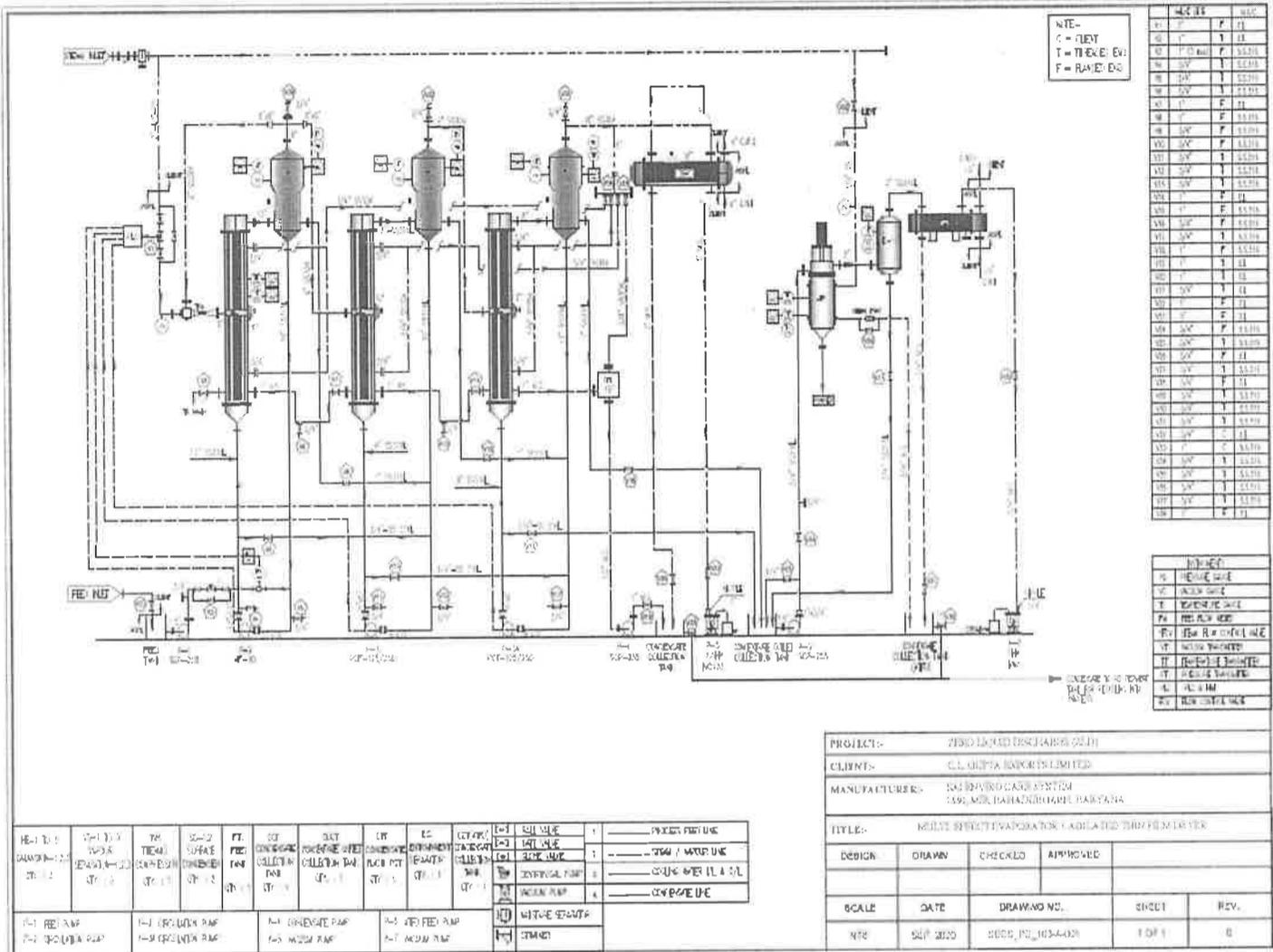
ETP Process Flow Diagram



PRE-ETP PROCESS FLOW DIAGRAM

PROJECT:- EFFLUENT TREATMENT PLANT (LACQUER PAINT SHOP)				
CLIENT:- C. L. GUPTA & EXPORT LIMITED				
MANUFACTURER:- SAJ ENVIRO CARE SYSTEM 15C, 15D, 15E, 15F, 15G, 15H, 15I, 15J, 15K, 15L, 15M, 15N, 15O, 15P, 15Q, 15R, 15S, 15T, 15U, 15V, 15W, 15X, 15Y, 15Z, 15AA, 15AB, 15AC, 15AD, 15AE, 15AF, 15AG, 15AH, 15AI, 15AJ, 15AK, 15AL, 15AM, 15AN, 15AO, 15AP, 15AQ, 15AR, 15AS, 15AT, 15AU, 15AV, 15AW, 15AX, 15AY, 15AZ, 15BA, 15BB, 15BC, 15BD, 15BE, 15BF, 15BG, 15BH, 15BI, 15BJ, 15BK, 15BL, 15BM, 15BN, 15BO, 15BP, 15BQ, 15BR, 15BS, 15BT, 15BU, 15BV, 15BW, 15BX, 15BY, 15BZ, 15CA, 15CB, 15CC, 15CD, 15CE, 15CF, 15CG, 15CH, 15CI, 15CJ, 15CK, 15CL, 15CM, 15CN, 15CO, 15CP, 15CQ, 15CR, 15CS, 15CT, 15CU, 15CV, 15CW, 15CX, 15CY, 15CZ, 15DA, 15DB, 15DC, 15DD, 15DE, 15DF, 15DG, 15DH, 15DI, 15DJ, 15DK, 15DL, 15DM, 15DN, 15DO, 15DP, 15DQ, 15DR, 15DS, 15DT, 15DU, 15DV, 15DW, 15DX, 15DY, 15DZ, 15EA, 15EB, 15EC, 15ED, 15EE, 15EF, 15EG, 15EH, 15EI, 15EJ, 15EK, 15EL, 15EM, 15EN, 15EO, 15EP, 15EQ, 15ER, 15ES, 15ET, 15EU, 15EV, 15EW, 15EX, 15EY, 15EZ, 15FA, 15FB, 15FC, 15FD, 15FE, 15FF, 15FG, 15FH, 15FI, 15FJ, 15FK, 15FL, 15FM, 15FN, 15FO, 15FP, 15FQ, 15FR, 15FS, 15FT, 15FU, 15FV, 15FW, 15FX, 15FY, 15FZ, 15GA, 15GB, 15GC, 15GD, 15GE, 15GF, 15GG, 15GH, 15GI, 15GJ, 15GK, 15GL, 15GM, 15GN, 15GO, 15GP, 15GQ, 15GR, 15GS, 15GT, 15GU, 15GV, 15GW, 15GX, 15GY, 15GZ, 15HA, 15HB, 15HC, 15HD, 15HE, 15HF, 15HG, 15HH, 15HI, 15HJ, 15HK, 15HL, 15HM, 15HN, 15HO, 15HP, 15HQ, 15HR, 15HS, 15HT, 15HU, 15HV, 15HW, 15HX, 15HY, 15HZ, 15IA, 15IB, 15IC, 15ID, 15IE, 15IF, 15IG, 15IH, 15II, 15IJ, 15IK, 15IL, 15IM, 15IN, 15IO, 15IP, 15IQ, 15IR, 15IS, 15IT, 15IU, 15IV, 15IW, 15IX, 15IY, 15IZ, 15JA, 15JB, 15JC, 15JD, 15JE, 15JF, 15JG, 15JH, 15JI, 15JJ, 15JK, 15JL, 15JM, 15JN, 15JO, 15JP, 15JQ, 15JR, 15JS, 15JT, 15JU, 15JV, 15JW, 15JX, 15JY, 15JZ, 15KA, 15KB, 15KC, 15KD, 15KE, 15KF, 15KG, 15KH, 15KI, 15KJ, 15KK, 15KL, 15KM, 15KN, 15KO, 15KP, 15KQ, 15KR, 15KS, 15KT, 15KU, 15KV, 15KW, 15KX, 15KY, 15KZ, 15LA, 15LB, 15LC, 15LD, 15LE, 15LF, 15LG, 15LH, 15LI, 15LJ, 15LK, 15LL, 15LM, 15LN, 15LO, 15LP, 15LQ, 15LR, 15LS, 15LT, 15LU, 15LV, 15LW, 15LX, 15LY, 15LZ, 15MA, 15MB, 15MC, 15MD, 15ME, 15MF, 15MG, 15MH, 15MI, 15MJ, 15MK, 15ML, 15MN, 15MO, 15MP, 15MQ, 15MR, 15MS, 15MT, 15MU, 15MV, 15MW, 15MX, 15MY, 15MZ, 15NA, 15NB, 15NC, 15ND, 15NE, 15NF, 15NG, 15NH, 15NI, 15NJ, 15NK, 15NL, 15NM, 15NO, 15NP, 15NQ, 15NR, 15NS, 15NT, 15NU, 15NV, 15NW, 15NX, 15NY, 15NZ, 15OA, 15OB, 15OC, 15OD, 15OE, 15OF, 15OG, 15OH, 15OI, 15OJ, 15OK, 15OL, 15OM, 15ON, 15OO, 15OP, 15OQ, 15OR, 15OS, 15OT, 15OU, 15OV, 15OW, 15OX, 15OY, 15OZ, 15PA, 15PB, 15PC, 15PD, 15PE, 15PF, 15PG, 15PH, 15PI, 15PJ, 15PK, 15PL, 15PM, 15PN, 15PO, 15PP, 15PQ, 15PR, 15PS, 15PT, 15PU, 15PV, 15PW, 15PX, 15PY, 15PZ, 15QA, 15QB, 15QC, 15QD, 15QE, 15QF, 15QG, 15QH, 15QI, 15QJ, 15QK, 15QL, 15QM, 15QN, 15QO, 15QP, 15QQ, 15QR, 15QS, 15QT, 15QU, 15QV, 15QW, 15QX, 15QY, 15QZ, 15RA, 15RB, 15RC, 15RD, 15RE, 15RF, 15RG, 15RH, 15RI, 15RJ, 15RK, 15RL, 15RM, 15RN, 15RO, 15RP, 15RQ, 15RR, 15RS, 15RT, 15RU, 15RV, 15RW, 15RX, 15RY, 15RZ, 15SA, 15SB, 15SC, 15SD, 15SE, 15SF, 15SG, 15SH, 15SI, 15SJ, 15SK, 15SL, 15SM, 15SN, 15SO, 15SP, 15SQ, 15SR, 15SS, 15ST, 15SU, 15SV, 15SW, 15SX, 15SY, 15SZ, 15TA, 15TB, 15TC, 15TD, 15TE, 15TF, 15TG, 15TH, 15TI, 15TJ, 15TK, 15TL, 15TM, 15TN, 15TO, 15TP, 15TQ, 15TR, 15TS, 15TT, 15TU, 15TV, 15TW, 15TX, 15TY, 15TZ, 15UA, 15UB, 15UC, 15UD, 15UE, 15UF, 15UG, 15UH, 15UI, 15UJ, 15UK, 15UL, 15UM, 15UN, 15UO, 15UP, 15UQ, 15UR, 15US, 15UT, 15UU, 15UV, 15UW, 15UX, 15UY, 15UZ, 15VA, 15VB, 15VC, 15VD, 15VE, 15VF, 15VG, 15VH, 15VI, 15VJ, 15VK, 15VL, 15VM, 15VN, 15VO, 15VP, 15VQ, 15VR, 15VS, 15VT, 15VU, 15VV, 15VW, 15VX, 15VY, 15VZ, 15WA, 15WB, 15WC, 15WD, 15WE, 15WF, 15WG, 15WH, 15WI, 15WJ, 15WK, 15WL, 15WM, 15WN, 15WO, 15WP, 15WQ, 15WR, 15WS, 15WT, 15WU, 15WV, 15WW, 15WX, 15WY, 15WZ, 15XA, 15XB, 15XC, 15XD, 15XE, 15XF, 15XG, 15XH, 15XI, 15XJ, 15XK, 15XL, 15XM, 15XN, 15XO, 15XP, 15XQ, 15XR, 15XS, 15XT, 15XU, 15XV, 15XW, 15XX, 15XY, 15XZ, 15YA, 15YB, 15YC, 15YD, 15YE, 15YF, 15YG, 15YH, 15YI, 15YJ, 15YK, 15YL, 15YM, 15YN, 15YO, 15YP, 15YQ, 15YR, 15YS, 15YT, 15YU, 15YV, 15YW, 15YX, 15YY, 15YZ, 15ZA, 15ZB, 15ZC, 15ZD, 15ZE, 15ZF, 15ZG, 15ZH, 15ZI, 15ZJ, 15ZK, 15ZL, 15ZM, 15ZN, 15ZO, 15ZP, 15ZQ, 15ZR, 15ZS, 15ZT, 15ZU, 15ZV, 15ZW, 15ZX, 15ZY, 15ZZ				
TITLE:- EFFLUENT TREATMENT PLANT				
DESIGN	DRAWN	CHECKED	APPROVED	
SCALE	DATE	DRAWING NO.	BHEET	REV.
NTS	SEP 2020	SECS_PD_104-A-0001	1 OF 1	0

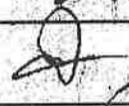
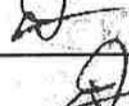
1684



MULTI EFFECT EVAPORATOR(MEE) PROCESSES FLOW DIAGRAM

**Table A2.1 : Flow Meter readings of Borewell # 3
March 2021**

1685

DATE	INITIAL READ	FINAL READING	WATER CONS	SIGNATURE	REMARK
01/03/21	32679	32768	89		
02/03/21	32768	32858	90		
03/03/21	32858	32947	89		
04/03/21	32947	33035	88		
05/03/21	33035	33126	91		
06/03/21	33126	33218	92		
07/03/21	33218	33256	38		
08/03/21	33256	33344	88		
09/03/21	33344	33434	90		
10/03/21	33434	33523	89		
11/03/21	33523	33611	88		
12/03/21	33611	33701	90		
13/03/21	33701	33792	91		
14/03/21	33792	33831	39		
15/03/21	33831	33922	91		
16/03/21	33922	34016	94		
17/03/21	34016	34115	99		
18/03/21	34115	34207	92		
19/03/21	34207	34297	90		
20/03/21	34297	34391	94		
21/03/21	34391	34428	37		
22/03/21	34428	34518	90		
23/03/21	34518	34611	93		
24/03/21	34611	34706	95		
25/03/21	34706	34798	92		
26/03/21	34798	34917	119		

**Table A2.2 : Flow Meter readings of Borewell # 4
March 2021**

1687

Date	Initial Reading	Final Reading	Water Cons. (KL)	Sign	Remarks
01/03/21	13612	13644	32	[Signature]	
02/03/21	13644	13679	35	[Signature]	
03/03/21	13679	13712	33	[Signature]	
04/03/21	13712	13747	35	[Signature]	
05/03/21	13747	13781	34	[Signature]	
06/03/21	13781	13817	36	[Signature]	
07/03/21	13817	13828	11	[Signature]	
08/03/21	13828	13863	35	[Signature]	
09/03/21	13863	13897	34	[Signature]	
10/03/21	13897	13929	32	[Signature]	
11/03/21	13929	13959	30	[Signature]	
12/03/21	13959	13994	35	[Signature]	
13/03/21	13994	14030	36	[Signature]	
14/03/21	14030	14039	9	[Signature]	
15/03/21	14039	14069	30	[Signature]	
16/03/21	14069	14100	31	[Signature]	
17/03/21	14100	14129	29	[Signature]	
18/03/21	14129	14161	32	[Signature]	
19/03/21	14161	14194	33	[Signature]	
20/03/21	14194	14229	35	[Signature]	
21/03/21	14229	14240	11	[Signature]	
22/03/21	14240	14272	32	[Signature]	
23/03/21	14272	14305	33	[Signature]	
24/03/21	14305	14335	30	[Signature]	
25/03/21	14335	14369	34	[Signature]	
26/03/21	14369	14402	33	[Signature]	

Table A2.3 : PRE TREATMENT WATER READING					
LOCATION		PRE E.T.P. INLET			
DATE	INITIAL READING	FINAL READING	CONSUMPTION (KL)	SIGNATURE	REMARK
01.03.21	1200.5	1220	19.5	<i>Sant</i>	
02.03.21	1220	1235	15.0	<i>Sant</i>	
03.03.21	1235	1251.6	16.6	<i>Sant</i>	
04.03.21	1251.6	1269.6	18.0	<i>Sant</i>	
05.03.21	1269.6	1290.6	21.0	<i>Sant</i>	
06.03.21	1290.6	1309.6	19.0	<i>Sant</i>	
07.03.21	— S	U N D A		Y —	—
08.03.21	1309.6	1326.1	16.5	<i>Sant</i>	
09.03.21	1326.1	1347.1	21.0	<i>Sant</i>	
10.03.21	1347.1	1364.6	17.5	<i>Sant</i>	
11.03.21	1364.6	1383.6	19.0	<i>Sant</i>	
12.03.21	1383.6	1403.6	20.0	<i>Sant</i>	
13.03.21	1403.6	1421.6	18.0	<i>Sant</i>	
14.03.21	—	S U	N D	A Y	—
15.03.21	1421.6	1444.6	23.0	<i>Sant</i>	
16.03.21	1444.6	1462.0	18.0	<i>Sant</i>	
17.03.21	1462.0	1483	21.0	<i>Sant</i>	
18.03.21	1483	1499.5	16.5	<i>Sant</i>	
19.03.21	1499.5	1517.5	18.0	<i>Sant</i>	
20.03.21	1517.5	1537.5	20	<i>Sant</i>	
21.03.21	—	S	U N D	Y	
22.03.21	1537.5	1554.5	17.0	<i>Sant</i>	
23.03.21	1554.5	1575.5	21.0	<i>Sant</i>	
24.03.21	1575.5	1592.5	17.0	<i>Sant</i>	
25.03.21	1592.5	1611.5	19.0	<i>Sant</i>	
26.03.21	1611.5	1627.5	16.0	<i>Sant</i>	
27.03.21	1627.5	1639.5	12.0	<i>Sant</i>	
28.03.21	— S	U N	D A	Y	
29.03.21	— H	O L I	—	—	
30.03.21	1639.5	1651	11.5	<i>Sant</i>	
31.03.21	1651	1664	13.0	<i>Sant</i>	

Table A2.4 : PRE TREATMENT WATER READING

LOCATION : PRE E.T.P. OUTLET					
DATE	INITIAL READING	FINAL READING	CONSUMPTION	SIGNATURE	REMARK
			(KL)		
01.03.21	1136.5	1155.5	19.0	<i>Sant</i>	
02.03.21	1155.5	1169.5	14.0	<i>Sant</i>	
03.03.21	1169.5	1185.5	16.0	<i>Sant</i>	
04.03.21	1185.5	1202.5	17.0	<i>Sant</i>	
05.03.21	1202.5	1222.5	20.0	<i>Sant</i>	
06.03.21	1222.5	1240.5	18.0	<i>Sant</i>	
07.03.21	— S	U N	D A Y	—	—
08.03.21	1240.5	1256.5	16.0	<i>Sant</i>	
09.03.21	1256.5	1276.5	20.0	<i>Sant</i>	
10.03.21	1276.5	1293.5	17.0	<i>Sant</i>	
11.03.21	1293.5	1311.5	18.0	<i>Sant</i>	
12.03.21	1311.5	1330.5	19.0	<i>Sant</i>	
13.03.21	1330.5	1347.5	17.0	<i>Sant</i>	
14.03.21	— S	U N	D A Y	—	—
15.03.21	1347.5	1369.5	22.0	<i>Sant</i>	
16.03.21	1369.5	1386.5	17.0	<i>Sant</i>	
17.03.21	1386.5	1406.5	20.0	<i>Sant</i>	
18.03.21	1406.5	1422.5	16.0	<i>Sant</i>	
19.03.21	1422.5	1439.5	17.0	<i>Sant</i>	
20.03.21	1439.5	1458.5	19.0	<i>Sant</i>	
21.03.21	—	S U	M D A Y	—	—
22.03.21	1458.5	1474.5	16.0	<i>Sant</i>	
23.03.21	1474.5	1494.5	20.0	<i>Sant</i>	
24.03.21	1494.5	1510.5	16.0	<i>Sant</i>	
25.03.21	1510.5	1528.5	18.0	<i>Sant</i>	
26.03.21	1528.5	1544.5	16.0	<i>Sant</i>	
27.03.21	1544.5	1556	11.5	<i>Sant</i>	
28.03.21	— S	U N	D A Y	—	—
29.03.21	—	H O L I	—	—	—
30.03.21	1556	1567	11.0	<i>Sant</i>	
31.03.21	1567	1579	12.0	<i>Sant</i>	

Table A2.5 : ETP Inlet Flow Meter

1691

Date	ETP Inlet Flow Meter			
	Initial Reading	Final Reading	Flow M ³ /day	Sign.
01.03.21	10736	10864	120.0	Sant
02.03.21	10864	10901	117.0	Sant
03.03.21	10901	11106	125.0	Sant
04.03.21	11106	11225	119.0	Sant
05.03.21	11225	11347	122.0	Sant
06.03.21	11347	11473	126.0	Sant
07.03.21	— S U N D A Y —			—
08.03.21	11473	11590	117.0	Sant
09.03.21	11590	11714	124	Sant
10.03.21	11714	11836	122	Sant
11.03.21	11836	11940	112	Sant
12.03.21	11940	12068	120	Sant
13.03.21	12068	12191	123	Sant
14.03.21	— S U N D A Y			—
15.03.21	12191	12310	119	Sant
16.03.21	12310	12432	122	Sant
17.03.21	12432	12557	125	Sant
18.03.21	12557	12674	117	Sant
19.03.21	12674	12792	110	Sant
20.03.21	12792	12921	129	Sant
21.03.21	— S U N D A Y			—
22.03.21	12921	13039	118	Sant
23.03.21	13039	13163	124	Sant
24.03.21	13163	13284	121	Sant
25.03.21	13284	13398	114	Sant
26.03.21	13398	13512	114	Sant
27.03.21	13512	13588	76	Sant
28.03.21	— S U N D A Y			—
29.03.21	— H O L I —			—
30.03.21	13588	13697	109	Sant
31.03.21	13697	13813	116	Sant

Table A2.6 : ETP Outlet Flow Meter

1692

Date	ETP Outlet Flow Meter			
	Initial Reading	Final Reading	Flow M ³ /day	Sign.
01.03.21	11040	11176	136	Sant
02.03.21	11176	11301	125	Sant
03.03.21	11301	11433	132	Sant
04.03.21	11433	11560	127	Sant
05.03.21	11560	11689	129	Sant
06.03.21	11689	11822	133	Sant
07.03.21	— S U	N D	A Y —	—
08.03.21	11822	11947	125	Sant
09.03.21	11947	12068	121	Sant
10.03.21	12068	12197	129	Sant
11.03.21	12197	12316	119	Sant
12.03.21	12316	12444	128	Sant
13.03.21	12444	12574	130	Sant
14.03.21	— S U	N D	A Y	—
15.03.21	12574	12701	127	Sant
16.03.21	12701	12820	119	Sant
17.03.21	12820	12952	132	Sant
18.03.21	12952	13076	124	Sant
19.03.21	13076	13202	126	Sant
20.03.21	13202	13338	136	Sant
21.03.21	— S U	N D	A Y —	—
22.03.21	13338	13464	126	Sant
23.03.21	13464	13595	131	Sant
24.03.21	13595	13724	129	Sant
25.03.21	13724	13846	122	Sant
26.03.21	13846	13967	121	Sant
27.03.21	13967	14052	85	Sant
28.03.21	— S	U N D	A Y	—
29.03.21	— H O	L I —	—	—
30.03.21	14052	14160	116	Sant
31.03.21	14160	14291	123	Sant

Table A2.7 : UF-1 Inlet Meter Record

1693

UF-1 Inlet Meter Record					
Date	Initial Reading	Final Reading	Consumption	Signature	Remarks
			Unit (KL)		
11/3/21	2225.1	2266.4	41.3		
21/3/21	2266.4	2304.4	38.0		
31/3/21	2304.4	2344.7	40.3		
4/3/21	2344.7	2382.5	37.8		
5/3/21	2382.5	2421.5	39.0		
6/3/21	2421.5	2461.3	39.8		
7/3/21	← S	U M	▷	A Y	→
8/3/21	2461.3	2499.6	38.3		
9/3/21	2499.6	2536.9	37.3		
10/3/21	2536.9	2575.7	38.8		
11/3/21	2575.7	2611.5	35.8		
12/3/21	2611.5	2650.8	39.3		
13/3/21	2650.8	2690.1	39.3		
14/3/21	← S	U	N ▷	A	Y →
15/3/21	2690.1	2728.4	38.3		
16/3/21	2728.4	2765.4	37.0		
17/3/21	2765.4	2804.7	39.3		
18/3/21	2804.7	2842.7	38.0		
19/3/21	2842.7	2880.9	38.3		
20/3/21	2880.9	2922.2	41.3		
21/3/21	← S	V	N ▷	A	Y →
22/3/21	2922.2	2960.2	38.0		
23/3/21	2960.2	3000.0	39.8		
24/3/21	3000.0	3039.0	39.0		
25/3/21	3039.0	3075.8	36.8		
26/3/21	3075.8	3113.1	37.3		
27/3/21	3113.1	3138.9	25.8		
28/3/21	← S	V	N ▷	A	Y →
29/3/21	← H	O L	I ▷	A	Y →
30/3/21	3138.9	3174.2	35.3		
31/3/21	3174.2	3212.0	37.8		

Table A2.8 : UF-1 Outlet Meter Record

1694

UF-1 Outlet Meter Record					
Date	Initial Reading	Final Reading	Consumption	Signature	Remarks
			Unit (KL)		
11/3/21	1996.8	2033.9	37.1		
21/3/21	2033.9	2068.1	34.2		
31/3/21	2068.1	2104.3	36.2		
41/3/21	2104.3	2138.3	34.0		
51/3/21	2138.3	2173.4	35.1		
61/3/21	2173.4	2209.2	35.8		
71/3/21	← S U N		D	A Y	→
81/3/21	2209.2	2243.6	34.4		
91/3/21	2243.6	2277.1	33.5		
10/3/21	2277.1	2312.0	34.9		
11/3/21	2312.0	2344.2	32.2		
12/3/21	2344.2	2379.5	35.3		
13/3/21	2379.5	2414.8	35.3		
14/3/21	← S U N		D	A Y	→
15/3/21	2414.8	2449.2	34.4		
16/3/21	2449.2	2482.5	33.3		
17/3/21	2482.5	2517.8	35.3		
18/3/21	2517.8	2552.0	34.2		
19/3/21	2552.0	2586.4	34.4		
20/3/21	2586.4	2623.5	37.1		
21/3/21	← S U N		D	A Y	→
22/3/21	2623.5	2657.7	34.2		
23/3/21	2657.7	2693.5	35.8		
24/3/21	2693.5	2728.6	35.1		
25/3/21	2728.6	2761.7	33.1		
26/3/21	2761.7	2795.2	33.5		
27/3/21	2795.2	2818.4	23.2		
28/3/21	← S U N		D	A Y	→
29/3/21	← H O L I		D	A Y	→
30/3/21	2818.4	2850.1	31.7		
31/3/21	2850.1	2884.1	34.0		

Table A2.9 : UF-2 Inlet Meter Record

1695

UF-2 Inlet Meter Record					
Date	Initial Reading	Final Reading	Consumption	Signature	Remarks
			Unit (KL)		
11/3/21	6698.4	6822.2	123.8	<i>[Signature]</i>	
21/3/21	6822.2	6936.2	114.0	<i>[Signature]</i>	
31/3/21	6936.2	7057.0	120.8	<i>[Signature]</i>	
4/3/21	7057.0	7170.3	113.3	<i>[Signature]</i>	
5/3/21	7170.3	7287.3	117.0	<i>[Signature]</i>	
6/3/21	7287.3	7406.6	119.3	<i>[Signature]</i>	
7/3/21	← S	U	N D	A	Y →
8/3/21	7406.6	7521.4	114.8	<i>[Signature]</i>	
9/3/21	7521.4	7630.9	109.5	<i>[Signature]</i>	
10/3/21	7630.9	7747.2	116.3	<i>[Signature]</i>	
11/3/21	7747.2	7854.5	107.3	<i>[Signature]</i>	
12/3/21	7854.5	7972.3	117.8	<i>[Signature]</i>	
13/3/21	7972.3	8090.1	117.8	<i>[Signature]</i>	
14/3/21	← S	U	N D	A	Y →
15/3/21	8090.1	8204.9	114.8	<i>[Signature]</i>	
16/3/21	8204.9	8315.9	111.0	<i>[Signature]</i>	
17/3/21	8315.9	8433.7	117.8	<i>[Signature]</i>	
18/3/21	8433.7	8547.7	114.0	<i>[Signature]</i>	
19/3/21	8547.7	8662.5	114.8	<i>[Signature]</i>	
20/3/21	8662.5	8786.3	123.8	<i>[Signature]</i>	
21/3/21	← S	U	N D	A	Y →
22/3/21	8786.3	8900.3	114.0	<i>[Signature]</i>	
23/3/21	8900.3	9019.6	119.3	<i>[Signature]</i>	
24/3/21	9019.6	9136.6	117.0	<i>[Signature]</i>	
25/3/21	9136.6	9246.9	110.3	<i>[Signature]</i>	
26/3/21	9246.9	9358.7	111.8	<i>[Signature]</i>	
27/3/21	9358.7	9436.0	77.3	<i>[Signature]</i>	
28/3/21	← S	U	N D	A	Y →
29/3/21	← H	O L	I D	A	Y →
30/3/21	9436.0	9541.8	105.8	<i>[Signature]</i>	
31/3/21	9541.8	9655.1	113.3	<i>[Signature]</i>	

Table A2.10 : UF-2 Outlet Meter Record

1696

UF-2 Outlet Meter Record					
Date	Initial Reading	Final Reading	Consumption	Signature	Remarks
			Unit (KL)		
11/3/21	6255.9	6373.5	117.6		
21/3/21	6373.5	6481.8	108.3		
31/3/21	6481.8	6596.5	114.7		
4/1/3/21	6596.5	6704.1	107.6		
5/1/3/21	6704.1	6815.3	111.2		
6/1/3/21	6815.3	6928.5	113.2		
7/1/3/21	← S	U M	∇	A Y →	
8/1/3/21	6928.5	7037.5	109.0		
9/1/3/21	7037.5	7143.7	106.2		
10/1/3/21	7143.7	7254.1	110.4		
11/1/3/21	7254.1	7356.0	101.9		
12/1/3/21	7356.0	7467.9	111.9		
13/1/3/21	7467.9	7579.8	111.9		
14/1/3/21	← S	U M	∇	A Y →	
15/1/3/21	7579.8	7688.8	109.0		
16/1/3/21	7688.8	7794.3	105.5		
17/1/3/21	7794.3	7906.2	111.9		
18/1/3/21	7906.2	8014.5	108.3		
19/1/3/21	8014.5	8123.5	109.0		
20/1/3/21	8123.5	8241.1	117.6		
21/1/3/21	← S	U M	∇	A Y →	
22/1/3/21	8241.1	8349.4	108.3		
23/1/3/21	8349.4	8462.7	113.3		
24/1/3/21	8462.7	8573.9	111.2		
25/1/3/21	8573.9	8678.6	104.7		
26/1/3/21	8678.6	8784.8	106.2		
27/1/3/21	8784.8	8857.4	72.6		
28/1/3/21	← S	U M	∇	A Y →	
29/1/3/21	← H	O L	I ∇	A Y →	
30/1/3/21	8857.4	8957.9	100.5		
31/1/3/21	8957.9	9065.5	107.6		

Table A2.11 : RO Feed Meter Record

1697

RO Feed Meter Record					
Date	Initial Reading	Final Reading	Consumption	Signature	Remarks
			Unit (KL)		
11/3/21	8255.7	8410.7	155		
21/3/21	8410.7	8553.7	143		
31/3/21	8553.7	8704.7	151		
4/3/21	8704.7	8846.7	142		
5/3/21	8846.7	8992.7	146		
6/3/21	8992.7	9141.7	149		
7/3/21	← S	V M D	A Y	→	
8/3/21	9141.7	9284.7	143		
9/3/21	9284.7	9424.7	140		
10/3/21	9424.7	9569.7	145		
11/3/21	9569.7	9703.7	134		
12/3/21	9703.7	9850.7	147		
13/3/21	9850.7	9997.7	147		
14/3/21	← S	V M D	A Y	→	
15/3/21	9997.7	10141.1	143.4		
16/3/21	10141.1	10279.9	138.8		
17/3/21	10279.9	10427.1	147.2		
18/3/21	10427.1	10570.1	143		
19/3/21	10570.1	10713.1	143		
20/3/21	10713.1	10868.1	155		
21/3/21	← S	V M D	A Y	→	
22/3/21	10868.1	11011.1	143		
23/3/21	11011.1	11160.1	149		
24/3/21	11160.1	11306.1	146		
25/3/21	11306.1	11444.1	138		
26/3/21	11444.1	11584.4	140.3		
27/3/21	11584.4	11680.4	96.0		
28/3/21	← S	V M D	A Y	→	
29/3/21	← H O L I	D A	Y	→	
30/3/21	11680.4	11812.4	132		
31/3/21	11812.4	11954.4	142		

Table A2.12 : RO-1 Permeate Meter Record

1698

RO-1 Permeate Meter Record					
Date	Initial Reading	Final Reading	Consumption	Signature	Remarks
			Unit (KL)		
1/3/21	5432	5536	104		
2/3/21	5536	5632	96		
3/3/21	5632	5733	101		
4/3/21	5733	5828	95		
5/3/21	5828	5926	98		
6/3/21	5926	6026	100		
7/3/21	← S	U	N ▽	A Y →	
8/3/21	6026	6122	96		
9/3/21	6122	6216	94		
10/3/21	6216	6313	97		
11/3/21	6313	6403	90		
12/3/21	6403	6501	98		
13/3/21	6501	6599	98		
14/3/21	← S	U	N ▽	A Y →	
15/3/21	6599	6695	96		
16/3/21	6695	6788	93		
17/3/21	6788	6886	98		
18/3/21	6886	6982	96		
19/3/21	6982	7078	96		
20/3/21	7078	7182	104		
21/3/21	← S	U	N ▽	A Y →	
22/3/21	7182	7278	96		
23/3/21	7278	7378	100		
24/3/21	7378	7476	98		
25/3/21	7476	7568	92		
26/3/21	7568	7662	94		
27/3/21	7662	7727	65.0		
28/3/21	← S	U	N ▽	A Y →	
29/3/21	← H	O L	I ▽	A Y →	
30/3/21	7727	7815	88		
31/3/21	7815	7910	95		

Table A2.13 : RO-2 Permeate Meter Record

1699

RO-2 Permeate Meter Record					
Date	Initial Reading	Final Reading	Consumption	Signature	Remarks
			Unit (KL)		
11/3/21	1372	1396	24		
21/3/21	1396	1418	22		
31/3/21	1418	1441	23		
4/3/21	1441	1463	22		
5/3/21	1463	1486	23		
6/3/21	1486	1509	23		
7/3/21	← S	U M	D	A Y	→
8/3/21	1509	1531	22		
9/3/21	1531	1553	22		
10/3/21	1553	1575	22		
11/3/21	1575	1596	21		
12/3/21	1596	1619	23		
13/3/21	1619	1642	23		
14/3/21	← S	U M	D	A Y	→
15/3/21	1642	1664	22		
16/3/21	1664	1685	21		
17/3/21	1685	1708	23		
18/3/21	1708	1730	22		
19/3/21	1730	1752	22		
20/3/21	1752	1776	24		
21/3/21	← S	U M	D	A	Y →
22/3/21	1776	1798	22		
23/3/21	1798	1821	23		
24/3/21	1821	1844	23		
25/3/21	1844	1865	21		
26/3/21	1865	1887	22		
27/3/21	1887	1902	15		
28/3/21	← S	U M	D	A Y	→
29/3/21	← H	O L I	D	A Y	→
30/3/21	1902	1922	20		
31/3/21	1922	1944	22		

Table A2.14 : RO-3 Permeate Meter Record

1700

RO-3 Permeate Meter Record					
Date	Initial Reading	Final Reading	Consumption	Signature	Remarks
			Unit (KL)		
11/3/21	592	602.8	10.8	[Signature]	
2/3/21	602.8	612.7	9.9	[Signature]	
3/3/21	612.7	623.1	10.4	[Signature]	
4/3/21	623.1	633.0	9.9	[Signature]	
5/3/21	633.0	643.4	10.4	[Signature]	
6/3/21	643.4	653.8	10.4	[Signature]	
7/3/21	←	S U	N D	A	Y →
8/3/21	653.8	663.7	9.9	[Signature]	
9/3/21	663.7	673.6	9.9	[Signature]	
10/3/21	673.6	683.5	9.9	[Signature]	
11/3/21	683.5	693.0	9.5	[Signature]	
12/3/21	693.0	703.4	10.4	[Signature]	
13/3/21	703.4	713.8	10.4	[Signature]	
14/3/21	←	S U	N D	A	Y →
15/3/21	713.8	723.7	9.9	[Signature]	
16/3/21	723.7	733.2	9.5	[Signature]	
17/3/21	733.2	743.6	10.4	[Signature]	
18/3/21	743.6	753.5	9.9	[Signature]	
19/3/21	753.5	763.4	9.9	[Signature]	
20/3/21	763.4	774.2	10.8	[Signature]	
21/3/21	←	S U	N D	A	Y →
22/3/21	774.2	784.1	9.9	[Signature]	
23/3/21	784.1	794.5	10.4	[Signature]	
24/3/21	794.5	804.9	10.4	[Signature]	
25/3/21	804.9	814.4	9.5	[Signature]	
26/3/21	814.4	824.3	9.9	[Signature]	
27/3/21	824.3	831.3	7.0	[Signature]	
28/3/21	←	S U	N D	A	Y →
29/3/21	←	H O L I	D	A	Y →
30/3/21	831.3	840.3	9.0	[Signature]	
31/3/21	840.3	850.3	10.0	[Signature]	

Table A2.15 : Condensate Meter Record

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Condensate Meter Record					
Date	Initial Reading	Final Reading	Consumption	Signature	Remarks
			Unit (KL)		
11/3/21	1045.6	1045.1	19.5	[Signature]	
21/3/21	1045.1	1063.3	18.2	[Signature]	
31/3/21	1063.3	1084.0	20.7	[Signature]	
4/3/21	1084.0	1102.2	18.2	[Signature]	
5/3/21	1102.2	1120.5	18.3	[Signature]	
6/3/21	1120.5	1139.9	19.4	[Signature]	
7/3/21	← S	U N	▷ A	Y →	
8/3/21	1139.9	1158.1	18.2	[Signature]	
9/3/21	1158.1	1176.3	18.2	[Signature]	
10/3/21	1176.3	1195.7	19.4	[Signature]	
11/3/21	1195.7	1212.6	16.9	[Signature]	
12/3/21	1212.6	1232.0	19.4	[Signature]	
13/3/21	1232.0	1251.4	19.4	[Signature]	
14/3/21	← S	U N	▷ A	Y →	
15/3/21	1251.4	1269.7	18.3	[Signature]	
16/3/21	1269.7	1289.2	19.5	[Signature]	
17/3/21	1289.2	1308.7	19.5	[Signature]	
18/3/21	1308.7	1327.0	18.3	[Signature]	
19/3/21	1327.0	1345.3	18.3	[Signature]	
20/3/21	1345.3	1364.8	19.5	[Signature]	
21/3/21	← S	S U	N ▷	A Y →	
22/3/21	1364.8	1382.4	17.6	[Signature]	
23/3/21	1382.4	1400.7	18.3	[Signature]	
24/3/21	1400.7	1418.3	17.6	[Signature]	
25/3/21	1418.3	1436.6	18.3	[Signature]	
26/3/21	1436.6	1453.2	16.6	[Signature]	
27/3/21	1453.2	1465.4	12.2	[Signature]	
28/3/21	← S	U N	▷ A	Y →	
29/3/21	← M	O L I	D	A Y →	
30/3/21	1465.4	1483	17.6	[Signature]	
31/3/21	1483	1500.89	17.89	[Signature]	

Table A2.16 : ETP-RO Water Recycled in Metal Division

Metal				
Date	Initial Reading	Final Reading	Consumption (KL)	Signature
1/3/21	4893	4956	63.0	
2/3/21	4956	5014	58	
3/3/21	5014	5076	62	
4/3/21	5076	5134	58	
5/3/21	5134	5194	60	
6/3/21	5194	5255	61	
7/3/21	← S U	M D	A Y	→
8/3/21	5255	5313	58	
9/3/21	5313	5370	57	
10/3/21	5370	5429	59	
11/3/21	5429	5484	55	
12/3/21	5484	5544	60	
13/3/21	5544	5604	60	
14/3/21	← S U	M D	A Y	→
15/3/21	5604	5662	58	
16/3/21	5662	5719	57	
17/3/21	5719	5779	60	
18/3/21	5779	5837	58	
19/3/21	5837	5895	58	
20/3/21	5895	5958	63	
21/3/21	← S U	M D	A Y	→
22/3/21	5958	6016	58	
23/3/21	6016	6077	61	
24/3/21	6077	6137	60	
25/3/21	6137	6193	56	
26/3/21	6193	6250	57	
27/3/21	6250	6285	35	
28/3/21	← S U	M D	A Y	→
29/3/21	← H O	L I	A Y	→
30/3/21	6285	6337	52	
31/3/21	6337	6396	59	

Table A2.17 : ETP-RO Water Recycled in Glass Division

Glass				
Date	Initial Reading	Final Reading	Consumption (KL)	Signature
11/3/21	7061	7145	84	
21/3/21	7145	7222	77	
31/3/21	7222	7304	82	
4/3/21	7304	7381	77	
5/3/21	7381	7461	80	
6/3/21	7461	7542	81	
7/3/21	← S U N D A Y →			
8/3/21	7542	7619	77	
9/3/21	7619	7695	76	
10/3/21	7695	7773	78	
11/3/21	7773	7846	73	
12/3/21	7846	7926	80	
13/3/21	7926	8006	80	
14/3/21	← S U N D A Y →			
15/3/21	8006	8083	77	
16/3/21	8083	8159	76	
17/3/21	8159	8239	80	
18/3/21	8239	8316	77	
19/3/21	8316	8393	77	
20/3/21	8393	8477	84	
21/3/21	← S U N D A Y →			
22/3/21	8477	8554	77	
23/3/21	8554	8635	81	
24/3/21	8635	8714	79	
25/3/21	8714	8789	75	
26/3/21	8789	8864	75	
27/3/21	8864	8921	57	
28/3/21	← S U N D A Y →			
29/3/21	← M O L I D A Y →			
30/3/21	8921	8994	73	
31/3/21	8994	9072	78	

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Table A2.18 : ETP-RO Water Recycled in Boiler Feed Division

DATE	INITIAL READING	FINAL READING	CONSUMPTION	SIGNATURE
1-3-21	449	466	17	(Sig)
2-3-21	466	482	16	(Sig)
3-3-21	482	497	15	(Sig)
4-3-21	497	513	16	(Sig)
5-3-21	513	527	14	(Sig)
6-3-21	527	544	17	(Sig)
7-3-21	544	560	16	-
8-3-21	560	576	16	(Sig)
9-3-21	576	594	18	(Sig)
10-3-21	594	609	15	(Sig)
11-3-21	609	623	14	(Sig)
12-3-21	623	638	15	(Sig)
13-3-21	638	654	16	(Sig)
14-3-21	654	671	17	-
15-3-21	671	687	16	(Sig)
16-3-21	687	703	16	(Sig)
17-3-21	703	719	16	(Sig)
18-3-21	719	734	15	(Sig)
19-3-21	734	749	15	(Sig)
20-3-21	749	764	15	(Sig)
21-3-21	764	780	16	-
22-3-21	780	795	15	(Sig)
23-3-21	795	811	16	(Sig)
24-3-21	811	826	15	(Sig)
25-3-21	826	842	16	(Sig)
26-3-21	842	857	15	(Sig)
27-3-21	857	873	16	(Sig)
28-3-21	873	873	0	-
29-3-21	873	873	0	-
30-3-21	873	889	16	(Sig)
31-3-21	889	906	17	(Sig)

Table A2.19 : ETP-RO Water Recycled in Wood Division

Date	Initial Reading	Final Reading	(KL)	Signature
1/3/21	747	756	9.0	<i>[Signature]</i>
2/3/21	756	764	8.0	<i>[Signature]</i>
3/3/21	764	773	9.0	<i>[Signature]</i>
4/3/21	773	781	8.0	<i>[Signature]</i>
5/3/21	781	791	10.0	<i>[Signature]</i>
6/3/21	791	799	8.0	<i>[Signature]</i>
7/3/21	← S U N D	A Y →		
8/3/21	799	807	8.0	<i>[Signature]</i>
9/3/21	807	815	8.0	<i>[Signature]</i>
10/3/21	815	825	10.0	<i>[Signature]</i>
11/3/21	825	834	9.0	<i>[Signature]</i>
12/3/21	834	842	8.0	<i>[Signature]</i>
13/3/21	842	852	10.0	<i>[Signature]</i>
14/3/21	← S U N D	A Y →		
15/3/21	852	860	8.0	<i>[Signature]</i>
16/3/21	860	869	9.0	<i>[Signature]</i>
17/3/21	869	877	8.0	<i>[Signature]</i>
18/3/21	877	886	9.0	<i>[Signature]</i>
19/3/21	886	894	8.0	<i>[Signature]</i>
20/3/21	894	904	10.0	<i>[Signature]</i>
21/3/21	← S U N D	A Y →		
22/3/21	904	912	8.0	<i>[Signature]</i>
23/3/21	912	922	10.0	<i>[Signature]</i>
24/3/21	922	931	9.0	<i>[Signature]</i>
25/3/21	931	939	8.0	<i>[Signature]</i>
26/3/21	939	948	9.0	<i>[Signature]</i>
27/3/21	948	951	3.0	<i>[Signature]</i>
28/3/21	← S U N D	A Y →		
29/3/21	← H O L I D	A Y →		
30/3/21	951	954	3	<i>[Signature]</i>
31/3/21	954	958	4	<i>[Signature]</i>

Table A2.20 : ETP-RO Water Recycled in Corrugation Division

Corrugation				
Date	Initial Reading	Final Reading	Consumption (KL)	Signature
1/3/21	40.5	42.5	2.0	
2/3/21	42.5	43.5	1.0	
3/3/21	43.5	45.5	2.0	
4/3/21	45.5	46.5	1.0	
5/3/21	48.5	48.5	2.0	
6/3/21	48.5	50.5	2.0	
7/3/21	← S	U N D	A Y	→
8/3/21	50.5	51.5	1.0	
9/3/21	51.5	52.5	1.0	
10/3/21	52.5	53.5	1.0	
11/3/21	53.5	54.5	1.0	
12/3/21	54.5	56.5	2.0	
13/3/21	56.5	58.5	2.0	
14/3/21	← S	U N D	A Y	→
15/3/21	58.5	60.5	2.0	
16/3/21	60.5	61.5	1.0	
17/3/21	61.5	62.5	2.0	
18/3/21	62.5	64.5	2.0	
19/3/21	64.5	65.5	1.0	
20/3/21	65.5	67.5	2.0	
21/3/21	← S	U N D	A Y	→
22/3/21	67.5	68.5	1.0	
23/3/21	68.5	70.5	2.0	
24/3/21	70.5	72.5	2.0	
25/3/21	72.5	73.5	1.0	
26/3/21	73.5	75.5	2.0	
27/3/21	75.5	77.5	2.0	
28/3/21	← S	U N D	A Y	→
29/3/21	← H	O L I	D A	Y →
30/3/21	77.5	79.5	2.0	
31/3/21	79.5	81.5	2.0	

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Table A2.21 : STP Inlet Record

Date	Initial Reading	Final Reading	Consumption	Signature	Remarks
			(KL)		
01.03.21	28913	29061	148	Rajul	
02.03.21	29061	29215	154	Rajul	
03.03.21	29215	29359	144	Rajul	
04.03.21	29359	29508	149	Rajul	
05.03.21	29508	29659	151	Rajul	
06.03.21	29659	29806	147	Rajul	
07.03.21	29806	29860	54	-	
08.03.21	29860	30011	151	Rajul	
09.03.21	30011	30159	148	Rajul	
10.03.21	30159	30306	147	Rajul	
11.03.21	30306	30450	144	Rajul	
12.03.21	30450	30597	147	Rajul	
13.03.21	30597	30737	140	Rajul	
14.03.21	30737	30790	53		
15.03.21	30790	30928	138	Rajul	
16.03.21	30928	31075	147	Rajul	
17.03.21	31075	31226	151	Rajul	
18.03.21	31226	31372	146	Rajul	
19.03.21	31372	31518	146	Rajul	
20.03.21	31518	31667	149	Rajul	
21.03.21	31667	31717	50	-	
22.03.21	31717	31864	147	Rajul	
23.03.21	31864	32004	140	Rajul	
24.03.21	32004	32148	144	Rajul	
25.03.21	32148	32284	136	Rajul	
26.03.21	32284	32420	136	Rajul	
27.03.21	32420	32546	126	Rajul	
28.03.21	32546	32594	48	-	
29.03.21	32594	32649	55	-	
30.03.21	32649	32780	131	Rajul	
31.03.21	32780	32925	145	Rajul	

Table A2.22 : STP Outlet Record

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Date	Initial Reading	Final Reading	Consumption	Signature	Remarks
			(KL)		
01.03.2021	28308	28452	144	(Rajul)	
02.03.21	28452	28601	149	(Rajul)	
03.03.21	28601	28752	151	(Rajul)	
04.03.21	28752	28898	146	(Rajul)	
05.03.21	28898	29043	145	(Rajul)	
06.03.21	29043	29187	144	(Rajul)	
07.03.21	29187	29238	51	-	
08.03.21	29238	29385	147	(Rajul)	
09.03.21	29385	29528	143	(Rajul)	
10.03.21	29528	29675	147	(Rajul)	
11.03.21	29675	29816	141	(Rajul)	
12.03.21	29816	29957	141	(Rajul)	
13.03.21	29957	30093	136	(Rajul)	
14.03.21	30093	30142	49		
15.03.21	30142	30277	135	(Rajul)	
16.03.21	30277	30420	143	(Rajul)	
17.03.21	30420	30565	145	(Rajul)	
18.03.21	30565	30708	143	(Rajul)	
19.03.21	30708	30851	143	(Rajul)	
20.03.21	30851	30995	144	(Rajul)	
21.03.21	30995	31042	47	-	
22.03.21	31042	31188	146	(Rajul)	
23.03.21	31188	31333	145	(Rajul)	
24.03.21	31333	31474	141	(Rajul)	
25.03.21	31474	31615	141	(Rajul)	
26.03.21	31615	31755	140	(Rajul)	
27.03.21	31755	31879	124	(Rajul)	
28.03.21	31879	31928	49	-	
29.03.21	31928	31981	53	-	
30.03.21	31981	32109	128	(Rajul)	
31.03.21	32109	32253	144	(Rajul)	

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Table A2.23 : Recycled water Consumption in Metal Division

Location: Metal Div.		Recycled Water Consumption Data			
Date	Initial Reading	Final Reading	Consumption (KL)	Signature	Remarks
01-03-21	6796	6827	31	Rey L	
02-03-21	6827	6853	26	Rey L	
03-03-21	6853	6882	29	Rey L	
04-03-21	6882	6909	27	Rey L	
05-03-21	6909	6939	30	Rey L	
06-03-21	6939	6970	31	Rey L	
07-03-21	6970	6970	00	-	
08-03-21	6970	6999	29	Rey L	
09-03-21	6999	7028	29	Rey L	
10-03-21	7028	7059	31	Rey L	
11-03-21	7059	7084	25	Rey L	
12-03-21	7084	7115	31	Rey L	
13-03-21	7115	7142	27	Rey L	
14-03-21	7142	7142	00	-	
15-03-21	7142	7168	26	Rey L	
16-03-21	7168	7199	31	Rey L	
17-03-21	7199	7228	29	Rey L	
18-03-21	7228	7256	28	Rey L	
19-03-21	7256	7283	27	Rey L	
20-03-21	7283	7309	26	Rey L	
21-03-21	7309	7309	00	-	
22-03-21	7309	7340	31	Rey L	
23-03-21	7340	7369	29	Rey L	
24-03-21	7369	7397	28	Rey L	
25-03-21	7397	7427	30	Rey L	
26-03-21	7427	7456	29	Rey L	
27-03-21	7456	7481	25	Rey L	
28-03-21	7481	7481	00	-	
29-03-21	7481	7481	00	-	
30-03-21	7481	7510	29	Rey L	
31-03-21	7510	7539	29	Rey L	

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**Table A2.24 : Recycled water Consumption in
Glass Division**

Location: GLASS DIV.			Recycled Water Consumption Details		
Date	Initial Reading	Final Reading	Consumption (KL)	Signature	Remarks
01-03-21	5499	5528	29	(Raj)	
02-03-21	5528	5557	29	(Raj)	
03-03-21	5557	5585	28	(Raj)	
04-03-21	5585	5614	29	(Raj)	
05-03-21	5614	5640	26	(Raj)	
06-03-21	5640	5671	31	(Raj)	
07-03-21	5671	5688	17	-	
08-03-21	5688	5717	29	(Raj)	
09-03-21	5717	5748	31	(Raj)	
10-03-21	5748	5776	28	(Raj)	
11-03-21	5776	5802	26	(Raj)	
12-03-21	5802	5830	28	(Raj)	
13-03-21	5830	5859	29	(Raj)	
14-03-21	5859	5877	18	(Raj)	
15-03-21	5877	5909	32	(Raj)	
16-03-21	5909	5938	29	(Raj)	
17-03-21	5938	5965	27	(Raj)	
18-03-21	5965	5995	30	(Raj)	
19-03-21	5995	6022	27	(Raj)	
20-03-21	6022	6050	28	(Raj)	
21-03-21	6050	6067	17		
22-03-21	6067	6094	27	(Raj)	
23-03-21	6094	6123	29	(Raj)	
24-03-21	6123	6150	27	(Raj)	
25-03-21	6150	6178	28	(Raj)	
26-03-21	6178	6207	29	(Raj)	
27-03-21	6207	6236	29	(Raj)	
28-03-21	6236	6236	00	-	
29-03-21	6236	6236	00	-	
30-03-21	6236	6268	32	(Raj)	
31-03-21	6268	6299	31	(Raj)	

Table A2.25 : Recycled water Consumption in Wood Division

Location: WOOD DIV			Recycled Water Consumption Details		
Date	Initial Reading	Final Reading	Consumption (KL)	Signature	Remarks
01-03-21	3045	3061	16	(Raj)	
02-03-21	3061	3077	16	(Raj)	
03-03-21	3077	3091	14	(Raj)	
04-03-21	3091	3110	19	(Raj)	
05-03-21	3110	3128	18	(Raj)	
06-03-21	3128	3145	17	(Raj)	
07-03-21	3145	3145	00	-	
08-03-21	3145	3161	16	(Raj)	
09-03-21	3161	3178	17	(Raj)	
10-03-21	3178	3194	16	(Raj)	
11-03-21	3194	3209	15	(Raj)	
12-03-21	3209	3225	16	(Raj)	
13-03-21	3225	3240	15	(Raj)	
14-03-21	3240	3240	00	-	
15-03-21	3240	3254	14	(Raj)	
16-03-21	3254	3271	17	(Raj)	
17-03-21	3271	3290	19	(Raj)	
18-03-21	3290	3306	16	(Raj)	
19-03-21	3306	3323	17	(Raj)	
20-03-21	3323	3339	16	(Raj)	
21-03-21	3339	3339	00	-	
22-03-21	3339	3354	15	(Raj)	
23-03-21	3354	3370	16	(Raj)	
24-03-21	3370	3387	17	(Raj)	
25-03-21	3387	3403	16	(Raj)	
26-03-21	3403	3420	17	(Raj)	
27-03-21	3420	3431	11	(Raj)	
28-03-21	3431	3431	00	-	
29-03-21	3431	3431	00	-	
30-03-21	3431	3445	14	(Raj)	
31-03-21	3445	3461	16	(Raj)	

Table A2.26 : Recycled water Consumption in Colony

Location: COLONY			Recycled Water Consumption Details		
Date	Initial Reading	Final Reading	Consumption (KL)	Signature	Remarks
01-03-21	198	205	7	Reyl	
02-03-21	205	213	8	Reyl	
03-03-21	213	219	6	Reyl	
04-03-21	219	227	8	Reyl	
05-03-21	227	234	7	Reyl	
06-03-21	234	242	8	Reyl	
07-03-21	242	248	6	—	
08-03-21	248	255	7	Reyl	
09-03-21	255	261	6	Reyl	
10-03-21	261	269	8	Reyl	
11-03-21	269	277	8	Reyl	
12-03-21	277	284	7	Reyl	
13-03-21	284	290	6	Reyl	
14-03-21	290	298	8	—	
15-03-21	298	305	7	Reyl	
16-03-21	305	311	6	Reyl	
17-03-21	311	318	7	Reyl	
18-03-21	318	326	8	Reyl	
19-03-21	326	333	7	Reyl	
20-03-21	333	339	6	Reyl	
21-03-21	339	346	7	—	
22-03-21	346	353	7	Reyl	
23-03-21	353	361	8	Reyl	
24-03-21	361	368	7	Reyl	
25-03-21	368	374	6	Reyl	
26-03-21	374	381	7	Reyl	
27-03-21	381	390	9	Reyl	
28-03-21	390	390	0	—	
29-03-21	390	390	0	—	
30-03-21	390	398	8	Reyl	
31-03-21	398	405	7	Reyl	

Table A2.27 : Recycled water Consumption in Green Belt

Location: Green Belt		Recycled Water Consumption Details			
Date	Initial Reading	Final Reading	Consumption (KL)	Signature	Remarks
01-03-21	7266	7300	34	Reyl	
02-03-21	7300	7338	38	Reyl	
03-03-21	7338	7377	39	Reyl	
04-03-21	7377	7414	37	Reyl	
05-03-21	7414	7448	34	Reyl	
07-03-21	7448	7485	37	Reyl	
08-03-21	7485	7514	29	-	
08-03-21	7514	7553	39	Reyl	
09-03-21	7553	7590	37	Reyl	
10-03-21	7590	7625	35	Reyl	
11-03-21	7625	7664	39	Reyl	
12-03-21	7664	7695	31	Reyl	
13-03-21	7695	7729	34	Reyl	
14-03-21	7729	7754	25	-	
15-03-21	7754	7784	30	Reyl	
16-03-21	7784	7817	33	Reyl	
17-03-21	7817	7853	36	Reyl	
18-03-21	7853	7887	34	Reyl	
19-03-21	7887	7917	30	Reyl	
20-03-21	7917	7951	34	Reyl	
21-03-21	7951	7975	24	-	
22-03-21	7975	8013	38	Reyl	
23-03-21	8013	8048	35	Reyl	
24-03-21	8048	8082	34	Reyl	
25-03-21	8082	8121	39	Reyl	
26-03-21	8121	8150	29	Reyl	
27-03-21	8150	8162	12	Reyl	
28-03-21	8162	8162	00	-	
29-03-21	8162	8162	00	-	
30-03-21	8162	8185	23	Reyl	
31-03-21	8185	8217	32	Reyl	

1715

SHREE RAM TESTING LABORATORIES PVT.LTD.

CIN:U74999UP2019PTC121280

NABL (ISO:IEC:17025) Govt. Approved Laboratory

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**TEST REPORT****Water Sample Analysis**

Issued To:- M/S C.L Gupta Exports Ltd.

18 km, Before Moradabad, Delhi Highway,
Vill- Jivai , Amroha - 244221

Issue Date:-07/08/2021

Test Report No :- SRLPL-20210804-14

Sample Description :- Bore Well Water
 Sample Location :- Bore well No-3
 Sample Received on :- 04/08/2021
 Sample Drawn By :- Given By SRLPL
 Sample Quantity :- 2 Litter
 Analysis Duration :- 04/08/2021 to 07/08/2021

P-1/2

Sr. No.	Parameter	Test Method	Unit	Results	Specification As Per IS:10500:2012 (Amd. No.2 Sep-2018)	
					Acceptable	Permissible
1	pH Value	IS 3025 (P-11)	-	7.27	6.5 –8.5	No relaxation
2	Total Suspended Solids	IS: 3025 (P-17)	mg/l	<5.0	-	-
3	COD (as O2)	IS:3025 (P-58)	mg/l	BDL	-	-
4	Total Dissolved Solids	IS 3025 (P-16)	mg/l	270.0	500 max	2000.0 max
5	Phosphate (as PO4-P)	IS:3025 (P-31)	mg/l	<1.0	-	-
6	Nitrate (as NO3)	IS: 3025 (P-34)	mg/l	BDL	45.0	No relaxation
7	Sulphate (as SO4)	IS: 3025 (P-24)	mg/l	BDL	200.0	400.0
8	Total Alkalinity (as CaCO3)	IS: 3025 (P-23)	mg/l	224.0	200.0	600.0
9	Total Hardness (as CaCO3)	IS: 3025 (P-21)	mg/l	186.0	200.0	600.0
10	Chloride (as Cl)	IS: 3025 (P-32)	mg/l	25.0	250.0	1000.0
11	Fluoride (as F)	IS 3025 (P-60)	mg/l	0.28	1 max	1.5 max
12	Total Arsenic (as As)	IS 3025 (P-37)	mg/l	BDL	0.01max	0.05 max
13	Cadmium (as Cd)	IS 3025 (P-41)	mg/l	BDL	0.003max	No relaxation
14	Cobalt (Co)	SRTLPL/CHEM/SO P-/01	mg/l	BDL	-	-

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 (3) Sample will be destroyed after 30 days from the date of reporting unless otherwise specified.
 (4) Total liability of our lab is limited to the invoice amount.
 (5) Report refers to the sample drawn by Shree Ram Testing Laboratories Pvt. Ltd. unless mentioned otherwise.

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SHREE RAM TESTING LABORATORIES PVT.LTD.

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**TEST REPORT****Water Sample Analysis**

Issued To:- M/S C.L Gupta Exports Ltd.

18 km, Before Moradabad, Delhi Highway,

Vill- Jivai , Amroha - 244221

Issue Date:-07/08/2021

Test Report No :- SRTLPL-20210804-14

Sample Description :- Bore Well Water

P-2/2

Sr. No.	Parameter	Test Method	Unit	Results	Specification As Per IS:10500:2012 (Amd. No.2 Sep-2018)	
					Acceptable	Permissible
15	Total Chromium (as Cr)	IS 3025 (P-52)	mg/l	BDL	0.05 max	No relaxation
16	Copper (as Cu)	IS 3025 (P-36)	mg/l	BDL	0.05 max	1.5 max
17	Iron (as Fe)	IS 3025 (P-53)	mg/l	0.032	1.0 max	No relaxation
18	Manganese (as Mn)	IS 3025 (P-35)	mg/l	BDL	0.1 max	0.3 max
19	Nickel (as Ni)	IS 3025 (P-54)	mg/l	BDL	0.02max	No relaxation
20	Lead (as Pb)	IS 3025 (P-47)	mg/l	BDL	0.01max	No relaxation
21	Antimony (as Sb)	IS:15303	mg/l	BDL	-	-
22	Selenium (as Se)	IS 3025 (P-56)	mg/l	BDL	0.01max	No relaxation
23	Vanadium (as V)	SRTLPL/CHEM/SO P-/01	mg/l	BDL	-	-
24	Zinc (as Zn)	IS 3025 (P-49)	mg/l	BDL	5max	15.0 max
25	Cyanide (as CN)	IS 3025 P-27	mg/l	BDL	0.05max	No relaxation

END OF REPORT

TESTED BY


AUTHORIZED SIGNATORY

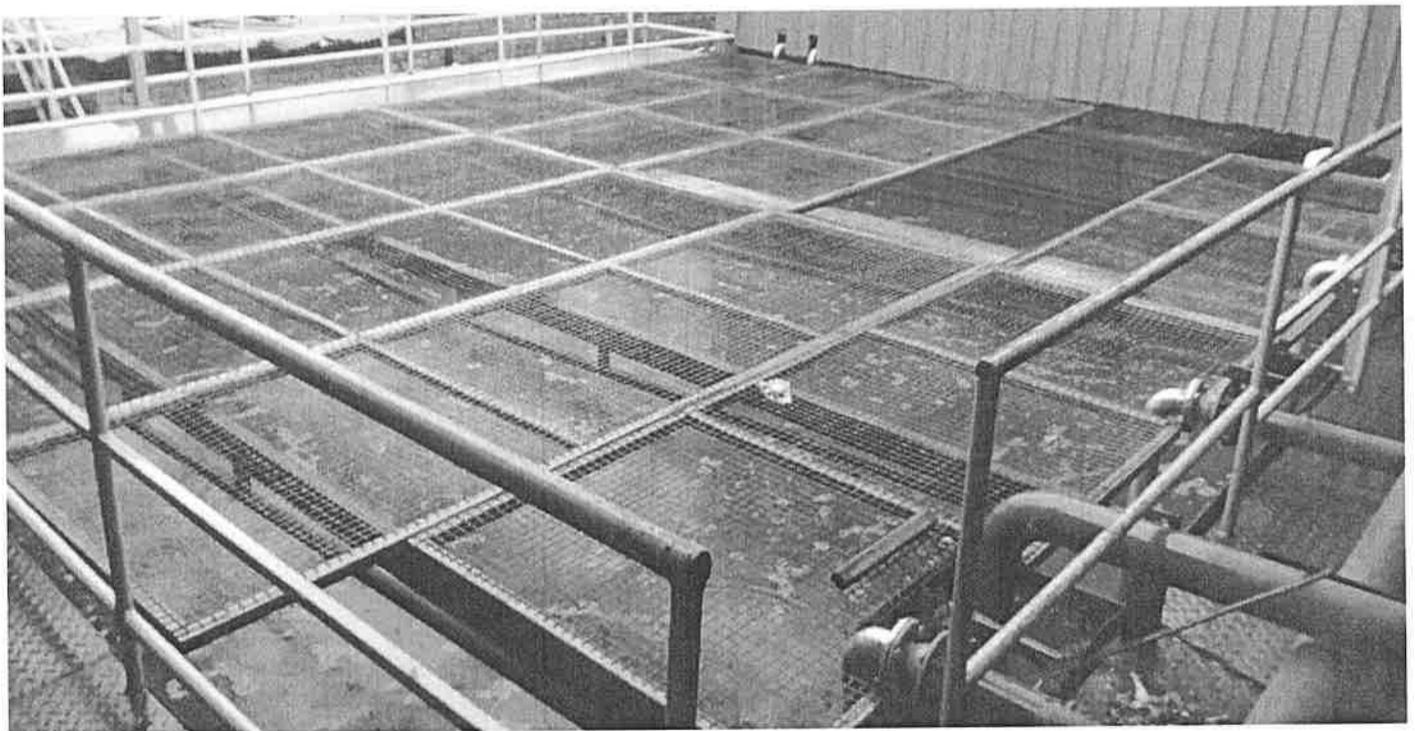
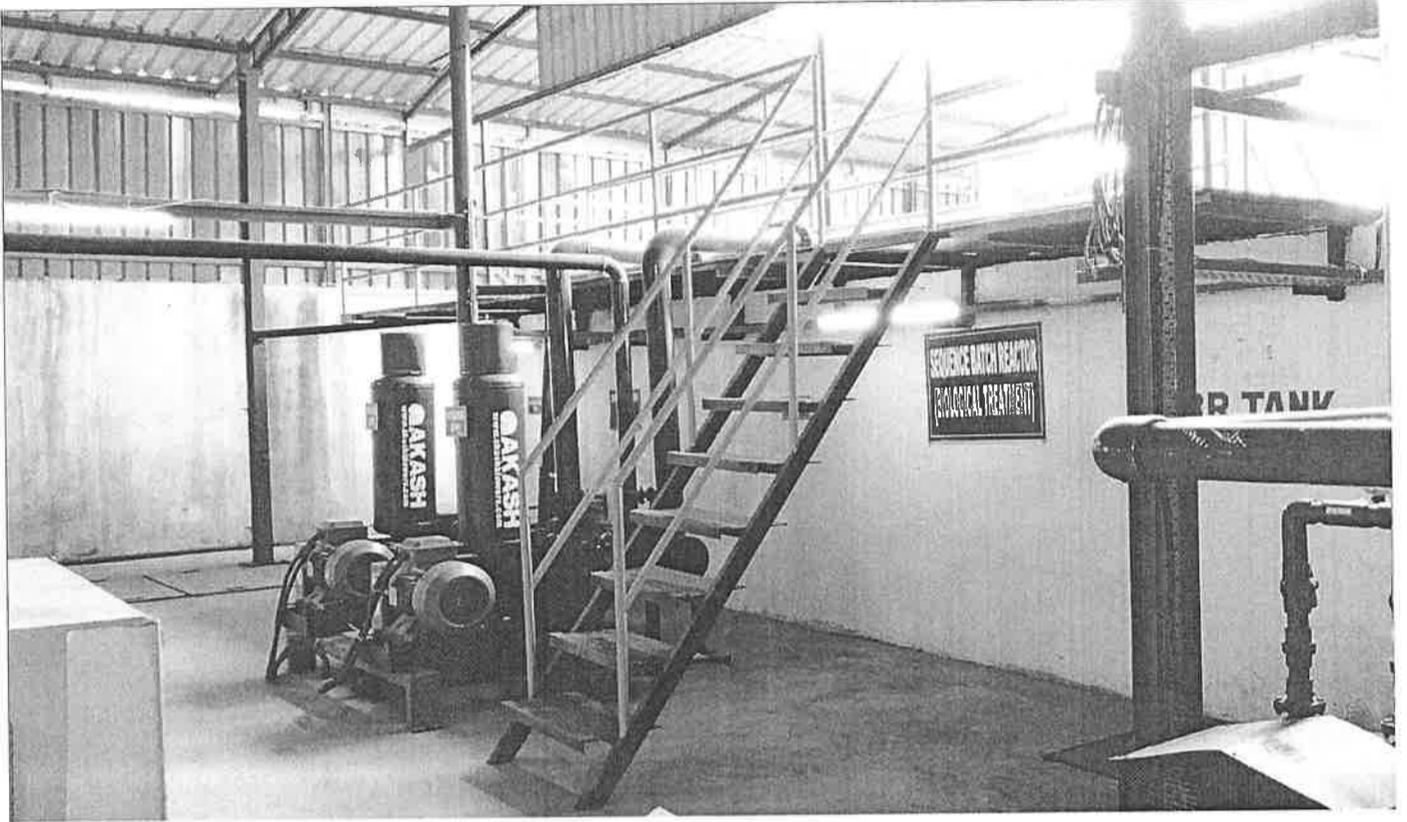

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EXHIBIT-4

Annexure-4

Sequence Batch Reactor (SBR)

1717



The characteristic of the sequencing batch reactor (SBR), anaerobic sequencing batch reactor (ASBR) and sequencing batch biofilm reactor (SBBR)

Koobum Kim

Abstract

Improvements in aeration devices and controls have allowed sequencing batch reactor (SBR) to successfully compete with conventional activated sludge systems. SBRs can achieve equalization, primary clarification, biological treatment, and secondary clarification in a single reactor. The processes of SBR system are five or six steps as anoxic fill, aerated fill, react, settle decant. SBR system is shown high removal efficiency for nitrogen, phosphate and heavy metal. But the efficiency of SBR system is affected on salt and heavy metals. The removal efficiency of pollutants between SBR and sequencing batch biofilm reactor (SBBR) shows that the efficiency of SBBR system is higher than SBR system for COD, BOD. Media and granular are used in SBBR system to complement some disadvantages of SBR system such as lots of sludge amount and high sludge volume index.

Keywords : SBR, ASBR, SBBR, nitrification and denitrification, nutrient.

Introduction

The SBR processor that can effectively compete with conventional activated sludge systems such as continuous stirred-tank reactor (CSTR) is not considered in wastewater treatment until the improvements in aeration devices and controls in the late 1950s and early 1960s. (EPA, 1999) Sequencing batch reactor (SBR) systems have benefits to alternative conventional flow systems for the biological treatment of both domestic and industrial wastewater. (Ying-Chih et al., 2007) There are some disadvantages such as lots of sludge amount and high sludge volume index in SBR process. (Sirianuntapiboon, et al., 2007) The Sequencing Batch Reactor (SBR) is operated under non-steady state conditions and same tank with an activated sludge process. The process consists of repetition of a cycle including five separate steps: feed, react, settle, draw and idle. Anaerobic sequencing batch reactor (ASBR) and sequencing batch biofilm reactor (SBBR) system is developed to complement disadvantage of SBR system. (Arnaldo et al., 2007; Li et al., 2003) The using of ASBR is attributed to a growing reevaluation of advantages of anaerobic processes and studying about the anaerobic biochemistry and microbiology. Anaerobic sequencing batch reactors (ASBR) are currently used for the treatment of wastewaters with amounts of particulate organic matter such as swine manure, leachate and dairy. (Arnaldo et al., 2007) The sequencing batch biofilm reactor (SBBR) have been shown that it has the high efficiency of nitrogen removal. (Li et al., 2003)

Some advantages and disadvantages of SBRs are listed below: (EPA, 1999)

Advantages of SBRs

- Equalization, primary clarification, biological treatment, and secondary clarification can be achieved in a single reactor vessel.
- Operating flexibility and control.
- Minimal footprint.
- Potential capital cost savings by eliminating clarifiers and other equipment.

Disadvantages of SBRs

- A higher level of sophistication is required especially for larger systems, of timing units and controls.
- Higher level of maintenance associated with more sophisticated controls, automated switches, and automated valves.
- Potential of discharging floating or settled sludge during the DRAW or decant phase with some SBR configurations.
- Potential plugging of aeration devices during selected operating cycles, depending on the aeration system used by the manufacturer.
- Potential requirement for equalization after the SBR, depending on the downstream processes.

Operation of SBR, ASBR and SBBR system

The procedure of operation of SBR

Normally, the process follows basic steps of Fill, React, Settle and Decant. Figure 1 shows the process of SBR worked on one tank. In Figure 1, picture 1, 2 is sorted as fill phases and picture 3, 4, 5, 6 are non-fill phases. The ability to create aerobic or anoxic conditions within the reactor results in flexible operation, better treatment of waste.

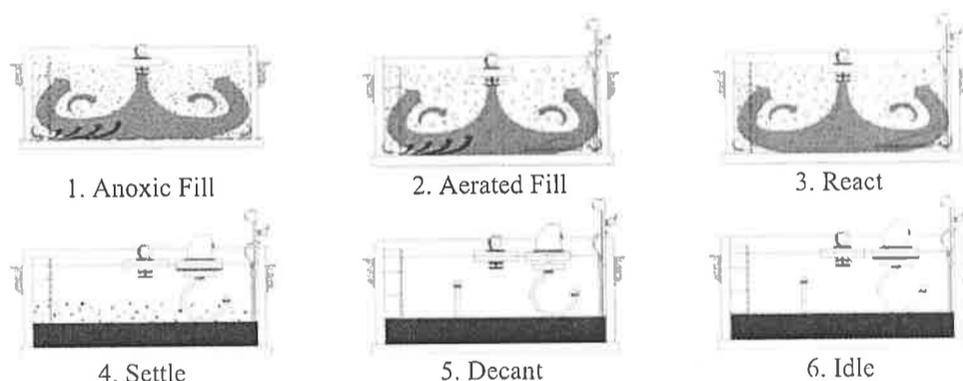


Fig.1. SBR process. (www.liquitek.com)

The below process explain about the each step from fill to idle. (www.liquitek.com)

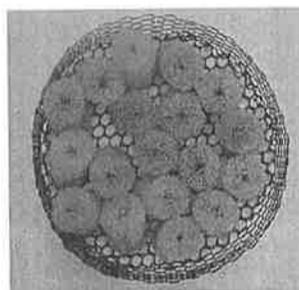
1. Anoxic Fill - Most of this period occurs without aeration to create an environment that favors the procreation of microorganisms with good settling characteristics.
2. Aerated Fill - Nitrification and denitrification occurs at the beginning of this stage.
3. React - some microorganisms will die because of the lack of food and will help reduce the volume of the settling sludge.
4. Settle - liquids should not enter or leave the tank to avoid turbulence in the supernatant.
5. Decant - This removal must be done without disturbing the settled sludge.
6. Idle - The wasted sludge is pumped to an anaerobic digester to reduce the volume of the sludge to be discarded.

The operation of ASBR and SBBR

Generally, SBR, ASBR and SBBR system have similar procedure for treating pollutants. The process of ASBR consist of five step of fill, react, settle, draw and idle. ASBR system is that in SBR system, anaerobic step is adapted in total process instead of anoxic and aerated step. The different of systems is that ASBR has anaerobic condition in first step and SBBR has a biofilm in SBR system. In anaerobic status, granular biomass has some advantages over processes, including better solids retention, operating control and absence of settling. (Arnaldo et al., 2007; Sirianuntapiboona et al., 2007) As adding the biofilm in SBR, the removal efficiency of pollutants in conventional SBR is increased. The process is not changed in SBR; however, to achieve the ideal operating condition for efficiency of biofilm, the reactor condition such as DO concentration should be considered. (Sirianuntapiboona et al., 2005; Li et al., 2003) Figure 2. illustrates the granular biomass used in ASBR reactor[a] and media adapted in SBBR.[b]



[a]



[b]

Fig. 2 granular biomass in ASBR[a] (Bing et al., 2005) and media included SBBR system.[b] (Sirianuntapiboona et al., 2005)

The comparison among SBR, ASBR and SBBR

Sequencing Batch Reactor (SBR)

Removal about nutrient in SBR system was studied about nitrification, denitrification, biological phosphorous and monitoring and control. (Obaja et al., 2003; Akin et al., 2005; Ahmet, 2006) For nitrification, denitrification, Obaja et al. (2003) studied about nutrients in piggery wastewater with high organic matter, nitrogen (N) and phosphorus (P) content in a sequencing batch reactor (SBR) with anaerobic, aerobic and anoxic stages. The SBR proved to be a very flexible tool, and was particularly suitable for the treatment of piggery wastewater, characterized by high nutrient content.

Nitrification is a two-step reaction: ammonium (NH_4^+) is first oxidized to nitrite (NO_2^-) by autotrophic ammonia oxidizers, nitrite is then oxidized to nitrate (NO_3^-) by autotrophic nitrite-oxidizers (Reactions (I) and (II)). In anoxic denitrification, nitrite/nitrate is reduced to nitrogen gas (N_2) by heterotrophic denitrifiers with the presence of extra carbon source (acid) as electron donor (Reaction (III)). Nitrification can only be successfully operated under low chemical oxygen demand (COD), sufficient dissolved oxygen (DO) and long sludge retention time (SRT), while denitrification needs sufficient COD under anoxic condition. These different requirements pose challenges for nitrogen removal in sequencing batch reactor (SBR) systems, where nitrification and denitrification occur in the same tank:(Le et al., 2007)

- $2\text{NH}_4^+ + 3\text{O}_2 \rightarrow 2\text{NO}_2^- + 4\text{H}^+ + 2\text{H}_2\text{O}$ (I)
- $2\text{NO}_2^- + \text{O}_2 \rightarrow 2\text{NO}_3^-$ (II)
- $5\text{CH}_3\text{COOH} + 8\text{NO}_3^- \rightarrow 4\text{N}_2 + 10\text{CO}_2 + 6\text{H}_2\text{O} + 8\text{OH}^-$ (III)

Obaja et al. (2003) could get some results about treatment of nutrient in SBR system. In working with initial concentrations of 1500 mg/l $\text{NH}_4^+ - \text{N}$ and 144 mg/l $\text{PO}_4^{3-} - \text{P}$, A removal efficiency of 99.7% for nitrogen and 97.3% for phosphate was attained. The ratio C/N must be higher than 1.7 to obtain complete denitrification to molecular nitrogen during the denitrification stage. The SBR can also remove high concentrations of $\text{NH}_4^+ - \text{N}$ even at temperatures as low as 16 °C. (Obaja et al., 2003)

Chiu et al. (2007) told that both the ammonium and the organic loading rates affect the occurrence of the simultaneous nitrification–denitrification (SND) process in the SBR system. The nitrogen removal efficiency decreased gradually with increasing ammonium-loading rates at constant COD loading. Therefore, appropriate control of the carbon source concentration can inspire the SND in a traditional SRB to optimize biological nutrient removal.

Ahmet, (2006) reported that effects of salt concentration (0–6%, w/v) on specific nutrient removal rates from saline wastewater in a sequencing batch reactor (SBR). Specific nutrient (COD, $\text{NH}_4 - \text{N}$ and $\text{PO}_4 - \text{P}$) removal rates decreased with increasing salt concentration due to adverse effects of salt on microorganisms. Fig. 3 shows the removal rate of COD, $\text{NH}_4 - \text{N}$ and $\text{PO}_4 - \text{P}$.

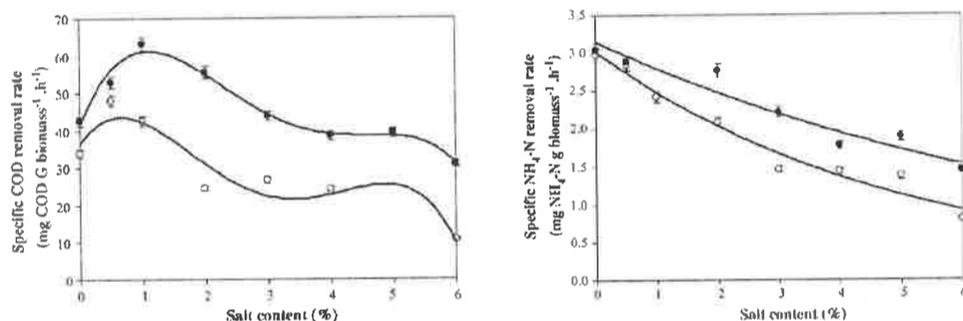


Fig. 3 Variation of specific COD, $\text{NH}_4 - \text{N}$ and $\text{PO}_4 - \text{P}$ removal rate with salt content. (Ahmet, 2006)

Akin et al. (2005), Obaja et al. (2003) and Li et al. (2007) studied to establish control strategies for biological phosphorus and nitrogen removal using Oxidation–reduction potential (ORP), dissolved oxygen (DO) and pH profiles in a Sequencing Batch Reactor (SBR) reactor. To monitor and control biological nutrient removal process, ORP, pH and DO can be used. The ORP can be used as a monitoring parameter to manage biological nitrogen removal in SBR systems. The regulation of ORP allows N of the effluents to be controlled by constantly adapting aeration to the amount of reducing matter present in the sludge. (Obaja et al., 2003) The change in the ORP and pH appears to be related to nitrate concentration and these parameters show a nitrate “knee” and the ammonia “valley” during the operation. Therefore, the experimental study showed that pH and ORP values can be used as control parameters for denitrification and biological phosphorus removal. However, it is observed that pH profile provide much information during the oxic phase, whereas ORP in the anoxic phase. The pH, ORP, nitrate and phosphate profiles observed in these studies are shown in Fig. 4. The nitrate break point measured by ORP indicates the end of the denitrification period (anoxic to anaerobic conditions), whereas the DO break point indicates the end of the nitrification period. (Akin et al., 2005)

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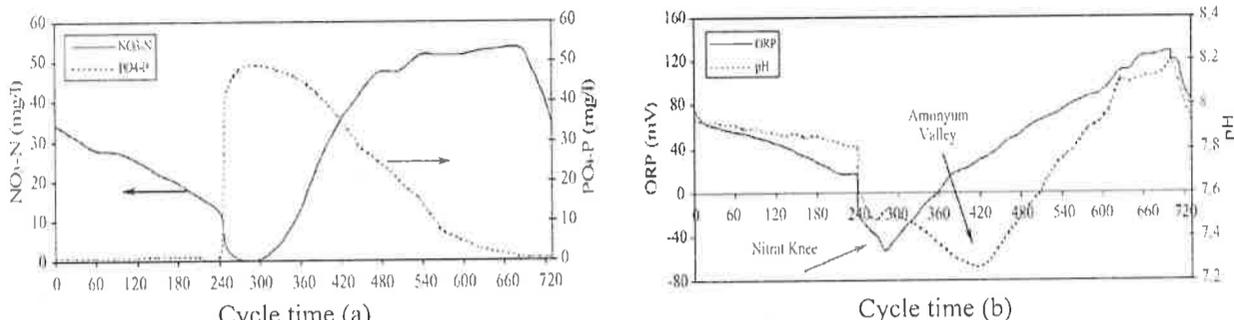


Fig. 4. (a) Nitrate and phosphate, (b) ORP and pH profiles. . (Akin et al., 2005)

Li et al. (2007) reported that both alkalinity and ORP exhibited clear variations in a SBR cycle under different operating conditions (COD, DO, and HRT), but alkalinity presented a better indication for effluent nitrogen concentration than ORP did. The involvement of COD and DO in ORP hindered its clear correlation with effluent nitrogen concentration. Alkalinity exhibited a linear reverse correlation with effluent nitrogen concentration ($Alk = -4.26[N] + 216$, $R^2 = 0.92$). Alkalinity lower than 100 mg/L indicated insufficient denitrification, while alkalinity higher than 200–250 mg/L was related with insufficient nitrification. (Li et al., 2007)

Sirianuntapiboona, et al. (2007) studied about removal of Zn²⁺, Cu²⁺, Pb²⁺ and Ni²⁺ by bio-sludge in sequencing batch reactor and granular activated carbon-SBR (GAC-SBR) systems. In this study, Sirianuntapiboona, et al. (2007) used both resting (living) and autoclaved (dead) bio-sludge. The results are that The maximum adsorption capacities of Zn²⁺ and Cu²⁺ were about 17–19 mg/g of bio-sludge. The results show that the bio-sludge could adsorb Zn²⁺ and Cu²⁺ from the wastewater, independently. The resting bio-sludge showed COD and BOD₅ removal abilities while dead bio-sludge did not. Cu²⁺ and Zn²⁺ could reduce COD and BOD₅ removal abilities of the bio-sludge, because they masked the adsorption site on the bio-sludge, in competition with organic matters. The heavy metals adsorption efficiency of the system increased with the increase of MLSS concentration of the system. Table 1 shows the efficiency of the removal of heavy metals (Zn²⁺, Cu²⁺) by bio-sludge in sequencing batch reactor.

The SBR system with short SRT operation was found to be suitable to treat the wastewater containing heavy metals especially Pb²⁺ and Ni²⁺, because, it could remove both organic matter and heavy metals from the wastewater with high efficiency. The heavy metals (Pb²⁺, Ni²⁺) removal efficiency of both SBR and GAC-SBR systems were increased with the increase of hydraulic retention time (HRT), or the decrease of organic loading. The SBR system showed higher heavy metals removal efficiency than GAC-SBR system at the same organic loading or HRT. Both organic and heavy metals (Pb²⁺ and Ni²⁺) adsorption abilities of bio-sludge were 10–30% reduced by autoclaving at 110 °C for 10 min. However, the dead bio-sludge was more suitable to use as the adsorbent of metal ions even the heavy metals adsorption capacity of dead bio-sludge was 10–30% lower than that of living bio-sludge. (Sirianuntapiboona, et al., 2007)

Table 1. The effluent concentration and removal efficiency of wastewater in SBR system (Sirianuntapiboona, et al., 2007)

Types of wastewater	Concentration of heavy metal in the wastewater	Parameters		Zn ²⁺		BOD ₅		COD		TKN		SS
		Effluent (mg/L)	% Removal	Effluent (mg/L)	% Removal	Effluent (mg/L)	% Removal	Effluent (mg/L)	% Removal	Effluent (mg/L)	% Removal	
SfEWw containing Cu ²⁺	10	1.52 ± 0.04	84.9 ± 0.4	—	—	23 ± 1	98 ± 1	130 ± 26	92 ± 2	13.9 ± 2.6	72.4 ± 5.5	89 ± 2
	20	4.33 ± 0.70	78.4 ± 3.5	—	—	60 ± 14	94 ± 2	352 ± 27	78 ± 2	31.5 ± 1.4	37.4 ± 3.6	168 ± 3
	30	10.06 ± 0.76	66.5 ± 2.5	—	—	98 ± 52	90 ± 6	348 ± 31	78 ± 2	33.5 ± 2.2	23.5 ± 3.5	332 ± 4
	40	20.34 ± 1.60	49.2 ± 3.5	—	—	130 ± 14	87 ± 1	328 ± 28	79 ± 2	33.3 ± 3.6	33.8 ± 6.2	609 ± 4
	50	29.50 ± 0.68	41.1 ± 1.4	—	—	143 ± 11	86 ± 1	328 ± 38	79 ± 3	34.2 ± 0.8	32.1 ± 0.7	670 ± 21
SfEWw containing Zn ²⁺	10	—	—	1.31 ± 0.10	87.0 ± 1.1	16 ± 1	98 ± 1	22 ± 2	99 ± 1	10.0 ± 0.2	80.0 ± 0.1	14 ± 1
	20	—	—	3.70 ± 0.47	81.6 ± 2.3	25 ± 5	98 ± 1	37 ± 5	98 ± 1	17.6 ± 1.8	64.8 ± 3.3	25 ± 1
	30	—	—	8.62 ± 1.70	71.3 ± 5.6	28 ± 3	97 ± 1	54 ± 9	97 ± 1	22.0 ± 0.8	55.8 ± 1.9	36 ± 1
	40	—	—	20.22 ± 6.19	49.4 ± 15.5	83 ± 10	92 ± 1	118 ± 6	93 ± 1	26.1 ± 2.4	47.5 ± 5.2	89 ± 1
	50	—	—	25.25 ± 8.17	49.5 ± 16.3	95 ± 13	91 ± 1	194 ± 6	88 ± 1	27.1 ± 1.2	45.6 ± 2.8	108 ± 1

He et al. (2007) studied about influence of the addition of zeolite powder in SBR system. The results show that the addition of zeolite powder could improve the activity of the activated sludge in SBR reactor, and COD, $\text{NH}_3\text{-N}$, TN and TP could be removed in a shorter cycle time and could also improve the nitrification rate and settling property of activated sludge, which is helpful to inhibit the sludge bulking and to enhance the performance of biological nitrogen removal.

Anaerobic sequencing Batch Reactor (ASBR)

Anaerobic sequencing batch reactor (ASBR) is a newly developed technology and has been extensively studied due to its advantages: (Xiangwen et al., 2007)

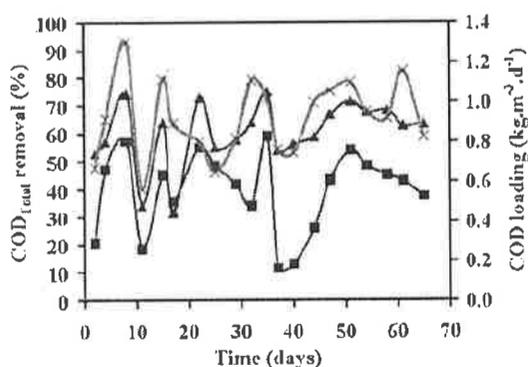
- No short circuit, as in the case of fixed-bed continuous systems.
- High efficiency for both COD removal and gas production.
- No primary and secondary settles.
- Flexible control.

Despite its operational advantages, the ASBR has not been used as widely in the wastewater treatment industry as other anaerobic processes. One of the reasons is its low performance efficiency if overloaded. (Cheong et al., 2007)

Gregor et al. (2007) reported that about the treatment of brewery slurry, the process phases were adapted to fit the brewery slurry discharge schedule. ASBR experiments were conducted under different organic loading rates (OLR) from 3.23 to 8.57 kg of COD/ m^3 day of reactor and control was conducted with OLR of 3.0 kg of COD/ m^3 day. The ASBR COD degradation efficiency was from 79.6% to 88.9%, control experiment efficiency was 65%. ASBR VSS removal efficiency was from 78.5% to 90.5%, control experiment efficiency was 54%. The ASBR methane production yield was from 371 to 418L/kg COD inserted, control experiment methane yield was 248L/kg COD inserted.

Combined ASBR–UASB treatment can increase the biogas yield compared to conventional up-flow anaerobic sludge blanket (UASB) treatment for all brewery wastewater. Combined ASBR–UASB treatment can also reduce overall reactor volume by 25% compared to conventional UASB treatment. (Gregor et al., 2007)

Sarti et al. (2007) told that pioneering efforts in reactors design have led to the development of new high rate reactors that can operate at higher loadings than conventional digesters, and systems capable of treating medium to low-strength wastewaters. Therefore, (Sarti et al., 2007) studied that the comparative performance of three pilot-scale anaerobic sequencing batch reactors treating domestic sewage, and the removal efficiencies in the two ASBR1 and ASBR2 reactors operated under mixed liquor recirculation show mean values of COD and TSS removals efficiencies of 40% and 65%, and average removal efficiencies of 60% and 80% for COD and TSS, respectively. Fig. 5 shows the result of the experiment of (Sarti et al., 2007).



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Fig. 5 the COD removal efficiency of two kinds of ASBR and organic loading rate. (Sarti et al., 2007)

Sequencing Batch Biofilm Reactor (SBBR) and Anaerobic Sequencing Batch Biofilm Reactor (ASBBR)

Sirianuntapiboon et al. (2005) reported that a SBBR system installed plastic media on the bottom of the SBR system could increase the removal efficiencies, improve sludge quality, reduce the amount of excess bio-sludge, and also reduce the acclimatization period of the system. The SBBR system was 2–3 d faster than the SBR system in reaching steady state and maintained almost stable removal efficiencies due to the low standard derivation values. Table 2 shows the comparison of the treatment result of SBR and SBBR.

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Table 2. The effluent qualities and removal efficiencies of SBR and SBBR system (Sirianuntapiboon, et al., 2005)

SBR system

HRT (d)	Organic loading (g BOD/m ³ d)	COD		BOD		TKN		Oil & grease		Effluent SS (mg/l)
		Effluent (mg/l)	% Removal							
3	1340	912 ± 16	87.0 ± 0.2	805 ± 12	79.9 ± 0.3	51 ± 2	48.7 ± 1.7	41 ± 3	79.3 ± 1	100 ± 12
4	1000	456 ± 11	93.5 ± 0.2	423 ± 10	89.4 ± 0.3	44 ± 1	56.4 ± 0.8	26 ± 1	87.1 ± 0.6	80 ± 10
6	680	190 ± 8	97.3 ± 0.1	176 ± 8	95.6 ± 0.2	38 ± 1	62.3 ± 1.0	16 ± 1	92.1 ± 0.6	25 ± 6
8	500	122 ± 4	98.3 ± 0.1	106 ± 6	97.4 ± 0.2	21 ± 1	79.4 ± 1.1	11 ± 1	94.6 ± 0.5	15 ± 5

SBBR system

HRT (d)	Organic loading (g BOD/m ³ d)	COD		BOD		TKN		Oil & grease		Effluent SS (mg/l)
		Effluent (mg/l)	% Removal							
3	1340	750 ± 7	89.3 ± 0.1	681 ± 10	83.0 ± 0.2	41 ± 1	59.4 ± 0.8	35 ± 1	82.4 ± 0.4	75 ± 11
4	1000	403 ± 6	94.2 ± 0.1	323 ± 6	91.9 ± 0.1	31 ± 1	69.4 ± 1.0	22 ± 3	89.1 ± 1.7	62 ± 8
6	680	150 ± 3	97.9 ± 0.0	120 ± 3	97.0 ± 0.1	21 ± 1	79.3 ± 1.0	11 ± 1	94.8 ± 0.5	15 ± 6
8	500	102 ± 2	98.6 ± 0.0	91 ± 4	97.7 ± 0.1	13 ± 1	87.0 ± 1.3	6 ± 1	97.1 ± 0.5	10 ± 7

Venkata Mohan et al. (2007) reported that Biofilm configured sequencing batch reactor (SBR) showed comparatively higher efficiency to the corresponding suspended growth and granular activated carbon (GAC) configured systems studied with same wastewater and sulfate removal efficiency of 20% was observed due to the prevailing anoxic microenvironment during the sequence phase operation and the existing internal anoxic zones in the biofilm. Table 3 presents the comparison among Biofilm, Suspended GAC and Suspended.

Table 3. Comparative performance evaluation of SBBR with other reactor configurations studied (Venkata Mohan et al., 2007)

Configuration (reactor microenvironment)	OLR (kg COD/cum-day)	HRT (h)	COD removal efficiency (%)	BOD removal efficiency (%)	SDR (kg COD/cum-day)	Sulfate removal efficiency (%)
Biofilm (anoxic-aerobic-anoxic)	0.92	24	88.05	88.89	0.81	14.67
	1.50	24	78.68	84.21	1.18	20.10
	3.07	24	56.67	76.00	1.74	22.0
	4.76	24	55.00	75.45	2.62	17.80
	4.76	48	70.24	88.24	3.38	19.82
Suspended GAC (anoxic-aerobic-anoxic)	1.70	24	67.34	86.21	1.13	13.21
	3.50	24	55.19	81.12	1.92	10.62
	5.50	24	37.99	66.01	2.09	9.67
Suspended (anoxic-aerobic-anoxic)	0.80	24	66.36	92.22	0.53	7.79
	1.70	24	47.01	72.67	0.80	8.26
	3.50	24	25.34	57.00	0.88	8.31

Pinho et al. (2005) reported that the anaerobic sequencing batch biofilm reactor (ASBBR) containing biomass immobilized in inert support and homogenized by mechanical stirring offers a potential alternative for accelerating the hydrolysis process, and stirring can help hasten the reduction of the particle diameter of particulate organic matter. The bioparticle size exerted a decisive influence on the performance of the anaerobic process under the conditions tested. The dissolution rates were apparently influenced mainly by the foam packing, whereas the consumption of filtered COD was probably influenced by more complex factors. (Pinho et al., 2005)

Conclusion

Advantages of SBRs are that equalization, primary clarification, biological treatment, and secondary clarification can be achieved in a single reactor vessel. These advantages can reduce the treatment area and cost.

The pollutant removal efficiency of SBR system is shown high removal efficiency for nitrogen and phosphate. And the SBR system can remove heavy metal such as Zn^{2+} , Cu^{2+} , Pb^{2+} and Ni^{2+} with organic pollutant and nitrogen.

The efficiency of SBR system to treat specific nutrient (COD, NH_4-N and PO_4-P) is affected on salt concentration in wastewater due to adverse effects of salt on microorganisms. And the heavy metals such as Cu^{2+} and Zn^{2+} in competition with organic matters could reduce COD and BOD_5 removal abilities, because the heavy metals adsorption efficiency of the system increased with the increase of MLSS concentration of the system.

The comparison of removal efficiency between SBR and SBBR shows that the efficiency of SBBR system is higher than SBR system for COD, BOD. To complement some disadvantages of SBR system such as lots of sludge amount and high sludge volume index, SBBR or ASBBR system is used to treatment of wastewater.

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Effective removal of heavy metals from industrial effluent wastewater by a multi metal and drug resistant *Pseudomonas aeruginosa* strain RA-14 using integrated sequencing batch reactor

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ABSTRACT

Sequencing batch reactor (SBR) is useful in removal of both non-biodegradable and biodegradable contaminants from wastewater. The main aim of the present investigation was to evaluate the potential of biocatalyst strain RA-14 on heavy metal removal under SBR. The selected strain was screened from the soil sediment contaminated with heavy metals. It was able to survive at different (Hg^{2+} , Pb^{2+} , Zn^{2+} , Cu^{2+} , Cd^{2+} and Ni^{2+}) heavy metals (>500 ppm). The bacterial strain RA-14 showed maximum bioaccumulation potential than other strains. Heavy metal resistance patterns of $\text{Pb}^{2+} > \text{Cu}^{2+} > \text{Cd}^{2+} > \text{Hg}^{2+}$, Ni^{2+} and Zn^{2+} was observed. Strain RA-14 was resistant to penicillin-G, nalidixic acid, ceftazidime, cefotaxime, kanamycin and ampicillin. The results revealed that bioaccumulation activities were improved at pH 7.0 ($83.2 \pm 1.8\%$), 40 °C ($89.34 \pm 3\%$) and affected at higher pH values and temperature. The results showed that contact time and initial Lead concentration was also affected Lead accumulation. The heavy metal tolerant strain RA-14 was further investigated towards heavy metal removal in SBR. Heavy metal was removed in SBR within 10 h of hydraulic retention time. Heavy metal removal was high at 2 mg/L (0.33 mg/L Cu^{2+} , 0.33 mg/L Hg^{2+} , 0.33 mg/L Pb^{2+} , 0.33 mg/L Zn^{2+} , 0.33 mg/L Cd^{2+} and 0.33 mg/L Ni^{2+}) heavy metals. Total nitrogen, biological oxygen demand (BOD) and chemical oxygen demand (COD) of treated water in SBR was removed and the removal efficacy was $91.3 \pm 2.1\%$, $97.6 \pm 3.3\%$, and $94.3 \pm 4.4\%$, respectively in 10 h hydraulic retention time. However, the efficiency of BOD, COD and total nitrogen content removal was decreased, due to the reduced metabolic process of bacteria after 10 h. The SBR reactor proved to be an efficient method for the treatment of various heavy metals from the wastewater.

1. Introduction

Heavy metals are one of the important pollutants causing various diseases. Industries use various heavy metals and the effluent contains considerable amount of heavy metals. Most of the heavy metals are highly toxic at higher concentrations to humans, animal and microbes. Treatment of heavy metals from the environment is significant due to their high toxicity to various living beings (Patthankar et al., 2021). Bioremediation of heavy metals are highly attractive than

physico-chemical methods such as, sorption technique, evaporation, and precipitation. Seaweeds, fungi and bacteria were commonly used to treat wastewater. Microorganisms have the ability to tolerate at higher concentrations of heavy metals and this ability would be useful in the treatment of wastewater where microorganisms indirectly or directly involved in the degradation of inorganic or organic matter (Yang et al., 2021).

Most of the heavy metals are soluble in water and easily enter into the food web (Zhu et al., 2019). Heavy metals namely, Lead (Pb), Nickel

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(Ni), Cadmium (Cd), Zinc (Zn), Copper (Cu) and Chromium (Cr) affect the ecosystem (Kalaimurugan et al., 2020). Lead is one of the toxic heavy metals involved in water, soil and air pollution (Kushwaha et al., 2018). This heavy metal is generally applied in battery production and production of water pipes (Hanfi et al., 2020). Heavy metals also enter into the environment through various natural processes (Naik and Dubey, 2013) and affected human body (Patel et al., 2018). Lead removal from the environment is achieved by bioremediation method (Sharma et al., 2018). Heavy metal resistant microorganisms have isolated from various sources, including, rhizosphere of plants grown in highly polluted soil sample, industrial wastes, and metal contaminated soils (Chaudhary and Shukla, 2019). Bacteria from the genera, *Enterobacter*, *Enterobacter*, *Corynebacterium*, and *Bacillus* were resistant against heavy metals (Su, 2016; Mondragon et al., 2011; Belogolova et al., 2020). Fungi such as, *Trichoderma viride*, *Aspergillus awamori*, *A. flavus*, *Saccharomyces cerevisiae*, and *Phanerochaete chrysosporium*, were played significant role in heavy metal removal (Joshi et al., 2011). Heavy metal resistant bacteria used various strategies for lead removal from the environment. These mechanisms include, precipitation of lead ions, metal transformation and extracellular sequestration, etc., (Pratish et al., 2018). Bacteria using various mechanisms to remove heavy metals, including, cation-diffusion facilitator transporter, ABC transporter, and P-type ATPase transports (Yin et al., 2019). Microorganisms have various adaptive mechanisms to survive in heavy metal environment (Manoj et al., 2020). Bacteria have various receptors to bind heavy metals and have mechanisms to tolerate high metal contaminated sites (Pandey et al., 2013).

Heavy metals are removed from the contaminated wastewater by various methods, such as anaerobic treatment (You et al., 2010), membrane filtration (Sojka-Ledakowicz et al., 2010), chemical oxidation (Mohan et al., 2001), coagulation (Stephenson and Duff, 1996), biosorption (Davis et al., 2003) and adsorption (Olgun and Atar, 2009). Among these techniques, biosorption has been more effective to remove heavy metals from the wastewater (King et al., 2007). The biomaterials such as, *Paenibacillus macerans*, *Bacillus jeotgali*, *Caulerpa lentillifera*, *Rhizopus oryzae*, *Azadirachta indica* bark, dead *Bacillus licheniformis*, *Spirogyra* sp. have been used for biosorption. Both living and dead bio-sludge based traditional methods are applied as absorbent of nickel, zinc, copper, lead and chromium (Sirianuntapiboon and Ungkapsatcha, 2006). The absorption ability of adsorbing material varied based on the age of bio-sludge (Sirianuntapiboon and Chaiyasing, 2000). Heavy metal concentration is one of the important factors affecting heavy metal removal efficacy. Bacteria in bioreactors may include methanogenic and acetogenic bacteria and sulphate-reducing bacteria (Pereyra et al., 2012). In anaerobic bioreactors, sludge contains various microbial species composed of methanogens, syntrophic bacteria and other fermenting bacteria (Antwi et al., 2017). Analysis of these anaerobic microbial stains in SBR is very important for improving heavy metal degrading efficiency (You et al., 2010). In this study, a multimetal tolerance biocatalyst was used for the removal of heavy metals using an integrated sequencing batch reactor.

2. Materials and methods

2.1. Bacteria and culture condition

Samples (S1, K2 and RA) were collected from three sampling sites contaminated with industrial effluents. Sampling was made between March 2019 and November 2019. About 100 gm soil sample was collected and stored at 4 °C. One-gram sample was transferred into an Erlenmeyer flask containing 99 mL double distilled water. It was spread on nutrient agar medium and incubated at 37 °C for 48 h. After 48 incubations, isolated bacterial strains were purified on nutrient agar plates. Initially 47 morphologically different bacterial strains were tested and only 12 bacterial strains were selected based on multimetal tolerance ability. Naturally the bacterial species survive in these

environments developed various mechanisms for tolerance to stressed, metal contaminated environment. Among the bacterial strain, *Pseudomonas aeruginosa* strain RA-14 was selected for the analysis of MIC.

2.2. Lead bioaccumulation analysis

Lead accumulation of the bacterial strain was analyzed by atomic absorption spectroscopic (AAS) analysis. To analyze lead accumulation, the bacterial strain was cultured in Erlenmeyer flask containing Lead (300 ppm). The culture medium was incubated for 72 h in an orbital shaker incubator at 37 ± 1 °C for 72 h and the pH was maintained at 7.0. After 72 h, the culture was centrifuged for 10 min at 12000 rpm. The harvested culture was digested with HNO₃ (double volume). This digested extract was filtered using a vacuum filtration unit attached with pump and collected in to an Erlenmeyer flask. This extract was further used for the determination of Lead removal or Lead bioaccumulation (%) from the sample. To the control sample bacterial strain was not added. Experiments were conducted in triplicate and the mean value was considered for analysis. Lead bioaccumulation or removal was calculated using the following formula.

$$\text{Lead bioaccumulation (\%)} = \frac{L_0 - L_1}{L_0} \times 100$$

L₀ = Initial Lead concentration (ppm), L₁ = Final concentration of Lead into the culture medium (ppm).

2.3. Antibiotic susceptibility analysis

Antibiotic susceptibility analysis of selected bacterial strains on various commercially available antibiotics was carried out by disc diffusion method (Onuoha et al., 2016). Nutrient broth was prepared and swabbed on LB agar plates appropriately and incubated for 24 h at 37 °C. The antibiotics used were Cefotaxime, Penicillin-G, Ampicillin, Nalidixic Acid, Ceftazidime, Cefotaxime, Tetracycline, Gentamicin and Kanamycin (Naik and Dubey, 2011). The zone of inhibition around the antibiotic disc was analyzed and the antibiotic susceptibility was determined.

2.4. Minimal inhibitory concentration (MIC) of metal tolerant bacterial species

MIC concentration of the heavy metals (Hg²⁺, Pb²⁺, Zn²⁺, Cu²⁺, Cd²⁺ and Ni²⁺) for the strain RA-14 was performed (Alam et al., 2013). The MIC value for the selected strain was evaluated using Nutrient Agar plate method containing these heavy metals at various concentrations ranging between 25 ppm and 4000 ppm. Heavy metal stock solutions were prepared at various ranges and incorporated to the nutrient agar medium. The selected twelve bacterial strains were spot inoculated (1×10^8 bacteria) on nutrient agar plates. The inoculated plates were incubated for 24 h at 37 ± 2 °C. The strain RA-14 showed maximum MIC value was further selected for bioaccumulation studies (Nokman et al., 2019).

2.5. Characterization of the bacterial strain

Physiological and biochemical properties of the selected bacterial culture were performed (Kandler and Weiss, 1986). The bacterial strain was grown in Nutrient broth medium for 18 h. DNA of the bacterial cells was extracted based on manufactures instructions. It was subjected for agarose gel electrophoresis and quantification was performed using a Nanodrop and the amount was expressed as µg/mL. PCR reaction was performed using forward (27F (5'-AGAGTTTGATCTGGCTCAG-3')) and reverse (1492R (5'-GGCTACCTTGTTAC GACTT-3')) primers. The amplified 16S rDNA was sequenced (Rejiniemon et al., 2015).

2.6. Environmental factors on lead bioaccumulation

P. aeruginosa strain RA-14 was cultured in LB broth medium at pH 7.0, 150 rpm and at 37 °C. To the culture medium 300 ppm Lead was incorporated and incubated up to 96 h in an orbital shaker incubator. After 96 h, the culture was centrifuged at 12,000 rpm for 10 min. The remaining Lead content in the supernatant was evaluated by AAS method. Strain RA-14 was grown in culture medium containing Lead at various pH ranges (5.5–9.0). After 72 h, the Lead accumulation (%) was calculated using AAS method (Qu et al., 2018). The influence of temperature on bioaccumulation was evaluated by culturing the strain RA-14 in the culture medium containing Lead at various temperatures (33 °C–46 °C). The culture flask was incubated at 150 rpm for 72 h. After 72 h, Lead accumulation (%) was calculated (Chatterjee et al., 2012). The strain RA-14 was cultured in LB medium at pH 8.0, 150 rpm and at 37 °C. To the culture medium 50–500 ppm Lead was incorporated and incubated up to 96 h to analyze the influence of lead content. The cells were harvested by centrifugation and the bacterial biomass was calculated. After 96 h incubation, the remaining Lead content in the supernatant was evaluated by AAS method. The influence of contact time on bioaccumulation was evaluated by culturing the strain RA-14 in the culture medium containing Lead at various contact times (5 min–40 min). The culture flask was incubated at 150 rpm for 72 h. After 72 h, Lead accumulation (%) was calculated as described previously (Chatterjee et al., 2012).

2.7. Sequencing batch reactor: reactor design and operation

Multi metals were prepared by dissolving copper sulphate pentahydrate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$), lead nitrate ($\text{Pb}(\text{NO}_3)_2$), mercury chloride (HgCl_2), zinc sulphate ($\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$), cadmium chloride hydrate ($\text{CdCl}_2 \cdot \text{H}_2\text{O}$) and nickel sulphate hexahydrate ($\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$) were prepared at 0.5 mg/L (0.083 mg each), 1.0 mg/L (0.166 mg each), 1.5 mg/L (0.25 mg each), 2.0 mg/L (0.333 mg each) and 2.5 mg/L (0.416 mg each) concentration. Wastewater was used to prepare the metal stock and strain RA-14 was introduced to the reactor for colonization and the reactor was filled with wastewater (Fig. S1). The experimental reactor was run till the biomass of bacteria reached 10 g/L or 10 days. Chemical oxygen demand (COD), biological oxygen demand (BOD) and biomass of *P. aeruginosa* strain RA-14 were determined. COD and BOD content of wastewater was analyzed by APHA method (APHA, 2005). To determine biomass, 1 L wastewater was centrifuged and the residue was dried at 103 ± 2 °C and constant weight was obtained. Heavy metal concentration in wastewater and in adsorbed cells was estimated using atomic absorption spectrophotometer as described by Karvelas et al. (2003). Heavy metal content of the wastewater was evaluated using AAS. Antibiotic concentration in the wastewater was tested using High Performance Liquid Chromatography with respected standard (Ganesan et al., 2020).

3. Results and discussion

3.1. Heavy metal resistant bacteria in contaminated soil sediment

Bacteria isolated from the soil sediment showed higher resistance against the presence of various heavy metals. Three samples (S1, K2 and RA) were subjected for the isolation of bacteria and 47 bacterial strains were isolated. The growth of metal resistant bacteria is mainly based on the concentrations of heavy metals in the culture medium. After initial screening, only 12 strains were selected for secondary screening of metal resistance. These strains were able to grow on nutrient agar medium containing 500 ppm multi metals (Hg^{2+} , Pb^{2+} , Zn^{2+} , Cu^{2+} , Cd^{2+} and Ni^{2+}). The tolerance level of the selected bacterial strain was described in Table 1. Yamina et al. (2012) isolated heavy metal tolerant bacterial strains from the wastewater and reported antibiotic resistance and heavy metal co-resistance. Heavy metals at elevated levels in the medium

Table 1

Heavy metals tolerance of the bacteria isolated from three different sampling sites contaminated with heavy metals.

Sampling site	Strains	Metal resistance					
		Hg	Pb	Zn	Cu	Cd	Ni
S1	S1-3	++	+	+	+	++	=
	S1-4	+	+	+	++	+	+
	S1-21	++	+	-	++	+	++
	S1-33	++	+	-	+	=	+
	K2-20	-	+	-	+++	=	+
K2	K2-73	+	++	-	++	+++	+
	K2-81	+	+	-	+	+	++
	K2-86	+	=	++	++	=	+
	RA-14	++	++++	++	+++	+++	+
RA	RA-29	+	+	+	+	++	+
	RA-41	++	++	++	+	+	+
	RA-43	+	++	+	=	++	++

-: sensitive; +: tolerance between 100 and 200 ppm; ++: tolerance between 200 and 500 ppm; +++: tolerance between 500 and 2000 ppm; ++++: tolerance above 2000 ppm.

would denature proteins, deactivate enzymes and compete with various essential cations affecting bacterial activity. There are various heavy metals in industrial effluent or in acid mine drainage, thus it is essential to understand the impact of multi metals on sulphate reducing bacteria (Kiran et al., 2017). Among various heavy metals, Pb, Cd and Hg were widely used in various industries and involved in industrial pollution (Wang et al., 2019). Heavy metal removal by biosorption method is promising method and is widely used in industries throughout the world (Wei et al., 2020).

3.2. Bioaccumulation of lead

The bacterial strain RA-14 showed maximum bioaccumulation potential than other bacteria. In this strain bioaccumulation percentage was $83.2 \pm 1.8\%$ at neutral pH value at 37 °C (Table 2). Bioaccumulation potential of *Enterobacter* sp. J1 and *Pseudomonas* BC15 has been reported previously. These strains accumulated 75% and 65% of lead from the culture medium (Lu et al., 2006; Raja et al., 2006). To analyze the application of bacteria in biosorption of various metals, the present study analyzed the growth of bacteria, oxidative damage and the removal efficacy of heavy metals under these stress conditions. Cell wall of the bacteria is the foremost protective barrier and antagonizing various toxic heavy metals through biosorption. Biosorption was occurred naturally not based on metabolic process (Wei et al., 2020).

3.3. Antibiotic susceptibility analysis

The strain *P. aeruginosa* RA-14 was resistant to penicillin-G, nalidixic acid, ceftazidime, cefotaxime, kanamycin and ampicillin. The result

Table 2

Bioaccumulation of lead by the selected bacterial strains at 300 ppm concentrations.

Strains	Initial Lead concentration (ppm)	Residual Lead (ppm)	Bioaccumulation (%)
S1-3	300	243 ± 2.3	19 ± 0.5
S1-4	300	73.8 ± 1.7	75.4 ± 0.7
S1-21	300	138.3 ± 3.1	53.9 ± 1.1
S1-33	300	78.3 ± 1.9	73.9 ± 1.4
K2-20	300	217.2 ± 3.3	27.4 ± 3.1
K2-73	300	149.4 ± 1.5	50.2 ± 4.2
K2-81	300	198.9 ± 3.9	33.7 ± 3.4
K2-86	300	70.5 ± 2.8	76.5 ± 1.9
RA-14	300	49.8 ± 5.2	83.4 ± 3.3
RA-29	300	133.8 ± 1.4	55.4 ± 4.3
RA-41	300	91.5 ± 4.9	69.5 ± 4.4
RA-43	300	59.4 ± 0.9	80.2 ± 5.2

presented in Table 3 revealed that the selected strain showed maximum resistance against tested antibiotics. The relationship between heavy metal resistance and antibiotic resistance was earlier reported (Tiquia-Arashiro, 2018). Chatterjee et al. (2012) reported lead tolerance potential and antibiotic resistance among bacteria. Generally, bacteria used specific mechanism for the efflux of both antibiotics as well as heavy metals. The efflux mechanism varied based on the bacterial strain (Tiquia-Arashiro, 2018). Xu et al. (2020) recently characterized cadmium resistant *Pseudomonas* sp. strain 375 isolated from the heavy metal polluted environment and developed as a novel biosorbent.

3.4. Minimum inhibitory concentration (MIC)

P. aeruginosa strain RA-14 was analyzed for its resistance properties against Cu²⁺, Hg²⁺, Pb²⁺, Zn²⁺, Cd²⁺ and Ni²⁺ at different levels. This organism was found to be highly tolerant to various concentrations of selected heavy metals. It was highly resistance to lead, copper and cadmium. Heavy metal resistance patterns of Pb²⁺ > Cu²⁺ > Cd²⁺ > Hg²⁺, Ni²⁺ and Zn²⁺ was observed in *P. aeruginosa* strain RA-14 (Table 4). Twelve strains showed high resistance (>500 ppm) against at least one of the selected heavy metals. Among these strains, strain RA-14 showed maximum MIC value (>2800 ppm lead) hence it was selected for further studies. Metal tolerance organisms use various mechanisms to survive in toxic environment such as, cations transporter, siderophores secretion, efflux pump, etc. Metal binding bacteria also has the presence of metallothionein, a metal binding protein. Ansari and Malik (2007) reported MIC value for *Pseudomonas* spp. Raja et al. (2006) reported multimetal resistant *Pseudomonas aeruginosa* and reported resistant up to 800 ppm. Maximum MIC was observed for lead (2800 ppm), copper (2750 ppm) and cadmium (2550 ppm). The present results revealed that the strain RA-14 showed the ability to survive at higher levels of copper, and cadmium. *Pseudomonas* sp. I3 showed high MIC values to Lead, which was mainly dependent on the various metal-resistant mechanisms of microbial consortia (Abou-Shanab et al., 2007).

3.5. Characterization of *P. aeruginosa* strain RA-14

Bacteria isolated from the polluted environment have developed various regulatory systems, which specifically allow them to cope and thrive with many environmental conditions such as, exposure to heavy metals, antibiotics, nutrient availability etc. These regulatory programs control various enzymatic reactions, sustaining growth of bacteria on a variety of antibiotics in the wastewater. The characterized organism was non-capsulated, catalase-positive, citrate-positive, flagellated, Gram – negative bacterium, β-hemolytic type organism, motile, oxidase-positive and rod-shaped. This organism was able to produce arginine dehydrolase, lecithinase, ornithine decarboxylase, phenylalanine deaminase and lipases. Carbohydrate fermentation reaction was analyzed. It was not able to ferment xylose, trehalose, sucrose, starch, sorbitol, rhamnose, myoinositol, lactose, cellobiose, arabinose, maltose, and mannose. It hydrolyzed ribose, mannitol, malonate, glucose, and fructose.

Table 4

Minimum inhibitory concentration (MIC) of heavy metals for *P. aeruginosa* strain RA-14.

Metals	Minimum Inhibitory Concentration (ppm)
Hg ²⁺	2250
Pb ²⁺	2800
Zn ²⁺	2000
Cu ²⁺	2600
Cd ²⁺	2500
Ni ²⁺	2100

3.6. Influence of physical factors on biosorption

The amount of heavy metal in the cell free extract was extremely low and varied between 24 and 72 h fermentation (Table 5). A similar Lead accumulation pattern was reported in *Stenotrophomonas* MB339. In this organism only 31% Lead accumulation was reported after 24 h, and this fact increased as 81.5% after 72 h incubation (Aslam et al., 2019). After 72 h, bioaccumulation was not observed in *P. aeruginosa* strain RA-14, the functional groups of bacterial cells saturated which restricted further uptake of Lead ions from the culture medium (Sharma and Adholeya, 2012). Medium pH affected the feature of the adsorbent and adsorbate, and it very much controls electrostatic interactions between adsorbent and adsorbate. The chemical properties of adsorbent varied mainly based on the pH of the culture medium. Bioaccumulation of Lead in *P. aeruginosa* strain RA-14 was improved with an increase in pH value, then it declined at alkaline pH ranges (>8.5). The pH value of the medium influenced Lead accumulation (Table 5). The previous finding also showed the similar impact of pH on Lead accumulation by bacteria. In bacteria, Lead accumulation was studied and bioaccumulation efficiency was over 95% at alkaline pH range (Shin et al., 2012).

At alkaline pHs, the bifunctional group available on the cell wall of bacteria are negatively charged and improved the accumulation process (Kalaimurugan et al., 2020). In *E. proliferans*, due to ionization of COOH groups on the organism, Pb²⁺ adsorption capability was maximum at pH 4.4 (Miretzky et al., 2008). Rao et al. (2014) and Akbari et al. (2015) reported the influence of pH dynamics in heavy metal bioaccumulation. Based on the present finding pH 8.0 was selected for further studies. Lead accumulation was maximum after 10 min of treatment (Fig. 1a). Lead accumulation was greatly influenced by the contact time than other physical factors.

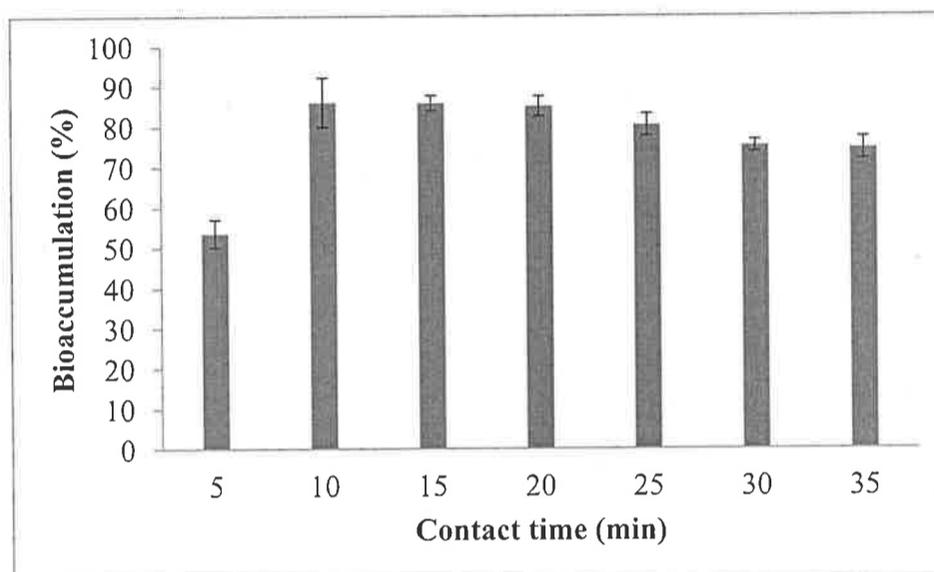
Temperature affected the growth, metabolic activity and Lead accumulation. In this study, Lead accumulation reached maximum at 40 °C (89.34 ± 3%) and further increases in temperature declined bioaccumulation. However, Lead bioaccumulation was observed throughout the incubation temperature. Absorption capacity of metal ions varied based on sorbents and types of microorganisms. Arivalagan et al. (2014) reported 35 °C was the optimum bioaccumulation rate in *Bacillus amyloliquefaciens*. These findings showed that the heavy metal accumulation by bacteria is mainly exothermic and accumulation is based on physical adsorption. Lead biosorption was maximum at 350 ppm concentration and 84.3% heavy metal concentration declined from

Table 3
Antibiotic resistance of bacterial strains isolated from the metal contaminated sample sites.

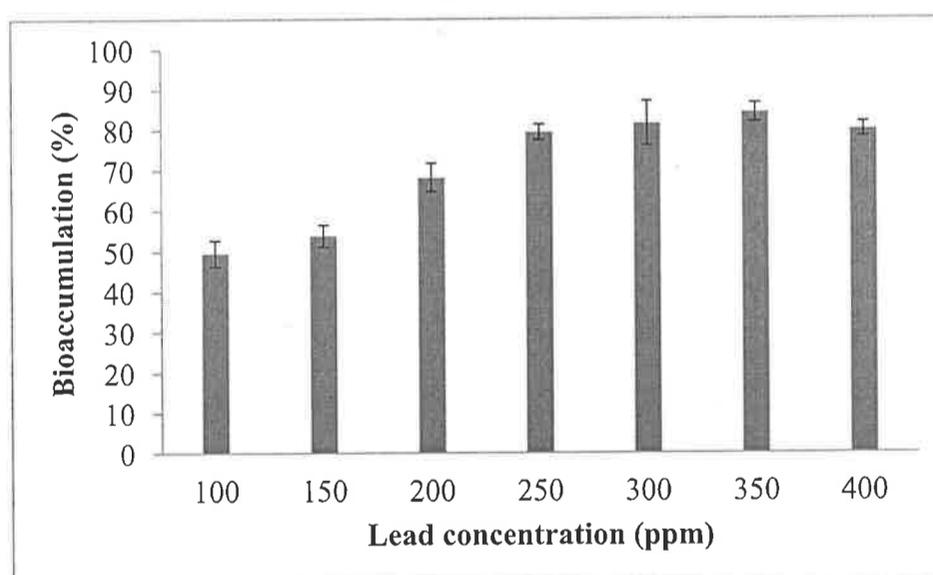
Antibiotics and concentration	Bacterial strains											
	S1-3	S1-4	S1-21	S1-33	K2-20	K2-73	K2-81	K2-86	RA-14	RA-29	RA-41	RA-43
Penicillin-G (10 µg)	R	R	R	R	R	R	S	R	R	R	S	R
Ampicillin (10 µg)	R	R	S	S	S	R	S	R	R	S	R	S
Nalidixic Acid (30 µg)	S	S	R	R	S	R	R	S	R	R	R	R
Ceftazidime (30 µg)	R	S	S	R	S	S	R	S	R	R	S	S
Cefotaxime (30 µg)	R	R	S	R	S	R	S	R	R	R	R	S
Tetracycline (30 µg)	S	R	R	R	R	S	S	S	S	S	S	S
Gentamicin (30 µg)	S	S	R	S	R	R	R	S	S	S	S	R
Kanamycin (30 µg)	R	R	R	R	R	S	R	R	R	R	R	R

Table 5
Influence of pH and temperature on bioaccumulation of Lead from the wastewater supplemented with 300 ppm Lead.

Incubation period (h)	Bioaccumulation (%)	pH	Bioaccumulation (%)	Temperature (°C)	Bioaccumulation (%)
12	2.3 ± 1.2	5.5	29.3 ± 3.2	25	50.8 ± 4.2
24	12.9 ± 2.3	6	40.1 ± 1.8	28	69.3 ± 0.92
36	51.3 ± 1.7	6.5	68.4 ± 4.4	31	74.2 ± 1.6
48	61.8 ± 2.1	7	79.2 ± 5.2	34	76.8 ± 4.2
60	72.9 ± 1.1	7.5	81.8 ± 7.2	37	85.2 ± 3.9
72	83.1 ± 0.9	8	93.6 ± 0.4	40	89.34 ± 2.2
84	80.3 ± 1.3	8.5	90.3 ± 1.3	43	81.2 ± 1.1
96	76.8 ± 2.7	9	86.8 ± 5.2	46	79.6 ± 2.6



A



B

Fig. 1. a. Accumulation of lead at various contact times (min) at 300 ppm concentrations. 1B. Influence of Lead concentration on bioaccumulation.

the medium (Fig. 1b). Xing et al. (2018) reported the influence of initial Lead concentration on bioaccumulation. The mechanism of Lead bioaccumulation in bacteria in relation with initial Lead concentration was

reported previously (Flores-Garnica et al., 2013). The dose of bio-surfactant is one of the significant factors influencing biosorption capacity and removal rate from the medium (Li et al., 2010). Increase of

biosorbent dose increase the number of binding sites on microorganisms, consequently maximum Lead removal efficacy. Moreover, excessive concentration of biosorbents is not necessary for the removal of heavy metals.

3.7. Heavy metal biosorption by the bacteria in sequencing batch reactor

In sequencing batch reactor, reduction of heavy metals takes place in two different stages. In the first stage, heavy metals are absorbed by particles, followed by metal removal by biosorption (da Silva Oliveira et al., 2007; Chipasa, 2003). This reactor was especially designed for nutrient removal, antibiotic treatment and heavy metals treatment in a biofilm system. The physico-chemical properties of wastewater were described in Table 6. The heavy metals such as, Ni²⁺, Cd²⁺, Zn²⁺, Pb²⁺, Hg²⁺ and Cu²⁺ can be removed within 10 h of hydraulic retention time in this reactor. These reactor operation parameters were optimized by loading various heavy metal concentrations (0.5 mg/L - 2.5 mg/L). Heavy metal reduction was found to be maximum in the wastewater containing 2.0 mg/L heavy metals. At 2.5% heavy metal concentrations, metal biosorption declined. It showed the influence of multi-metals and initial concentrations on heavy metal removal. Bacteria are stressed at higher metal ion concentration, hence metabolic process declined and metal (Cu²⁺, Hg²⁺, Pb²⁺, Zn²⁺, Cd²⁺ and Ni²⁺) biosorption process decreased (Huang and Liu, 2013; Kurniawan et al., 2006). At extreme lower metal ion concentration, heavy metal removal efficacy was high due to stimulatory activity. At higher composite heavy metal concentration (>2.0 mg/L) the decreased removal of metal could be due to the reduced metabolic activity of bacteria in the reactor. At higher initial concentration of metals metabolic process would be severely affected, thus affected treatment process (Stasinakis and Thomaidis, 2010). The finding indicated greater removal efficiencies at very low concentrations and declined metals removal at higher initial concentrations in the inlet. The present result was similar with previous findings that the efficacy of heavy metal removal increases if the initial inlet Lead concentration is > 0.5 mg/L. The efficacy of metals removal was also based on biological, chemical and physical variables of the wastewater treatment reactor (Chanpiwat et al., 2010). The removal of Cu ion was 27 ± 1.8% at 0.5 mg/L concentration and increased up to 2.0 mg/L concentration. At 0.5 mg/L concentration, 64.1 ± 2.1% removal efficacy was obtained. The selected strain removed 87.8 ± 0.3% Pb²⁺ from the reactor at 2.0 mg/L concentration (Table 7). It was previously reported that removal efficacy

Table 6
Physico-chemical characters of wastewater used in reactor.

Physico-chemical characters	Result
pH	7.39 ± 0.13
Chemical oxygen demand (mg/L)	894 ± 50
Biological oxygen demand (mg/L)	350 ± 45
NO ₂ (mg/L)	0.4 ± 0.12
NO ₃ (mg/L)	23 ± 4.1
Total nitrogen (mg/L)	28.4 ± 3.6
Heavy metals	
Hg ²⁺ (mg/L)	0.09 ± 0.001
Pb ²⁺ (mg/L)	0.13 ± 0.06
Zn ²⁺ (mg/L)	0.007 ± 0.0
Cu ²⁺ (mg/L)	0.32 ± 0.14
Cd ²⁺ (mg/L)	0.001 ± 0.0
Ni ²⁺ (mg/L)	0.001 ± 0.0
Antibiotics	(µg/L)
Penicillin	0.031
Ampicillin	0.001
Nalidixic Acid	ND
Ceftazidime	ND
Cefotaxime	ND
Tetracycline	0.28
Gentamicin	0.002
Kanamycin	0.001

ND: Not detected or lower than detection limit.

Table 7
Bioaccumulation of heavy metals by the strain *P. aeruginosa* strain RA-14.

Heavy metal concentration (mg/L)	Bioaccumulation (%)					
	Cu ²⁺	Hg ²⁺	Pb ²⁺	Zn ²⁺	Cd ²⁺	Ni ²⁺
0.5	27 ± 1.8	30.52 ± 9.5	42.9 ± 1.2	10.3 ± 0.09	35.3 ± 0.49	40.3 ± 5.2
1	48 ± 3.2	39.4 ± 1.8	51.8 ± 0.83	12.4 ± 0.19	38.9 ± 1.7	69.3 ± 2.7
1.5	60.3 ± 1.8	59.6 ± 0.42	69.4 ± 1.2	20.1 ± 2.8	54.7 ± 0.18	70.2 ± 0.31
2	64.1 ± 2.9	75.7 ± 2.3	87.8 ± 0.3	35.3 ± 5.3	59.2 ± 4.2	74.3 ± 1.5
2.5	59.8 ± 3.7	76.2 ± 0.07	83.2 ± 4.1	40.8 ± 0.06	57.4 ± 3.6	73.8 ± 0.97

depends on the interaction between the composition of other wastewater components, heavy metal species in the system and the biological operating system (Laurent et al., 2009). The removal efficacy of Cd²⁺ and Ni²⁺ was 59.2% and 74.3%. Ajmal et al. (1982) stated the less impact of initial Cd concentration in the biological reactor at lesser hydraulic retention time. The heavy metals concentration in the outlet level decreased in some extent due to cellular adsorption via bacteria, active bacterial uptake, flocculent formation and extracellular polymeric complexation.

3.8. Removal of organic matter from the wastewater by meal resistant bacteria in packed bed reactor

Heavy metal tolerant bacteria are widely applied to eliminate organic matters from the environment. However, these heavy metals are highly toxic at higher concentrations and negatively influenced the removal of organic matters and functional properties. The heavy metal concentrations up to optimum level supported the removal of COD and BOD from the wastewater. The heavy metals such as, copper and cadmium are highly toxic to bacteria even at very lower concentrations (Karwowska et al., 2016). The maximum COD removal (%) observed in this study can be related to the efficacy of inoculated bacteria on removing various available organic substances in the waste water. Reduction of organic matter in wastewater was high in the reactor than in the conventional bioprocess (Huang et al., 2018). The oxidation process involves conversion of ammonia to nitrate in the packed bed reactor consists of oxidation and transformation by nitrifying bacteria. The maximum hydraulic retention time of the reactor improved the removal of ammonia and achieved 78.4% removal from the wastewater (Table 8). Mannina et al. (2017) reported 67–87%, 53–69%, and 98–98% removal of total phosphorus, total nitrogen and COD, respectively in moving bed reactor with 10 h hydraulic retention time. Total nitrogen removal efficacy declined to 91.3 ± 2.1% and 89.5 ± 3.1% at 2.0 and 2.5% concentrations. The observed results suggest that hydraulic retention time higher than 10 h is not usually recommended due to decreased availability of organic matter concentration by phosphate reducing bacteria which affect the energy source for denitrifying organism.

Table 8
Removal of BOD, COD and total nitrogen in the packed bed reactor.

Heavy metal concentration (mg/L)	BOD removal (%)	COD removal (%)	Total nitrogen (%)
0.5	52 ± 3.2	64 ± 4.2	43 ± 3.3
1	67.8 ± 1.8	72.6 ± 3.8	49.8 ± 1.8
1.5	89.5 ± 3.7	87.5 ± 4.2	52.4 ± 2.2
2	94.3 ± 4.4	97.6 ± 3.3	91.3 ± 2.1
2.5	92.3 ± 6.2	90.8 ± 4.1	89.5 ± 3.1

4. Conclusions

The industrial wastewater samples were polluted with various heavy metals and antibiotics, which induced drug resistance among bacteria. These pollutants negatively influenced the population of bacteria. In this study multi metal resistant bacteria was screened and isolated. The selected strain (*P. aeruginosa* strain RA-14) showed resistance against all tested heavy metals and MIC value was maximum against lead (2800 ppm). It was resistant against most of the common antibiotics (penicillin-G, nalidixic acid, ceftazidime, cefotaxime, kanamycin and ampicillin). The selected strain removed $87.8 \pm 0.3\%$ Lead from wastewater after 10 h hydraulic retention time in sequencing batch reactor. Results revealed that the removal performance of various organic nutrients and heavy metals were not only influenced by various physical factors, however, microbial consortia or individual bacterium had potent impact in SBR.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.envres.2021.111240>.

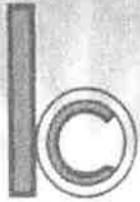
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All the authors share equal credit to this manuscript.

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"Passionately Protecting Mother-Nature since 1978"

Estd. Since 1978

Bharat Oil & Waste Management Ltd.

Common HW TSDF at Sahibabad, Kanpur-Dehat (UP), Mauza Mukimpur Roorkee and SIDCUL Haridwar (UK)

ISO 9001-2015



Quality Certified Company

CIN - U11201DL2007PLC160944

Hazardous, Electronic & Municipal Waste Management	Secured Landfill, Incineration, Pre-Processing/ Coprocessing of Waste	SEPL™ - NABL Accredited Laboratory for Testing of Air, Water, Soil, Hazardous Waste /Sludge/Sturry/Soil/Sediments /Chemicals/Materials	Lube Oil Re-Refining & Wholesale of Industrial Lubricating Oils
WTS™ - Enterprise Waste Tracking & Management Software	Regd with MoEF&CC / CPCB as Recycler & Reprocessor	Authorised by UPPCB, for HW & E-Waste Management	Authorised by UEPPCB, Uttarakhand for HW & E-Waste Management

Date – 05.08.2021

To,

M/s C. L Gupta Exports Ltd.
18 km Moradabad-Delhi NH-24
Village-Jivai Amroha

Sub: Facility of disposals of Hazardous Waste.

Sir,

This is to inform you that we have authorization from UPPCB, Lucknow issued. under the HWM Rules 2016 as per order No. 1403/UPPCB/Kanpur Dehat(UPPCBRO)/HWM/KANPUR DEHAT/2018 Dated 01.05.18 with details as below:

1. Category of Hazardous Waste as per the Schedules I, II and III of these rules: All category of Schedules I, II and III
2. Authorized mode of disposal or recycling or utilization or co-processing etc.: Disposal through SLF and incineration.

3. Validity 30.04.23

4. Standard Mode of disposal:

We collect these samples and store them at our storage area eg. from your company the ETP and STP sludge are received together and first of all we do random sampling from the lump and analysis is done in our NABL laboratory to check all Constituents and nature.

5. Accordingly they are first treated/neutralised and enmarked for suitable disposal based on criteria of CPCB guideline.

Thanks & Regards

For Bharat Oil & Waste Management Ltd.

Authorised Signatory



Regd. & Sales/Corporate Office:
Building No. 11, LGF, Community Centre,
East of Kailash, New Delhi - 110065, India
Ph : 011-41000710, 26210205, 26216466
Sales/WhatsApp : +91-9717706048
Email : sales@bharatoll.com
Website : www.bharatoll.com

Facilities:

- E - 18, Sahibabad Industrial Area, Site 4, Ghaziabad - 201010, UP, India
- Gata No. 672 & 706 G, Vill. Kumbhi, NH - 2 Kanpur-Dehat - 209101, UP, India
- Mauza Mukimpur Roorkee-Lakshar Road Roorkee - 247664, UK, India
- SIDCUL - Haridwar, UK, India



Part A: Engineering

- v. Can be used with primary clarifiers and power generation configurations where the ratio of VSS:TSS is high.
 - vi. Allows for easy modular expansion for population growth, modular configurations and cyclic operation is easily managed to provide continuous inflow and outflow hydraulic profiles, dispensing with the need for outflow hydraulic balancing
- b. Disadvantages
- i. Compared to the conventional activated sludge system, a higher level of sophistication and maintenance can be associated with more automated switches and valves.
 - ii. Basin depth should be sufficient to provide an adequate clear water depth over the sludge blanket to prevent settled solids entrainment.
 - iii. In small single stream SBR systems approximately less than 10 MLD, effluent flow balancing may be needed for downstream processing, such as filtration or disinfection.
 - iv. Short-circuiting of influent conservative parameters (ammonia nitrogen, orthophosphate) under the non-interrupted inflow protocol may be a process failure consideration in some SBRs.
 - v. Larger capacity aeration system, relative to aeration time per cycle and per day, is required compared as to conventional activated sludge system.
 - vi. The potential for discharging floating or settled sludge during the decant phase with certain SBR configurations.
 - vii. Potential plugging of aeration devices during selected operating cycles depending on the aeration system used by the manufacturer.
 - viii. There should be sufficient allowance of clear water depth from the sludge blanket to minimize sludge carryover. The volume of water decanted should be limited to prevent scouring of solids.
 - ix. All the SBR plants must be designed to cater to the peak flows. A minimum of two tank system is required.

5.18.12.4 Typical Design Parameters

A compilation of typical process details that would feature in the use of SBR facilities is mentioned in Table 5.57. It has to be recognized that as with all similar technologies, these are only of informative value for India and it is mandatory that there is a demonstrated available level of Indian expertise and support services for the design of SBR systems and its operational methodology for India which is to be hereafter evolved with reference to a validation of design vs. actual performance of SBRs built in India.

One of the classical difficulties that pertain to establishing the design parameters for SBR is the biomass metabolism. In the ASP and CFR, it takes place under "steady state conditions" where a steady BOD profile from inlet to outlet is existing in the aeration tank irrespective of time.

Table 5.57 Typical process parameters for SBR configurations (for unsettled sludge)

S. No.	Parameters	Units	Continuous Flow and Intermittent Decant	Intermittent Flow and Intermittent Decant
1	F/M ratio	d ⁻¹	0.05 - 0.08	0.05 - 0.3
2	Sludge Age	d	15 - 20	4 - 20
3	Sludge Yield	kg dry solids/ kg BOD	0.75 - 0.85	0.75 - 1.0
4	MLSS	mg/L	3,000 - 4,000	3,500 - 5,000
5	Cycle Time	h	4 - 8	2.5 - 6
6	Settling Time	h	> 0.5	> 0.5
7	Decant Depth	m	1.5	2.5
8	Fill Volume Base	-	Peak Flow	Peak Flow
9	Process Oxygen			
	BOD	kg O ₂ /kg BOD	1.1	1.1
	TKN	kg O ₂ /kg TN	4.6	4.6

* For Phosphorous ≤ 1 mg/L, after bio-P removal, metal precipitant (Fe³⁺ or Al³⁺) shall be added. Sludge yield factor and sludge age not applicable for primary settled sewage; typical primary TSS removal 60%, BOD 30%.

In the case of SBR, the biomass metabolism takes place under “unsteady state conditions” where the BOD profile decreases with time during the batch time interval. Thus, calculating the oxygen requirements is a challenge depending on many factors. In actual practice, the oxygen requirement is calculated as though it is a steady state condition as in the CFR and then the rate of air delivery to the basin is calculated by delivering the entire volume of air in the actual aeration interval. This will need a much bigger air compressor and air diffuser system.

However the motor is controlled by VFD and thereby the delivery of the compressor is gradually adjusted down to suit the real need or maintained as it is based on maintaining the required residual D O in the basin at the end of aeration. It is a unique feature in the design of SBR aeration facilities.

However, it needs a focussed study to establish the actual oxygen uptake rate as a function of aeration interval to make future designs more realistic. Such data as validated by actual observations is not found in literature.

5.18.12.4.1 Disinfection tank volume

The capacity of the chlorine contact tank for the treated sewage of batch processes such as the SBR will be based on 30 minutes detention time of the rate of decant flow calculated as volume of decant flow divided by the duration of decanting of any one or multiple reactors decanting simultaneously.

4.5.2 Maintenance

Because grit removal is rarely provided before equalization, grit tends to accumulate in the basins. Therefore, provisions for collecting these solids should be made in the design. If the primary purpose of the equalisation basin is flow equalising, then, after the basin has been emptied, following the peak flow event, primary sludge solids will be present in the basin floor. Water cannons or strategically placed cleaning hoses, ideally supplied with plant effluent water, will allow for cleaning the basins. Other equalization basin types that do not operate in a fill/draw mode will also accumulate solids over a period of time and will have to be emptied.

The cleaning interval depends on the influent sewage characteristics and has to be established by operational experience.

4.6 PRIMARY TREATMENT

4.6.1 Primary Sedimentation Tank Management

This is a simple gravity controlled separation for removing the settleable solids and the Biochemical Oxygen Demand (BOD) that is caused by the settleable solids.

4.6.2 Preventive Maintenance

Preventive maintenance of the equipment should be done by the equipment supplier as per the manual.

4.6.3 Day to Day Maintenance

The most important is the daily cleaning of the overflow weirs and the weekly scraping of the floor and walls of the launder. Moreover, periodical checking of the walkway for corrosion is important. In actual day-to-day working, the operator should not lean or put his weight on the handrails.

4.6.4 Troubleshooting

Troubleshooting is as given in Appendix B.4.1.

4.7 ACTIVATED SLUDGE PROCESS (ASP)

The activated sludge process is still the most widely used biological treatment process for reducing the concentration of organic pollutants in sewage. Well-established design standards based on empirical data have evolved over the years.

The basic ASP has many different process modifications. The process selected in a specific STP depends on the treatment objectives, site constraints, operational constraints, etc.

The process can be categorized by loading rates, reactor configuration, feeding and aeration patterns, and other criteria including various biological nutrient removal (BNR) processes.

A typical plan layout of a basic ASP is illustrated in Figure 4.5 overleaf.

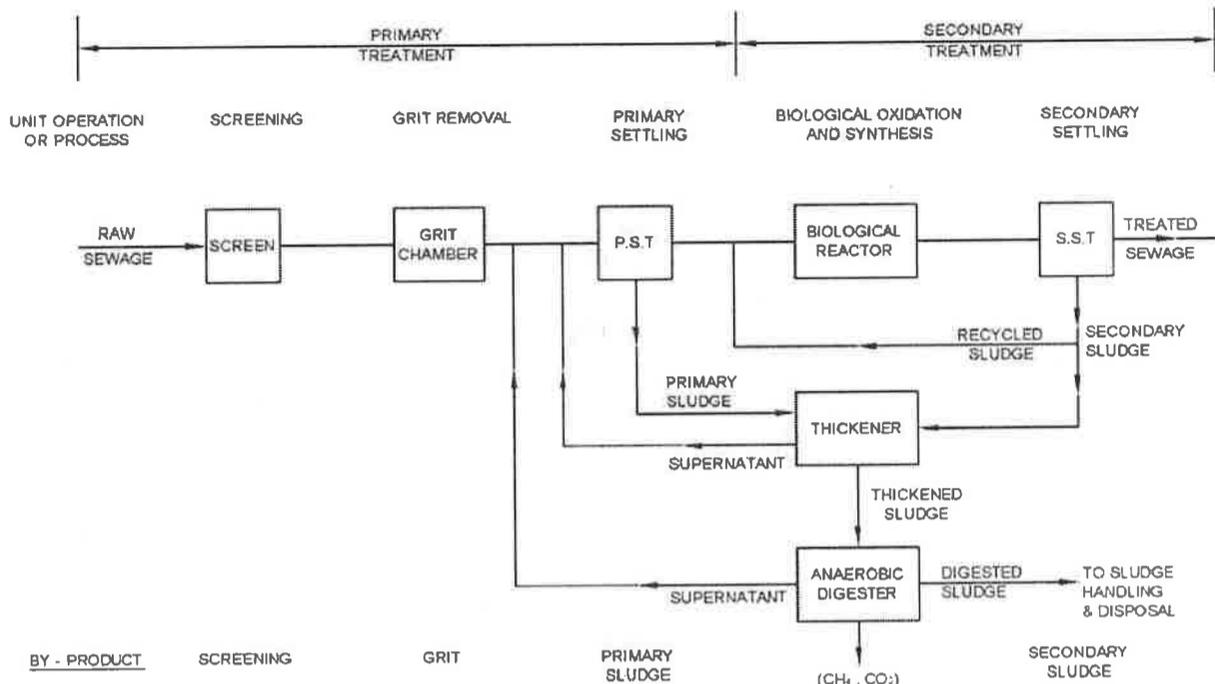


Figure 4.5 Typical plan layout of activated sludge plant

4.7.1 Description of ASP

4.7.1.1 Biological Treatment Processes

In the biological treatment of sewage, the stabilisation of organic matter is accomplished biologically using a variety of microorganisms, principally bacteria. They convert the colloidal and dissolved carbonaceous matter into gases and non-degradable matter and incorporate it into their cell tissue. The resulting cell tissue has a specific gravity slightly greater than that of water. The portion of organic matter that has been converted to various gaseous and non-degradable end products, which itself is organic, will be measured as the difference between the inlet and outlet.

The conversion of organic matter can be accomplished either by aerobic, anaerobic or facultative processes. Oxidation of organic matter to various end-products is carried out to obtain the energy required for the synthesis of new cell tissues. In the absence of organic matter, the cell tissue undergoes endogenous respiration. In most treatment systems, these three reactions, oxidation, synthesis and endogenous respiration occur simultaneously.

The microbial mass comprises a heterogeneous population of microorganisms, mostly heterotrophic bacteria. Various groups of organisms carry out their metabolic reactions independently as well as sequentially. The combination of organisms in the treatment process occurs naturally, depending upon the sewage characteristics and the environmental conditions maintained.

4.7.1.2 Design and Operational Parameters

The ASP operation is commonly controlled by maintaining the design Mixed Liquor Suspended Solids (MLSS), or sometimes, by maintaining the design Food to Microorganisms (F/M) ratio. The latter approach takes care of fluctuations in the quality of raw sewage.

If actual F/M is to be assessed, then measurement of active biomass measured as Mixed Liquor Volatile Suspended Solids (MLVSS) is needed.

The solids retention time (SRT), which is directly related to F/M, is not being used for operational control. Some of the important design and operational parameters are as follows.

The operational parameters and their formula are explained in Appendix B.4.2 and examples of their calculations are described in Appendix B.4.3.

4.7.1.3 Choice between SRT and F/M as Operation Control Parameter

The evaluation of the active mass of microorganism often makes the use of F/M as a control parameter impractical. Biological solids are commonly measured as volatile suspended solids.

This parameter is not entirely satisfactory because of the variety of volatile matter not related to active cellular material.

On the other hand, the evaluation of SRT as a plant control parameter is simple. Since SRT is the ratio of total suspended solids in the system and the total suspended solids wasted per day, it requires only measurement of the suspended solids in the system and the solids wasted, either from the aeration tank or from the recycle line is the same. Use of SRT as a plant control parameter becomes simpler if sludge wasting is done directly from aeration tank, as the ratio of "total solids in system to solids wasting per day" reduces to the ratio of "aeration tank volume to volume of sludge wasted per day," provided the mass of solids escaped in treated effluent is negligible.

4.7.1.4 Effect of SRT on Settling Characteristics and Drainability of Sludge

It has been established that as a system is operated at higher solids retention time, the settling characteristics of the biological flocs improve. For domestic sewage, SRT of the order of 3 to 4 days are required to achieve effective settling. Further, it is established that drainability of waste sludge also improves when a system is operated at higher SRT.

The SRT at which a process is operated approximately represents the average age of biomass present in the process. As the biomass ages, it contains increasing proportion of dead cells and inert matter. Presence of higher proportion of mineralised sludge in a process operated at high SRT is responsible for better setting characteristics and better drainability of sludge.

4.7.1.5 Effect of SRT on Excess of Sludge Production

SRT is inversely related to F/M ratio. A higher operational SRT represents a low F/M ratio, a condition of limiting substrate. The Bacteria undergoes endogenous respiration or decay under a limiting substrate environment. More biomass undergoes endogenous respiration, resulting in lesser net bacterial growth.

Therefore, excess sludge production is reduced if a system is operated at high SRT. Further, since the settling characteristic of sludge improves at high SRT, concentrated underflow can be withdrawn from the sedimentation tank. This results in reduction in excess sludge.

EXHIBIT- 8

1744



C.L. Gupta Exports Ltd.

18 km before Moradabad - Delhi Highway,
Vill. Jivai, Amroha - 244221, (U.P.) India
CIN : U74999 DL2004 PLC 125090
GSTIN : 09AACCG0992J1ZC

Tel. : +91-591-2477000
Fax : +91-591-2477300
e-mail : mail@clgupta.com
Web : www.clgupta.com

CLG/HR-31/21-22/201

03.07.2021

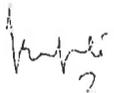
The Chairman,
U.P. Pollution Control Board,
T.C.-12 V, Vibhuti Khand,
Gomti Nagar, Lucknow-226010

Sir,

I have the honor to submit that the applicant unit has applied for renewal of consents pending consideration at the end of the Board and the unit fulfills entire environmental norms and standards and it also specifically undertakes that the unit will still continue to maintain and fulfill the entire environmental norms and standards in future by taking abundant caution in this regard; apart from the fact that keeping in view the prevalent covid-19 epidemic in the country, many employees/workers will become jobless in case of stoppage of functional work of the unit and as such the provisional consents for 15 days is sought to be accorded until final decision upon the application of renewal of consent under the Water Act, 1974 and Air Act, 1981, is taken at your end. It is also not out of place to mention here that the unit has also removed the entire deficiencies including the deposit of Environmental Compensation as observed by NGT in the pending adjudication before it.

It is therefore requested that keeping in view the present epidemic problem of covid-19 in the country and also to avoid joblessness of workers/employees working in the unit, the 15 days provisional consents may kindly be extended or unit the final decision upon applications for renewal is taken at the end of the Board whichever is earlier. Kindly do the needful at an earliest due to prevalent epidemic problem in the country in public interest.

Thanking You
Yours Faithfully
For C. L. Gupta Exports Ltd.


(Teevra Gupta)

Director

Manufacturer & Exporters

Brass Art Ware • E.P.N.S. Ware • Wrought Iron Ware • Glass & Crystal Ware • Iron & Steel Ware • Wooden Furniture & Accessories

Regd. Office : DPT 337, DLF PRIME TOWER, OKHLA, NEW DELHI-110020

Handwritten: R.O. Copy Received
July 12
13-7-2021
क्षेत्रीय कार्यालय
राष्ट्रीय प्रदूषण नियंत्रण बोर्ड
आर. ए. गणानन्द नगर, निकट सीए
धर्मपुर रोड, बिजनौर-246101

1745

Annexure-8



C.L. Gupta Exports Ltd.

18 km before Moradabad - Delhi Highway,
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e-mail : mail@clgupta.com
Web : www.clgupta.com

CLG/HR-31/21-22/224
The Chief Environment Officer(Circle-7)
Uttar Pradesh Pollution Control Board
Building.No. TC-12V, VibhutiKhand,
Gomti Nagar,
Lucknow-226010.

Date: 02.08.21

Sub: Renewal of Air and Water consents.

Sir,

Kindly refer to above subject. In this respect we wish to submit that:

1. As per your letter No. 128686/UPPCB/Bijnore(UPPCBRO) /CTO/air /JYOTIBAPHULE NAGAR /2021 and 128687/UPPCB/Bijnore (UPPCBRO)/ CTO/water/JYOTIBA PHULE NAGAR/2021 both dated 18.06.2021 the renewal was to be extended on the basis of inspection report of Joint Committee (CPCB, UPPCB & CGWA).
2. As per the inspection report dated 30.07.2021 received from the Joint Committee the unit is complying with all the earlier recommendations.

Hence it is humbly requested that our pending consents may please be renewed at your earliest convenience as our work is suffering very badly and the present period is very vital for orders execution.

Thanks & Regards

(A.K. Johri)

GM(HR/Admin)

Manufacturer & Exporters

Brass Art Ware • E.P.N.S. Ware • Wrought Iron Ware • Glass & Crystal Ware • Iron & Steel Ware • Wooden Furniture & Accessories

Regd. Office : DPT 337, DLF PRIME TOWER, OKHLA, NEW DELHI-110020

1746



C.L. Gupta Exports Ltd.

18 km Before Moradabad, Delhi Highway,
vill. Jivai, Amroha-244221, India
Cin :- U74999 DL2004 PLC 125090

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e-mail : mail@clgupta.com

CLG/HR-31/2021-22/ 215

17.07.2021

The Chief Environmental Officer (Circle-7),
Uttar Pradesh Pollution Control Board,
TC-12-V, Vibhuti Khand,
Gomti Nagar, Lucknow 226010.

**Sub: Clarification wrt Consent application (water) of C.L. Gupta Exports Ltd,
Village Jivai, District Amroha**

- 1) Point wise Compliance of consent order no. 128687/UPPCB/Bijnore (UPPCBRO) /CTO/water/JYOTIBA PHULE NAGAR/2021 dated 18.6.21 is as per **Annexure-I**
- 2) Payment Status of 1,15,72,567/= is as per **Annexure-II** which has already been accepted by your department.
- 3) Reply of notice No. H 62543/C-7/Jal-54/21 dated 18.06.2021 has also been given. Copy as per **Annexure-III**

You are requested to please renew the water consent.

Thanking You
Yours Faithfully
For C. L. Gupta Exports Ltd.

(A.K. Jhari)
GM/HR/Admin)

Encl: aa

Cc: Regional Officer UPPCB, Behind St. Mary School, Adampur Road, Bijnore for kind information.

Manufacturer & Exporters
Brass Art Ware • E.P.N.S. Ware • Wrought Iron Ware • Glass & Crystal Ware • Iron & Steel Ware • Wooden Furniture & Accessories

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Annexure-I

1747



C.L. Gupta Exports Ltd.

18 km before Moradabad - Delhi Highway,
Vill. Jivai, Amroha - 244221, (U.P.) India
CIN : U74999 DL2004 PLC 125090
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Fax : +91-591-2477300
e-mail : mail@clgupta.com
Web : www.clgupta.com

CLG/HR-31/2021-22/218

17.07.2021

The Chief Environment Officer (Circle-7)
Uttar Pradesh Pollution Control Board
TC-12V, Vibhuti Khand, Gomti Nagar
Lucknow

Sub: Compliance for Consent order No.128687/U PPCB/Bijnore(U PPCBRO)/ CTO/ Water/
JYOTIBAPHULE NAGAR/2021 dated 18.06.2021

1) Noted Except the quantities of following items are written more by your office inadvertently.

<u>Item</u>	<u>As already approved</u>	<u>As approved Now</u>
Marble Artware	90 TPM	345 TPM
Thermocol	65 TPM	345TPM

2) Noted

3) Noted for contd. Compliance

4) Noted for contd. Compliance

5) Noted for contd. Compliance

6) Noted

7) Not used at all

8) CPCB has not prescribed any cleaner Technology to us. If it is with UPPCB it may be provided to us. We however are adopting all standard Systems and end results are OK.

9) Noted for contd. Compliance

10) Installed and records maintained

11) Installed and records maintained

12) Noted

13) Installed and records maintained

14) Noted for contd. Compliance

15) Noted

16) Noted for contd. Compliance

17) Noted for contd. Compliance

18) We are using ZLD to satisfy the system.

19) Noted

20) Noted

21) Noted, including the second part i.e. if any order passed is negative, the consent order shall become valid automatically if the said order is revoked by the Board subsequently.

Thanks & Regards

(A.K. Jouri
GM/HR/Admin)

Manufacturer & Exporters

Brass Art Ware • E.P.N.S. Ware • Wrought Iron Ware • Glass & Crystal Ware • Iron & Steel Ware • Wooden Furniture & Accessories

Regd. Office : DPT 337, DLF PRIME TOWER, OKHLA, NEW DELHI-110020

1748



C.L. Gupta Exports Ltd.

18 km before Moradabad - Delhi Highway,
Vill. Jivai, Amroha - 244221, (U.P.) India
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e-mail : mail@clgupta.com
Web : www.clgupta.com

CLG/HR-31/2021-22/214

17.07.2021

The Chief Environmental Officer (Circle-7),
Uttar Pradesh Pollution Control Board,
TC-12-V, Vibhuti Khand,
Gomti Nagar, Lucknow 226010.

Sub: Clarification wrt Consent application (air) of C.L. Gupta Exports Ltd, Village Jivai, District Amroha

- 1) Point wise Compliance of consent order no. 128686/UPPCB/Bijnore (UPPCBRO) /CTO/air/JYOTIBA PHULE NAGAR/2021 dated 18.6.21 is as per **Annexure-I**
- 2) Payment Status of 1,15,72,567/= (already made) is attached **Annexure-II**.
- 3) Reply of notice No. H 62543/C-7/Jal-54/21 dated 18.06.2021 received on 28.06.21 already given on 03.07.21. Copy attached as **Annexure-III**

You are kindly requested to please renew the air consent.

Thanking You
Yours Faithfully
For C. L. Gupta Exports Ltd.

(A.K. Johri)
GM(HR/Admin)

Encl: aa

Cc: Regional Officer UPPCB, Behind St. Mary School, Adampur Road, Bijnore for kind information

Manufacturer & Exporters

Brass Art Ware • E.P.N.S. Ware • Wrought Iron Ware • Glass & Crystal Ware • Iron & Steel Ware • Wooden Furniture & Accessories

Regd. Office ; DPT 337, DLF PRIME TOWER, OKHLA, NEW DELHI-110020

Annexure-I

1749



C.L. Gupta Exports Ltd.

18 km before Moradabad - Delhi Highway,
Vill. Jivai, Amroha - 244221, (U.P.) India
CIN : U74999 DL2004 PLC 125090
GSTIN : 09AACCG0992J47C

Tel. : +91-591-2477000
Fax : +91-591-2477300
e-mail : mail@clgupta.com
Web : www.clgupta.com

17.07.21

CLG/HR-31/2021-22/217
The Chief Environment Officer (Circle-7)
Uttar Pradesh Pollution Control Board
TC-12V, Vibhuti Khand, Gomti Nagar
Lucknow

Sub: Compliance for Consent order No.128686/UPPCB/Bijnore(UPPCBRO)/CTO/ air/ JYOTIBAPHULE
NAGAR/2021 dated 18.06.2021

1) Noted, Except the quantities of following items are written more by your office inadvertently.

<u>Item</u>	<u>As already approved</u>	<u>As approved Now</u>
Marble Artware	90 TPM	345 TPM
Thermocol	65 TPM	345TPM

2) Noted

3) Noted for continued compliance

4) Noted for continued compliance

5) Complined

6) Complined

7) Noted for continued compliance

8) Noted for continued compliance

9) Noted for continued compliance

10) Noted for continued compliance

11) No cyanide is used

12) CPCB has not prescribed any cleaner Technology to us. If it is with UPPCB it may be provided to us. We however are adopting all standard Systems and end results are ok.

13) Noted for continued compliance

14) Installed and records maintained

15) Installed and records maintained

16) Yes

17) Installed and working satisfactorily

18) Noted

19) Noted and compliance ensured

20) Noted and compliance ensured

21) Noted and records maintained

22) We are using ZLD, to satisfy the system.

23) Noted for compliance

24) Noted

25) Noted, including the second part i.e. if any order passed is negative, the consent order shall become valid automatically if the said order is revoked by the Board subsequently.

Thanks & Regards

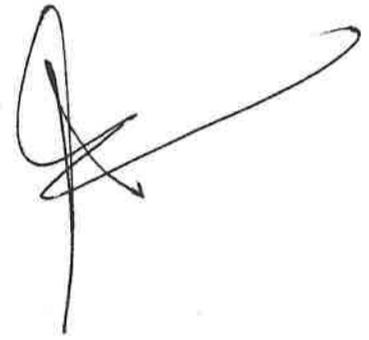
(A. T. Jhri
GM (HR/Admin)

Manufacturer & Exporters

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Environmental Compensation Deposition Details			
Sr. No.	UTR No.	Date	Amount
1	SBIN421159087452 SBIN220171842298 SBIN220171842422	08-06-2021 19-06-2020 19-06-2020	1,08,60,000
2	SBINR52020110500162607 SBIN220171867465	05-11-2020 19-06-2020	7,12,567
	Total		1,15,72,567



1751

Sent: Tue 08 Jun 21 4:41

From: Neeraj Bansal <nbansal@cdgupta.com>
To: ajaijohn@cdgupta.com
Cc:
Subject: UTTAR PRADESH POLLUTION CONTROL BOA

R/Sir

We are given below the UTR No. against payment paid to U P Pollution Control Board:

TO TRANSFER
08-Jun-2021 (08-Jun-2021) INB NEFT UTR NO: SBIN421159087452
UTTAR PRADESH POLLUTION CONTROL BOA 70,96,400.00

Regards

Neeraj Bansal
C L Gupta Exports Ltd
18th Km Before Moradabad, Delhi Highway,
Vill. Jival, amroha-244221, India.
CIN No. U44999 DL2004 PLC125090

(C) - 70,96,400/-

1752

Sent: Fri:06 -Nov 20 9:59

From: Neeraj Bansal <nbansal@dqupta.com>
 To: ajajohri@dqupta.com
 Cc:
 Subject: FW: RTGS UTR

R/sir

We are given below the details of RTGS paid to U P Pollution Control Board .

05/11/2020	05/11/2020	CHQ TRANSFER-RTGS UTR NO: SBINR52020110500162607--443437 UP POLLUTION CONTROL BOARDS	/ 443437 UP POLLUTION CONTROL BOARDS	4113	612567
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Regards

Neeraj Bansal

(8) - 612,567/-

1753

From: Neeraj Bansal <rbansal@cdgupta.com>
To: aajajohn@cdgupta.com
Cc: pankaj@cdgupta.com
Subject: UTR NO OF UP POLLUTION CONTROL BOARD NEFT

Sent: Fri 19-Jun-20 5:12

R/Sir

We are given below the UTR No. of Amount paid to U P Pollution Control Board :-

19/06/2020	CHQ TRANSFER-NEFT UTR NO: SBIN220171842298--140027 UP POLLUTION CONTROL BOARD	/ 140027 UP POLLUTION CONTROL BOARD	4113	3753600
19/06/2020	CHQ TRANSFER-NEFT UTR NO: SBIN220171842422--140026 UP POLLUTION CONTROL BOARD	/ 140026 UP POLLUTION CONTROL BOARD	4113	10000
19/06/2020	CHQ TRANSFER-NEFT UTR NO: SBIN220171867465--140025 UP POLLUTION CONTROL BOARD	/ 140025 UP POLLUTION CONTROL BOARD	4113	100000

Regards

Neeraj Bansal
C L Gupta Exports Limited
18 KM Before Amroha-244221
CIN No. U74999 DL2004 PLC125090

(A) 3063,600/-

Annexure-III

1754



C.L. Gupta Exports Ltd.

18 km Before Moradabad, Delhi Highway,
viii. Jivai, Amroha-244221, India
Cin :- U74999 DL2004 PLC 125090

Tel. : +91-591-2477000
Fax : +91-591-2477300
e-mail : mail@clgupta.com

CLG/HR-31/2021-22/202

03.07.2021

The Chief Environmental Officer (Circle-7),
Uttar Pradesh Pollution Control Board,
TC-12-V, Vibhuti Khand,
Gomti Nagar, Lucknow 226010.

Sir,

With reference to the notice/letter No. H 62543/C-7/Jal-54/21 dated 18.06.2021 I have to respectfully submit that the foundation of the notice is the report of the joint committee dated 30.07.2020 whereby, the Environmental compensation already paid by the applicant unit has been sought to be modified and show cause notice must contain those documents which are sought to be considered must be supplied with notice in order to explain effectively to achieve the very object of the principle of natural justice and as such it is a sort of tentative reply with the prayer that those documents/ reports which are the foundation of the aforesaid notice must be supplied to the applicant and as such the applicant unit is reserving its right to file detailed reply after receipt of those documents.

Further on these grounds pending writ petition no. 95/2021 (M/B) before Hon'ble High Court Lucknow Bench Lucknow is pending wherein U.P. State Pollution Control Board is also one of the respondents and after hearing both the parties at length, Hon'ble High court required respondents to file counter affidavit by means of an order dated 19.01.2021 thereby four weeks time has been granted to the respondents and two weeks time was granted to the applicant unit to file rejoinder affidavit but till today no counter affidavit has been filed by the either of the respondents and as such the order dated 30.09.2020 which has been sought to be quashed in the aforesaid writ petition cannot be made the foundation of the show cause notice dated 18.06.2021.

It is further relevant to point out here that application for consent to operate the unit was also refused by means of an order dated 06.06.2021 which has also been challenged in statutory appeals under the relevant provisions of the Water Act, 1974 and the Air Act, 1981 before the appellate authority being the State Governments and in both the appeals U.P.P.C.B is also one of the respondents in appellate forum apart from the other authorities and both the appeals so submitted before the appellate authority are also pending adjudication in conformity

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with the provisions of law and as such pre-decisional hearing at the end of the Board is not permissible under law and as such the aforesaid notice has got no significance in respect of those matters which are pending before High Court as well as before the Appellate authority where the right of the parties are to be adjudicated on merit.

It is also pointed out that certain technical abbreviations have been used which are required to be elaborated at the end of the authority issuing notice in order to enable the notice to explain and reply as to why and how the Environmental Compensation already imposed and deposited under protest upon the interim direction of NGT as passed in pending OA no. 220/2019 and this case is also pending adjudication by Hon'ble NGT and no final finding can be recorded by the Board specially when the Board is also one of the respondents in the original OA application as mentioned above.

GROUNDS

1. Because it is undisputed that a dispute bearing case number 220/2019 Adil Ansari V/s C.L. Gupta Export Ltd. is pending before Hon'ble NGT where the rights of the parties are to be adjudicated on merit on the basis of set of evidence led by respective parties and the lis is to be decided by way of an award in the form of final decree as defined under the provisions of CPC and the procedure and the general principle of CPC apart from the special procedure provided under the NGT, Act 2010 and as such any interim/interlocutory order which always merges with the final decree/award to be passed by Hon'ble Tribunal by way of final adjudication and the interim/interlocutory order / observation of NGT can never be made foundation of finding recorded by statutory authority in absence of any direction of NGT where the OA as mentioned above is pending adjudication.
2. Because from the bare reading of the aforesaid provision, it transpires that the power to execute Environmental compensation/damages due to pollution is exercisable by NGT nor by State Board nor the same can be imposed by the issuance of the notice and as such the proposed notice dated 18.06.2021 is not sustainable in law in absence of any specific order by NGT.

MATTER IN RESPECT OF ENVIRONMENTAL COMPENSATION

3. That the bare perusal of the provisions of all environmental laws including the Water Act, 1974, Air Act, 1981 and Environment (Protection) Act, 1986 as well as under the Rules framed thereunder, there is no provisions to this effect to impose environmental compensation by Board upon any industrial unit and even to those units to which the

consent has been accorded by the state Board after resorting to regulatory procedure provided under the relevant Rules and as such the order imposing the Environmental compensation passed either by State Board or by its authorities is wholly without jurisdiction and also without any authority of law.

4. That it is well settled that Parliament in its collective wisdom has not provided any provision in the Environmental Enactments upon Boards for imposition of Environmental compensation upon the Industrial units to which the consent has been specifically accorded for running the unit after resorting to the regulatory procedure provided under the Rules framed thereunder after due deliberation and thus in absence of any specific provision to this effect, the State Board or its functionaries are not at all empowered to pass any order in respect of imposition of Environmental compensation or damage and the order so passed imposing the such compensation or damage is wholly without any authority of law and also without jurisdiction.

It is further to elaborate that:-

1. No reply of our letters dated 14.10.20, 27.10.20, 28.11.20 and our letter dated 15.12.20 u/s 21/22 of Air Act 1981 and 25/26 of Water Act 1974 were received wherein your order dated 30.09.20 was requested to be rescinded by invoking the power u/s 21 of General clauses Act.
2. There seems to be no justification of granting consents for 12 days once we pay fees for full one year and there is no bar from NGT side as well to stop issuance of consents where over 6000 persons are employed and we were found complined by UPPCB LUCKNOW, IIT Roorkee, CSIR-NEERI and Jamia Millia Islamia University.
3. The above applications were considered during VC held on 8.1.21 with you the conclusion/reply of which has never been conveyed to us.

On the basis of above and availing the opportunity of resjudicata, the imposition of further EC of Rs. 19,80,000/- may kindly be waived.

In case, you are not satisfied with our above clarifications, we may kindly be allowed to give us an opportunity to explain our matter personally with you to safeguard the interest of industry as there was no change of technical status of factory during the said 66 days. The basis of imposition of EC(Formulae) is also not clear challenged and basis from your side.

Thanking You
Yours Faithfully
For C. L. Gupta Exports Ltd.

(A.K. Johri)
GM/IR/Adnan

Cc: Chairman UPPCB, Lucknow for kind information please.