

COMPLIANCE REPORT OF SEWAGE TREATMENT PLANT (STP) AT M/s ELYSIUM PROPERTIES INDIA PVT. LTD. AS PER THE DIRECTION OF NGT (SZ) DATED MARCH 16, 2020 IN THE MATTER OF ORIGINAL APPLICATION NO. 213 OF 2015

1.0 Preamble

The National Green Tribunal (NGT) Southern Zone, Chennai in the matter of O. A. No. 213 of 2015 in case of Sh. C. P. Senthil Vs Tamil Nadu Pollution Control Board and 2 others issued an order stating that:

“We direct the same committee to inspect the STP in question and ascertain as to whether the recommendations made in the joint committee report have been complied with by the third respondent and if not what action has been taken by them against the violator including imposition of environmental compensation and submit a factual as well as action taken report to this Tribunal. The committee is also at liberty to conduct fresh inspection and collect the inlet and outlet data on waste water from the STP to ascertain as to whether the pollution control norms have been fully complied with or not including the parameters shown in the report relied on by the committee in their earlier report.”

2.0 Joint inspection by the committee

As per the order dated March 16, 2020, a joint inspection of STP facility located at Flushing Meadows, Vellanaipatty village was carried out by the joint committee members: Smt. Poornima B M, Scientist “D”, (CPCB, Regional Directorate, Chennai), Dr. V. Deepesh, Scientist “C” (CPCB, Regional Directorate - Bengaluru) and Smt. D. Jeyalakshmi (DEE, TNPCB, Coimbatore North) along with Dr. P. Ramesh (AE, TNPCB, Coimbatore North) on August 18, 2020. The officials from CPCB joined the virtual inspection through online video conferencing due to the prevailing COVID-19 pandemic situation. A virtual video walkthrough in and around the STP facility was done by the TNPCB officials and CPCB officials interacted with the operators through video conferencing. During inspection, STP was operational and samples were collected by the TNPCB team from the inlet and outlet components of the STP.

3.0 Compliance verification

As per the direction of NGT (SZ) in its order dated December 22, 2016 the joint committee constituted by NGT comprising of CPCB and TNPCB officials inspected the STP at 'Flushing Meadows' (M/s. Elysium Properties India Pvt. Ltd.) on March 9, 2017 and the joint committee report was submitted to NGT summarizing the findings & recommendations. In continuation of the case, honourable Tribunal in its order dated March 16, 2020 directed the same committee to inspect the STP and to ascertain that, the recommendations/ suggestions made in the joint committee report have been complied by the third respondent. The status of compliance to the recommendations is depicted in table 1.

Table 1: Status of compliance by third respondent

No.	<i>Findings of the committee (09-03-2017)</i>	<i>Compliance status as on 18-08-2020</i>
1	<p>The STP is meeting the standard consented parameters (BOD and TSS) of TNPCB and the NH₄-N reported at outlet is 11.26 mg/ L. The MLSS in the aeration tank is 58 mg/ L, which indicates the poor operation and maintenance of STP.</p>	<p><i>Not Complied</i></p> <p>The analysis result (Table 2) of sample collected on 18-08-2020 shows that the parameters of the STP outlet are meeting the standard prescribed by TNPCB. However, BOD and COD values are reported to be higher in the aeration tank than the values reported in the raw sewage. BOD:COD ratio of raw sewage is usually 0.3 to 0.8, but in this case it is 0.16 which is very unusual. Ammonia content also was unusually high in the aeration tank. If the ammonia concentration is > 1 mg/L, then a condition exists in the aeration tank that is limiting the complete conversion of the influent waste into bacterial cells. The nitrifying bacteria, which convert ammonia to nitrate, require adequate DO throughout the aeration tank environment. The above observations and the very poor MLSS in the aeration tank suggest serious flaws in the operation and maintenance of the STP. While collecting inlet sample from collection tank, the committee observed floating plastic bio-media rings, which implies that the water from the clarifier tank is pumped/ channelized to collection tank for dilution. The committee has pointed out the presence of plastic bio-media rings in clarifier tank in the 2017 report also. Bio-media is the active component of the aeration tank and it should be retained in the aeration/ bio-treatment tank for the optimal treatment of sewage. Presence of bio-media rings in clarifier/ collection tanks vouches to poor engineering/ design.</p>

2	The STP has facility of tertiary treatment which includes disinfection and polishing dual media filtration (pressure sand & activated charcoal filters), but treatment efficiency is very poor as the Total and Fecal Coliform counts are 79000 and 23000 MPN/100 mL respectively.	TNPCB, District Office, Coimbatore could not sent the samples to TNPCB, Advanced Environmental Laboratory at Salem for total and fecal coliforms (TC & FC) analysis due to prevailing COVID-19 pandemic situation.
3	The existing STP is not constructed as per the engineering aspects and shall be augmented at the earliest for optimal and efficient treatment/ operation.	<i>Not Complied</i> The STP has not augmented and is operating with the existing facility without any rectifications or augmentations.
4	The treatment components such as bar screen chamber, collection & equalization tanks, which are constructed below the ground level has to be provided with the facilities for periodic cleaning and removal of accumulated sludge.	<i>Not Complied</i> It was informed that the sludge is been removed once in six months by the third party engaged for the operation & maintenance of the STP. However no documents were provided for verification. During inspection, the appearance of the STP clearly shows sludge is not scientifically managed. MLSS levels in the aeration tank suggest poor sludge generation due to poor operation of STP.
5	The equalization tank shall be provided with the coarse bubble diffusers for equalizing the wastewater before pumping into the aeration tank. Horizontal centrifugal, non- clog sludge, solids – handling pumps with open impellers shall be used which is more efficient and also reduces the noise pollution generated during operation. The pumps shall not be installed on tanks/ hollow space as it will amplify noise.	<i>Not Complied</i> The equalization tank is not provided with coarse bubble diffusers for equalizing the wastewater. The location of the pumps is also not changed.
6	Aeration tank shall be designed and operated properly so that the bio-media (floating plastic media) is not carried away by the sewage to the subsequent treatment units. A safe provision like observation platform shall be made for aeration tank to verify the physical working condition.	<i>Not Complied</i> It was stated by the operator, that the technology presently adopted is conventional activated sludge process (ASP). However the floating bio-media rings were observed in raw sewage collection tank. The sludge recirculation to aeration tank for the maintaining MLSS in the aeration tank is also not provided.

		Observation/ inspection platform for the aeration tank is not provided to verify regulatory compliance and to assess the physical working condition.
7	The clarifier shall be revamped completely and constructed & operated scientifically.	<i>Not Complied</i> The clarifier is not revamped
8	The sludge drying beds, filter press or sludge bio digester shall be incorporated to handle the excess sludge generated and not to divert the excess sludge to collection tank. Sludge/ MLSS return shall be scientifically managed with regular monitoring of aeration tanks parameters.	<i>Not Complied</i> It was informed that two sludge drying beds are provided. The operator could not show sludge/ MLSS return arrangement. The MLSS in the aeration tank was very poor on the day of inspection. This again indicates that the STP is not operated scientifically.
9	M/s Elysium shall be directed to engage a qualified firm/ agency for operating & maintaining the STP in consultation with TNPCB. The STP has to be operated regularly in a scientific manner to avoid septic conditions and resulting odour problems.	<i>Complied</i> M/s Elysium has engaged M/s. Eco Green Technology, Coimbatore for the operation & Maintenance of STP. However, operators are not well versed with the basics of operating an ASP based STP.
10	M/s Elysium shall also be directed to make all provision for avoiding the entry of storm water into the STP which hampers the regular and efficient operation of the treatment system.	No information provided by the operator on the issue of storm water entry into STP. However, the unit has provided storm water drain in and around the premises.
11	The analysis of treated sewage shall be done periodically to know the performance of the STP and the results shall be submitted to TNPCB.	<i>Not complied</i>
12	A provision or dual piping system shall be installed in the gated community for utilizing the treated sewage for toilet flushing. The sewage treated shall be reused completely in the community and at no point of time discharged outside the premises.	<i>Not Complied</i> Dual piping system is not installed for utilizing the treated sewage for toilet flushing though TNPCB has given specific condition to utilize 55KLD of treated sewage for toilet flushing. It is informed that the treated sewage is used for gardening inside the premises.

Table 2: Analysis results of samples collected from various unit processes.

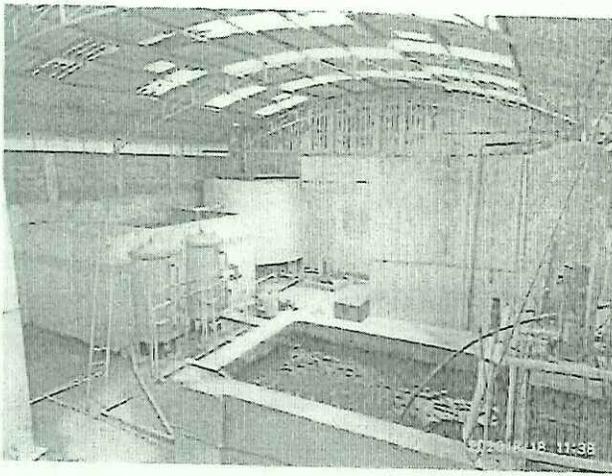
<i>Parameters</i>	<i>Inlet: sewage collection tank</i>	<i>Outlet: after dual media filter</i>	<i>Discharge limit</i>
pH	7.23	7.09	5.5-9.0
TSS (mg/L)	132	10	30
COD (mg/L)	272	8	-
BOD (mg/L)	44	BDL (<2)	20
Total Coliforms (MPN/100 mL)	NA		-
Fecal Coliforms (MPN/100 mL)	NA		-
NH ₄ -N (mg/L)	48.7	< 2.0	-

NA: Not analysed

The result of the samples collected during the inspection is given in table 2; the samples were analysed at the TNPCB Advanced Environmental Laboratory, Coimbatore. The results show that, the STP outlet sample is complying with the standards. MLSS collected from aeration tank was terribly inadequate. Higher BOD and COD values in the aeration tank also points out issues with treatment efficacy and flawed operations. The influent BOD: COD ratio is abnormally skewed and needs further investigation. Ammonia in the aeration tank is abnormally high (42 mg/L) and suggests that the condition of the aeration tank is limiting the nitrification process and hampering complete conversion of the influent waste into activated sludge. With such a situation and pH being near neutral (7.09) it is not possible to achieve ammonia below 2.0 mg/L in the final outlet. During sample collection from the inlet of STP (collection tank), the floating plastic bio-media rings were observed and it gives the apprehension that the treated water from the clarifier is mixed at the inlet of the STP. In the earlier report submitted in 2017, this committee reported the presence of bio-media rings in the clarifier tank as there was no retaining mechanism in the aeration tank.

4.0 Inspection of STP

The STP was inspected on August 18, 2020 by the same joint committee consisting of CPCB & TNPCB officials. CPCB officials joined the virtual inspection through online video meeting. M/s Elysium properties India Pvt. Ltd has developed a gated community and constructed 125 individual villas in 15 acres of land under the name "Flushing Meadows" at Vellanaipatty village, Annur taluk, Coimbatore district. Presently around 100 villas are occupied with an average of four members living in each villa. Important observations are listed below:



STP without any safe inspection platform for most of the tanks



Poor MLSS in the aeration tank

4.1 Observations:

- a) M/s Elysium properties has installed a STP of capacity 125 KLD to treat the sewage generated from the community and has obtained consent to operate from the TNPCB in the year 2014 with validity up to June 30, 2015, which was subsequently renewed on 29-06-2015 and was valid up to 30-06-2017 (copy of the consent is annexed as Annexure 1) with specific condition to reuse 55 KLD treated sewage for toilet flushing. At present there is no valid consent to operate from the TNPCB.
- b) It was informed that M/s Elysium properties have engaged M/s Eco Green Technology, Coimbatore for the operation and maintenance of the STP located near to recreation facilities, inside the gated community.
- c) During inspection, STP was operational with a stated inlet load of 98 KLD. It was observed that augmentations/ modifications/ improvements recommended by the committee in earlier report of 2017 are not complied.
- d) It was informed that, the treatment adopted in the STP at present is the conventional ASP, however no details were provided or explained during inspection. The operator failed to explain or show the sludge return arrangements in the STP. The operation of the aeration tank indicates that there are no changes from the earlier conditions reported in 2017 by this committee.
- e) The earlier joint committee report (submitted on March 9, 2017) has recommended 12 improvement points for compliance. The compliance was verified during inspection and out of 12, only one point is barely complied.
- f) The inlet raw sewage sample taken from the underground collection tank has unusual BOD:COD ratio (0.16). BOD, COD and ammonia sample collected from aeration tank is high and even more than the BOD & COD values in the raw sewage. High ammonia in

aeration tank also indicates poor treatment efficacy. Overall, these observations indicate that operation, maintenance and efficacy of STP are substandard.

- g) MLSS in aeration tank was very low on the day of inspection, the operator was unable to show the sludge recirculation/ return system for maintaining MLSS in aeration tank and plastic bio-media rings were found in the collection tank. These are a few indications of poorly managed and unscientifically operated STP.
- h) The STP has not made any arrangements for safe inspection platforms for aeration and other tanks. Most of the unit treatment system is not accessible for visual inspection which hampers regulatory inspections and daily operational checks by the operators.

5.0 Environmental compensation

As per the direction dated February 19, 2019 in case of O.A. No. 593/2017 (W.P. Civil No.375/2012), CPCB has developed a methodology for assessing environmental compensation (EC) based on the pollution index of industries. Environmental Compensation calculated as per the honourable NGT direction dated March 16, 2020 is deliberated below as per the formula ($EC = PI \times N \times R \times S \times LF$):

- *PI (Pollution Index)* is calculated as per the categorisation of industries as red, orange, green & white. STPs established at residential apartments, commercial complex, housing colony with wastewater generation more than 100 KLD falls under red category as per classification. Accordingly, the STP in consideration comes under the red category and the average pollution index is considered as 80 as suggested for environmental compensation calculation ($PI = 80$)
- *N (Number of days of violation took place)* is calculated from the date of first inspection (non-compliance observed) i.e. 09-03-2017 to the date of present inspection (18-08-2020). This translates into 1259 days of violation inclusive of both dates and thereafter for every day till compliance is achieved. In this case N is considered as 1259 days till 18-08-2020.
- *R (Rupee factor)* is considered as 250 as suggested in environmental compensation calculation ($R = 250$).
- *S (Scale of operation)* since the STP falls in small scale as per the consent to operate issued earlier dated 29-06-2015, the S factor is taken 1.0 as suggested in environmental compensation calculation ($S = 1.0$).

- *LF (Location Factor)* is considered as 1, since the STP is located at Vellanaipatty village, Annur taluk, Coimbatore district which is 28 Km away from Coimbatore and having population less than one million ($LF = 1.0$).

$$EC = PI \times N \times R \times S \times LF$$

$$EC = 80 \times 1259 \times 250 \times 1 \times 1 = \text{Rs. } 2,51,80,000/- \text{ (From 09-03-2017 to 18-08-2020)}$$

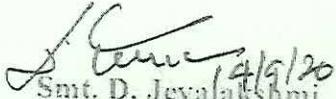
$$EC = 80 \times 1 \times 250 \times 1 \times 1 = \text{Rs. } 20,000/- \text{ (For each day of non-compliance from 19-08-2020 onwards till compliance is achieved).}$$

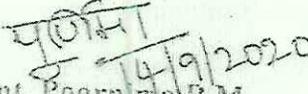
Committee suggested imposing interim environmental compensation as illustrated above for 1259 days till 18-08-2020 for Rs. 2,51,80,000/- (Rupees two crores, fifty one lakhs and eighty thousand only) and thereon Rs. 20,000/- (twenty thousand) each day until compliance is achieved.

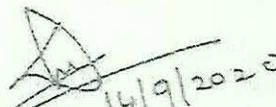
6.0 Findings and recommendations

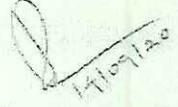
From the conditions observed, it can be concluded that the STP is being operated for name sake and it is apprehended that the STP is hardly operated or maintained. Poor MLSS, high ammonia, BOD and COD in aeration tank indicates that the STP is not operated scientifically. From the conditions observed during inspection, it is concluded that, operator is not relying on any scientific rationale for the operation of the STP. The improvement points suggested in the earlier report of the committee are not complied. TNPCB consent condition to re-use 55 KLD treated water for toilet flushing is also not complied and the STP is operating without a valid consent to operate at the time of inspection. Shoddy operation of STP and non-compliance to improvement points in the earlier report warrants imposition of environmental compensation. It is suggested to recover EC from the defaulter and directions may be given to comply with all the directions given by the joint committee and TNPCB.

Report dated September 14, 2020.


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