

**BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI**

Original Application No.32 of 2024 (SZ)
Earlier O.A. No. 691/2023 (PB)

**In re: News item appeared in The Hindu dated 17.10.2023 titled
“Beach-goers stunned as sea in Puducherry turns red”**

**Report on the Effluent Treatment Plant (ETP) in
M/s. Aurobindo Handmade Paper Unit**



May 2024

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**Date: 15.05.2024
Place: Puducherry**



**Dr. N. RAMESH
Member Secretary
Puducherry Pollution Control Committee**



**Government Advocate
Pudhucherry**

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1.0 Background details:

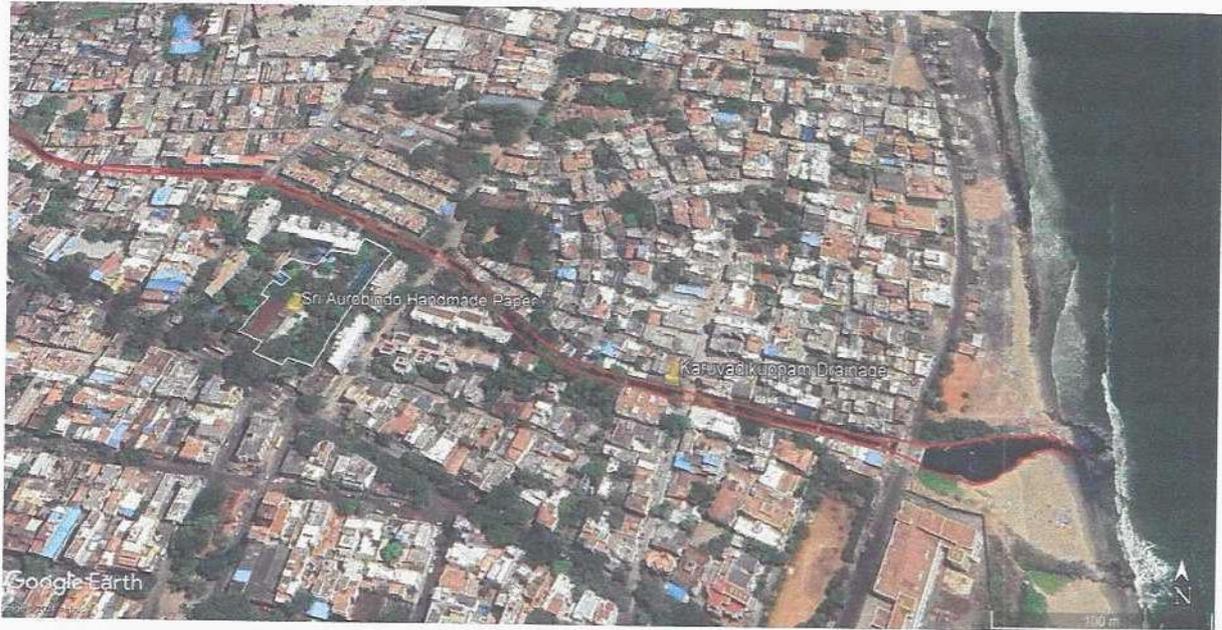
Based on the news item in The Hindu dated 17.10.2023 titled “Beach – goers stunned as sea in Puducherry turns red”, Hon’ble National Green Tribunal, Principal Bench registered the present OA on a suo motu basis. A committee was constituted by the Tribunal to investigate the matter and submit its findings to the Hon’ble NGT, Southern Zone. Upon review of the committee’s report on 19.03.2024, the Hon’ble NGT, Southern Zone directed the submission of an additional report regarding the existence of the Effluent Treatment Plant (ETP) in M/s. Aurobindo Handmade Paper unit and the action to be taken for arresting such incidents in future.

In compliance to the order of Hon’ble NGT, Southern Zone the Member Secretary and Junior Scientific Assistant of Puducherry Pollution Control Committee inspected the paper unit on 24.04.2024. The subsequent report outlines the findings of this inspection.

2.0 Industry Overview:

Established in 1959, M/s. Sri Aurobindo Handmade Paper, a unit of Sri Aurobindo Udyog Trust, operates as a small-scale, red category unit, producing 45 kgs/day of Handmade paper used for stationery purposes. The facility, situated at No.50, S.V. Patel Salai, Puducherry, spans a total land area of 4231.03 Sq.mts. with a

built-up area of 2504 Sq.mts. Surrounded by a Main Road to the South and Sri Aurobindo Ashram Wood Works and Ashram residential units on the other three sides. The unit is in close proximity to the Karuvadikuppam drainage canal, which is directly linked to the nearby sea, where the phenomenon of Red Tides occurred.



Location map of M/s. Sri Aurobindo Handmade Paper

3.0 Manufacturing process:

The Handmade paper is crafted from cotton rags using aged old traditional paper making technology, heavily dependent on skilled labour with minimal machinery involvement. Handmade Paper is manufactured in three different colours viz. White Ivory White and Black. The manufacturing process involves:

- i) **Sorting and size reduction:** Cutting waste cotton rags procured from the textile industries in Tiruppur is sorted for small extraneous particles on a metal sieve and then cut into finer pieces using rag-chopping machine.
- ii) **Soaking:** Chopped cotton rags are soaked in water for 4-6 hours in concrete vats.
- iii) **Pulping:** Soaked cotton rags undergo pulping and beating in a Hollander Beater with addition of 4% of Talcum, 1% of Starch and 4% of Calcium Carbonate. This process, lasting 7-8 hours, facilitates the breakdown of rags into pulp suitable for papermaking. Different types of cotton rags are used to produce paper of varying colours. Specifically, the unit manufactures white, ivory white and black colour

papers. White and black cotton rags are used to respectively make white and black colour papers. For manufacturing ivory colour paper small quantity of Yellow Chrysophenine G Extra is added in the pulping process. The unit is not using any red or other colour dyeing chemicals in the process.

- iv) **Lifting, Couching and Drying:** Once the pulp is prepared, it is poured onto a mold (wooden framed sieved deckles) in the lifting vat to create sheets. Skilled workers lift each sheet out of the water, giving it the right shake to form properly. The sheets thus produced are couched (laid one on top of other) on wooden platform with felt sheets interleaved between each lifted-wet sheet. Subsequently, they undergo pressing, peeling, and air-drying for 2-3 days in the factory's drying room.
- v) **Calendering and Trimming:** Dried sheets are passed between heavy rollers to smoothen the surface before undergoing quality checks and final trimming as per customer specifications.



Chopping



Pulping



Lifting



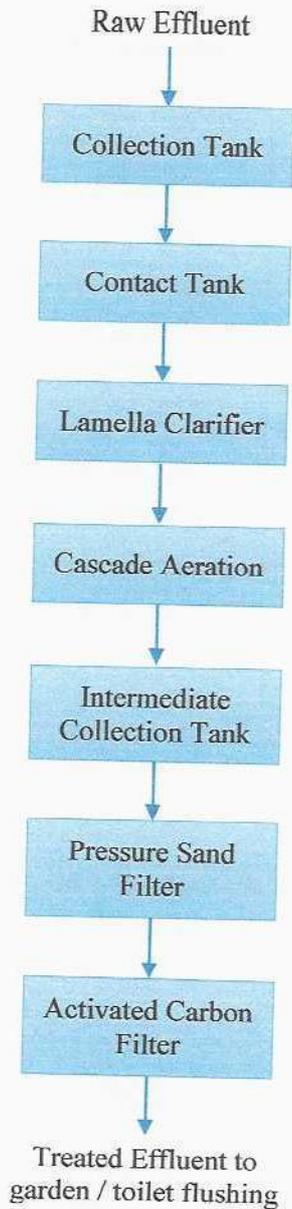
Drying

4.0 Effluent generation and treatment:

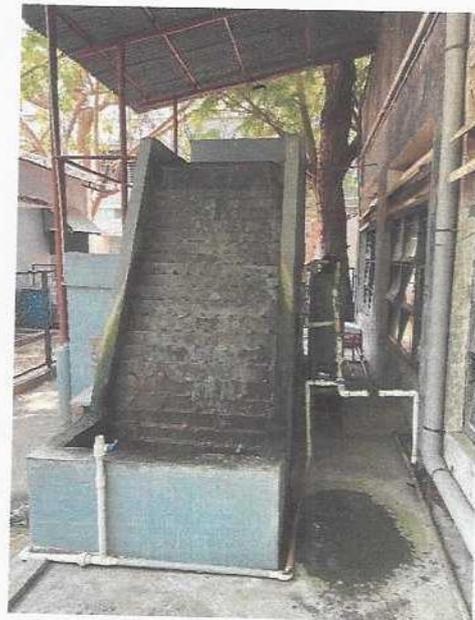
About 3000 LPD of effluent is generated in the unit from pulping and lifting process and floor washing. The waste water is treated in an Effluent Treatment Plant (ETP) consisting of following treatment units:

- i) **Effluent Collection:** The entire effluent generated in the process is collected in the Effluent Collection Tank by gravity flow.
- ii) **Chemical Oxidation:** The effluent is then transferred to a Contact Tank where the effluent undergoes chemical oxidation. Hydrogen peroxide (H_2O_2) is introduced into the effluent and allowed to react for approximately 8 hours. Upon addition, liquid H_2O_2 dissociates, generating highly reactive hydroxyl radicals. These radicals effectively degrade organic contaminants in the effluent, breaking down complex compounds such as cellulose into simpler, more readily removable forms. Light cellulose materials float to the surface of the Contact Tank, where they are manually removed and subsequently composted in the agriculture farm operated by Sri Aurobindo Society.
- iii) **Lamella Clarifier:** The oxidized waste water is transferred by gravity to the Lamella Clarifier which consists of a series of inclined plates to facilitate the settling of suspended solids. As the wastewater flows through the clarifier, the heavier cellulosic materials settle onto the inclined plates by gravity and gets collected at the bottom of the clarifier as sludge, while clarified water rises to the surface. The settled sludge is removed and recycled to the pulping process.
- iv) **Cascade Aeration:** Clear water overflow from lamella clarifier, flows down through a steep sloped cascades or steps, where the water is subject to free surface aeration. It removes odour and dissolved gases like CO_2 and increases Oxygen content in the water. The free-flowing water is collected at the bottom of Cascade Aeration unit in an intermediate collection tank.
- v) **Filtration process:** The waste water in intermediate collection tank is passed through Pressure Sand Filter and Activated Carbon Filter to remove the traces of suspended solids and organic matter. This improves the overall water quality to meet the discharge standards. The treated wastewater is used for toilet flushing and

gardening after passing through a flow meter provided for monitoring the waste water discharge quantity. The treated water is clean and transparent.



Effluent Treatment Plant



Cascade Aeration

5.0 Performance efficiency of Effluent Treatment Plant:

The unit had carried out unit wise performance test of the ETP on 13.04.2024 through NABL accredited lab. The test report reveals that the treated effluent meets the standards for land discharge as well as discharge into surface water bodies stipulated

under the Environment Protection Rules, 1986. Details of the waste water characteristics and treatment efficiency in the various process units of the effluent treatment plant is provided in the following table:

Parameters	Raw effluent in collection tank	Effluent after lamella clarifier	Effluent after stepped cascade aeration	Final treated water after Filtration	Discharge Standards – Inland surface water	Discharge Standards – Land for irrigation
pH	6.56	7.11	6.85	7.55	5.5 to 9.0	5.5 to 9.0
Total Suspended Solids, mg/L	194	26	24	21	100	200
Oil & Grease, mg/L	17	5	4	4	10	10
BOD, mg/L	89	17	13	13	30	100
COD, mg/L	248	76	68	63	250	-

Table 1: Effluent characteristics at each process unit of the Effluent Treatment Plant

During present inspection, the treated waste water samples were collected from the final outlet of the ETP and analyzed in the Puducherry Pollution Control Committee Laboratory. The analysis results tabulated below, reveals that the treated waste water is meeting the discharge standards:

Parameters	Test results	Discharge Standards – Inland surface water	Discharge Standards – Land for irrigation
pH	7.55	5.5 to 9.0	5.5 to 9.0
Total Suspended Solids, mg/L	17	100	200

Oil & Grease, mg/L	4.8	10	10
BOD, mg/L	12.8	30	100
COD, mg/L	32.3	250	-

Table 2: Test results of treated effluent carried out by PPCC

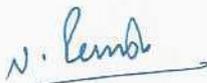
5.0. Disposal of treated waste water:

The treated waste water was earlier discharged into the Karuvadikuppam drainage channel running behind the factory, as permitted in the Water Consent of the unit. After the occurrence of Red Tide incidence in the sea, the unit was inspected by the expert committee and as an abundant precaution, direction was issued to the unit on 11.12.2023 to stop discharging the treated waste water into the drainage canal. Subsequently, the unit has stopped the discharge of treated effluent in the drainage channels. The treated waste water is completely reused for gardening and toilet flushing purpose within the factory.

6.0. Further actions:

Subsequent to the direction issued by PPCC on 11.12.2023, the unit has completely stopped the discharge of treated effluent in the Karuvadikuppam drainage channel and reuses the treated effluent within the unit for toilet flushing and gardening. Further actions include regular inspections by the PPCC to ensure compliance with discharge regulations. Public Works Department is in the process of construction of 15 MLD STP at Dubrayapet. Sewage discharged into Karuvadikuppam drainage canal need to be diverted and treated in the newly constructed 15 MLD STP.

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