BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI

OA.No. 20 of 2016 (SZ)

Mr. Santo P L Trichur
& Ors. …Applicant(s)

Versus

State of Kerala
and Ors. …Respondent(s)

REPORT OF COMMITTEE IN THE MATTER OF ORIGINAL APPLICATION NO. 20 OF 2016, SRI. SANTO P. L. & OTHERS Vs STATE OF KERALA AND OTHERS SUBMITTED BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL SPECIAL BENCH, AS PER THE ORDER DATED 20.04.2022

Dated at Chennai on 8th February, 2023

REMA SMRITHI VK
Standing Counsel for KSPCB - R2-R4

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1.0 Preamble

In the matter of original application No. 20 of 2016, Sri. Santo P.L. & Others Vs State of Kerala & Others the National Green Tribunal Special Bench, has passed an order dated April 20th 2022 and directed to *"constitute a joint committee of senior officer of CPCB, Member Secretary, State PCB, Director Environment, State of Kerala and District Magistrate, Thrissur to ascertain the compliance status in respect of each of the units within three months and take action to close the polluting units, as per law. If the units are found compliant, the Committee may ascertain the period of past violations, at least from the date of filing of this application till compliance and for such period compensation may be assessed and recovered on polluter pays principle based on estimated cost of remediation and also taking into account the deterrent element, referable to the financial capacity of each of the units. The committee has to file the action taken status as on 30.09.2022 by 15.10.2022 report sent to the Registrar Southern Bench by e – mail"*.

Pursuant to the order, Kerala State Pollution Control Board requested the respective institutes/ departments to nominate officials for the joint committee. The following officials were nominated by the respective department as members of the committee.

- Sri. Reji Joseph, Additional District Magistrate, Thrissur.
- Dr. Deepesh V, Scientist C, Central Pollution Control Board, Regional Directorate, Bengaluru.
- Sri. Baburajan P.K, Chief Environmental Engineer, Kerala State Pollution Control Board, Regional Office, Ernakulam
- Sri. Kalaiarasan P, Environmental Engineer, Directorate of Environment and Climate Change (DoECC), Govt. of Kerala., Thiruvananthapuram

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2.0 Background of OA 20/2016

A complaint from the Edakkunni Poura Samithi dated 16.07.2012, was received at the District Office, Thrissur of the Board, regarding water pollution of the wells in and around the industrial estate at Ollur. In the enquiry conducted by the State Pollution Control Board officials on 23.07.2012 and 27.07.2012, it was found that almost all the electroplating units were working without having adequate pollution control measures and not obtained Consent to Operate from the Board. There were 20 units operating in the estate at that time. Analysis of well water samples collected from the complainant's wells showed that the water was acidic in nature. In the light of serious complaints, the District Collector constituted a monitoring committee consisting of ward councilor, District Medical Officer, representative of complainants, Environmental Engineer, KSPCB, representative of industrial association, representative of Thrissur corporation as members, as per the decision of the meeting convened on 26.04.2013 at the chamber of District Collector. During the inspection of the committee on 26.04.2013, the committee noticed that only one company by the name M/s Bright & Company had adequate pollution control measures. Upon the recommendation of the committee, subsequent to their inspections, the District Collector directed vide order No. C3-60051/2012 dated 27.04.2013 to close down the operation of 19 units until adequate pollution control measures were provided. Copy of the same is attached herewith as **Annexure 1**. The units were directed to provide a treatment plant, reuse facility and to dispose of the sludge at the common hazardous waste storage and disposal facility at Ambalamedu. Further District Collector had issued certain directions to the units vide proceedings dated 30.07.2013 with regard to prevention of the water pollution. Copy of the same is attached herewith as **Annexure 2**. Later upon several inspections of the committee the units which have complied with the instructions were allowed to restart by the orders No. C3-60051/2012 dated 5.06.2014 and 4.08.2014 of the District Collector. Copies of the orders are attached herewith as **Annexure 3 and Annexure 4**. Meanwhile some of the units stopped their operation and as on 16.06.2022 only 13 of the electroplating units are working in the industrial estate.

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List of 19 industries which were directed to close down by the order No. C3-60051/2012 dated 27.04.2013 of the District Collector	
1	M/s Bee Pee Gold Imitations
2	M/s Indu Ornaments
3	M/s Mini Job Works
4	M/s Renu Gold Covering
5	M/s DOT Engineering
6	M/s Rajeshkumar Electroplating
7	M/s Golden View Plating
8	M/s Two Star Designs Gold Covering
9	M/s Pee Gee Gold Covering
10	M/s Honest Electrocolouring
11	M/s Three Star Electroplating
12	M/s Bright Precured System No. 1
13	M/s Bright Precured System No.2
14	M/s United Aluminium Company
15	M/s St. Joseph Colour Coats
16	M/s Pradeeksha Aluminium Polishing ElectroColouring Unit
17	M/s Dash Machineries
18	M/s Anna Plastics Electroplating Works
19	M/s St. Joseph Engineering and Gold Works

List of 13 respondent industries functioning in the industrial estate as on 16.06.2022	
1	M/s Bee Pee Gold Imitations
2	M/s Indu Ornaments

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3	M/s Mini Job Works - name changed to Aiswarya Gold Covering
4	M/s Renu Gold Covering
5	M/s DOT Engineering
6	M/s Rajeshkumar Electroplating
7	M/s Golden View Plating
8	M/s Two Star Designs Gold Covering
9	M/s Pee Gee Gold Covering
10	M/s Honest Electrocolouring
11	M/s Three Star Electroplating
12	M/s Bright Precured System 2
13	M/s Bright & Company

From the verification of files of the District Office of the Board at Thrissur, it was observed that in the analysis of well water samples conducted by the State Pollution Control Board on 22.02.2016 and 15.11.2018 the pH of the well water was in the acidic range and heavy metals were observed in some wells. These were also submitted to the Hon'ble NGT vide reports from the District Office of the Board at Thrissur, dated 03.11.2016, 8.02.2020 and 11.12.2020. Copies of the reports are submitted herewith as **Annexure 5**, **Annexure 6** and **Annexure 7** respectively. The State Board had co-opted the Ground Water Department to conduct hydrogeological study in and around the Ollur Industrial Estate and to probe the reason for groundwater contamination in the area. Copy of the report is submitted as **Annexure 8.** The report concludes as follows: *"The samples collected from the wells of the industrial estate close to the electroplating units are showing higher pH value i.e. of lesser acidic nature. Whereas the samples collected from the open wells outside the industrial area and close to the boundary of the estate are showing higher acidic nature. Hence sampling during peak summer season and also the study of heavy metal concentration in the ground water source will provide much more refined information on the ground water in order to arrive at a realistic conclusion on the pollution caused by the electroplating related industries in the estate and also to establish base flow direction from industrial area, a*

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detailed study using tracer techniques or similar advanced methods have to be engaged through competent agencies". Accordingly, the State Board has engaged Center for Water Resources Development and Management (CWRDM) vide order No. PCB/HO/SEE-1/TSR-TSGWC/09/2021 dated 22.12.2021, to conduct study using tracer techniques. The investigation aims at studying the quality of ground water in and around the Ollur industrial estate, groundwater flow characteristics prevailing in the area and to identify the cause of groundwater contamination in the area. The methodology of study includes adding stable isotopes tracers to the newly constructed boreholes for the study and water samples will be collected from the boreholes along with existing wells for analysis. Periodic monitoring of the wells will be done to identify the hydrological connectivity between industrial areas and surrounding wells. Stable isotopes in the water samples will be analyzed using the IRMS facility available at CWRDM. The study is envisaged to end by August 2023 and it is considered that the cause for the low pH in the open wells surrounding the industrial estate could be identified. The State Pollution Control Board has signed a MoU with CWRDM and they have initiated the study.

2.1 Compliance of Hon'ble NGT Order

Pursuant to the Order of the Hon'ble NGT dated 20.04.2022, the first meeting of the committee was held on 7.06.2022 and had a preliminary discussion about the matter and charted out a plan for inspecting the units in question. The 13 units presently engaged in the electroplating activities are the respondent units in the original application. In the initial phase, it was decided to inspect the units on 16th and 17th of June 2022. Discussion on the large number of such unauthorized electroplating units working in the district and general acidic nature of the ground water of Thrissur district were also discussed in the initial meeting. In the meeting it was also decided to analyze the water sample from the well which are alleged to be contaminated. Minute of the meeting is attached as **Annexure 9.**

3.0 Field visit and Observations

The field visit was conducted on 16th and 17th of June 2022 and the observations are described as follows. The thirteen respondent units are located in the industrial estate of SIDCO at Ollur. The electroplating activities carried out at these thirteen respondent units

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are either electrocolouring of aluminum profiles or electroplating on metallic ornaments. In the case of aluminum electro colouring, the surface of the aluminum profiles is made smooth through the buffing process and then subjected to anodizing and then to chromium/ nickel/ copper electroplating depending on the colour required. In the case of electroplating of metallic ornaments, the surface is coated with copper and then with gold colouring agents.

Figure 1 - Electroplating bath at M/s Golden View Plating

After each electroplating process, the aluminum profiles/ ornaments are dipped in the water. This water is the major source of effluent and wastewater from floor washings also form a part of the effluent. Also the occasional cleaning of electroplating baths contributes to the effluent. Hence the quantity of effluent at the end of a working day will be very less and most of the effluent treatment plants (ETP) are of batch process. Of the thirteen industries, ten are engaged in the electroplating of metallic ornaments, two in electro colouring of aluminium profiles and one is a zinc electroplating unit. Typically, these industries are small scale units functioning in two or three rooms and do not have much vacant land area. All of them have valid consent of the State Board. The ETP provided are similar in these units and consist of collection tank, settling tank, filter feed tank, pressure sand filter, activated carbon

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filter, treated water collection tank. The chemicals used for the treatment are mixed in the collection tank itself.

Figure 2 - Typical electroplating units in the Industrial Estate

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Figure 3 - Drains for conveying spillages to the effluent treatment plant

The settling tank consists of a conical shaped tank where in the sludge is drawn from the bottom and overflow goes to the filter feed tank. Below the settling tank is a sludge drying bed which consists of graded coarse and fine aggregate, and the sludge from the settling tank is allowed to dry here. The dried sludge is then transported to the common hazardous waste storage and disposal facility at Ambalamedu, Ernakulam. In all the units it is claimed that the treated water is reused.

During inspection it was observed that ETP provided in the units were in operational condition (batch mode) except in the unit named Bright Precured Systems II, which is an electro colouring unit. The wastewater from the unit was discharged into the premises of the unit. The compliance of other units with regard to reuse provisions, sludge storage and manifest submission and other statutory records are being duly submitted.

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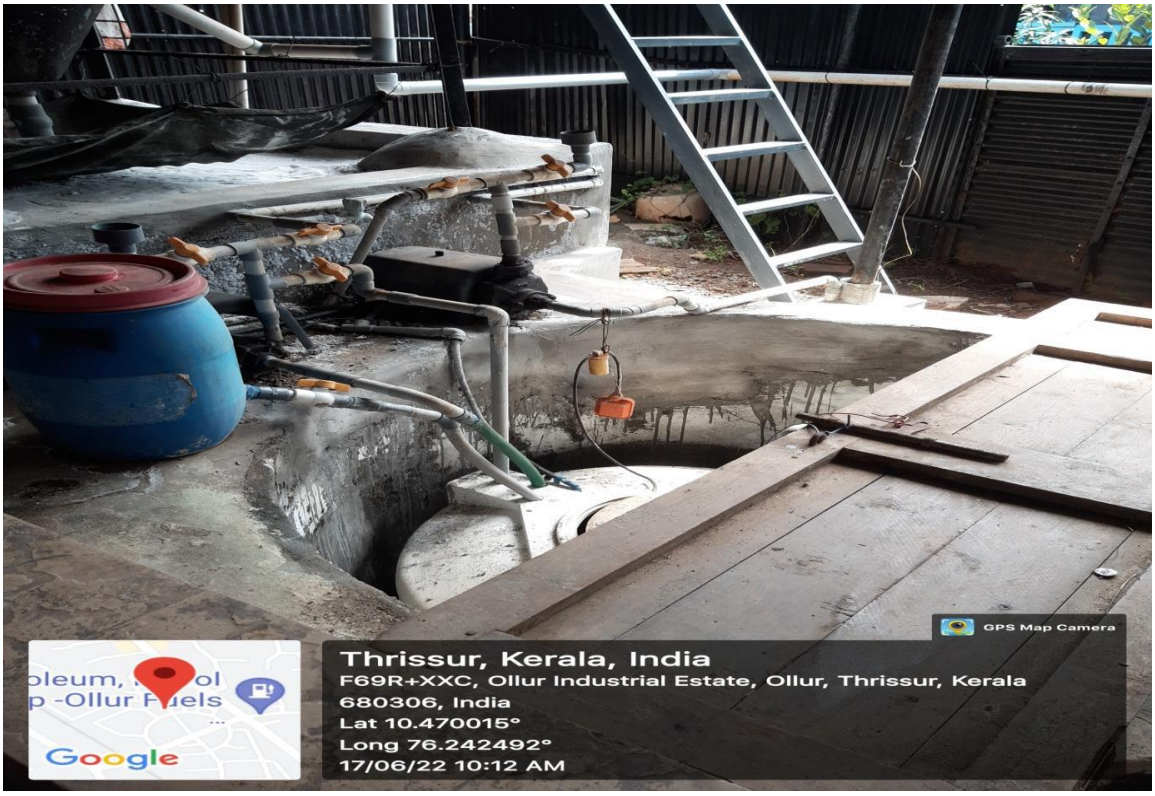

Figure 4 - Collection tank and chemical addition installations in ETP

Figure 5 - Hopper bottom settling tank and sludge drying bed

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3.1 Results of treated effluent collected from the unit

The treated effluents were collected from the units except Honest electro colouring, Dot Engineers, Bright Precured Systems II and analyzed for the parameters as per the Consent to Operate issued to the units. The treated effluent was not available at Honest Electro Colouring and DOT Engineers, as revamping of ETP and civil structures were going on in Honest Electro Colouring and treated effluent was not available at DOT Engineers. Also in the premise of M/s Bright Precured an open well was seen adjacent to the discharge of effluent from the unit and a sample was also collected to verify its quality. The results of analysis of treated effluent of each unit and the standards prescribed by the State Pollution Control Board are furnished in Table 1.

Figure 6 - Wastewater conveyed to the outside premises at Bright Precured Systems 2

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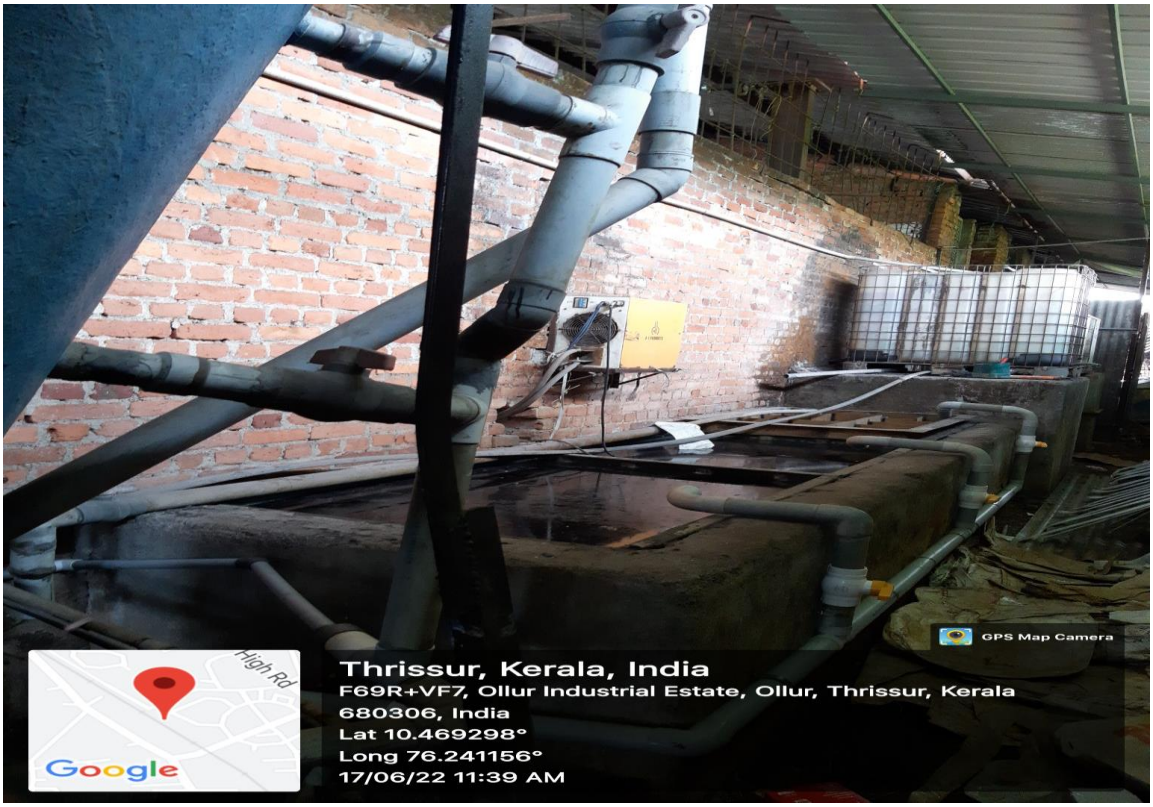

Figure 7 - Defunct effluent treatment plant at Bright Precured Systems 2

3.2 Assessment of well water quality

As decided the water samples from the open wells alleged to have been contaminated were collected. There were 18 wells and this includes a well in the premises of the industrial estate also. It was observed that most of the wells are being used for domestic purposes except two open wells in the premises of Sri. R. K. Nair and Sri, Tony Thottan. During the inspection it was observed that there is a service center of earth movers functioning adjacent to the plot owned by Sri Tony Thottan. The samples of well water were analyzed for pH, heavy metals and cyanide and the results were compared with the drinking water standards IS 10500:2012. The results and the limit are furnished in Table 2.

The location coordinates of the open well and industries inspected are furnished in Table 3.

4.0 Compliance status of the respondent units

The compliance status of the units with the consent conditions are furnished in Table 4.

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Table 1: Results of treated effluent collected from the industries.

Parameters (mg/L)*	1#	2#	3	4	5	6	7	8	9	10	11	12	Prescribed limits (mg/L)*
Copper			BDL	0.85	41.1	0.39	1.07	0.43	4.42	2.29	0.41	BDL	3
Cadmium			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	2
Total Chromium			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.14	2
Iron			BDL	BDL	2.12	1.54	0.14	0.21	0.69	BDL	0.93	6.83	3
Manganese			BDL	BDL	0.12	BDL	0.99	0.31	BDL	BDL	BDL	BDL	-
Nickel			BDL	BDL	5.63	BDL	BDL	1	0.52	BDL	0.29	0.17	3
Lead			BDL	BDL	0.19	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.1
Zinc			BDL	BDL	6.81	BDL	BDL	0.22	0.19	0.21	0.17	2.01	5
Cobalt			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	-
Cyanide			0.1	0.2	1	0.1	BDL	0.1	BDL	BDL	0.1	0.2	0.2
pH			7.66	8.57	2.99	7.58	7.69	8.33	10.16	8.6	6.22	6.95	6.5-9.0

1: M/s. Honest Electro Colouring, 2: M/s. Dot Engineers, 3: M/s. Pee Gee Gold Covering, 4: M/s. Indu Ornaments, 5: M/s. Aiswarya Gold Covering, 6: M/s. Bee Pee Gold Imitation, 7: M/s. Rajeshkumar Electroplating, 8: M/s. Golden View Plating, 9: M/s. Two Star Designs Gold Covering, 10 M/s. Renu Gold Covering, 11: M/s. Bright & Company & 12: M/s. Three Star Electroplating
**** Except for pH # Treated sample not collected/ available***

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Table 2: Results of well water samples collected from open wells in the vicinity of industrial estate.

Parameters (mg/L)*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Limit (mg/L)*
Copper	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**1.03**	BDL	BDL	BDL	BDL	**0.05**
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**0.003**
T. Chromium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**0.05**
Iron	BDL	BDL	BDL	**0.88**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**0.19**	BDL	BDL	BDL	BDL	BDL	BDL	**0.3**
Manganese	BDL	**0.31**	BDL	BDL	BDL	BDL	**0.17**	BDL	BDL	BDL	**0.11**	BDL	BDL	**0.79**	**1.31**	BDL	BDL	**0.11**	**0.1**
Nickel	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**0.52**	**0.11**	BDL	BDL	BDL	**0.02**
Lead	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**0.01**
Zinc	BDL	**0.32**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**0.12**	BDL	BDL	BDL	**0.82**	**8.48**	**0.21**	BDL	BDL	**5.0**
Cobalt	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	-
Cyanide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**0.05**
pH	**5.06**	**4.4**	**4.91**	**4.92**	**4.92**	**4.56**	**4.60**	**4.60**	**4.78**	**4.87**	**4.67**	**5.69**	**4.84**	**3.56**	**4.14**	**4.72**	**5.03**	**4.57**	**6.5-8.5**

1: Industrial estate, 2: R K Nair, 3: Sankara Narayanan, 4: Bharathi, 5: V Unnikrishnan, 6: Kanchana V, 7: Joy Perincheri, 8: Indira Balakrishnan, 9: Laksham Veedu Colony, 10 Vincent Moyalan, 11: Sunil Pottayil, 12: Dr. R Kumar, 13: Joyco Transport, 14: Tony Thottan, 15: A A Paulose, 16: George Ematty, 17: Santo P & 18: Unnikrishnan Edakkuny.

* *Except for pH*

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Table 3: Location of open wells and industries

S.No.	*LATITUDE*	*LONGITUDE*	*LOCATION NAME*
1	10.4686987	76.244058	Open Well-Industrial Estate
2	10.4667453	76.2462387	Open Well -R.K.Nair
3	10.4671469	76.2470061	Open Well -Sankara Narayanan
4	10.4663562	76.2475151	Open Well -Bharathi
5	10.4646371	76.2485384	Open Well -V Unnikrishnan
6	10.4634131	76.2491439	Open Well -Kanchana V
7	10.4657458	76.2464227	Open Well -Joy P
8	10.4665983	76.2458941	Open Well -Indira B
9	10.4665911	76.2459204	Open Well -Laksham Veedu Colony
10	10.4656021	76.2422751	Open Well -Vincent M
11	10.4685474	76.2411315	Open Well -P V Sunil
12	10.4753427	76.2424418	Open Well -Dr R Kumar
13	10.4701331	76.2437391	Open Well -Joyco
14	10.4699064	76.2444876	Open Well -Tony T
15	10.4710959	76.2420532	Open Well -Paulose A
16	10.4708512	76.2422881	Open Well -George E
17	10.4702883	76.2431301	Open Well -Santo P
18	10.4675729	76.2464934	Open Well -Unnikrishnan E
19	10.4689728	76.2435614	M/s. Honest Electro Colouring
20	10.468728	76.2440963	M/s. Dot Engineers
21	10.4704221	76.243409	M/s. Pee Gee Gold Covering

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22	**10.4673222**	**76.2443021**	**M/s. Indu ornaments**
23	**10.467151**	**76.2448646**	**M/s. Aiswarya Gold Covering**
24	**10.4675741**	**76.2447897**	**M/s. Bee Pee Gold Imitation**
25	**10.467582**	**76.244804**	**M/s. Rajesh Kumar Electroplating**
26	**10.4686224**	**76.2430767**	**M/s. Golden View Plating**
27	**10.4670725**	**76.2435656**	**M/s. Two Star Industry**
28	**10.4698453**	**76.2420932**	**M/s. Renu Gold Covering**
29	**10.4697215**	**76.2421667**	**M/s. Bright & Company**
30	**10.469384**	**76.241637**	**M/s. Three Star Electroplating Works**
31	**10.4695052**	**76.241236**	**M/s Bright Precured Systems II**

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Table 4: Compliance status of respondent industries

Name of the unit	***Activity***	***Consent validity***	***Compliance with treated effluent standards***	***Compliance with other consent conditions***	***Remarks***
M/s. Honest Electro Colouring	Electro Colouring	Valid consent up to 30.06.2023	Treated effluent not available due to ETP revamping.	Reuse provisions provided, sludge storage adequate and monthly reports submitted.	Revamping of ETP and civil modifications observed during the visit. General housekeeping was not good with several pilferages and spillage in the work area.
M/s. Dot Engineers	Gold electroplating	Valid consent up to 30.06.2023	Treated effluent not available.	Reuse provisions provided, sludge storage adequate and monthly reports submitted.	ETP claimed to be operational and general housekeeping was satisfactory.
M/s. Pee Gee Gold Covering	Gold electroplating	Valid consent up to 31.12.2023.	Complies with prescribed limits.	Reuse provisions provided, sludge storage adequate and monthly reports submitted.	ETP claimed to be operational and general housekeeping was satisfactory.
M/s. Indu ornaments	Gold electroplating	Valid consent up to 30.06.2023	Complies with prescribed limits	Reuse provisions provided, sludge storage adequate and monthly reports submitted.	ETP claimed to be operational and general housekeeping was satisfactory.
M/s. Aiswarya Gold Covering	Gold electroplating	Valid consent up to 30.06.2023	Non- compliance with respect to copper, nickel and zinc.	Reuse provisions provided, sludge storage adequate and monthly reports submitted.	ETP claimed to be operational, spillage/ pilferage of process liquid on the floors observed, makeshift drainage facility to ETP collection tank needs to be changed.

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Name of the unit	*Activity*	*Consent validity*	*Compliance with treated effluent standards*	*Compliance with other consent conditions*	*Remarks*
M/s. Bee Pee Gold Imitation	Gold electroplating	Valid consent up to 30.06.2023	Complies with prescribed limits.	Reuse provisions provided, sludge storage adequate & monthly reports submitted.	ETP was operational and general housekeeping was satisfactory
M/s. Rajesh Kumar Electroplating	Gold electroplating	Valid consent up to 30.06.2023	Complies with prescribed limits.	Reuse provisions provided, sludge storage adequate and monthly reports submitted.	ETP was operational and general housekeeping was satisfactory
M/s. Golden View Plating	Gold electroplating	Valid consent up to 31.12.2024	Complies with prescribed limits.	Reuse provisions provided, sludge storage adequate and monthly reports submitted.	ETP claimed to be operational and revamping works were observed during the visit. General housekeeping was good.
M/s. Two Star Designs Gold Covering	Gold electroplating	Valid consent up to 30.06.2023	Non- compliance with respect to copper, and pH.	Reuse provisions provided, sludge storage adequate and monthly reports submitted.	ETP claimed to be operational and general housekeeping was satisfactory
M/s. Renu Gold Covering	Gold electroplating	Valid consent up to 30.06.2023	Complies with prescribed limits	Reuse provisions provided, sludge storage adequate and monthly reports submitted.	ETP was operational and general housekeeping was satisfactory

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Name of the unit	*Activity*	*Consent validity*	*Compliance with treated effluent standards*	*Compliance with other consent conditions*	*Remarks*
M/s. Bright & Company	Electro Colouring	Valid consent up to 30.06.2023	Complies with prescribed limits.	Reuse provisions provided, sludge storage adequate and monthly reports submitted.	ETP was operational and general housekeeping was satisfactory
M/s. Three Star Electroplating Works	Zinc electroplating	Valid consent up to 30.06.2023	Non- compliance with respect to iron.	Reuse provisions provided, sludge storage adequate and monthly reports submitted.	ETP was operational and spillage/ pilferage observed in ETP floor. No permanent acid proof floor layering for ETP Housekeeping in the ETP area was not satisfactory..
Bright Precured System 2	Electro Colouring	Valid consent up to 31.12.2023	Unauthorized discharge/ defunct ETP.	Reuse of treated effluent not provided and no sludge storage facility	ETP was not operational, effluent discharged in the premises near to an open well. Spillage of process water/ chemicals in the process area, no liner/ drainage for the flooring..

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5.0 Observations of the Joint Committee

A) Industry operations and compliance status

All the respondent industries are small scale industrial units operating within the Ollur Industrial Estate, managed and promoted by Kerala Small Industries Development Corporation (SIDCO) an undertaking of Government of Kerala. All the member units in the estate are relying on their captive wastewater treatment facilities and at present there are no common wastewater treatment facilities provided in the Ollur industrial estate.

All the respondent units are undertaking batch processes based on the work orders and hence wastewater management is also carried out in batch process. Since the ETPs are operated in batch mode, there are lacunas/ flaws in the ETP operation and this is reflected in the treated effluent quality. The ETPs are operated by the unit staff as per the protocol suggested by the consultant without the basic understanding of the treatment system, which leads to below par ETP performance. Being a batch process, the raw effluents are conveyed through makeshift arrangements like flexible hoses and this may lead to spillage pilferages and diversions in the unit premises. Provisions for collecting the spillage to the effluent treatment plant are not adequate in most of the electroplating units and there are no proper chemical resistant floor lining in the process area.

The units which are found non-compliant with the conditions of consent are served with notices dated 28.09.2022. Copies of the notices issued to M/s Aishwarya Gold Covering, M/s Bright Precured System 2, M/s Three Star Electroplating, M/s Two Star Designs Gold Covering are attached herewith as **Annexure 10, 11, 12 and 13**. The units were again inspected on 29.12.2022 by the officials of the District Office of the State Pollution Control Board, Thrissur and the functioning of the units was found satisfactory.

However, at this stage of inspection it cannot be concluded that the reasons for the concentration of heavy metals such as nickel, zinc, copper in excess of the permissible limits in well water is

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solely due to the electroplating units, as other type of units with activities such as pickling were observed working near the premises of these wells. The presence of iron and manganese in excess of the permissible limit of drinking water standards can be due to geogenic reasons.

B) Assessment of water quality of open wells in the vicinity

The respondent industrial units in the Ollur industrial estate are at higher elevation when compared to all the open wells selected for the assessment except the well inside the industrial estate. There are low lying fields/ seasonal wetlands to the southwestern, southern and southeastern directions of the industrial estate (Figure 1). The predominant natural surface runoff and water table gradient shall be towards these directions from the estate. Majority of the wells monitored are in eastern and southeastern direction from the respondent units. Some of the wells are in western southwestern and northern sides of the estate.

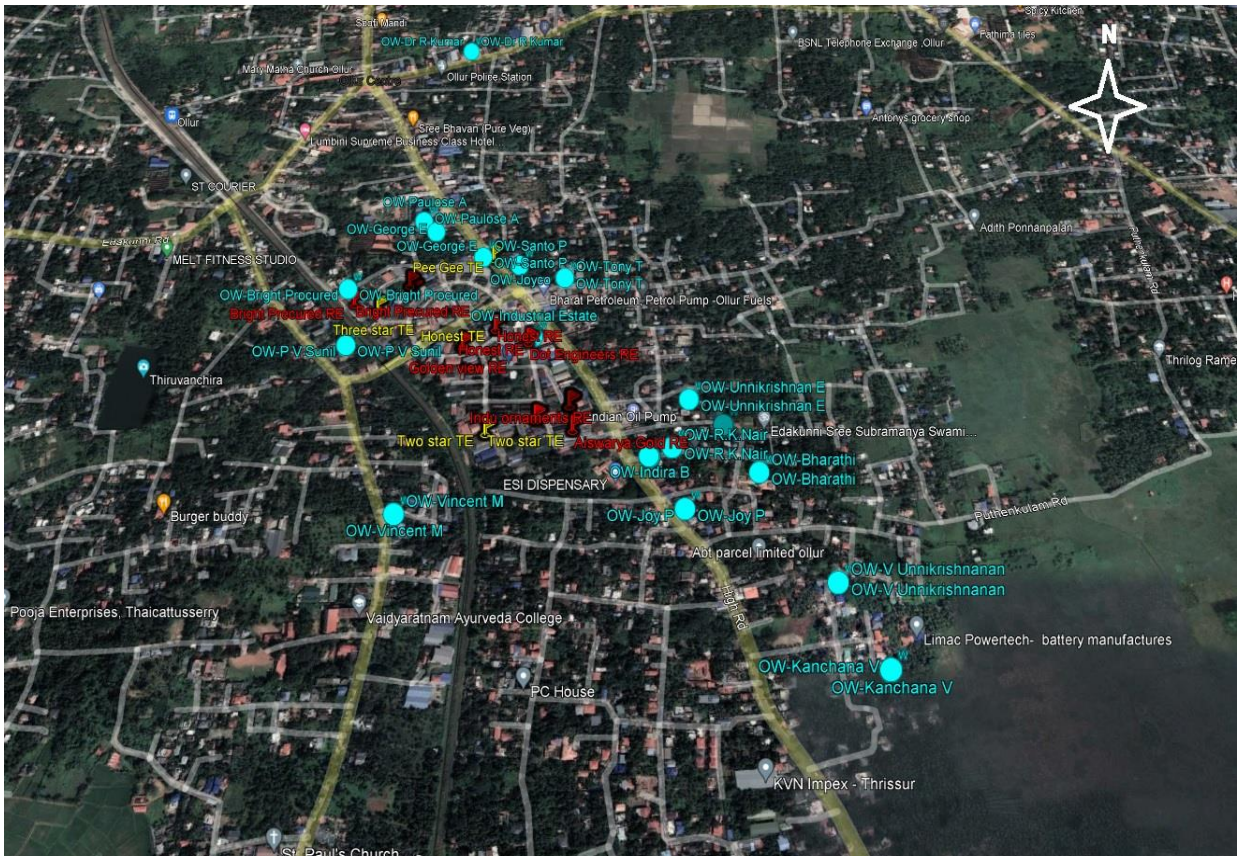

Figure 8: Location of industries and open wells

(OW - Open well, TE - Treated effluent, RE- Raw effluent)

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As per the analysis results all the well water samples registered a pH value of 5.69 and below, which are not in compliance with the prescribed pH range of 6.5-8.5 in the IS 10500-2012 drinking water standard. Such low pH values are reported in groundwater samples in Thrissur and could be attributed to peculiar geomorphological conditions.

Usually, presence of iron, manganese and zinc in groundwater are often reported and is attributed to the peculiar geology of the State of Kerala. Several well water samples collected for this assessment indicated the presence of iron, manganese and zinc. Manganese values exceeded the limit in all six reported well samples, iron and zinc exceeded their respective limits in one open well each. Though, presence of iron, manganese and zinc in Kerala is linked to the geogenic attributes, presence of manganese, nickel and unusually higher zinc in a particular open well in the premises of A A Paulose indicates specific pollution from other sources. Similarly, the open well in the premise of Tony Thottan registered the presence of copper, nickel, manganese and zinc. During the visit it was observed that an automobile workshop exclusively for heavy earth movers was operating near to this well.

Due to the higher elevation in the industrial estate, the surface runoff and water table gradient shall be towards the low lying fields in east and south eastern directions. A railway line at a lower elevation passes along the western boundary of the estate. The majority of wells in the south eastern direction have not registered the presence of specific heavy metals except for iron and manganese. The two wells monitored in the western side, beyond the railway line also registered manganese and zinc respectively. The open well (A A Paulose) which registered nickel, manganese, unusually higher zinc and pH of 4.14 is north to the estate and very near to a brick manufacturing unit in the western side. The other open well which registered copper, manganese, nickel, zinc and the lowest pH (3.56) is located in the eastern side of the estate across the Thalore-Thrissur road. In the vicinity of this well there is a petrol station, automobile service center for heavy earth movers, other commercial establishments and residences. The unusual presence of heavy metals like nickel, copper, manganese and zinc needs further investigation. With the available monitoring data and observations, it is indicated that presence of specific heavy metals like nickel, copper, chromium used in electroplating/ electro colouring industries are not detected

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in the downstream wells. The two wells in which copper and nickel were detected have several other potential sources near to them. The unusual presence of zinc in the open well needs to be probed further as there is a clay brick kiln near to the premise. Usually fine textured soil/clay will be richer in zinc and it could be possibly from the clay or zinc bearing soil used for brick manufacturing.

Though there are possibilities of spillage pilferage in many respondent industries, with this assessment it is not possible to link the presence of heavy metals in well water with the unauthorized discharge from the respondent units. Moreover, metals like iron, manganese and zinc are detected in a few wells which could be from geogenic sources. Ollur is also known for its traditional clay bricks/ tile industries due to the abundant clay soil in the low lying fields and the clay soil is usually rich in manganese and zinc.

6.0 Finding and suggestions of the Joint Committee

I. The respondent industries are small scale industrial (SSI) units handling processes in batches based on piecemeal work/ job orders and the resulting wastewater management is also carried out manually in batches. When the effluent treatment is done in batch mode with manual intervention in each step, several variables (expertise of the personal, chemical dosage, variability (qualitative/ quantitative) in the influent wastewater and treatment equipment conditions) affect the overall treatment efficiency. Lack of a technically qualified ETP operator, makeshift arrangement for conveying wastewater and unscientific dosing of chemicals results in poor ETP performances. Being SSI units, they need to be mentored by the authorities of the industrial estate in which they are operating.

II. It is always recommended to have a common ETP under the aegis of the industrial estate to cater to all the member units including the respondent SSI units. Common ETP can be operated effectively on continuous mode under the supervision of a qualified operator and the inherent flaws in the batch operations of individual ETP can be avoided. Therefore, Kerala SIDCO, the custodian of the industrial estate shall be directed to provide a common

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ETP to manage all the effluent generated in the member units in the industrial estate and operation and maintenance cost should be realized from the member industries.

III. All the respondent SSI units have small scale ETP to precipitate and separate out the metal contaminants in the effluent stream. The conditions of ETP indicate that there are no dedicated/ trained personnel to operate the system scientifically. The general treatment scheme consists of manual equalization/ neutralization of the collected wastewater from the process, neutralized wastewater is then pumped to a hopper shaped tank and flocculation / precipitation agents are manually dosed to precipitate metals. After certain contact time, effluent water containing precipitates is drained over a bed filled with sand/ coarse aggregates to retain the precipitates. Clear water from the bed is pumped through pressure sand & carbon filters and collected in a clear water tank for reuse. From the field observations, it is evident that neutralization/ equalization of the wastewater is not done properly and pH of the effluent is critical for effective precipitation of metals. Even the wastewater from the batch process is not conveyed to the collection tank in a foolproof manner, the dosing of precipitating/ flocculating agents in the hopper shaped tank is manually done and there are no design interventions to ensure affecting mixing of precipitating/ flocculating agents in this tank. The existing ETPs with their inherent design flaws along with the operational errors by untrained persons compounded the issue of poor treatment performance.

IV. From the assessment carried out, nickel and copper contamination in two of the open wells cannot be linked to the respondent SSI units as there are many other small units processing metals and alloys. There are several service centers and other commercial units in the vicinity.

V. In compliance with the orders of the NGT environmental compensation has to be calculated for the period of past violation. The period of past violation was verified from the file records of District Office of State Pollution Control Board at Thrissur. It is observed that

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discharging of effluents to outside by these industries except that from M/s Bright and Company was noted in the complaint enquiry conducted on 23.07.2012 by the State Pollution Control Board. Later due to the mounting complaints, the District Collector constituted a committee for verification of the complaint and on recommendation of the committee issued an order on 27.04.2013 to close down these units except M/s Bright and Company. These details have already been stated in this report under the heading 'Background of OA20/2016'. The order of the District Collector dated 27.04.2013 has already been produced herewith as Annexure 1. So the period of past violation is taken from 23.07.2012 to 27.04.2013. Therefore, calculation for Environmental Compensation (EC) as per the CPCB guidelines is furnished below.

EC = PI*N*R*S*LF, where PI, Pollution index of industrial sector = 65 (being a small scale industry having only water pollution potential)
N: Number of days of violation = 278 days (for the period from 23.07.2012 to 27.04.2013)
R: A factor in Rupees for EC = 100 (as the unit is a small scale red category unit)
S: Factor for scale of operation = 0.5 (being a small scale unit)
LF: Location factor = 1 (for population less than 1 million)
Hence, EC = 65*278*100*0.5*1 = Rs.9,03,500/-

VI. However, in Bright Precured System 2, it was observed during the visit of this committee on 17.06.2022 that wastewater was discharged outside without any treatment and ETP was not in operation. Hence the unit is liable to pay compensation for violating the conditions in Consent No. PCB/DO/TSR/R2/ICO/2871/2018 issued to the unit. Copy of the consent to operate submitted as **Annexure 14.** Also the results of open well water sample from the unit shows a pH of 4.3 as well as there are exceedances with respect to Copper, Manganese and Nickel above the limits prescribed in the drinking water standards IS 10500:2012. It was also observed from the file of the State Pollution Control Board that the unit has replied

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to the notice issued from the District Office, Thrissur and inspection was conducted by the State Pollution Control Board, District Office, Thrissur on 29.12.2022. During the inspection it was observed that all the 13 respondent units were functioning and the effluent treatment plants in all the units including that of M/s Bright Precured System 2 were in operational condition. Also no discharge from M/s Bright Precured System 2 to the premises or outside was observed. The house keeping in all the units were found satisfactory. Hence in addition to the Environmental Compensation (EC) amount calculated in para 5 above, Environmental Compensation (EC) for M/s Bright Precured System 2 has to be calculated as per the CPCB guidelines for the period 17.06.2022 to 29.12.2022 which is furnished below.

EC = PI*N*R*S*LF, where PI, Pollution index of industrial sector = 65 (being a small scale industry having only water pollution potential)
N: Number of days of violation = 195 days (for the period from 17.06.2022 to 29.12.2022)
R: A factor in Rupees for EC = 100 (as the unit is a small scale red category unit)
S: Factor for scale of operation = 0.5 (being a small scale unit)
LF: location factor = 1 (for population less than 1 million)
Hence, PI = 65*195*100*0.5*1 = Rs.633750/-

Total amount of EC to be levied on M/s Bright Precured System 2 is the sum of 9,03,500/- and 6,33,750/- which is Rs. 15,37,250/-

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VII. The amount of EC to be realized from the units are tabulated and furnished below:

S. No.	*Name of Industries*	*Environmental Compensation*
1	M/s Bee Pee Gold Imitations	Rs. 903500/-
2	M/s Indu Ornaments	Rs. 903500/-
3	M/s Mini Job Works (Aiswarya Gold Covering)	Rs. 903500/-
4	M/s Renu Gold Covering	Rs. 903500/-
5	M/s DOT Engineering	Rs. 903500/-
6	M/s Rajesh Kumar Electroplating	Rs. 903500/-
7	M/s Golden View Plating	Rs. 903500/-
8	M/s Two Star Designs Gold Covering	Rs. 903500/-
9	M/s Pee Gee Gold Covering	Rs. 903500/-
10	M/s Honest Electro colouring	Rs. 903500/-
11	M/s Three Star Electroplating	Rs. 903500/-
12	M/s Bright Precured System 2	Rs. 1537250/-
13	M/s Bright & Company	Nil
	Total	**Rs.11475750/-**

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BEFORE THE NATIONAL GREEN TRIBUNAL, SOUTHERN ZONE, CHENNAI

OA No.20 of 2016

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