

BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI

Original Application No.184 of 2024 (SZ) &

I.A. No.84 of 2024 (SZ)

WITH

Original Application No. 233 of 2024 (SZ)

[Earlier O.A. No.732/2024 (PB)]

WITH

Original Application No. 234 of 2024 (SZ)

[Earlier O.A. No.776/2024 (PB)]

WITH

Original Application No. 287 of 2024 (SZ)

IN THE MATTER OF:

Tribunal on its own motion SUO MOTU based on the News item Published in ‘The Hindu’, Kochi Edition dt. 21.05.2024 titled, “Another mass fish kill in ‘Periyar’ River in Kerala after suspected effluent release”

And

The Principal Secretary to Govt. of Kerala,
Environment Department,
Thiruvananthapuram and Ors.

...

Respondent(s)

WITH

Tribunal on its own motion SUO MOTU based on the News item appearing in Mathrubumi.com dt. 25.05.2024 titled, “KUFOS disputes PCB report on ‘Periyar’ Fish Kill, identifies ammonia, sulphur presence” and news item appearing in The New Indian Express dt. 26.05.2024 titled, “KUFOS analysis finds high toxin level in ‘Periyar’ river”

And

Kerala State Pollution Control Board,
Through its Member Secretary, Kerala and Ors.

...

Respondent(s)

WITH

Tribunal on its own motion SUO MOTU based on the News item Published in 'The Hindu', dt. 07.06.2024 titled, "Fish Kill spotlights pangs of 'Periyar'"

And

MoEF&CC, Through Regional Office,
Bangalore and Ors.

... Respondent(s)

WITH

T.V. Rajan, Kerala and Anr.

... Applicant(s)

VERSUS

MoEF&CC, Rep. by the Secretary,
New Delhi and Ors.

... Respondent(s)

INDEX

S. No.	Particulars	Page. No.
1.	Report by Central Pollution Control Board, Respondent No. 1 (Respondent No. 4 in earlier OA No. 106 of 2024 PB)	1-22
2.	Annexure I - Copy of Hon'ble NGT SZ order dated 20.08.2024	23-28
3.	Annexure II - Copy of minutes of the meeting held on 05.11.2024 with CMFRI, KUFOS and KSPCB	29-33
4.	Annexure III - Copy of Report and analysis results received from CMFRI	34-42
5.	Annexure IV - Copy of Report and analysis results received from KUFOS	43-72
6.	Annexure V - Copy of Status Report including analysis results, status of industrial discharge and directions for ZLD received from KSPCB	73-283
7.	Annexure VI - Copy of the Committee report filed before the Hon'ble High Court of Kerala	284-566

Place: Bengaluru

Date: 09.01.2025

[Signature]
09/1/2025
Deponent

[Signature]
Filed through CPCB Counsel



J. Chandra Babu
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CENTRAL POLLUTION CONTROL BOARD
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**Report by Central Pollution Control Board, Respondent No. 1
(Respondent No. 4 in earlier OA No. 106 of 2024 PB) in pursuant
to the Hon'ble NGT SZ Order dated 20.08.2024**

in

**Original Application No.184 of 2024(SZ) &
I.A. No.84 of 2024 (SZ)**

WITH

**Original Application No. 233 of 2024 (SZ)
[Earlier O.A. No.732/2024 (PB)]**

WITH

**Original Application No. 234 of 2024 (SZ)
[Earlier O.A. No.776/2024 (PB)]**

WITH

Original Application No. 287 of 2024 (SZ)

By

**Central Pollution Control Board
Regional Directorate, Bengaluru**

REPORT FILED BY THE CENTRAL POLLUTION CONTROL BOARD (CPCB) IN PURSUENT TO THE DIRECTIONS GIVEN BY HON'BLE NGT SZ IN OA NO. No.184 of 2024(SZ) & I.A. No.84 of 2024 (SZ) WITH OA No. 233 of 2024 (SZ), OA No. 234 of 2024 (SZ) OA No. 287 of 2024 (SZ)

1.0 PREAMBLE:

The Hon'ble National Green Tribunal (NGT) SZ Bench, while considering the above referred matters, vide order dated 20.08.2024 in OA No. 184 of 2024(SZ) along with OA No. 233 of 2024(SZ), OA No. 234 of 2024(SZ), OA No. 287 of 2024 - Tribunal on its own motion SUO MOTU based on the News items related to fish kill in 'Periyar' River had issued following directions to CPCB, being a respondent. The relevant portion of the Hon'ble NGT order dated 20.08.2024 is reproduced below;

“The study by the KUFOS and CMFRI, prima facie, is said to be contradictory with the reports of the Kerala SPCB. Hence, we direct the CPCB to produce both the study reports from the KUFOS and CMFRI and also point out what is the contradiction made by the Kerala SPCB in this regard. As the Monitoring Committee had already directed the industries concerned in the catchment area near the 'Periyar' River to adopt the Zero Liquid Discharge (ZLD) system, let the report also give particulars about the industries operating on the catchment area, their method of discharging the effluents and the level of contamination in the 'Periyar' River.”

Copy of the Hon'ble NGT order dated 20.08.2024 is placed as **Annexure I**. In compliance to the direction given by the Hon'ble Tribunal, CPCB Regional Directorate, Bengaluru requested the Central Marine Fisheries Research Institute

(CMFRI), Kerala University of Fisheries and Ocean Studies (KUFOS) and Kerala State Pollution Control Board (KSPCB) to share the individual study reports. Further, on receipt of the reports, CPCB RD, Bengaluru also convened an online interaction meeting with both the institutes and KSPCB and discussed about the findings of the reports and other aspects, as mentioned in the Hon'ble NGT order.

2.0 ACTIONS INITIATED BY CPCB:

Since CPCB was not in possession of the reports and details of the studies conducted by KUFOS and CMFRI and for ensuring compliance to the Hon'ble NGT directions, CPCB Regional Directorate, Bengaluru requested KUFOS and CMFRI vide letter dated 04.09.2024 for providing the original copies of the assessment reports. CPCB, RD had requested KSPCB also for providing the assessment reports of KSPCB, contradicting the reports by KUFOS & CMFRI and also to provide the status of 'Zero Liquid Discharge (ZLD)' implementation by industries in River 'Periyar' Catchment (Compliance status as per final directions given by Hon'ble NGT order dated **27.05.2022** in OA No. 395 & 396 of 2013)

After receiving the reports and reviewing the same, an online meeting was convened through VC on **05.11.2024** to review the received reports, which was attended by the representatives of CMFRI, KUFOS and KSPCB. A copy of the minutes of the meeting held on 05.11.2024 is attached as **Annexure II**. As per the discussions and deliberations in the meeting, KUFOS, CMFRI and KSPCB were requested to submit additional information including original Analysis Results of the samples collected, to verify the methodology of sampling and analysis, details of analysis which were outsourced, including the accreditation status of such labs/institutes and updated status on the ZLD implementation directions issued to industries by KSPCB. Accordingly, some additional

information was also received, which was examined by CPCB. A copy of the report including analysis results, as received from CMFRI is placed as **Annexure III**. A copy of the report including analysis results, as received from KUFOS is placed as **Annexure IV**. The copy of the status report including analysis results, directions issued by KSPCB w.r.t ZLD and responses from the industries etc. as received from KSPCB is placed as **Annexure V**.

3.0 REPORTS ON THE FISH KILL INCIDENT:

As per the information received from the institutes and KSPCB and as per the interactions held during the VC meeting held on 5.11.2024, it is primarily observed that the two institutes and KSPCB have carried out independent sampling at different dates/times and locations, as per the routine activities/request from farmers or assessment taken up independently, subsequent to the fish kill in river 'Periyar' respectively. The details of sampling and major findings by the individual institutes are detailed in the following sections.

3.1. Sampling and report by CMFRI

As per the reports received from CMFRI and interactions, water samples were collected by the CMFRI, Kochi along the estuarine waters of Kochi backwaters and lower reaches of 'Periyar' River on 21.05.2024, as part of the routine sampling. It was also informed that a necropsy analysis was done on dead fish samples brought by a cage farmer on 22.05.2024. The water samples were collected from six different locations, including four fish farm/cage culture sites in 'Periyar' River and analysis were carried out for routine water quality parameters.

Sampling Locations:

Station code	Details of the stations	Geo Coordinate locations
1	Near Ponjikkara North jetty	9°59'50.71"N, 76°15'54.16"E
2	Near Chittoor metro station	10°2'20.21"N, 76°16'8.84"E
3	Sugil's Fish farm (Chittoor) (<i>Etroplussuratensis</i>)	10°2'22.46"N, 76°16'10.22"E
4	Fish cage culture site 1 (Cheranalloor) (Gravitas fish farm) outer waters - <i>Etroplussuratensis</i> & <i>Latescalcalifer</i>	10°3'23.68"N, 76°16'46.35"E
5	Fish cage culture site 1 (Cheranalloor) (Gravitas fish farm) inside cage waters - <i>Etroplussuratensis</i> & <i>Latescalcalifer</i>	10°3'23.47"N, 76°16'47.02"E
6	Fish cage culture site 2 (<i>Etroplussuratensis</i> & Gift Tilapia)	Mulavukad

Findings of CMFRI:

As per the results of the analysis carried out by CMFRI, following are the major findings:

1. Very low dissolved oxygen (D.O) levels ranging from 0.5 to 1.67 mg/l and high values of Chemical Oxygen Demand (COD) levels (43.8 mg/l to 230 mg/l) were observed, which are higher than maximum permissible limits for brackish water aquaculture, as detailed in the report.
2. Total Ammonia Nitrogen (TAN) was also found elevated, ranging from 0.85 to 1.85 mg/l against the recommended TAN levels of less than <0.1 mg/l. at three sampling stations.
3. Abrupt changes in the water quality parameters recorded at sampling locations suggest a sudden influx of untreated effluents in to the water body.
4. The necropsy analysis of the dead fish samples indicated acute chemical toxicity.

5. It was also informed that CMFRI did not pursue additional investigations into the possible involvement of potential chemical toxicity.
6. The comparison of the pre monsoon and monsoon level values of these parameters at the relevant locations by CMFRI also depicts higher values in the samples collected after the fish kill incident.

The maximum permissible limits referred in the report are optimism values which are prescribed for brackish water aquaculture, However, the report received from the CMFRI does not indicate the accreditation details of the analytical lab or the analytical methods followed for the analysis of the samples.

3.2. Sampling and report by KUFOS

As per the reports received and interactions held with KUFOS representatives to get the insights into the study carried out by the institute, overview of the sampling and analysis results and major findings in the report, it is observed that samples were collected by KUFOS on 21st and 23rd May 2024. Samples of water, sediment and fish were collected for the analysis to assess the water quality and reasons for fish kill, from 11 selected locations, from the upstream and downstream areas of the ‘Pathalam’ Bridge. The samples were collected from 03 locations on 21.05.2024, cage fish farms at Varappuzha, Kothad and Moolampally being done in ‘Periyar’ River and from 08 locations in the river on 23.05.2024. The sampling locations included site near the bridge in the stagnant navigation canal, the lotic upstream side and nine sites from the downstream including cage fish farms.

Sampling Locations:

S. No.	Details of the stations	Date of samples
1.	Kothad farm	21.05.2024
2.	Moolampilly farm	21.05.2024
3.	Varapuzha farm	21.05.2024

4.	Upstream Channel	23.05.2024
5.	Upstream open	23.05.2024
6.	TCC outlet	23.05.2024
7.	Central Portion	23.05.2024
8.	FACT outlet	23.05.2024
9.	Alliance outlet	23.05.2024
10.	Sud chemie	23.05.2024
11.	Cheranelloor farm	23.05.2024

As per the reports and interactions, it is observed that apart from the general water quality parameters, KUFOS has also carried out heavy metals and other metals analysis in the water and sediment samples including Cadmium, Lead, Arsenic, Chromium, Nickel, Copper, Zinc, Cobalt, Manganese, Uranium, Selenium, Rubidium and Cesium. Further the institute has also carried out toxicant analysis for parameters such as DDT, BHC, PAH, Benzenes, Tetrachloro-Methane, Chlorodiphenyl-Methane, Alkylated Benzenes in the water, sediment and tissue of fishes from Kothad farm, Moolampilly farm and Varapuzha farm and water samples from upstream and downstream of Pathalam regulator.

Finding of KUFOS:

As per the analysis results of KUFOS, following are the major findings:

1. The Dissolved Oxygen (D.O) levels were found to be low on the day of the incident (0.3mg/l to 3.08mg/l), as well as higher levels of Hydrogen Sulphide (H₂S) (2.53 mg/l to 3.79 mg/l) and Ammonia (NH₃) (1.39 mg/l to 1.97 mg/l) were observed in the three cage farm sites from where samples were collected on 21.05.2024.
2. The lower levels of D.O, coupled with the higher levels of H₂S, which is a lethal toxic gas to aquatic life and Ammonia, toxic even at very low concentrations of 0.05 ppm to most fishes can be attributed to the large scale fish mortality.

3. It was also informed that the sample collections done after the day of fish kill, i.e on 23rd May, 2024 depicted that the level of dissolved oxygen was reaching back to normal level, which can be attributed to the opening of shutters, mixing of water from the Boothathankettu reservoir and heavy precipitation. The D.O levels varied from 4.98 ppm in the upstream to 5.68 ppm in the downstream. However, the ammonia levels were ranging from 0.12 ppm 1.26 ppm and the sulphide levels were at higher levels both at the upper and lower reaches, varying from 1.26 ppm at TCC (M/s. Travancore Cochin Chemicals Ltd.) outlet where much dilution is happening to 2.53 ppm at the upper and lower streams of the river.
4. The analysis result indicates that in addition to the routine water quality parameters, the concentrations of pollutants like heavy metals Pesticides and other toxicants were exceeding the permissible limits. The accumulation of these toxic chemicals in the water, sediment and fish meat is alarming. This area needs urgent attention and the sources need to be identified.

CPCB representatives had enquired about the sampling and analysis procedures followed for the specific pollutant parameters such as Heavy Metals, pesticides etc. and also requested to share the original lab results for verification of analytical methods. It was informed that some of the parameters have been outsourced through M/s. Amrutha Hospital, mainly pesticide values in sediments and whereas other parameters were reported to be analysed at KUFOS only. It was also requested to share the geo coordinates of the sampling locations. However, the report received from the KUFOS neither indicate geo-coordinates of the sampling sites nor provided the accreditation details of the analytical lab or the analytical methods followed.

3.3. *Sampling and report by KSPCB*

CPCB also reviewed the reports and analysis results received from KSPCB and had interactions regarding the findings and contradictions, if any about the findings by CMFRI and KUFOS. It was informed by the KSPCB representatives that, based on the complaints received from the Eloor ferry area regarding fish death in the 'Periyar' River on 20.05.2024, at around 9 PM. Kerala Pollution Control Board's surveillance team had inspected the site and observed fish, including varieties like carp, Pearl spot, Tilapia floating in the river were struggling to breathe and by dawn, on 21/05/2024, fish were found dead in various locations, including Vettukadavu, Eloor Ferry, Cheranalloor, Varapuzha, Kadamakudy, and Kothadu. Samples of water and dead fish were collected from the area where dead fish were found.

The dissolved oxygen (DO) level of the water sample found to be lower than that required for the survival of the fish. It was also informed that routine daily sampling is being carried out for D.O levels in the region and a sudden decrease in DO levels were observed after the opening of the regulator shutter. It was also informed that the DO levels at the upstream of Pathalam regulator upstream has been declining and has been below 4.0 mg/l almost a month previous to the incident and that the DO levels at D/s of the regulator was quite low, almost in the same period. The samples collected from the River 'Periyar' was also analysed for other parameters and some high COD values (82.08 mg/l to 129.60 mg/l) were obtained; however, BOD values observed were less than 3.0 mg/l only. It was also informed that sediment samples have not been collected by KSPCB after the incident and that Heavy Metals were not detected in the water samples collected on 21st May, 2024 except for small amount of Zinc.

Sampling Locations:

Routine Sampling locations by KSPCB

S. No.	Sampling Locations	Geo Coordinates (Lat, Long)
1.	River 'Periyar' - Pathalam Bridge	10° 4'52.39"N 76°19'2.64"E
2.	River 'Periyar' - Pathalam Bund Upstream	10° 4'34.77"N 76°18'34.55"E
3.	River 'Periyar' - Pathalam Bund Downstream	10° 4'34.72"N 76°18'28.37"E
4.	River 'Periyar' - Vettukadavu	10° 5'16.31"N 76°17'51.39"E
5.	River 'Periyar' - Eloor Ferry	10° 4'24.61"N 76°16'56.39"E
6.	River 'Periyar' - Puthalam Kadavu	10° 3'47.74"N 76°19'6.13"E

Samples collected from River 'Periyar' on 21.05.2024 (Boat Sampling)

S. No.	Sampling Locations	Geo Coordinates (Lat, Long)
1.	Amrutha Pumping station	10° 3'51.68"N 76°17'40.18"E
2.	FACT PD	10° 4'8.44"N 76°17'25.92"E
3.	Kuzhikandom Thodu	10° 4'14.49"N 76°17'6.95"E
4.	Eloor Ferry	10° 4'24.61"N 76°16'56.39"E
5.	Muttinakam	10° 4'55.00"N 76°17'6.31"E
6.	Vettukadavu	10° 5'16.31"N 76°17'51.39"E
7.	IRE	10° 4'57.55"N 76°17'56.00"E
8.	FACT-UD	10° 3'58.32"N 76°17'38.67"E
9.	Binani Zinc Ltd.	10° 4'48.96"N 76°18'0.76"E
10.	Sud chemie	10° 4'37.72"N 76°18'11.90"E
11.	CMRL	10° 4'36.82"N 76°18'28.35"E
12.	TCC	10° 4'33.31"N 76°18'17.24"E

CPCB requested to share the original analysis reports by KSPCB and also enquired about any comments on the findings of CMFRI & KUFOS reports. KSPCB also informed that River water sampling and analysis is carried out on monthly basis by them.

It was indicated by the representatives of KUFOS that there can be some variation in the values, depending upon the sampling location, sampling method, especially on D.O samples collected at a depth from the surface. The anoxic conditions specially above the river bed level can lead to the release of H₂S by Sulphur active bacteria.

The CMFRI, KUFOS and KSPCB representatives agreed that the opening of the 'Pathalam' regulator only could have triggered the fish kill incident and the sources/reasons for the accumulation of pollutants in the upstream of the regulator channel needs to be addressed in detail to avoid such fish kill incidence in the river 'Periyar'.

4.0 COMPARITIVE ASSESSMENT OF REPORTS ON THE FISH KILL INCIDENT:

After going through all the three reports and analysis results in detail, as provided by CMFRI, KUFOS and KSPCB, following are the major observations of CPCB:

1. The sampling time, date and locations as carried out by the two Institutes and KSPCB are not uniform.
2. CMFRI has done limited sampling and has not conducted detailed analysis of samples, other than general parameters. As per the analysis results from CMFRI, Higher Total Ammonia levels, low Dissolved oxygen and High BOD and COD values at the six sampling locations, four of which are cage farm sites have been observed, which could be the main reason for the mass fish kill. The Necropsy study results by CMFRI of the dead fish samples, as received from one of the farmer suggests chemical toxicity.
3. KUFOS has carried out analysis of General Water Quality parameters, Heavy Metals and other metals and Toxicant Analysis for some of the pesticides, in the water, sediment and tissue of fishes from various

locations in the upstream and downstream of 'Pathalam' regulator. As per the analysis results of the sampling carried out on 21.05.2024 from the three fish farms, lower Dissolved Oxygen levels, Higher levels of Hydrogen Sulphide and Ammonia levels are attributed as the main reasons for the fish kill. Further the KUFOS report indicates higher levels of some of the heavy metals in the water, sediment and tissue of fishes, collected from the three fish farm locations on 21.05.2024.

4. KUFOS had carried out sampling from another Eight locations on 23.05.2024, which indicates that the DO levels were reaching back to normal levels. However, it is reported that H₂S and Ammonia levels were still significant in these locations. The Heavy Metal and other metal concentrations in these locations, in comparison with the Drinking Water Standards (IS 10500:2012) are mostly reported to exceed the standards. The Necropsy analysis by KUFOS suggests toxicant associated fish kill corroborated with the onsite observation of fishes showing aquatic surface respiration (ASR) and aerial emergence behaviour. However, KUFOS could not show any documentary evidences with regard to the analysis results indicating methods followed, NABL accreditation status of KUFOS or the samples got analysed for pesticides through M/s. Amrita Hospitals.
5. As per the KSPCB report and analysis results, based on the sampling conducted on 20.05.2024 (morning & evening) and 21/05/2024, the dissolved oxygen (DO) level of the water sample found to be lower than that required for the survival of the fish. It is also reported that samples from some locations had high COD values, however, BOD values observed were less. The Heavy metal concentrations have not been observed or are reportedly very low in almost all the sampling locations, contrary to as reported by KUFOS. As per the results provided, KSPCB has not carried out the analysis of H₂S or toxic constituents w.r.t pesticides and hence cannot be compared with KUFOS results. The KSPCB results depicts

higher levels of COD at most of the locations, during the boat survey conducted on 21.05.2024.

6. It is primarily observed from the three different reports that the CMFRI and KUFOS has focused on water quality parameters related to the aqua culture farming activities, whereas KSPCB sampling is mainly focused on general river water quality parameters. It may also be considered that the parameters such as Ammonia, H₂S etc. are highly unstable and dependent on pH and other parameters.
7. Considering that the sampling locations and sampling time were not uniform and that tidal influence on the downstream side of 'Pathalam' regulator on river 'Periyar' also cause lot of dynamic changes in the water quality parameters, variations of such nature cannot be ruled out.
8. All the three reports recognize the fact that accumulation of mixed waste water on the upstream of 'Pathalam' regulator and opening of its shutter resulted in lowering of DO levels, and variations in parameters such as Ammonia, H₂S etc., by way mixing of the contaminants which triggered the fish kill in river 'Periyar' on 20.04.2024

However, w.r.t the findings made by KUFOS related to increased Heavy Metal and Toxicant contamination (Pesticides such as DDT, BHC, PAH etc.) in the water, sediment and tissue of fishes at various locations, a detailed study shall be required to confirm the same, since KSPCB results does not indicate such contamination. The sampling locations, methodology and preservation, analytical methods followed (APHA, Standard Methods, IS etc.) are very crucial for such studies, KSPCB and KUFOS shall take up a Joint investigation in this regard and technical supervision regarding sampling and analysis, if required shall be provided by CPCB.

5.0 WATER QUALITY OF RIVER 'PERIYAR':

Central Pollution Control Board at present monitors water quality of River 'Periyar' at 13 locations under National Water Quality Monitoring Programme (NWMP) in association with the Kerala State Pollution Control Board. The water quality data of River 'Periyar' monitored during the year 2024 (Jan-Oct) is given below in Table 1. The analysis result indicates that all the 13 locations were found to be non-complying w.r.t Dissolved Oxygen (DO), pH, Biochemical Oxygen Demand (BOD), Faecal Coliform and Faecal Streptococci when compared with Primary Water Quality Criteria for Outdoor Bathing notified under Environment (Protection) Rules, 1986.

Table 1. Water Quality data of River 'Periyar' monitored under NWMP (2024 Jan-Oct)

S. No	Monitoring Location	Dissolved O ₂ (mg/L)		pH		BOD (mg/L)		Faecal Coliform (MPN/100 ml)		Faecal Streptococci (MPN/100ml)		Compliance Status
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
Primary Water Quality Criteria for Outdoor Bathing		> 5 mg/L		6.5-8.5		< 3 mg/L		< 2500 MPN/100 ML		< 500 MPN/100 ML		
1	River ‘Periyar’ At Aluva-Eloor	4.3	7.4	6.3	8.7	1	2.5	200	2800	40	630	Non-Complying
2	River ‘Periyar’ At Kalady	6.1	10.1	6.1	8.5	1	4.3	70	940	31	400	Non-Complying
3	River ‘Periyar’ At Sewage Discharge Point, Aluva, Ernakulam	4.5	7.2	6.1	7.8	1	2.7	700	3900	40	410	Non-Complying
4	River ‘Periyar’ Rsvr At Bhoothathanketu	4.6	7.8	6	7.9	1	3.9	40	490	14	120	Non-Complying

5	River 'Periyar' Rsvr At Edamalar	6.3	7.7	6.7	8.1	1	1.9	10	240	1.8	79	Compl ying
6	River 'Periyar' At Muppathadam	4.1	7.4	6.4	8.9	1	2.1	110	700	28	220	Non- Compl ying
7	River 'Periyar' At Pathalam	5.5	8	7	9	1	3.5	170	1500	58	460	Non- Compl ying
8	River 'Periyar' At Kalamassery	3.8	7.4	6.4	8.8	1	3	270	1700	54	350	Non- Compl ying
9	River 'Periyar' At Purappallikadavu	5.2	7.7	6.2	8.1	1.1	4.2	150	1400	10	350	Non- Compl ying
10	River 'Periyar' At Kwa Intake, Aluva	5.1	7.3	6.3	9.44	1	4.2	170	1900	63	140	Non- Compl ying
11	River 'Periyar' Azhikode Ferry, Kodungallur, Thrissur	4	11	6.6	8	1	3.5	1.8	800			Non- Compl ying
12	River 'Periyar' At Kulamavu Reservoir At Idukki	6.4	8.1	6.4	7.5	1.1	2	1.8	1800	1.8	600	Non- Compl ying
13	River 'Periyar' At Panamkutti Bridge, Idukki	7	8.3	6.5	7.4	1.6	2.1	1.8	630	1.8	630	Non-C omplyi ng

6.0 STATUS OF DISCHARGE OF INDUSTRIAL EFFLUENT AND ZERO LIQUID DISCHARGE DIRECTIONS BY KSPCB:

The Hon'ble NGT while passing final judgement dated 27.05.2022 in the River 'Periyar' pollution related matters, in OA No. 395 & 396 of 2013, had directed the Chief Secretary, Govt. of Kerala to constitute a monitoring committee comprising of four Additional Chief Secretaries of concerned Departments - Environment, Local Self-government, Irrigation/Water Resource and Finance to

take stock of the situation of execution of action plan with time-bound targets. As per the judgement, the Committee may also consider core steps required to restore the water quality of the river so as to protect the environment and public health and may also ensure that all concerned industries in the catchment area of the ‘Periyar’ River in the stretch in question adopt Zero Liquid Discharge (ZLD) and are compliant with the norms.

The status of the industrial discharge into River ‘Periyar’ from the Eloor – Edayar industrial area and the status of the directions issued for maintaining Zero Liquid Discharge by KSPCB was examined based on the information received. As per KSPCB records, there are four large scale industrial units generating effluent at Eloor and out of which three units are permitted to discharge treated effluent into River ‘Periyar’. Two divisions of FACT (M/s. Fertilizers and Chemicals Travancore Ltd – Fertilizer and Petro Chemical Plant) and M/s. Indian Rare Earths Limited (IREL) are consented to discharge treated effluent into ‘Periyar’, while in case of M/s. Travancore Cochin Chemicals Limited (TCC), it is reported that the entire effluent is reused in process and irrigation.

In compliance to the Hon’ble Tribunals directions while disposing the OA No. 395 & 396 of 2013 and the conditions of the Consent to operate issued, directions have been issued by KSPCB dated 07.09.2024 under section 33A of The Water (Prevention and Control of Pollution) Act, 1974 to the three industries viz., M/s. FACT – 02 units and M/s. IREL to achieve ‘zero liquid discharge’. As per the responses received from the three industries, they have adopted measures for reduction of effluent generation and promoting reuse, however have not achieved ZLD yet. It is informed by the KSPCB that these industries are exploring technical feasibility for further improvement and adoption of ZLD; however, committed time lines/ time targeted action plans have not been provided.

W.r.t TCC, it is mentioned that based on inspection findings, regarding effluent discharged through the storm water drain, direction was issued on 03-07-2024 under Section 33A of The Water (Prevention and Control of Pollution) Act, 1974. As per the response from the company, industry is maintaining ZLD by treatment and recycle/re use of effluent and incidental discharge was due to maintenance of cooling towers and corrective action for installing additional pumps have been taken up.

As per the report received from KSPCB, there are 75 No. of effluent generating industries generating around 2.47 MLD effluent in the Edayar industrial area, covering all categories. Out of 75 units, the major quantity of effluent, i.e. 1.21.MLD out of 2.47 MLD is generated by three units namely, M/s. CMRL (Cochin Minerals and Rutile Limited), M/s. Sudchemie (Sudchemie India Private Limited) and M/s. TMS Leathers, having permission to discharge treated effluent into the River. Directions have been issued by KSPCB dated 07.09.2024 under section 33A of The Water (Prevention and Control of Pollution) Act, 1974 to these three industries to achieve zero liquid discharge, in compliance to the Hon'ble NGT judgement and Consent to Operate conditions.

As per the responses received from the three industries, M/s. Sudchemie has adopted ZLD system for other streams, except one production line, while M/s. CMRL is claiming that they are meeting discharge standards and discharging to the downstream section of 'Pathalam' regulator, where saline water mixes with the River. M/s. TMS Leathers have responded that Chrome recovery plant is in operation for recycle/re use of chrome and other actions are being initiated. As per the details made available, these industries have not yet achieved ZLD and are exploring technical feasibility for further improvement and adoption of ZLD; however, committed time lines/ time targeted action plans have not been provided by any of these units also.

As per the KSPCB report, the rest of 72 units are generating 1.26 MLD of effluent, out of which 0.89 MLD is generated by the five rubber processing units and these five rubber units are recirculating treated effluent. The remaining 67 medium and small scale units are generating 0.37 MLD of effluent and reportedly having their own treatment system.

7.0 ACTIONS RELATED TO IDENTIFIED POLLUTED RIVER STRETCHES (PRS):

During the year 2018, based on exceedance of Bathing Water Quality Criteria parameter of BOD (exceeding 3 mg/L), CPCB had identified Polluted River stretches including polluted river stretch of River ‘Periyar’ from Alwaye-Eloor to Kalamassery in Kerala under Priority class V (BOD 3.2 - 5.1). Similarly, during the year 2022, CPCB identified Polluted River stretch of River ‘Periyar’ along Alwaye-Eloor, along Purappallikavu and along Kalamassery in Kerala under Priority class V (BOD 3.3 - 3.9). For rejuvenation of polluted river stretches identified in 2018 including River ‘Periyar’, action plans were prepared by River Rejuvenation Committee (RRC) constituted by the respective State Government/ UT Administration including the state of Kerala, under the overall supervision and coordination of Principal Secretary, Environment of the concerned State/ Union Territory for bringing all the polluted river stretches identified by CPCB fit for bathing purposes (i.e. BOD < 3 mg/L and FC < 500 MPN/100 mL). Prepared action plans covers aspects such as Source control (Municipal sewage management, Industrial pollution control, Waste management), River catchment/Basin Management (Adoption of good irrigation practices, Utilization of treated sewage, Ground water recharge aspects), Flood Plain Zone protection and its management (Setting up of bio-diversity parks, Removal of

encroachments, Rain water harvesting, Plantation on both sides of the river), Ecological/Environmental Flow (E-Flow) and Watershed management.

Implementation of time-bound action plans have been assigned to State Government Departments/ UT Administration Departments and are responsible for rejuvenation of polluted river stretches identified in the respective State/UT under the overall supervision and coordination of ‘Principal Secretary, Environment of the concerned State/Union Territory’. Overall responsibility lies with the Chief Secretary, State Governments/UT Administrations. Further, progress of implementation of action plans is reviewed by the RRC at State Level and Central Monitoring Committee (CMC) constituted under the Chairmanship of Secretary, Ministry of Jal Shakti at Central Level. It is the responsibility of the Kerala State to ensure rejuvenation of identified polluted rivers including river ‘Periyar’ in Kerala in a time bound manner.

8.0 *RELATED LITIGATION BEFORE HON’BLE HIGH COURT OF KERALA:*

As already submitted before, the Hon’ble High Court of Kerala, vide Writ Petition (Civil) No. 9534 of 2020 along with WPC No. 996 of 2012 and WPC No. 31236 of 2023, related to pollution in River ‘Periyar’, is also considering the matter of pollution and the incident of fish kill in River ‘Periyar’. The Hon’ble High Court of Kerala had constituted a Committee comprising ‘Secretary to Government, Environment Department, Govt. of Kerala, Regional Director, Central Pollution Control Board, Bangalore, Director, Environment & Climate Change, Govt. of Kerala and Chairperson, Kerala State Pollution Control Board to make site visits, interact with the petitioners and to file the report with recommendations.

Accordingly, the Committee had conducted multiple site visits including industrial inspections, interaction with petitioners and held review meeting with the Stakeholder Departments to assess the progress made on implementation of action plans for rejuvenation of River ‘Periyar’. Based on the observations made during the visits by the Committee, KSPCB has issued directions/ notices to the 11 industries for providing delay pond for the storm water drains before discharge and to ensure compliance with effluent quality standards and for other actions. Directions were given to the Irrigation Department regular operation of the ‘Pathalam’ regulator cum bridge for maintaining minimum flow, periodic de-silting, installation of real time water quality monitoring station and other actions. Directions were also issued to the Industries Department to identify whether industrial effluent discharge is getting mixed into storm water drain in the industrial area, complete the ongoing storm water construction in the area, to provide delay ponds for the storm water drains before reaching Riverine system etc. and actions are being taken in compliance to the Hon'ble High Court of Kerala directions in the matter. A copy of the Committee report filed before the Hon’ble High Court of Kerala is placed at **Annexure VI**.

9.0 CONCLUSIONS AND RECOMMENDATIONS:

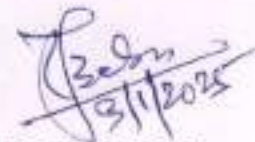
1. There are some variations in the reports of CMFRI and KUFOS subsequent to the fish kill in river ‘Periyar’ on 20.05.2024 with the reports and findings of KSPCB, especially in the general water quality parameters. However, it may also be considered that the parameters such as Ammonia, H₂S etc. are highly unstable and dependent on pH and other parameters. Considering the sampling locations and sampling time were not uniform and that tidal influences also causes lot of dynamic changes in the water quality parameters, variations of such nature cannot be ruled out.

2. All the three reports (CMFRI, KUFOS and KSPCB) recognize the fact that accumulation of pollutants and the mixed waste water at the upstream of 'Pathalam' regulator on river 'Periyar' and opening of its shutter resulted in lowering of DO levels, and variations in parameters such as Ammonia, H₂S etc., by way of abrupt turbulence and mixing of the contaminants which lowered the dissolved oxygen and triggered the fish kill in river 'Periyar' on 20.05.2024
3. However, the KUFOS study depicts increased Heavy Metal concentrations in many sampling locations, contradictory to the KSPCB results. Additionally, high levels of Toxicant contamination (Pesticides such as DDT, BHC, PAH etc.) in the river water, sediment and tissue of fishes at various locations are reported by KUFOS, whereas KSPCB has not analysed and reported for these parameters.
4. A detailed study shall be required to confirm the Heavy Metal and pesticide contamination at uniform sampling locations following the uniform sampling protocols i.e., methodology and preservation, analytical methods followed (APHA, Standard Methods, IS etc.) are very crucial for such studies. KSPCB and KUFOS shall take up a Joint investigation in this regard and technical supervision regarding sampling and analysis, if required, shall be provided by CPCB.
5. As reported by KSPCB, the condition to provide Zero Liquid discharge had already been specified in the consent issued to the major effluent generating units and directions have also been issued in this regard. But it is observed that the industries are yet to achieve the ZLD status, even though steps have been taken to reduce effluent generation and recycling of effluent streams. KSPCB shall obtain committed time lines/ time targeted action plans from these units by exploring technical feasibility for further improvement and adoption of ZLD for ensuring compliance to Hon'ble NGT orders.

6. Kerala Govt. and KSPCB may further explore the possibility regarding the proposal of setting up of a Common Effluent Treatment Plant for the small and medium scale industries in the region.
7. It is the responsibility of the Kerala State to ensure rejuvenation of identified polluted rivers including river 'Periyar' in Kerala in a time bound manner. The Kerala Govt. and KSPCB shall ensure the Implementation of time-bound action plans with respect to River 'Periyar' for rejuvenation of identified polluted river stretches and regular review of the progress of implementation of action plans shall be made at State level in line with the review by Central Monitoring Committee (CMC) constituted under the Chairmanship of Secretary, Ministry of Jal Shakti at Central Level.
8. The Hon'ble High Court of Kerala is also pursuing the matter as detailed in above sections.
9. That in light of the above submission, it is respectfully submitted that this Answering respondent i.e. CPCB, shall abide by any order(s) or direction(s) passed by this Hon'ble tribunal in the instant OA.



Counsel for CPCB

DEPONENT

J. Chandra Babu
REGIONAL DIRECTOR
CENTRAL POLLUTION CONTROL BOARD
REGIONAL DIRECTORATE - BENGALURU
(MIN. OF ENV, FOREST & CC, GOVT OF INDIA)
BENGALURU - 560 079. MOB: 9868278903

Item Nos.1, 2 & 4:-

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

(Through Video Conference)

**Original Application No. 184 of 2024 (SZ) &
I.A. No.84 of 2024 (SZ)**

WITH

Original Application No. 233 of 2024 (SZ)
[Earlier O.A. No.732/2024 (PB)]

WITH

Original Application No. 234 of 2024 (SZ)
[Earlier O.A. No.776/2024 (PB)]

IN THE MATTER OF:

Tribunal on its own motion **SUO MOTU**
based on the News item published in 'The
Hindu', Kochi Edition dt. 21.05.2024 titled,
**"Another mass fish kill in Periyar River in
Kerala after suspected effluent release"**.

And

The Principal Secretary to Govt. of Kerala,
Environment Department,
Thiruvananthapuram and Ors.

...Respondent(s)

WITH

Tribunal on its own motion **SUO MOTU**
based on the News item appearing in
Mathrubumi.com dt. 25.05.2024 titled,
**"KUFOS disputes PCB report on Periyar
Fish Kill, identifies ammonia, sulphur
presence"** and news item appearing in The
New Indian Express dt. 26.05.2024 titled,
**"KUFOS analysis finds high toxin level in
Periyar river"**.

And

Kerala State Pollution Control Board,
Through its Member Secretary,
Kerala and Ors.

...Respondent(s)

WITH

Tribunal on its own motion **SUO MOTU**
based on the News item Published in 'The
Hindu', dt. 07.06.2024 titled, "**Fish Kill**
spotlights pangs of Periyar".

And

MoEF&CC,
Through Regional Office,
Bangalore and Ors.

...Respondent(s)

Date of hearing: 20.08.2024.

CORAM:

HON'BLE Smt. JUSTICE PUSHPA SATHYANARAYANA, JUDICIAL MEMBER

HON'BLE Dr. SATYAGOPAL KORLAPATI, EXPERT MEMBER

O.A. No.184/2024 (SZ):

For Applicant(s): Suo Motu.

For Respondent(s): Ms. Mokshavathy represented
Mr. E.K. Kumaresan for R1 to R3, R6 & R7.
M/s. N. Nathami for R4.
Mrs. V.K. Remasmrithi for R5.
Mr. K.K. Ashkar – I.A.

O.A. No.233/2024 (SZ):

For Applicant(s): Suo Motu.

For Respondent(s): Mrs. V.K. Remasmrithi for R1.
M/s. N. Nathami for R2.

O.A. No.233/2024 (SZ):

For Applicant(s): Suo Motu.

For Respondent(s): Mrs. V.K. Remasmrithi for R2.
M/s. N. Nathami for R3.

ORDER

1. The Original Application [O.A. No.184 of 2024 (SZ)] was Suo Motu registered by this Tribunal, based on the news item published in 'The Hindu', Kochi Edition dated 21.05.2024 under the caption **"Another mass fish kill in Periyar River in Kerala after suspected effluent release"**.

2. Meanwhile, the Original Application No.732 of 2024 (PB) and Original Application No.776 of 2024 (PB) were Suo Motu registered by the Principal Bench, National Green Tribunal, New Delhi, based on the news items appearing in Mathrubumi.com dated 25.05.2024 titled, **"KUFOS disputes PCB report on Periyar Fish Kill, identifies ammonia, sulphur presence"** and in The New Indian Express dated 26.05.2024 titled, **"KUFOS analysis finds high toxin level in Periyar river"** and the news item published in 'The Hindu', dated 07.06.2024 titled, **"Fish Kill spotlights pangs of Periyar"** respectively.

3. Thereafter, both matters have been transferred to this Bench and re-numbered as **Original Application No.233 of 2024 (SZ)** and **Original Application No.234 of 2024 (SZ)** respectively.

4. As the issues raised in all these applications are similar in nature, the same have been clubbed together for consideration.

5. As the news item itself says that "*KUFOS disputes PCB report on Periyar Fish Kill, identifies ammonia, sulphur presence*", we *Suo Motu* implead the Kerala University of Fisheries and Ocean Studies (KUFOS), represented through its Director, Panangad Road, Madvana Junction, Kochi, Ernakulam, Kerala as additional Respondent No.4 in O.A. No.233 of 2024 (SZ) and Respondent No.9 in O.A. No.184 of 2024 (SZ).

6. Further, the CMFRI is also a necessary party to this proceeding, we *Suo Motu* implead the Central Marine Fisheries Research Institute (CMFRI) represented by its Director, Post Box No.1603, Ernakulam North P.O., Kochi, Kerala as additional Respondent No.10 in O.A. No.184 of 2024 (SZ), Respondent No.5 in O.A. No.233 of 2024 (SZ) and Respondent No.5 in O.A. No.234 of 2024 (SZ).

7. Let notice be issued to the respondents in O.A. Nos.233 & 234 of 2024 (SZ) through the Tribunal along with a copy of the newspaper report.

8. The learned counsel Mrs. V.K. Remasmrithi, accepts notice on behalf of the Kerala State Pollution Control Board and Ms. N. Nathami, accepts notice on behalf of the Central Pollution Control Board.

9. In O.A. No.184 of 2024 (SZ), the report dated 19.08.2024 of the Kerala SPCB and the reply dated 19.08.2024 of the CPCB are filed.

10. It appears that in **Original Application Nos.395 and 396 of 2013 (SZ)**, an order was already passed by this Tribunal on 27.05.2022, which covered the overall pollution issues related to river Periyar, previous incidents of fish kill and discoloration and also the execution of remediation projects.

11. If the directions were already given by this Tribunal, we are surprised why the Kerala SPCB and CPCB have not taken care and allowed the further mass fish kill on 21.05.2024 after two years. There is also a Monitoring Committee constituted by the Tribunal in this regard.

12. The study by the KUFOS and CMFRI, prima facie, is said to be contradictory with the reports of the Kerala SPCB. Hence, we direct the CPCB to produce both the study reports from the KUFOS and CMFRI and also point out what is the contradiction made by the Kerala SPCB in this regard. As the Monitoring Committee had already directed the industries concerned in the catchment area near the Periyar River to adopt the Zero Liquid Discharge (ZLD) system, let the report also give particulars about the industries operating on the catchment area, their method of discharging the effluents and the level of contamination in the Periyar River.

13. Let the matter be listed on **13.09.2024**. Meanwhile, the respondents are directed to file their respective replies/reports.

Sd/-
Smt. Justice Pushpa Sathyanarayana, JM

Sd/-
Dr. Satyagopal Korlapati, EM

O.A. No.184/2024 (SZ) &
I.A. No.84 of 2024 (SZ)
O.A. No.233/2024 (SZ)
O.A. No.234/2024 (SZ)
20th August, 2024. Mn.





Central Pollution Control Board

(Ministry of Environment, Forests and Climate Change)

Regional Directorate, Bengaluru

NisargaBhavan, Shivanagar

Bengaluru- 560079

Minutes of the Meeting held on 05.11.2024 with the representatives of CMFRI, KUFOS and KSPCB for review of the reports related to the fish kill incident in 'Periyar' River, in pursuance of directions of Hon'ble NGT SZ in OA No. 184 of 2024

The Hon'ble NGT SZ Bench had passed an order dated 20.08.2024 in OA No. 184 of 2024(SZ) along with OA No. 233 & 234 of 2024 - Tribunal on its own motion SUO MOTU based on the News items related to fish kill in 'Periyar' River, wherein directions were given to CPCB, being a respondent. The relevant portion of the Hon'ble NGT order is reproduced below;

"The study by the KUFOS and CMFRI, prima facie, is said to be contradictory with the reports of the Kerala SPCB. Hence, we direct the CPCB to produce both the study reports from the KUFOS and CMFRI and also point out what is the contradiction made by the Kerala SPCB in this regard. As the Monitoring Committee had already directed the industries concerned in the catchment area near the 'Periyar' River to adopt the Zero Liquid Discharge (ZLD) system, let the report also give particulars about the industries operating on the catchment area, their method of discharging the effluents and the level of contamination in the 'Periyar' River."

Accordingly, CPCB Regional Directorate vide letter dated 04th Sep, 2024 had requested Central Marine Fisheries Research Institute (CMFRI), Kerala University of Fisheries and Ocean Studies (KUFOS) and Kerala State Pollution Control Board (KSPCB) for providing the reports prepared on the fish kill incident on 20.05.2024 and also a meeting was convened through VC on 05.11.2024 to review the received reports. The following officials and representatives of CMFRI, KUFOS and KSPCB attended the meeting;

CMFRI Representatives:

1. Dr.(Smt.) K. S. Shobhana, Principal Scientist
2. Dr. (Smt.) D. Prema, Principal Scientist



KUFOS Representatives:

1. Dr. Binu Varghese, Asst. Prof., Dept. of Aquaculture
2. Dr. Prabhakaran M.P., Asst. Prof., Dept. of Aquatic Environment Management

KSPCB Representatives:

1. Smt. Sreekala. S, Chairperson
2. Dr. (Smt.) Sheela A.M., Member Secretary
3. Sh. P. K. Baburajan, CEE, KSPCB, Ernakulam
4. Sh. Krishnan, SEE, KSPCB, Thiruvananthapuram
5. Sh. M. A. Shiju, SEE, KSPCB, ESC Eloor

CPCB Representatives:

1. Sh. J Chandra Babu, Regional Director, CPCB, RD, Bengaluru
2. Sh. Vivek. K, Additional Director (Sc. E), CPCB, RD, Bengaluru

Sh. J Chandra Babu, Regional Director, CPCB, RD, Bengaluru welcomed all the participants and after a brief round of introduction, the background and the directions given by the Hon'ble Tribunal were briefed to the participants by Sh. Vivek K, Additional Director (Sc. E), CPCB. Accordingly, both the institutes were requested to share brief details about the reports prepared on the fish kill incident, sampling dates and locations, analysis results and any contradictory findings with the KSPCB report.

The representatives from CMFRI shared their insights on the report prepared on the fish kill, sampling and analysis details. It was informed that water samples were collected by the CMFRI, Kochi along the estuarine waters of Kochi backwaters and lower reaches of 'Periyar' River on 21.05.2024, as part of the routine sampling. It was also informed that a necropsy analysis was done on dead fish samples brought by a cage farmer on 22.05.2024. The water samples were collected from six different locations, including four fish farm/cage culture sites and analysis were carried out for routine water quality parameters. As per the results of the analysis carried out by CMFRI, very low dissolved oxygen levels ranging from 0.5 to 1.67 mg/l and high values of and COD levels were observed, which are higher than maximum permissible limits for brackish water aquaculture, as detailed in the report. It was also informed that total ammonia nitrogen (TAN) was also found elevated, ranging from 0.85 to 1.85 mg/l against the recommended TAN levels of less than <0.1 mg/l. at



three sampling stations. It was also reported that the abrupt changes in the water quality parameters recorded at sampling locations suggest a sudden influx of untreated effluents in to the water body. The necropsy analysis of the dead fish samples indicated acute chemical toxicity. It was also informed that CMFRI did not pursue additional investigations into the possible involvement of potential chemical toxicity.

CPCB representatives enquired about the source of the maximum permissible limits for brackish water aquaculture, as referred in the report and also requested to share the original lab analysis results, so as to verify the analytical methods followed. CMFRI representatives agreed to share the same.

Thereafter, the KUFOS representatives shared the insights into the study carried out by the institute, overview of the sampling and analysis results and major findings in the report. It was informed that samples were collected by KUFOS on 21st and 23rd May 2024. Samples of water, sediment and fish were collected for the analysis to assess the water quality and reasons for fish kill, from 11 selected locations, from the upstream and downstream areas of the 'Pathalam' Bridge. The samples were collected from 03 locations on 21.05.2024, cage fish farms at Varappuzha, Kothad and Moolampally and from 08 locations on 23.05.2024. The sampling locations included site near the bridge in the stagnant navigation canal, the lotic upstream side and nine sites from the downstream including cagefish farms. As per the analysis results, the Dissolved Oxygen (D.O) levels were found to be low on the day of the incident (0.3 mg/l to 3.08 mg/l), as well as higher levels of Hydrogen Sulphide (H₂S) (2.53 mg/l to 3.79 mg/l) and Ammonia (NH₃) (1.39 mg/l to 1.97 mg/l) were observed in the three cage farm sites from where samples were collected on 21.05.2024. The lower levels of D.O, coupled with the higher levels of H₂S, which is a lethal toxic gas to aquatic life and Ammonia, toxic even at very low concentrations of 0.05 ppm to most fishes can be attributed to the large scale fish mortality. The representative of KUFOS also informed that the sample collections done after the day of fish kill i.e. on 23rd May, 2024 depicted that the level of dissolved oxygen was reaching back to normal level, which can be due to the opening of shutters, mixing of water from the Boothathankettu reservoir and heavy precipitation. The DO levels varied from 4.98 ppm in the upstream to 5.68 ppm in the downstream. However, the ammonia levels were ranging from 0.12 ppm to 1.26 ppm and the sulphide levels were still at higher levels both at the upper and lower reaches, varying from 1.26 ppm at TCC outlet where much dilution is happening to 2.53 ppm at the upper and lower streams of the river. It was also indicated that in addition to these routine water quality parameters, the concentrations of pollutants like heavy metals Pesticides and other toxicants were far beyond the permissible limits. The accumulation of these



toxic chemicals in the water, sediment and fish meat is alarming. This area needs urgent attention and the sources need to be identified.

CPCB representatives enquired about the sampling and analysis procedures followed for the specific pollutant parameters such as Heavy Metals, pesticides etc. and also requested to share the original lab results for verification of analytical methods. It was informed that some of the parameters have been out sourced through Amrutha Institute of Medical Sciences, mainly pesticide values in sediments and other parameters were analysed at KUFOS Lab. It was also requested to share the geo coordinates of the sampling locations.

Finally, KSPCB representatives were requested to share the findings and also to indicate regarding any contradictions about the findings by CMFRI and KUFOS. It was informed by the KSPCB representative that, based on the complaints received from the Eloor ferry area regarding fish death in the Periyar River on 20.05.2024, at around 9 PM. Pollution Control Board's surveillance team had inspected the site and observed fish, including varieties like carp, Pearl spot, Tilapia floating in the river were struggling to breathe and by dawn, on 21/05/2024, fish were found dead in various locations, including Vettukadav, Eloor Ferry, Cheranalloor, Varapuzha, Kadamakudy, and Kothadu. Samples of water and dead fish were collected from the area where dead fish were found. The dissolved oxygen (DO) level of the water sample found to be lower than that required for the survival of the fish. It was also informed that routine daily sampling is being carried out for D.O levels in the region and a sudden decrease in DO levels were observed after the opening of the regulator shutter. It was also informed that the DO levels at the upstream of Pathalam regulator upstream has been declining and has been below 4.0 mg/l almost a month previous to the incident and that the DO levels at D/s of the regulator was quite low, almost in the same period. The samples collected from the River 'Periyar' was also analysed for other parameters and some high COD values were obtained; however, BOD values observed were less than 3.0 mg/l only. It was also informed that sediment samples have not been collected by KSPCB after the incident and that Heavy Metals were also not detected in the water samples collected on 21st May, except for small amount of Zinc.

CPCB representatives requested to share the original analysis reports by KSPCB also enquired about any comments on the findings of CMFRI & KUFOS reports. It was informed that KSPCB is carrying out the River water and sediment sampling and analysis on 6 monthly basis and the available results can be compared with the results of KUFOS. It was also indicated by KUFOS there can be some variation in the values, depending upon the sampling method, especially on D.O samples



collected at surface and at a depth from the surface. The anoxic conditions can lead to the release of H₂S by Sulphur active bacteria.

Upon deliberations, the CMFRI, KUFOS and KSPCB representatives agreed that the opening of the 'Pathalam' regulator could have triggered the fish kill incident and the sources/reasons for the accumulation of pollutants in the upstream of the regulator channel needs to be addressed. Further, CPCB representatives requested CMFRI, KUFOS and KSPCB representatives **for submission of the original analysis results** and comments/brief note on the findings, if any may also be provided by **11.11.2024 (12 Noon)**. Also, KSPCB was requested the status of directions given to the industries to follow ZLD by the Monitoring Committee shall also be shared by **11.11.2024 (12 Noon)**, considering the timeline to be followed for filing the report before Hon'ble NGT.

Sh. Vivek K, CPCB concluded the meeting by thanking all the participants for attending and sharing the findings of their report.

-- OO --



vivek.cpcb< vivek.cpcb@gov.in >

Fwd: Hon'ble NGT SZ Order dated 20.08.2024 in OA No.184 of 2024(SZ) along with OA No.233&234 of 2024 related to Fish kill in Periyar River

< pmecell.cmfri1@gmail.com >

Tue, 05 Nov 2024 5:03:49 PM +0530

To "J Chandra Babu"<jcb.cpcb@nic.in>

Cc "Vivek K"<vivek.cpcb@gov.in>,"Avanish Tripathi"<atripathi.cpcb@gov.in>,"Anjana Kumari"<anjana.cpcb@nic.in>,"grinsongeorge"<grinsongeorge@gmail.com>,"sobhanapradeep11"<sobhanapradeep11@gmail.com>

3 Attachment(s)Fish Kill report CMFRI_0001.pdf
639.7 KBWater quality analysis report-...
335.7 KBNecropsy report.pdf
584.4 KB**F.No.3(2)/PME/Court Matter/2023****Dated: 05.11.2024****To****Shri. J. Chandra Babu**

Regional Director

Central Pollution Control Board

Regional Directorate (Bengaluru)

Nisarga Bhawan, A-Block, 1&2 Floors

Thimmariah Road, 7 D Main, Benngaluru 560079.

Sub: Hon'ble NGT SZ Order dated 20.08.2024 in OA No.184 of 2024(SZ) along with OA No.233 & 234 of 2024 related to Fish kill in Periyar River - reg.

Ref: Your email dated 17.09.2024.

Dear Sir,

As desired, I am once again forwarding herewith the ICAR-CMFRI assessment report in connection with the recent fish kill in river Periyar and the letter from Director, ICAR-CMFRI for your kind perusal and further necessary action.

With regards,

Dr. K.S. Sobhana

For Scientist-in-charge, PME Cell

--

डॉ. बोबी इग्नेशियस/Dr. Bobby Ignatius,
प्रभारी वैज्ञानिक/Scientist-in-charge,
पी एम ई - सेल/PME Cell
भा कृ अ प - कें स मा अ सं, कोच्ची/
ICAR-CMFRI, Kochi.



भारतीय कृषि अनुसंधान परिषद
Indian Council of Agricultural Research
केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान
Central Marine Fisheries Research Institute



(कृषि अनुसंधान एवं शिक्षा विभाग, कृषि एवं किसान कल्याण मंत्रालय, भारत सरकार)
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Celebrating 75 Glorious Years of Marine Fisheries & Mariculture Research

F.No.3(2)/PME/Court Matter/2023

Dated: 10.09.2024

To

Shri. J. Chandra Babu
Regional Director
Central Pollution Control Board
Regional Directorate (Bengaluru)
Nisarga Bhawan, A-Block, 1&2 Floors
Thimmariah Road, 7 D Main, Bengaluru 560079

Sub: Hon'ble NGT SZ Order dated 20.08.2024 in OA No.184 of 2024(SZ) along with OA No.233&234 of 2024 related to Fish kill in Periyar River

Ref: Your email dated 05.09.2024

Dear Sir,

With reference to the subject cited above, please be informed that, as part of the routine samplings under our Institute research project, water samples were collected by the ICAR-CMFRI, Kochi along the estuarine waters of Kochi backwaters and lower reaches of Periyar River on 21.05.2024. Samples from six different locations (Station 1 to 6) were analysed for routine water quality parameters. The results of analyses revealed very low dissolved oxygen levels ranging from 0.5 to 1.67 mg l⁻¹. The optimum DO levels recommended for brackish water aquaculture is 4-8 mg l⁻¹. The Biological Oxygen Demand (BOD) in the water samples varied from 9.2 to 20.45 mg l⁻¹ which also supports high levels of oxygen demand in the water. The maximum permissible limit for BOD for brackish water aquaculture is 4 mg l⁻¹. Another important parameter which was found elevated was total ammonia nitrogen (TAN) which ranged from 0.85 to 1.85 mg l⁻¹. Recommended TAN levels for brackish water fish is ≤0.1 mg l⁻¹. The pH levels however ranged between 6.5-7.3. Dissolved orthophosphate (PO₄-P) levels ranged from 0.04 to 0.31 mg l⁻¹, exceeding permissible limit of 0.05 mg l⁻¹ at three sampling stations (Stations 1, 2 and 3). All the above values showed abrupt changes from the mean levels recorded by ICAR-CMFRI during the routine investigations conducted as part of the Institute's research project. The abrupt changes in the water quality parameters recorded at sampling locations from Ponjikkara Jetty to Cheranelloor suggest a sudden influx of untreated effluents in to the water body.

Further a necropsy analysis was done on dead fish samples brought by a cage farmer on 22.05.2024. Although necropsy analysis is generally performed on morbid or live fish samples due to unique challenges associated with examining dead specimens, in this case it was carried out on dead fish samples as the farmer reported that no live or morbid fish remained in the farm. According to the farmer, there was 100% mortality among the cultured fish in cage farms affecting multiple species. The farmer also noted a sudden onset of mortality strongly indicating abrupt changes in water quality. The case history and macroscopic lesions observed were suggestive of acute water quality issues and absence of infectious causes.

The reports on the water quality analysis and necropsy studies conducted at ICAR-CMFRI are enclosed for your review. Since KUFOS is the designated nodal organisation responsible for investigating the 2024 Periyar fish kill, ICAR-CMFRI did not pursue additional investigations into the possible involvement of potential chemical toxicity.

With regards,

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'Grinson George', with a long horizontal line extending to the right.

Grinson George
Director

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

Marine Biodiversity and Fishery Environment Management Division

P.B. No. 1603, Ernakulam North P. O, Kochi – 682018

Case: Mass fish mortality incidence along the estuarine waters of Kochi backwaters and lower reaches of Periyar River on 21.05.2024

Preliminary report

1. Sample collection

Date: 21.05.2024 & 22.05.2024 (Sample brought by farmer)

Mass fish mortality and floating dead fishes were observed in the early morning hours by the localities as well as the fishermen along the estuarine waters of Kochi and lower reaches of Periyar River, along the Mulavukad, Chittoor and Cheranalloor areas. To understand the scenario water and sediment samples were collected from 5 stations.

Station code	Details of the stations	Geo locations
1	Near Ponjikkara North jetty	9°59'50.71"N, 76°15'54.16"E
2	Near Chittoor metro station	10°2'20.21"N, 76°16'8.84"E
3	Sugil's Fish farm (Chittoor) (<i>Etroplussuratus</i>)	10°2'22.46"N, 76°16'10.22"E
4	Fish cage culture site 1 (Cheranalloor) (Gravitas fish farm) outer waters <i>Etroplussuratus</i> & <i>Latescalifer</i>	10°3'23.68"N, 76°16'46.35"E
5	Fish cage culture site 1 (Cheranalloor) (Gravitas fish farm) inside cage waters <i>Etroplussuratus</i> & <i>Latescalifer</i>	10°3'23.47"N, 76°16'47.02"E
6	Fish cage culture site 2 (<i>Etroplussuratus</i> & Gift Tilapia)	Mulavukad



Gravitas fish farm site

2. Water Analysis report

Weather condition: Heavy rains in the night on 20.05.2024 and early morning hours on 21.05.2024.

Drizzling/Heavy rains experienced during sampling.

Tide: High tide

Rotten smell was felt while moving towards the upstream stations and the colour of the water was light brownish

SL No	Water Quality Parameters	1	2	3	4	5	6	Optimum level for brackish water aqua culture	Remarks
	Time of sampling(hrs)	11.00	11.40	12.00	12.35	12.40			
1	Air Temperature(°C)	32	33	33	30	30			
2	Surface Water Temperature(°C)	32	32.1	32	32	32			
3	pH	7.3	6.8	6.8	6.5	6.5		6.5 -8.5	
4	Salinity (PSU)	16	8	7	0	0		15 - 25	
5	Dissolved oxygen(mg l ⁻¹)	1.67	1.11	0.81	0.75	0.5		4.0-8.0	Extremely low
6	Total Ammonia Nitrogen (TAN)(mg l ⁻¹)	0.85	1.82	1.76	1.73	1.85	1.73	Must not exceed 0.1	Extremely high
7	Biological Oxygen Demand (BOD) (mg l ⁻¹)	9.2	16.7	14.4	18	20.45		Should not exceed 4	
8	Dissolved orthophosphate (PO ₄ -P)(mg l ⁻¹)	0.1	0.31	0.15	0.05	0.04	0.12	0-0.05	St 1, 2,3 and 6 are near domestic household area
9	Reactive Silicate(SiO ₃ -Si)(mg l ⁻¹)	0.959	3.175	2.845	5.745	5.510	3.689	4.0-6.0	St 1 shows low
10	Nitrite -N (NO ₂ -N)(mg l ⁻¹)	0.03	0.01	0.01	0.01	0.01	0.004	Should not exceed 0.5	
11	Nitrate - N (NO ₃ -N) (mg l ⁻¹)	0.04	0.01	0.01	0.07	0.09	0.09	0.1-3	Low
12	Chemical Oxygen Demand (mg l ⁻¹)	43.8	105.7	102.8	134.4	134.6	230	15-20	
13	TSS (mg l ⁻¹)	743.1	505	203.6	238.2	347.4	338.5	<100	

Mean water quality parameters recorded by ICAR-CMFRI at various sampling locations as part of Inhouse research project

	STATIONS	pH	SALINITY	Dissolved Oxygen	BOD	TAN	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	TSS
			ppt	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Premonsoon	Mulavukad	7.5	8	5.48	2.87	0.609	0.097	0.913	0.027	0.128	67.5
	Chittor ferry	7.1	2	4.33	3.46	0.308	0.064	1.357	0.017	0.173	26.7
	Cheranallloor	7.6	0	5.48	2.60	0.305	0.034	1.167	0.014	0.206	50.9
	Eloor	7.32	0	4.76	3.29	0.217	0.070	1.324	0.014	0.183	8.3
	Edayar	7.1	0	5.05	5.05	0.069	0.030	1.343	0.012	0.177	7.8
	Eloor terminal	7.2	0	0.00	0.00	0.171	0.019	0.857	0.013	0.162	103.8
	Fort Kochi	7.7	16	3.38	1.46	0.292	0.076	0.972	0.020	0.101	107.5
	Thompumpady	7.6	21	3.19	0.43	0.968	0.128	0.822	0.024	0.091	135
	Aroor	7.7	6	4.57	1.54	0.274	0.060	1.329	0.019	0.116	77.1
	Thevara	7.6	9	5.05	1.89	1.256	0.596	1.028	0.051	0.113	131.1
	IFP	7.6	12	5.22	2.83	0.302	0.093	0.975	0.020	0.079	88
Monsoon	Mulavukad	7.2	0	5.99	2.81	0.216	0.002	1.451	0.012	0.258	87.2
	Chittor ferry	7.1	0	5.87	1.60	0.121	0.001	1.431	0.008	0.287	80.8
	Cheranallloor	7	0	6.16	1.41	0.079	0.002	1.248	0.007	0.263	166.3
	Eloor	7	0	6.64	2.78	0.036	0.010	1.310	0.007	0.268	74.2
	Edayar	6.7	0	5.87	1.24	0.042	0.000	1.207	0.007	0.255	71.5
	Eloor terminal	6.7	0	7.13	1.89	0.032	0.001	1.085	0.003	0.236	891
	Fort Kochi	7.2	3	3.94	2.42	0.782	0.002	1.267	0.017	0.157	87.2
	Thompumpady	7.2	2	4.56	1.83	0.531	0.001	1.370	0.013	0.143	5.2
	Aroor	7.4	0	5.05	0.94	0.096	0.002	1.636	0.011	0.124	94.9

	Thevara	7.1	0	5.04	2.22	0.015	0.010	1.611	0.034	0.259	12.2
	IFP	7.3	0	5.61	0.62	0.303	0.002	1.302	0.013	0.144	92.4

Key findings:

- High Total Ammonia N
- Very low Dissolved oxygen
- High BOD and COD
- High phosphate-P concentrations observed in the estuarine stations



Indian Council of Agricultural Research
केन्द्रीय समुद्री मत्स्यिकी अनुसंधान संस्थान
Central Marine Fisheries Research Institute

(कृषि अनुसंधान एवं शिक्षा विभाग, कृषि एवं किसान कल्याण विभाग, भारत सरकार)
(Department of Agricultural Research and Education, Ministry of Agriculture and Farmers' Welfare, Govt. of India)
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42

Celebrating 75 Glorious Years of Marine Fisheries & Mariculture Research

No. Microbio/CMFRI/Kochi/SA-2/2024

29/05/2024

To,

Antony Dowreva
Cage farmer
Moolampally

NECROPSY REPORT

Date of receipt	: 22/05/2024
Description	: <i>Etroplus suratensis</i> and <i>Oreochromis niloticus</i>
ANAMNESIS of the case	Massive mortality of wild fishes and animals cultured in cage farms. More than four species of fish were involved. The affected fish showed mortality without clinical signs
EXAMINATION CONDUCTED	Dead fish were from the cage farms collected by the farmer and submitted to ICAR-CMFRI, Kochi. The fish were examined for external lesions and parasites. Necropsy was then conducted in which all the internal organs were observed for gross pathological changes.
OBSERVATIONS	
Gross lesions	Darkened eroded skin with loss of scales, necrotic and pale gills with no visible parasites, normal spleen, congested kidney, highly fragile liver with pale patches on surface, enlarged gall bladder filled with bile were observed in <i>E. suratensis</i> . Darkened skin, darkened gills with no visible parasites, yellow discoloration of liver with pale patches, darkened and congested kidney, and normal spleen were observed in <i>O. niloticus</i> . Further microbiological investigation was not done as only dead fish were submitted.

DIAGNOSIS: Anamnesis and macroscopic lesions were suggestive of acute chemical toxicity.

GENERAL COMMENTS

* Results were based on the provided samples to Fish Health lab, Marine Biotechnology, Fish Nutrition & Health Division (MBFNHD), ICAR-CMFRI

Analyzed by

Dr. Sumithra T.G
Scientist, MBFNHD

Dr. Krupesha Sharma
SR, Principal Scientist,
MBFNHD

Dr. Paragash Kumar R.,
Scientist, MBEMD

Dr. Anusree V Nair
MBFNHD

Certified by

Dr. Kajal Chakraborty
Principal Scientist and Head, MBFNHD, ICAR-CMFRI, Kochi



vivek.cpcb<vivek.cpcb@gov.in>

Re: Minutes of the Meeting held on 05.11.2024

<registrar@kufos.ac.in>

Wed, 13 Nov 2024 12:05:40 PM +0530

To "CPCB Regional Directorate Bengaluru"<zobangalore.cpcb@nic.in>,"J Chandra Babu"<jcb.cpcb@nic.in>,"Vivek K"<vivek.cpcb@gov.in>

Cc "ga8"<ga8@kufos.ac.in>

1 Attachment(s)

fish kill incident in Periyar river...

3.5 MB

Sir,

Please see the analysis results of KUFOS study pertaining to the Fish kill incident in Periyar river attached herewith.

On Sat, Nov 9, 2024 at 1:37 PM CPCB Regional Directorate Bengaluru
<zobangalore.cpcb@nic.in> wrote:

Regards,**Dr. K. Dinesh****Registrar****Kerala University of Fisheries and Ocean Studies (KUFOS)****Panangad, Kochi, Kerala Pin: 682506**

Sir/Madam,

The Minutes of the Meeting held on 05.11.2024 for reviewing the reports received by CPCB and the status of industries, as per the Hon'ble NGT SZ Order dated 20.08.2024 in OA No. 184 of 2024(SZ) along with OA No. 233 & 234 of 2024 related to fish kill in Periyar River is attached for your information and further needful actions. It is requested to provide the information, as desired in the meeting latest by 12.00 PM, 11th Nov, 2024.

Regards

CPCB Regional Directorate, Bengaluru / सीपीसीबी क्षेत्रीय निदेशालय, बेंगलुरु

Nisarga Bhawan,A-Block, 1st & 2nd Floors / निसर्ग भवन, ए-ब्लॉक, पहली और दूसरी मंजिल
Thimmaiah Road, 7th D-Main / तिमैया रोड, 7वां डी-मेन
Shivanagar, Bengaluru-560079 / शिवनगर, बेंगलुरु-560079
Telephone / टेलीफोन: 080-23233739, 23233827, 23233996

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REPORT ON THE FISH KILL INCIDENT IN THE PERIYAR RIVER AND ADJOINING AQUAFARMS -DOWNSTREAM OF PATHALAM REGULATOR BRIDGE



By
Expert Committee constituted by
Kerala University of Fisheries & Ocean Studies
KUFOS Order No. GA8/3907/2024 dated 22.5.2024.

Contents

Sl. No	Title	Page No.
1	Introduction	1
2	Regulator cum Bridges in Periyar River	1
3	Fish and Fisheries of Periyar River	2
4	Aquaculture activities	3
5	Description of the Fish Kill	4
6	Industries around	5
7	Water Pollution	6
8	Pollution Monitoring and Control	7
9	Field Visits and Sample Collection	7
10	Sampling Methods	7
11	Causes of fish kill	9
12	Data Interpretation	18
13	Summary	18
14	Recommendations	19
15	References	20
16	Acknowledgements	20
17	Annexures	21

EXECUTIVE SUMMARY

Periyar River, a crucial waterway in Kerala, experienced devastating fish kill events from the 20th evening and culminated to a catastrophic proportion by the 21st of May 2024. A massive fish kill event occurred from downstream of Pathalam regulator – cum – bridge, which resulted in the death of hundreds of thousands of fish and aquatic fauna, impacting both the local ecosystem and the livelihoods of fishermen and fish farmers. This report on the fish kill incident spans across 15 comprehensive sections, providing an in-depth analysis of the event, its probable causes, implications and recommendations to avoid recurrence. The report covers the geographical and historical significance of Periyar River, the role of the Pathalam regulator cum bridge in water management and the impact of industrial discharges, domestic sewage, septage waste, agriculture runoff, and effluents from markets, hospitals, hotels, and other commercial establishments on water quality. It also examines the contribution of these factors in the recent fish kill event. Field visits and laboratory analyses provide empirical data on water quality and pollutant levels, while community reports and eyewitness accounts offer valuable insights into the local impact of the incident. The report also explores mitigation measures and concludes with actionable recommendations for policy reforms, sustainable practices and enhanced community involvement to prevent future incidents and restore the health of the River Periyar ecosystem. Comprehensive annexures include maps, diagrams, field visit observation and photographic documentation to support the findings and recommendations. At the same time, since the report is based on a short-term study and depicts the causes of this ecological disaster, it may fail to pin point to an absolute conclusion on the exact source of pollutants. So, it is believed that this report will throw light on the need of further continuing studies, in this regard. Localized fish kills in connection with the opening of the Pathalam regulator shutters are a regular phenomenon since many decades. Occasionally, minor fish mortalities were often reported from Purappalikkavu segment. The severity reached catastrophic proportions due to the increased contribution from industrial sources. Field visits, sample collection, and laboratory analysis revealed higher levels of hydrogen sulphide, as the prime culprit which was equally contributed by increased levels of ammonia. These together with lower dissolved oxygen levels created a death trap for most aquatic organisms including microbes to fishes. The severity of the event was evident by the extent of fish kill within a short time frame, which affected many kilometers (Pathalam to Mulavukad) and spread to tributaries till it merged with larger Vembanad Lake. Apart from these factors leading to fish kill, alarming levels of elements including heavy metals, toxic chemicals etc. were found in the water, sediment and fish. The disaster should be an eye-opener to implement stringent control on effluent treatment and release, increased surveillance on polluting industries and real-time monitoring of surface and bottom water and bottom sediments in the upstream and downstream of Pathalam regulator. Proper operational protocols and alert systems must be implemented for operating the regulator after checking the water quality from the upper and lower reaches. The report outlines recommendations for pollution control, operational guidelines for regulators, the need for assessment of biodiversity in Periyar River, the extent of pollutants in the system and suitability of the area for aquaculture and fisheries activities. Keeping this as the major objective, an Expert Committee was constituted vide University Order No. GA8/3907/2024 dated 22.05.2024 under the Chairmanship of Dr. Binu Varghese, Assistant Professor, Department of Aquaculture and the Convener-ship of Dr. Dinesh Kaippilly, Professor & Registrar (i/c). The Members of the Committee include Dr. Anu Gopinath, Head, Department of Aquatic Environment Management; Dr. M.K. Sajeevan, Head, Department of Fisheries Resource Management; Dr. Devika Pillai, Head, Department of Aquatic Animal Health Management & Director of Research; Dr. M. P. Prabhakaran, Assistant Professor, Department of Aquatic Environment Management and Shri. Saneer N.S., Fishing Technology Assistant. Dr. Rahul Krishnan, Assistant Professor, Department of Aquatic Animal Health Management contributed by analyzing the heavy metals, toxicants and histological studies. The inputs from various stakeholders were collected and compiled extensively.

1. Introduction

Periyar River, also known as the "Lifeline of Kerala," is the longest river in the State and plays a critical role in the ecological and economic well-being of the region. As the name indicates, it's the largest river of the State. The river supports diverse aquatic life, sustains traditional fishing practices and aquaculture activities and serves as a crucial source of potable water and irrigation. The river flows through the Periyar Tiger Reserve (PTR) which is the major hot spot of biodiversity in the State on which thousands of species depend on. There are millions of people who thrive on the mercy of this river for meeting their livelihoods through agriculture, industry, tourism, fishing and aquaculture.

The river has faced several environmental challenges over the decades from pollution to flooding. Pollution from industrial effluents, agricultural runoff, domestic sewage and effluents from markets, hotels, hospitals, and other commercial establishments significantly deteriorated the water quality in many stretches. Encroachments, sand mining and deforestation have led to habitat and species loss and the increased sedimentation, impacting the river's flow and overall ecological health. Climate change poses additional threats, with altered precipitation patterns and increased frequency of extreme weather events affecting the entire ecosystem associated with Periyar.

A massive fish kill event was reported downstream of Pathalam segment of the Periyar, from 20th evening and 21st of May 2024, causing significant ecological and economic damages. Kerala University of Fisheries and Ocean Studies (KUFOOS) has already submitted a preliminary report (Annexure 1) in this regard and this report is the extension of the same, presenting the findings of the field study conducted to determine the causes of the fish kill and proposing the mitigation measures to prevent similar events in future.

2. Regulator cum Bridges in Periyar River

The lower reaches of the River Periyar has a few regulator-cum-bridges, out of which the three at Purappillikkav, Manjummal and Pathalam (Fig. 1) are the most important ones. These are located at different branches of Periyar to avoid incursion of saline water from the Arabian Sea / Vembanad Lake during the high tides and to regulate water levels for irrigation and drinking purposes. The Pathalam regulator-cum-bridge, connecting Eloor and Edayar is located amidst the Edayar industrial belt and is a crucial point in Periyar River (Fig. 2) as far its significant role played on the ecological, environmental, agricultural, fisheries and aquaculture activities are concerned. Since time immemorial the local inhabitants used to make temporary earthen barriers for protecting the agricultural crops from salinity intrusion which was later carried out by the Government, for the purpose. The temporary earthen barrier was replaced with a permanent concrete structure way back in 2016. As indicated earlier, it acts as a barrier against the incursion of saline water and also the chemical pollutants from entering the pumping stations of Kerala Water Authority at Elookkara

and Aluva situated about 4 km and 9 km away, respectively. The area offers the home ground to several industrial units, including many in the red category, raising concerns on potential pollution impacting water quality and aquatic life. In the upper region of Pathalam regulator, the water flow gets curtailed which induces thermal stratification in summer months and also act as a dumping yard of organic and inorganic materials. It is worth mentioning that regular flow in the upstreams and tidal influences in the downstream typically controls thermal stratification and creation of lentic environment and anoxic conditions. Obviously, the water quality parameters in the upper and lower layers are influenced by industrial and domestic effluents, local climatic conditions and flow management creating a complex and dynamic aquatic / terrestrial environment.

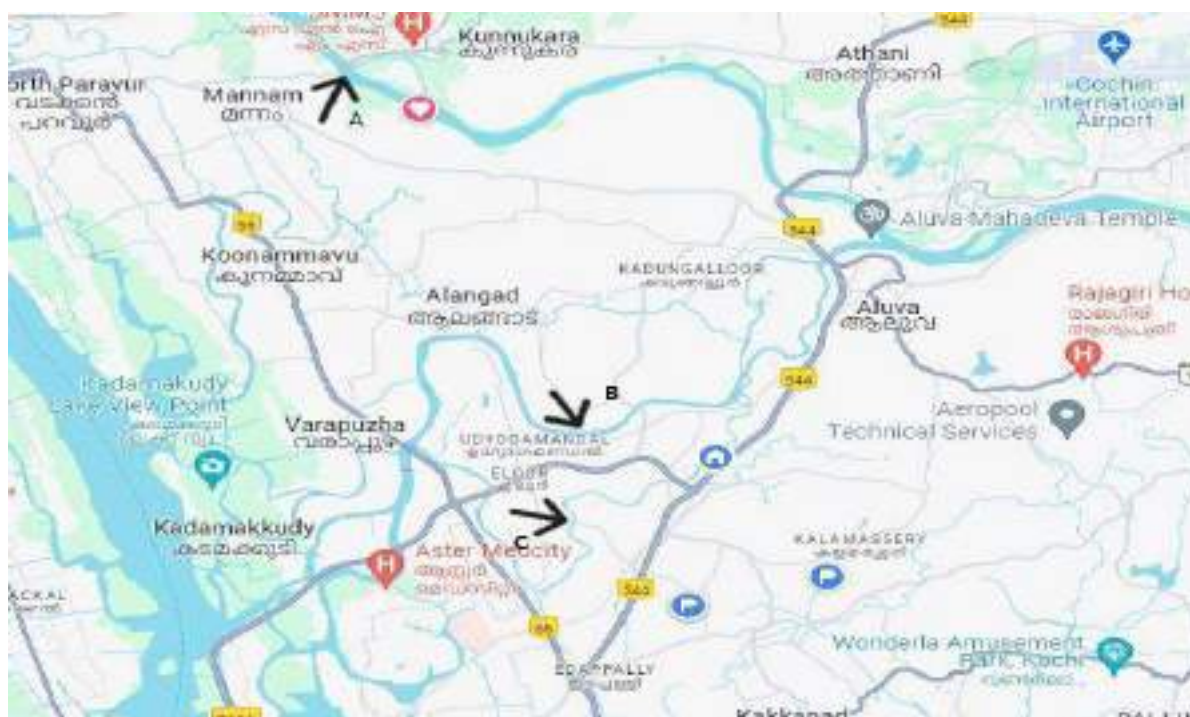


Fig. 1. The three major regulator bridges in the lower reaches of Periyar (A - Purappallikavu, B - Pathalam, C - Manjummal)

3. Fish and Fisheries of Periyar River

As already discussed, Periyar River flowing through the lush landscapes of Kerala, is not only a lifeline for the region but also a treasure trove of aquatic biodiversity. The river hosts the Periyar Tiger Reserve (PTR), one of India's 21 biodiversity hotspots. The reserve harbors a rich array of flora and fauna, including an impressive diversity of fish species. A recent aquatic faunal survey conducted in the PTR, in which KUFOS also participated, during 16-19 May 2024 recorded 56 species of food and ornamental fish. It includes 9 fish species showing micro-endemism within the PTR. Some of the notable endemics are *Gonoproktopterus micropogon periyarensis*, *Lepidopygopsis typus*, *Crossocheilus periyarensis*, *Garra periyarensis*, *Nemacheilus periyarensis* and *Nemacheilus menoni*.



Fig. 2. Pathalam regulator bridge and industries in the Edayar belt

Still it may be noted that comprehensive information and studies undertaken on the fish and fisheries of Periyar is scanty. Earlier surveys reported the occurrence of only 54 fish species from PTR (Radhakrishnan & Kurup, 2010) which got amended to 56 of late. The annual capture fisheries production was estimated to be a meagre of 2.3 tonnes from the Periyar Lake (Kurup et al, 2006) which is believed to be an under estimation by many fisheries scientists. The study indicates that gill nets and cast nets are the major fishing gears in operation. It was reported that the exotic species like *Cyprinus carpio* and *Oreochromis mossambicus* coexist with indigenous species listed above. Fishing with stake nets, Chinese dip nets, gill nets and trammel nets are the major livelihood activities in the downstream of Pathalam regulator and adjoining islands. Thousands of people are engaged in the ancillary jobs related to fisheries for their daily bread and butter.

To understand the impact of the fish kill, a comprehensive survey was conducted to identify the fish species and other aquatic organisms found dead in the Pathalam - Cheranelloor - Moollampilly - Kothad - Pizhala - Kadamakkudy-Mulavukadu segments (Annexure 2). This information is crucial for assessing the ecological damage created by the mishap and drawing guidelines for the future restoration efforts.

4. Aquaculture activities

Downstream of Pathalam segment supports a vibrant fisheries sector as far as the number of stakeholders engaged and associated socio economic significance are concerned. Major fisheries and aquaculture activities in the area are Chinese dip nets, stake nets, traditional trapping cum holding system (*Chemmeen kettu*), brackish water

fish farming, cage-farming apart from fishing using the gill nets and cast nets by local fishers. There are about 150 cage fish farms, apart from many traditional *Chemmen kettu* and fish farms in the region.

The major fishes farmed in the cages are the high value species like Asian sea bass, pearl spot, red snapper, giant trevally etc. All these fishes are highly susceptible to water pollutants and low dissolved oxygen (DO) as they are farmed at higher densities of 25 – 30 kg/cubic meter, in confined cages.

5. Description of the Fish Kill

The fish mortality was reported from the late evening hours of 20th May 2024 and it culminated into a fish kill on the next day. Mass fish mortality was also reported from different regions in the following days. The fish kill event extended upto the area where the river merges with the larger Vembanad Lake. Dead fishes were found floating on the water surface throughout the affected area and got accumulated along the banks and bottom of the river. Field visits confirmed the severity of the devastating occurrence with hues and cries from everywhere from all realms of life. Bunches of putrified fishes were seen to be heaped along the banks of the river with irritating off odour. The farmers were literally weeping with a turbulent state of mind cursing the officials. They begged for the compensation of their crop loss. The shrimp and crabs were also found dead in huge numbers in the premises. Initial estimates suggest that hundreds of thousands of fish were affected, including several species that are critical to the aquatic ecosystem (**Fig. 3**), impacting both the ecosystem health and the livelihoods of fishermen and fish farmers. Mass mortality was observed in a large number of *Chemmen kettu* which had opened sluice gates on that eventful day as they were unaware of the consequences of the shutter opening.



Fig. 3. Dead fishes from the study area

The fish kill was triggered by the opening of three shutters of Pathalam regulator cum bridge – one at 3.30 pm and the other two at 6.00 pm on 20.05.2024 and the resultant outflow of polluted water. The Irrigation Department informed that they opened the same as there was increase in water level owing to the opening of Boothathankettu barrage and the prevailing heavy rains on the day. The released water had undesirable substances and reduced oxygen levels which led to massive fish kill in the downstreams. The stagnation of water in the upstream of the regulator and the accumulation of organic and inorganic wastes and pollutants created anoxic conditions in the benthic region. The accumulation of organic materials like domestic wastes, discharges from public drains, decaying plant and animal materials, effluents from markets, hotels, etc., leads to the production of noxious gases like hydrogen sulphide, methane, ammonia etc. This is the primary reason for fish mortality coupled with changes in water quality parameters like decreased dissolved oxygen, sharp variations in important parameters like temperature, pH, salinity, etc. All these factors alone or in combination with others are capable of causing only localized fish death as the ill effects will be diluted and nullified soon. It will be confined only to the initial reaches of the downstream as fishes will move away from the polluted region in search of clean waters with desirable quality standards. Such incidents are common with the opening of even other regulator shutters in Periyar, especially much larger Purapallikkavu, wherein cage fish farmers are forced to move further downstream due to complete or gradual loss of stocked fish after the establishment of the permanent regulator in place of the temporary earthen bund. Unlike the fishes naturally inhabited in the river, the ones inside the cage can't escape from the incoming polluted water. They become stressed and died resulting in huge economic loss.

6. Industries around

Edayar Industrial area located on the banks of Periyar, includes various industries concerned with chemicals, tanneries, fertilizers, metals, meal processing, rubber, food processing etc. These industries are concentrated in the industrial zones such as Edayar, Eloor and Udyogamandal. Effluent management practices vary across industries, with some adopting advanced treatment technologies while others lag behind (Fig. 4).



Fig. 4. Companies in Edayar Industrial area

7. Water Pollution

a) Sources of Pollution

Historical data and case studies highlight the significant impact of industrial discharges on the water quality of Periyar River. Analyses of specific pollutants such as heavy metals, organic compounds and other toxic substances, demonstrate the extent of contamination. Comparative studies of water quality of upstream and downstream of industrial zones offer insights on the industrial impact to the scenario. Identifying and elaborating on the sources of pollution in Periyar River is crucial for understanding the fish kill incident. Major sources of pollutants include:

- **Industrial Effluents:** Discharges from chemical, mineral, wastes and meal processing, tanneries and other manufacturing industries contain hazardous pollutants. Many industries fall in the red category due to their specific and hazardous raw materials or products. Very few companies have legal permission to discharge treated effluents leading to the river. The monitoring and surveillance of effluent treatment and discharge need to be more stringent
- **Agricultural Runoff:** The banks of Periyar are highly fertile and a lot of agricultural activities happen there since time immemorial. The hilly region from where the river originates has extensive plantations like tea, cardamom etc., which are known to use excessive pesticides and chemicals during different stages of cultivation. Pesticides, fertilizers and sediments from agricultural fields enter the river through runoff, especially after heavy rains. This in turn leads to eutrophication and excessive growth of aquatic weeds like water hyacinth etc. The death and decay of these vegetation leads to poor water quality.
- **Domestic and Urban Sewage:** Untreated or partially settled sewage from residential areas, hotels, hospitals, shops and slaughterhouses contributes to organic waste and pathogens. This is one of the major sources of pollution in Periyar. There is hardly any sewage treatment plants exist along the course of the river. All the sewage from Panchayaths, Municipalities and Corporations unfortunately ends up in Periyar. Moreover, many Local Self Governments are ignorant about the septic tank waste, kitchen wastes etc. getting channelized through illegal pipes which are connected to the drainage system. Apart from these, many residential and commercial buildings are directly releasing sewage of all types to the river.

b) Types of Pollutants

- **Heavy Metals:** Alarmingly, all the tested heavy metals had the presence in the river, sediment and in fish. The relative presence varies with location and there is no defined maximum residue level for some parameters in BIS or FSSAI.
- **Pesticides:** Residues from industries and agricultural runoff. Though major pesticide producers are closed down a few years back, there are toxic elements still in water and sediments. This shows the earlier accumulation as well as excessive use in agriculture.

- **Nutrients:** Excessive nutrients are the major cause of aquatic weed proliferation and associated eutrophication in the river especially in smaller tributaries. Mainly, nitrogen and phosphorus from fertilizers and sewage cause eutrophication.
- **Organic substances** both from the river system and external sources.
- **Toxic chemicals** from the industrial effluents, hospitals, industrial areas especially plywood industry and companies in the upstream.

8. Pollution Monitoring and Control

Current pollution monitoring and control measures include government regulations, monitoring programs and enforcement actions. Kerala Pollution Control Board (KPCB) and Central Pollution Control Board (CPCB) are involved in monitoring and controlling of pollution in the river. National Green Tribunal has constituted a committee for surveillance and monitoring.

9. Field Visits and Sample Collection

As per the directions of the Hon'ble Vice Chancellor of KUFOS and Department of Fisheries, samples were collected on 21st and 23rd May 2024 (**Fig. 5**). Samples of water, sediment and fish were collected for the analysis to assess the water quality and reasons for fish kill by the experts at KUFOS. Observations were made on water quality parameters, mortality of aquatic life and fish behavior during the event of pollution. The team also interacted with local people, fishermen, fish farmers, environmentalists and government officials.

10. Sampling Methods

Standard protocols were followed for sample collection and analysis to ensure accuracy and reliability of the investigation.

10.1. Sampling Locations

Sampling locations were identified from the upstream and downstream areas of the Pathalam Bridge. A total of 11 sites were selected which include one site near the bridge in the stagnant navigation canal, one on the lotic upstream side and nine sites from the downstream (TCC outlet, center of the river after the industrial area, FACT outlet, Alliance Marine outlet, Sud Chemie in the Edayar region, cage fish farms at Cheranallore, Varappuzha, Kothad and Moolampally). Locations were selected based on probable pollution sources, areas of reported fish mortality and the premises of regulator bridge.

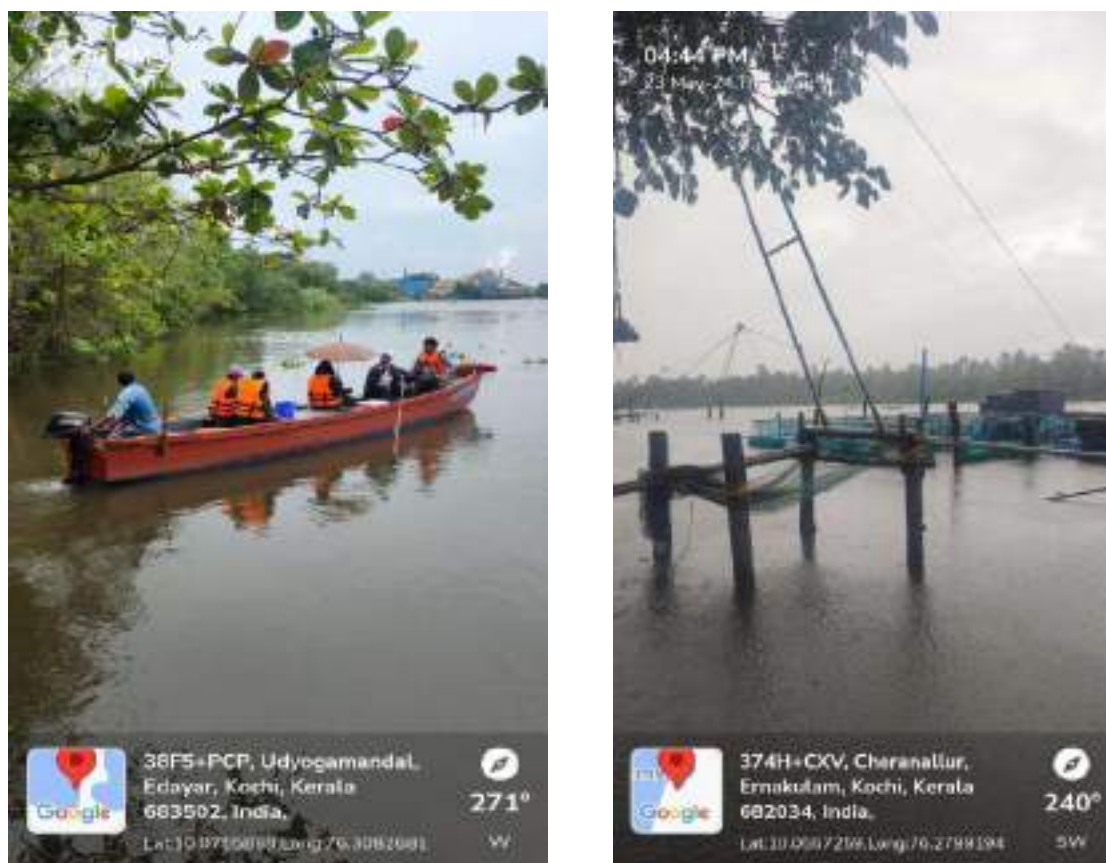


Fig. 5. Sample collection from the affected areas

10.2. Laboratory Analysis

Standard methods were followed for the collection and analysis of the water, sediment and fish samples.

- **Water Quality parameters:** Tests were performed to find out the water quality parameters such as pH, temperature, dissolved oxygen, salinity, ammonia, hydrogen sulphide, silicate, iron, calcium, heavy metals and other metals such as Cadmium, Lead, Arsenic, Chromium, Nickel, Copper, Zinc, Cobalt, Manganese, Uranium, Selenium, Rubidium and Cesium.
- **Sediment Analysis:** Examination of sediment samples was carried out for pollutants and heavy metals (Cadmium, Lead, Arsenic, Chromium, Nickel, Copper, Zinc, Cobalt, Manganese and Uranium). Other metals include selenium, Rubidium and Cesium)
- **Toxicant Analysis:** Analysis was done for DDT, BHC, PAH, Benzenes, Tetrachloro-Methane, Chlorodiphenyl-Methane, Alkylated Benzenes, Examination of water, sediment and tissue of fishes from Kothad. Water samples from upstream and downstream of Pathalam regulator were also analyzed.

11. Causes of fish kill

Detailed examination of the water, sediment and fish was done carried out meticulously using the standard operating procedures to find out the actual cause of fish kill. The results were presented among the committee members for further deliberations. This report is the culmination of the above activities.

11.1. Water Quality Parameters on the day of fish kill

Data on key water quality indicators on the day of the incident is given in **Table 1**. It was noticed that the pH ranged from 6.6 (Moolampilly site) to 7.2 (Varappuzha site). The temperature was normal which ranged from 29.8 to 30.2 without much variation. The turbidity levels were 6.25 to 6.95 NTU which is higher than the normal. The other parameters like silicates, calcium were also higher. These factors might not have contributed to the fish kill though minor deviations from the normalcy existed.

Table 1. Water parameters of cage farms affected by fish kill (21.05.2024)								
Site/ Parameter	Temp (C)	D.O (mg/l)	pH	H ₂ S (mg/l)	Ammonia (mg/l)	Turbidity (NTU)	Silicate (μmol/l)	Ca (mg/l)
Kothad farm	30.2	1.14	6.7	2.53	1.97	6.25	144.79	500
Moolampilly farm	29.8	0.3	6.6	2.53	1.39	6.84	72.56	1250
Varapuzha farm	29.9	3.08	7.2	3.79	1.56	6.94	122.75	850

Dissolved Oxygen levels were as low as 0.3ppm at the Moolampilly, 1.14 ppm at Kothad and 3.08 ppm at Varappuzha cage farm sites wherein complete mortality was observed. The dead and decayed organisms including fishes in the river with increased biological oxygen demand may be the reason for the extremely low DO obtained at Moolampilly. These low DO levels alone can cause complete mortality in the cage farms wherein sea bass and pearl spot are mostly stocked. However, fishes in the river escaped from these low oxygen conditions by moving further downstream. It was observed that air breathing fishes like catfishes were also found dead. This indicates that reduction in DO alone cannot be attributed to the present fish kill.

The levels of **Hydrogen Sulphide**, a lethal toxic gas to aquatic life, were found at an extremely higher range. It was 2.53 ppm in Kothad and Moolampilly and reached to 3.79 ppm at Varappuzha. This toxicant is fatal to the most aquatic fauna even at the lower detection levels. This could be the primary cause of fish mortality as we interpret it through the specific fish behavior, histological studies and the narration by local people. This is a known irritant which creates itching and off odour even at a

lower concentration of 0.5 ppm. The behavior of fishes prior to mortality conforms to this observation as they tried to jump out of water in cages. The analysis of CCTV footage from a few cage farm sites in Cheranellloor area showed very specific and most uncommon behavioural changes among the fishes both inside and outside the cages by midnight of 20.5.24. The fishes stocked in the cages were strugglingly jumping out of water with high rate of unrest. Even the air breathing fishes which are hardier than the normal fishes showed this kind of stress leading to mortality. The fishes further showed sideways and erratic movements losing the balance in cages. Normally, the fishes gulp on the surface layers, if there exists anoxic conditions. Those in river also showed rapid surfacing, rushed to smaller canals and even jumped on to the river banks. The chemical might have created severe irritation to fish while it got exposed to the skin and gills. The farmers and local people who happened to get in contact with contaminated water suffered from severe itching and irritating off odour beyond the extent of tolerance.

The **Ammonia** levels also shot up drastically to lethal levels. The unionized ammonia is toxic even at very low concentrations to the tune of 0.05 ppm to most fishes and crustaceans. Here it ranged from 1.39 ppm at Moolampilly to 1.97 ppm at Kothad site. The fishes showed extreme stress and absolute unrest leading to damaged gills and internal organs. So, the ammonia toxicity could have also caused severe fish kill.

The **heavy metals (Table 2), pesticides and other chemicals (Table 3)** tested in selected sites also had shown very high values in water, sediment and fish. The detected levels are alarming and need to be addressed at the earliest. Though these factors might not have directly contributed to the present fish kill event, they must have adversely affected the health of fish. Many parameters are much beyond the drinking water and consumption limits prescribed by different organizations.

11.2. Water Quality Parameters after the fish kill

The sample collections done after one day of fish kill (23rd of May 2024) is given in **Table 4**. The expert team visited various sites and collected samples from the upper and lower reaches of Pathalam regulator and from the cage fish farm, which was one of the first cage farms which got exposed to contaminated water at Cheranallloor.

The basic water quality parameters such as temperature, pH and salinity were found to be stable in the river, except the sharp variations observed at the outlet points of industries. This normalcy might have been due to the opening of shutters and heavy rainfall during these days. However, the fluctuations in these parameters at outlet points of factories are evident from the **Table 4**.

Table 2. Heavy metals and others observed in the water, sediment and fish on the day of fish kill (21.05.2024) with available standards

Place/ Parameter	Heavy metals										Other metals			
	Cadmium	Lead	Arsenic	Chromium	Nickel	Copper	Zinc	Cobalt	Manganese	Uranium	Iron	Selenium	Rubidium	Cesium
Water (mg/l)														
Kothad	0.001	< 0.000	0.054	0.018	0.193	0.165	4.931	0.017	9.834	0.016	89.37	0.052	2.339	0.019
Moolampilly	0.003	< 0.000	0.105	0.034	0.084	0.037	0.414	0.009	0.605	0.036	8.088	0.061	4.549	0.036
Varapuzha	0.006	< 0.000	0.074	0.039	0.253	0.096	2.614	0.042	30.402	0.017	7.885	0.054	3.668	0.016
STD(IS 10500:2012)	0.003	0.010	0.010	0.050	0.020	0.050	5.000	NL	0.100	NL	0.300	0.010	NL	NL
Fish (mg/kg)														
Kothad	0.035	0.055	0.483	0.755	0.438	1.128	56.013	0.066	15.731	0.022	3.987	0.380	0.394	0.005
Moolampilly	0.012	0.005	0.799	0.538	0.355	0.721	16.293	0.009	1.901	0.002	0.878	0.659	1.745	0.007
Varapuzha	0.010	< 0.000	0.320	0.562	0.375	0.570	6.988	0.010	0.211	0.001	3.296	0.297	1.911	0.019
STD (FSSAI)	0.300	0.300	*	*	*	*	*	*	*	*	*	*	*	*
Sediment (mg/kg)														
Kothad	1.836	4.224	1.095	28.081	7.822	9.378	218.822	3.120	62.271	0.674	10449.5	0.779	6.739	0.155
Moolampilly	0.773	5.472	1.729	29.636	7.917	8.011	88.906	2.558	28.028	0.801	11215.9	0.755	8.033	0.204
Varapuzha	1.660	4.585	0.834	25.392	7.345	8.889	206.605	2.806	52.343	1.188	10254.9	0.734	7.790	0.150

Table 3. Presence of Insecticides/Toxicants in the water, fish and sediments

Pesticide/Toxicants	Fish (Kothad) 21.05.24	Water (Kothad) 21.05.24	Sediment (Kothad) 21.05.24	Water (Upstream) 23.05.24	Water (Downstream) 23.05.24
DDT (sum of O,P-DDE, P,PDDE O.P-DDD, PP-DDD. O.P.DDT & P P-DDT expressed as DDT)	75.8 mg/kg	251 mg/l (0.001)	220 mg/kg	82.3 mg/l (0.001)	148.3 mg/l (0.001)
BHC (sum of alpha-HCH, beta HCH, gamma HCH & delta HCH expressed as BHC)	30.2 mg/kg	120.5 mg/l (0.002)	133 mg/kg	12.4 mg/L (0.002)	117.1 mg/l (0.002)
PAH (sum of fluoranthene, BbF, BkF, BaP, BgP and InD expressed as PAH)	4.79 ng/g	28.96 ng/ml (<0.0001)	26.2 ng/g	24.12 ng/ml (<0.0001)	10.6 ng/ml (<0.0001)
Benzenes, tetrachloro-Methane, chlorodiphenyl-Methane, Alkylated benzenes	Detected	Detected	Detected	Detected	Detected
<i>Kothad – Mortality of cage fish; Upstream – Above Pathalam Regulator Bridge; Downstream – Below Pathalam Regulator Bridge. Values in brackets – BIS Standard for potable water</i>					

Table 4. Water parameters of Periyar River in the up and downstream of Pathalam regulator 23rd May 2024

Sampling site/ Parameter	Temp (°C)	DO (mg/l)	Salinity (ppt)	pH	H ₂ S (mg/l)	Ammonia (mg/l)	Silicate (μmol/l)	Ca (mg/l)
Upstream Channel	28.7	4.66	0.4	7.2	1.26	1.26	82.75	525
Upstream open	28.7	4.98	0.05	6.7	2.53	0.28	89.55	75
TCC outlet	29.1	5.68	0.1	7.1	1.26	0.14	174.12	25
Central Portion	28.9	5.68	0.04	6.9	2.53	0.12	57.03	25
FACT outlet	29	5.85	0.05	5.6	2.53	0.51	176.6	25
Alliance outlet	28.9	5.71	0.05	6.8	2.53	0.13	51.08	25
Sud chemie	28.9	5.68	0.04	7	1.26	0.2	150.66	25
Cheranellloor farm	29.8	3.64	0.06	6.8	2.53	0.66	120.58	25

The level of dissolved oxygen was noticed to be reaching back to normal levels and this can be due to the opening of shutters, mixing of water from the Boothathankettu and heavy precipitation. The DO levels varied from 4.98 ppm in the upstream to 5.68 ppm in the downstream. However, the DO levels in the Cheranalloor farm was yet to be recovered and was found to be falling at 3.64 ppm. This may be due to higher oxygen demand as many dead and decayed fishes were still floating in the cages and river bottom. The comparatively lower DO levels to the tune of 4.98 ppm recorded might be due to the lack of proper mixing of water in the upstream areas. It was alarming as there were increased levels of ammonia and hydrogen sulphide even after opening the three shutters of the regulator. Undesirable levels of both these chemicals were observed in the upper and lower reaches of the Pathalam segment. This indicates the increased accumulation of these toxic elements in water and sediments. The undesirable levels were also observed at Cheranalloor farm, which clearly shows the ecological damage caused by the fish kill in areas which are many kilometers away from the epicenter. These increased levels may also be due to the consistent death and decay of organic matter along with the effluents from the regulator. It is also reported that at certain outlet points the committee observed some yellow coloured powder like substances suspecting the presence of direct release of sulphur into the water body.

The ammonia levels were 0.12 ppm at the downstream of Pathalam regulator to as high as 0.66 ppm at the Cheranalloor farm. It may also be noted that the ammonia levels were at 1.26 ppm at the navigation channel (which was closed). The ammonia level at the upper reaches also showed double the value than the lower stream. This indicates the higher accumulation of ammonia in the upper part of Pathalam regulator. The sulphide levels were still at very dangerous levels both at the upper and lower reaches. It varied from 1.26 ppm at TCC outlet where much dilution is happening to 2.53 ppm at the upper and lower streams of the river. Similar higher levels were also observed at Cheranalloor farm. This indicates that the water body above the Pathalam regulator is functioning as a reservoir of hydrogen sulphide. This could be due to the increased accumulation and slow dissolution as only 3 of the 13 shutters were opened.

While the concentrations of pollutants (**Table 3**) like heavy metals (**Table 5**) and other elements were compared with permissible limits, majority of these parameters were above permissible limits prescribed for the potable water. The maximum residue levels (MRL) for many elements are yet to be fixed for sediments and fishes in our country. The accumulation of heavy metals in the samples collected from faraway places such as Moolampally is alarming.

Pesticides and other toxicants were far beyond the permissible limits. The accumulation of these toxic chemicals in the water, sediment and fish meat is alarming. This area needs urgent attention and the sources need to be identified. As major companies producing these chemicals were shut down a few years back, the status of stock disposal, use of banned chemicals in plantations, agriculture and industries needs to be thoroughly assessed.

Table 5. Heavy metals and others observed in the water a day after fish kill (23.05.2024) with available standards

Place/ Parameter	Heavy metals									Other metals		
	Cadmi um	Lead	Arse nic	Chro mium	Nickel	Copper	Zinc	Cobalt	Manga nese	Iron	Selen ium	Cesium
Water (mg/l)												
Upstream Channel	0.001	0.040	0.019	0.514	0.516	0.537	3.012	0.024	5.065	2.376	0.000	0.004
Upstream	0.018	0.031	0.013	0.534	0.546	0.620	1.775	0.021	4.491	3.967	0.012	0.002
TCC out	0.025	0.023	0.012	0.543	0.677	0.586	3.355	0.051	2.788	2.351	0.006	0.002
Central Region	0.005	0.047	0.009	0.531	0.451	0.507	0.700	0.018	1.083	2.453	0.009	0.001
FACT out	0.014	0.027	0.010	0.522	0.534	0.573	1.900	0.047	3.669	6.681	0.003	0.002
Alliance out	0.004	0.028	0.089	0.440	0.334	0.363	0.633	0.034	9.191	11.782	0.011	0.004
Sud Chemie	0.009	0.028	0.013	0.565	0.449	0.576	2.474	0.016	1.912	8.272	0.002	0.008
Cheranelloor farm	0.009	0.029	0.013	0.548	0.490	0.616	1.058	0.010	1.072	3.300	0.009	0.002
STD(IS 10500:2012)	0.003	0.010	0.010	0.050	0.020	0.050	5.000	NL	0.100	0.300	0.010	NL

Biological Health: Health indicators in fish samples, such as the presence of lesions and pollutant bioaccumulation were investigated by the team. Mainly the samples of pearl spot were used for the laboratory examinations.

11.3 Necropsy examination

Samples of fishes received at ARL-KUFOS were subjected to postmortem examination. Findings include severe congestion and hemorrhages in gills with epithelial sloughing. Examination of affected fishes were suggestive of a toxicant associated fish kill corroborated with the onsite observation of fishes showing aquatic surface respiration (ASR) and aerial emergence behavior. Hematological analysis indicated immature red blood cells in the fish blood indicative of toxic pollution in the water body concurrent with the gill lesions indicated previously (Fig. 6a to 6e).

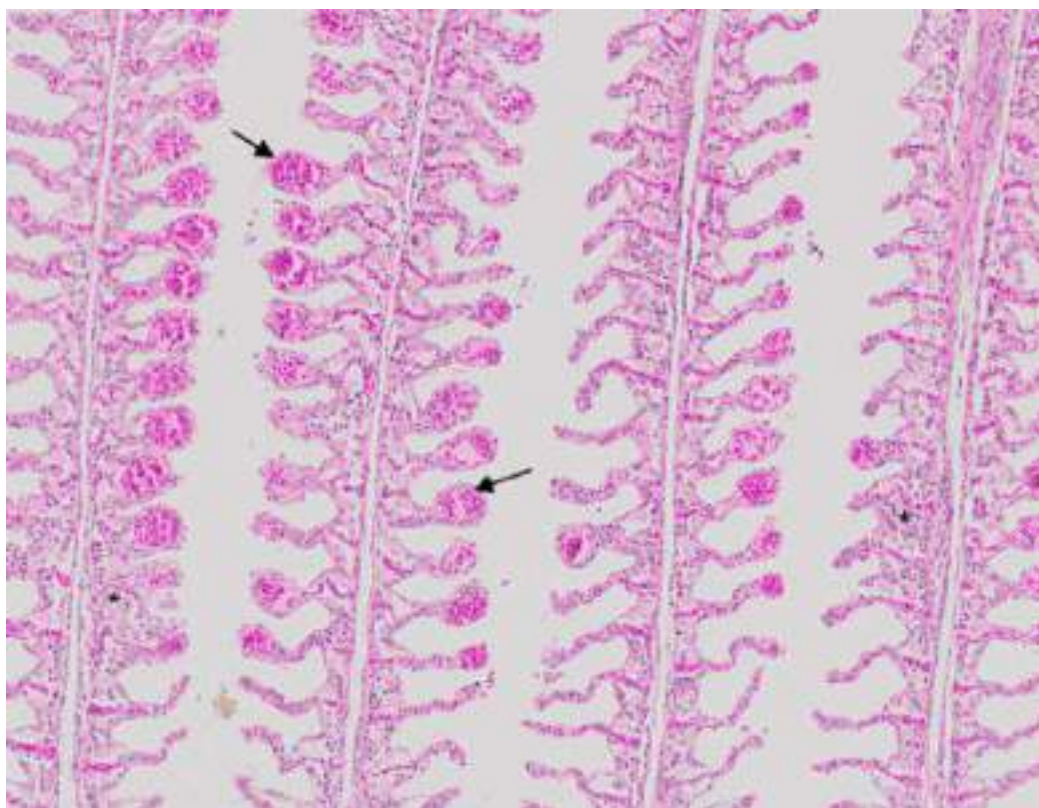


Fig. 6a. Severe telangiectasis and/or lamellar thrombosis in the gill



Fig. 6b. Hemorrhages and epithelial lifting in gills

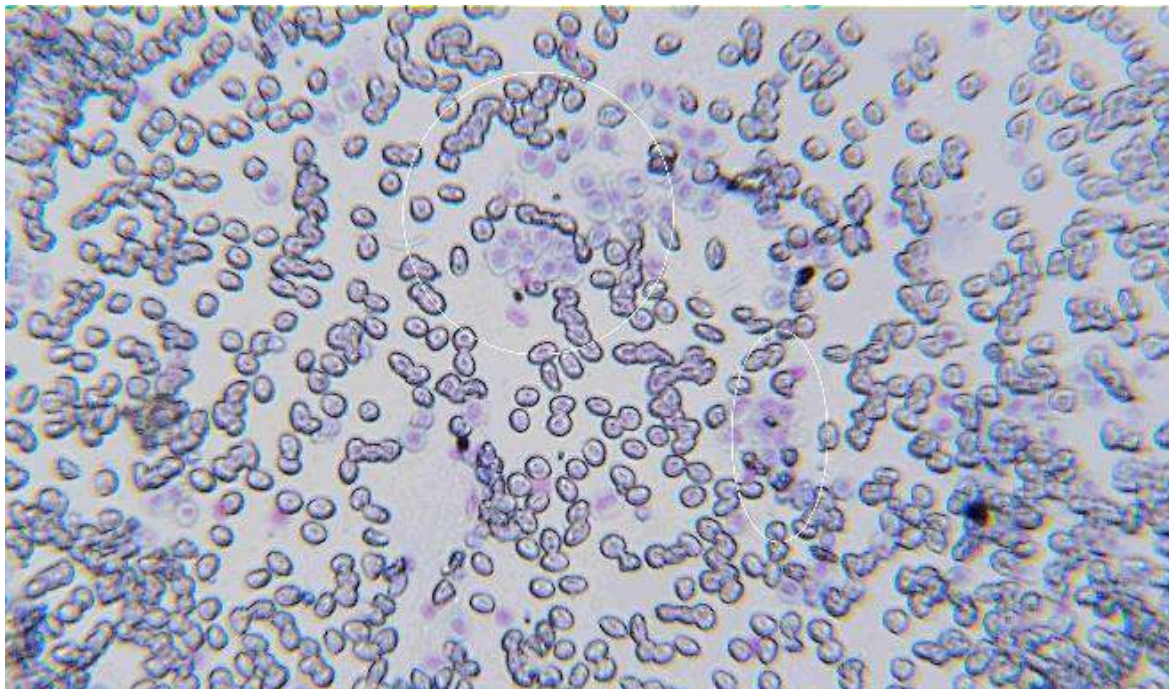


Fig. 6c. Numerous immature RBCs in the peripheral blood

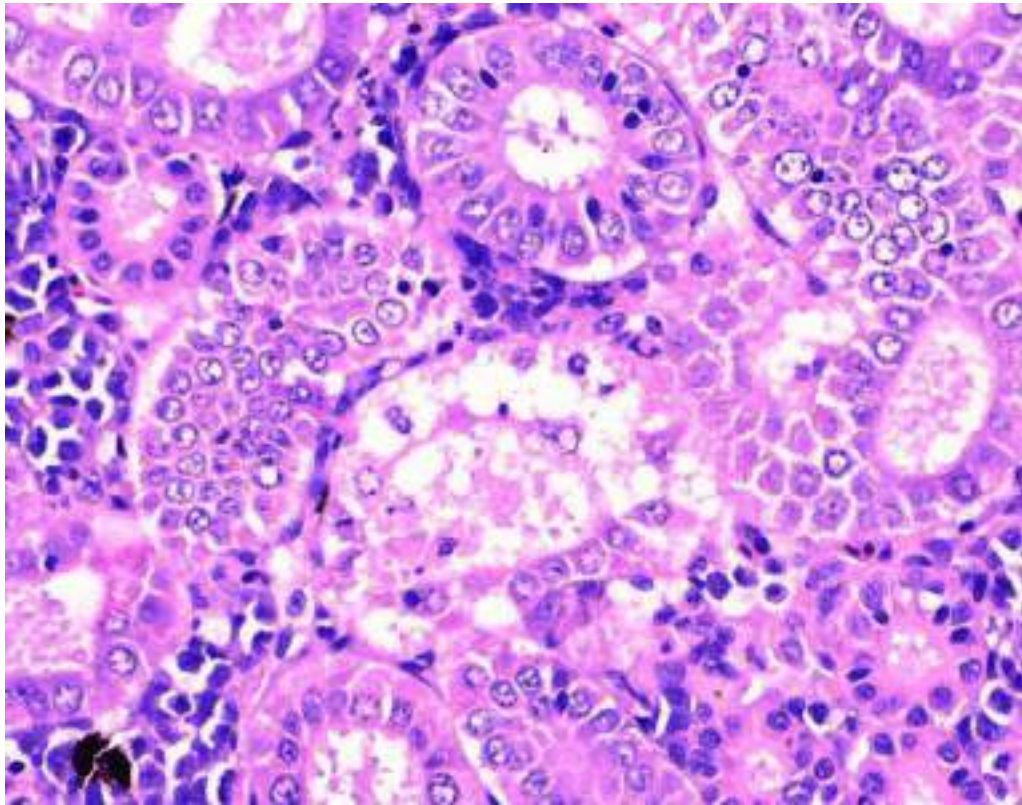


Fig. 6d. Extensive necrosis and hydropic degeneration of tubular epithelium

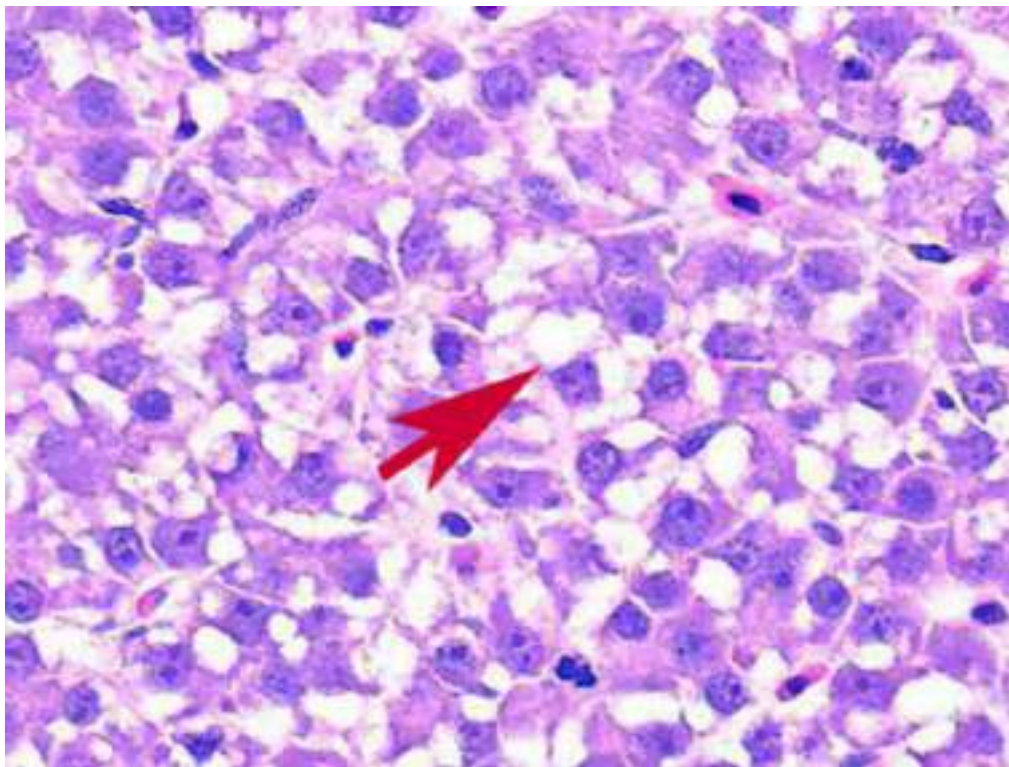


Fig. 6e. Vacuolar degeneration in the liver

12. Data Interpretation

The relationship between hydrogen sulphide (H_2S), ammonia (NH_3) and low dissolved oxygen (DO) in fish mortality is complex, involving interactions that significantly affect aquatic environments.

Hydrogen sulphide is a toxic gas produced by the anaerobic decomposition of organic matter. It is also produced by industrial effluents such as sulphate, Sulphur etc. There are industries which have hydrogen sulphide as a product and byproduct. In water, it is particularly harmful to fish due to the following reasons:

Toxicity: H_2S is highly toxic to fish. It interferes with cellular respiration by binding to hemoglobin which reduces the oxygen-carrying capacity of blood.

Low Concentration Effects: Even at low concentrations, H_2S can cause significant stress, leading to gill damage and reduced oxygen uptake.

Synergistic Toxicity

Ammonia and hydrogen sulphide both interfere with respiratory enzymes and gill function. Low DO exacerbates the situation by limiting the oxygen available for respiration and increasing the fish's susceptibility to toxins.

Stress and Mortality

Fish exposed to low DO, high ammonia and hydrogen sulphide simultaneously experience multiple stressors that overwhelm their physiological systems. The combined effects lead to increased mortality rates due to respiratory failure, cellular damage, and inability to detoxify harmful substances.

13. Summary

The interplay between hydrogen sulphide, ammonia and low dissolved oxygen created a highly stressful and lethal environment for fish and other aquatic fauna. Accumulation of excessive organic matter and nutrient input lead to eutrophication, causing low DO levels. Anaerobic conditions enhanced the production of hydrogen sulphide and ammonia, both of which are highly toxic to fish. The combination of these factors resulted in increased fish mortality due to compromised respiration and systemic toxicity. This natural situation might have worsened by the discharge of sulphur and sulphates in to the system, which ultimately ended up in hydrogen sulphide production. Apart from all these, there are industries known to discharge hydrogen sulphide directly into the water bodies.

14. Recommendations

- Implement effluent treatment and release regulations as per the norms of the National Green Tribunal. Emphasizes the essentiality of a dyke wall with a walk way along the Eloor –Edayar stretch.
- Real-time monitoring system for water quality parameters may be installed in the immediate upper and lower stretches of the Pathalam Regulator bridge and the shutter operations shall be aligned in tune with the data obtained.
- A Co-ordination Committee including members from various Departments and LSGD to be formed to regulate the operation of regulator cum bridge
- An AI assisted system for display and alert may be devised for issuing early warning signals to the stake holders in the downstream before opening the shutters.
- Biodiversity assessment and continuous monitoring of the upper and lower streams of Pathalam bridge may be initiated.
- Suitability of sites including water and sediments quality may be ascertained before licensing aquaculture activities.
- KUFOS may be entrusted to undertake an in depth study on fish and fisheries including aquaculture activities in the River Periyar.
- A special drive may be undertaken to clean Periyar and create mass awareness on water pollution with the participation of government and non-government agencies, public and the industries by using CSR Fund.
- Distribution of proper compensation to fishermen, allied workers and fish farmers in the River Periyar and other places wherein similar incidents were reported.
- Proper control and regulations may be followed in the use of pesticides and fertilizers in the agriculture sector.
- Proper domestic and commercial sewage treatment mechanism and control measures may be ensured.
- Unregulated discharges from the domestic and commercial establishments may be penalized.
- Engage local communities in monitoring efforts through citizen science initiatives.

15. References

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16. Acknowledgements

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Annexure 2. List of dead fishes observed		
Sl No	Common name	Scientific name
1	Pearlspot	<i>Etroplus suratensis</i>
2	Seabass	<i>Lates calcarifer</i>
3	Sole / flatfish	Pleuronectiformes
4	Needle Anchovy	<i>Ehirava fluviatilis</i>
5	Orange chromide	<i>Pseudetroplus maculatus</i>
6	Mossambique tilapia	<i>Oreochromis mossambicus</i>
7	Nile tilapia	<i>Oreochromis niloticus</i>
8	Mud crab	<i>Scylla spp</i>
9	Shrimp	Penaeids
10	Catfish	<i>Mystus armatus</i>
11	Scats	<i>Scatophagus argus</i>
12	Mangrove snapper	<i>Lutjanus argentimaculatus</i>
13	Filament barb	<i>Dawkinsia filamentosa</i>
14	Gobies	<i>Glossogobius giuris</i>
15	Lady fish	<i>Sillago sihama</i>
16	Glass fish	<i>Parambassis spp</i>
17	Giant travelly	<i>Caranx ignobilis</i>
There were many unidentifiable fishes seen in the video grabs of various visual media.		



☎0484- 2703782, Fax: 91-484-2700337; e-mail: utypanangad@kufos.ac.in, registrar@kufos.ac.in website: www.kufos.ac.in

Preliminary Report on the Mass mortality of fishes in Periyar River on 21.05.2024

As per the letter No. JDFEKM/136/2024/B1 dated 22.05.2024, the Joint Director, Fisheries (Central Zone), Directorate of Fisheries, Govt. of Kerala has requested the University to conduct a detailed study on the mortality of fish in Periyar river occurred on 21.05.2024. The University as per order No. GA8/3907/2024 dated 22.05.2024 has constituted an Expert Committee with the following members to conduct detailed investigation on the matter and directed to submit a preliminary report on or before 24.05.2024.

Dr. Binu Varghese, Asst. Prof., Dept. of Aquaculture	- Chairman
Dr. Anu Gopinath, Prof. & Head, Dept. of Aquatic Environment Management	- Member
Dr. M.K. Sajeevan, Head, Dept. of Fisheries Resource Management	- Member
Dr. Devika Pillai, Head, Aquatic Animal Health Management	- Member
Dr. M..P. Prabhakaran, Asst. Prof., Dept. of Aquatic Environment Management	- Member
Shri. Saneer N.S., Fishing Technology Assistant	- Member
Dr. Dinesh Kaippilly Professor & Registrar i/c.	- Convener

The Committee members visited the sites on 23.05.2024 and collected water and fishes. As per direction of Hon'ble Vice Chancellor, the University had already collected samples on 21.05.2024 for conducting detailed study on the matter.

After detailed study, the Committee found that the recent fish kills are linked to the events after the opening three shutters of Pathalam regulator in the afternoon hours of 20.5.2024. However, local environmentalists intimated minor fish kills in the upstream area of the regulator on the previous day. The mass mortality was seen in the downstream stretches from early morning on 21.05.2024 onwards and it extended about 10 km.

Initial mortality due to poor water quality parameters led to mass mortality of aquatic fauna for many kilometres from the source on 20.05.2024. The water quality got further deteriorated due to this mass mortality and the system is yet to recover. The inhabitant fishes and those stocked in more than 100 cages in the river got killed in the event.

The sources of pollutants may be of organic / inorganic origin or both and the analysis on these aspects is progressing at KUFOS labs. Certain critical tests will take at least a fortnight for getting the accurate results.

Basic water quality parameters like temperature, salinity, pH, dissolved oxygen and ammonia were analysed on the day of mass mortality and on the day after. These need to be compared with prior data of Pollution Control Board (PCB). PCB has promised that the data can be made available on 26.05.2024 and the comparative analysis will be incorporated in the final report. During the analysis, in general, lower dissolved oxygen level as low as 1.14 ppm, abnormally high values of ammonia i.e., 3.296 ppm & silicates to the level of 176.9 micro mole per litre, Sulphide to the level of 3.7859 ppm, Calcium to the level of 1250 ppm in some selected areas and low pH levels to the tune of 6.6 (which are undesirable traits as far as the water quality parameters for a healthy aquatic ecosystem are concerned) were observed. These can individually or collectively cause reduced health, stress and even mortality in aquatic organisms.

Analysis of hydrogen sulphide which is yet another critical undesirable water quality parameter which has the potential of killing fishes is also in progress in KUFOS labs. This will indicate the presence of organic load from certain specific origins. Likewise, ICPMS (Inductively Coupled Plasma Mass Spectrometry) analysis is also in progress at KIUFOS labs for finding out the presence of heavy metals, if any.

The analysis of CCTV footage from a few cage farm sites in Cheranelloor area showed very specific and most uncommon behavioural changes among the fishes both inside and outside the cages by midnight of 20.5.24. The fishes stocked in the cages were strugglingly jumping out of water with high rate of unrest. Even the air breathing fishes which are hardier than the normal fishes showed this kind of stress leading to mortality. Other aquatic organisms including shrimps, crabs and other invertebrates were also found dead in large number. This clearly indicates that the water must have contained some very undesirable compounds of organic or inorganic origin with the potential of making the fish highly stressed leading to sudden mortality. The fishes further showed sideways and erratic movements losing the balance in cages. Normally, the fishes gulp on the surface layers, if there exists anoxic conditions.

The people in the surrounding localities reported that they have observed erratic movements of fishes into the smaller canals or even to the embankments in order to escape from polluted waters. The mass mortality of fishes within a span of 2-3 hours indicates the presence of some pollutants in the water and our current studies will be able to throw light on these agents to a great extent.

Analysis of gills and gill filaments of the affected fishes showed necropsy and stained blood smears indicating the presence of certain toxic substances.

In this context, it is noteworthy to mention that during the meeting convened by Shri. P. Rajeeve, Hon'ble Minister for Industries on 23.05.2024, there was a pressing demand from the public for a comprehensive report on the biodiversity in the river with a comparative analysis of the old data. So, the need of the hour is to take precautionary measures to avoid such undesirable incidents in future.

It is further reported that there has been an allegation by local people on the duration / timing of shutter operations done during these days. Sudden mixing of upstream water and downstream water must have resulted in certain dynamic changes in the water quality. So, they are agitatedly demanding that strict monitoring and regulation by a competent authority with the support of scientific organisations is to be implemented to scientifically manage the opening and closing of shutters of the regulator bridge. Obviously, the operations of shutters need to be regulated by considering the water quality aspects of the upstream and downstream regions of the river using the data generated by KUFOS.

It is reported that there are at least half a dozen poultry meal factories in the region generating foul and irritating off odour resulting serious social concerns. The process of the plant operations, protocols and the associated inputs involved along with the products and by products outflow are to be seriously investigated to find out the probable pollutants, if any.

It is also reported that at certain outlet points the committee observed some yellow coloured powder like substances suspecting the presence of direct release of sulphur into the water body.

It may be noted that fishes are reared at the density of 20 to 30 kg/m³ in cages and even a slight change in water quality / health of the animal / environmental parameters / host pathogen dynamics will contribute to the sudden death of fishes.

To conclude, KUFOS recommends a real time monitoring and regular sampling system in Periyar river throughout the year to avoid this kind of incidences in future. We can install water quality checking probes in different parts of river permanently which will enable continuous monitoring of water quality parameters. The University has successfully demonstrated its capacity in Vembanad lake monitoring studies which were compiled scientifically and handed over the same to the Hon'ble Chief Minister and Fisheries Minister of Kerala.

Hence, the committee unanimously recommends to allocate a special fund for Periyar River monitoring in terms of pollution, biodiversity index, carrying capacity and absolute ecosystem health.

Sd/-

Registrar i/c.



KERALA UNIVERSITY OF FISHERIES & OCEAN STUDIES
കേരള ഫിഷറീസ്-സമുദ്രപഠന സർവ്വകലാശാല
PANANGAD P.O., KOCHI 682 506, KERALA, INDIA



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GA8/3907/2024

Dated 13/11/2024

From

Registrar

To

Shri. J. Chandra Babu
 Regional Director
 Central Pollution Control Board
 Regional Directorate
 NisargaBhavan, Shivanagar
 Bengaluru 560079

Madam/Sir,

Sub: Fish Kill Incident in "Periyar River"-Original Analysis results forwarded-Reg.

Ref: 1. That office mail dated 09.11.2024

2. Minutes of the meeting held on 05.11.2024

Kind attention is invited to the references cited above.

During the meeting held on 05.11.2024 for reviewing the reports received by the Central Pollution Control Board (CPCB) and the status of Industries, as per Hon'ble National Green Tribunal, Southern Zone order, it was directed to submit the original analysis results of Kerala University of Fisheries and Ocean Studies pertaining to the Fish Kill incident in "Periyar" River.

Accordingly, the same is forwarded herewith for necessary action.

Yours faithfully


REGISTRAR

Encl:- Original lab analysis results



REGISTRAR
KERALA UNIVERSITY OF
FISHERIES & OCEAN STUDIES
PANANGAD P.O. KOCHI-682 506



KERALA UNIVERSITY OF FISHERIES AND OCEAN STUDIES

Referral Laboratory for Aquatic Animal Disease Diagnosis and Quality Testing

Panangad, Kochi-682506, Kerala, India
Tel.: +91-484 2700598, E mail: arl@kufos.ac.in

Fish kill investigation report

Onsite investigation

TIME/DATE KILL INVESTIGATED: 10:45 a.m / 21-05-24 and 10:00 am / 23-05-24

HABITAT DESCRIPTION: (circle as appropriate)

(A) Freshwater estuarine marine

(B) stream river anabranch / lake / swamp / drain / channel / impoundment / bay / lagoon / farm dam / beach / open ocean / other:

ADJACENT LAND USES (specify): Industrial Area

PHYSICAL EVIDENCE OF POLLUTION (OR ALGAL BLOOMS) OBSERVED: Oily layer over the water, dead fishes

ON-SITE WATER SAMPLING RESULTS WATER SAMPLES COLLECTED (21-05-24) : Yes / No

Sample no.	1	2	3
Name of sampling site	Kothad	Moolampilly	Varappuzha
pH	6.72	6.60	7.21
Temp. (°C)	30.2	29.8	29.9
Dissolved Oxygen surface (ppm)	2.12	0.3	3.81
Turbidity (NTU)	6.25	6.84	6.94
Others (specify)			

ON-SITE WATER SAMPLING RESULTS WATER SAMPLES COLLECTED - Surface (23-05-24) : Yes

Sample no.	1	2	3	4	5	6	7	8
Name of sampling site	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Station 7	Station 8
pH	6.62	6.58	7.12	6.94	5.57	7.02	6.83	6.99
Temp. (°C)	28.7	28.7	29.1	28.9	29	28.9	28.9	28.9
Dissolved Oxygen surface (ppm)	4.7	4.98	5.72	5.72	5.85	5.8	5.71	5.68
Salinity (ppt)	0.26	0.05	0.05	0.04	0.05	0.00	0.05	0.04
Conductivity (ppm)			69.6	52.2	110.8	89	108.4	97.3
Ammonia	1.4 ppm	1.5 ppm	3.1 ppm	3.0 ppm	3.5 ppm	3.25 ppm	3.1 ppm	2.98 ppm



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ON-SITE WATER SAMPLING RESULTS WATER SAMPLES COLLECTED - Depth (23-05-24) :Yes

Sample no.	1	2	3	4	5	6	7	8
Name of sampling site	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Station 7	Station 8
Temp. (°C)	28.7	28.8	28.9	28.9	29	27.5	29	33.3
Dissolved Oxygen surface (ppm)	4.66	4.6	5.68	5.78	5.75	5.75	5.08	5.16
Salinity (ppt)	0.4	0.05	0.1	0.04	0.05	0.00	0.06	11.85
H ₂ S	2.382 mg/l	2.7055 mg/l	-	-	-	-	-	-

CONDITION OF FISH (circle) dying / freshly dead / few hours old / few days old / decomposed OTHER

COMMENTS: (eg behaviour/appearance of fish) Gulping at the surface

AFFECTED FISH SPECIES (Full name)	LENGTH RANGE (cm)	NUMBERS	SAMPLES COLLECTED
<i>Etroplus suratensis</i>	15-20	5	Yes
<i>Lates calcarifer</i>	20-25	4	Yes
Pleuronectiformes (flatfish)	10-15	6	Yes
Anchovy	4-5	50	Yes
<i>Etroplus maculatus</i>	5-7	4	Yes
<i>Oreochromis mossambicus</i>	20-25	1	Yes

SUSPECTED CAUSE OF FISH KILL: Hydrogen sulphide

WATER SAMPLES DESPATCHED TO: ARL-KUFOS

TO BE TESTED FOR: Heavy metals, toxicology

FISH SAMPLES DESPATCHED TO: ARL-KUFOS

TO BE TESTED FOR: Necropsy, Heavy metals, toxicology

INVESTIGATED BY: ARL- KUFOS



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Laboratory examination

Necropsy examination

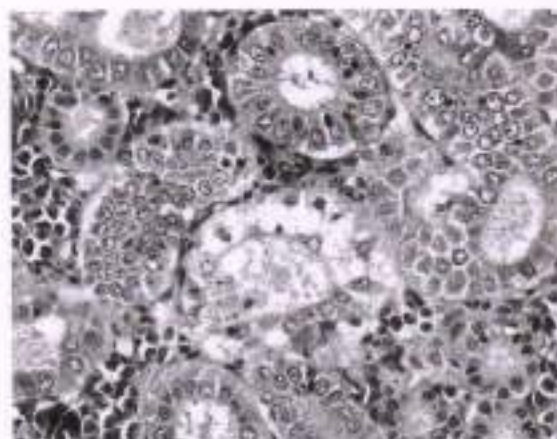
Samples of fishes received at ARL-KUFOS were subjected to postmortem examination. Findings include severe congestion and hemorrhages in gills with epithelial sloughing. Examination of affected fishes were suggestive of a toxicant associated fish kill corroborated with the onsite observation of fishes showing aquatic surface respiration (ASR) and aerial emergence behaviour. Hematological analysis indicated immature red blood cells in the fish blood indicative of toxic pollution in the water body concurrent with the gill lesions indicated previously.



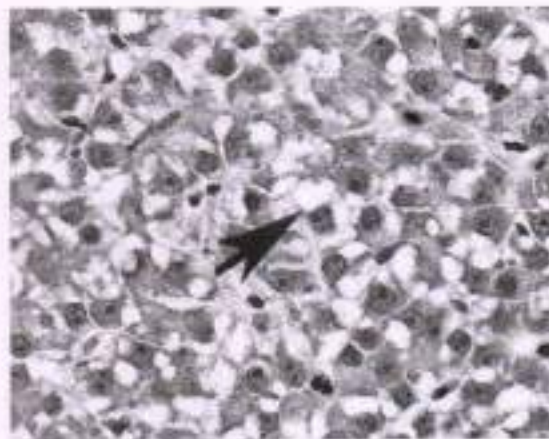
Hemorrhages and epithelial lifting in gills



Numerous immature RBCs in the peripheral blood



Extensive necrosis and hydropic degeneration of tubular epithelium

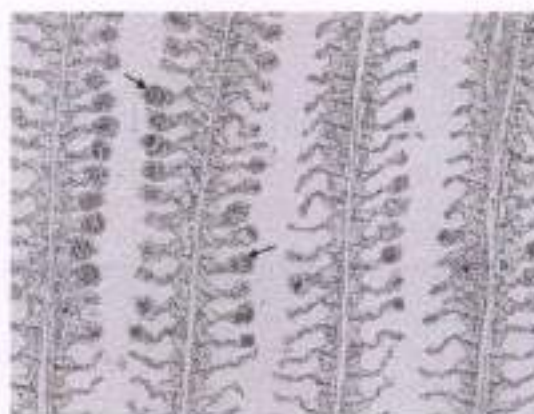


Vacuolar degeneration in the liver



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Severe telangiectasis and/or lamellar thrombosis in the gill

Toxicant analysis by GC-MS

Fish tissue		Result
DDT (sum of O,P-DDE, P,PDDDE O,P-DDD, PP-DDD, O,P-DDT & P P-DDT expressed as DDT)		75.8 mg/kg
BHC (sum of alpha-HCH, beta HCH, gamma HCH & delta HCH expressed as BHC)		30.2 mg/kg
PAH (sum of fluoranthene, BbF, BkF, BaP, BgP and InD expressed as PAH)		4.79 ng/g
Benzenes, tetrachloro-Methane, chlorodiphenyl- Methane Alkylated benzenes		Detected
Water sample		
DDT (sum of O,P-DDE, P,PDDDE O,P-DDD, PP-DDD, O,P-DDT & P P-DDT expressed as DDT)		251 mg/L
BHC (sum of alpha-HCH, beta HCH, gamma HCH & delta HCH expressed as BHC)		120.5 mg/L
PAH (sum of fluoranthene, BbF, BkF, BaP, BgP and InD expressed as PAH)		28.96 ng/mL



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Benzenes, tetrachloro- Methane, chlorodiphenyl- Methane Alkylated benzenes	Detected
Sediments	Results
DDT (sum of O,P-DDE, P,PDDE O,P-DDD, PP-DDD, O,P-DDT & P P-DDT expressed as DDT)	220 mg/kg
BHC (sum of alpha-HCH, beta HCH, gamma HCH & delta HCH expressed as BHC)	133 mg/kg
PAH (sum of fluoranthene, BbF, BkF, BaP, BgP and InD expressed as PAH)	26.2 ng/g
Benzenes, tetrachloro- Methane, chlorodiphenyl- Methane Alkylated benzenes	Detected

Upper stretches (water)		Result
DDT (sum of O,P-DDE, P,PDDE O,P-DDD, PP-DDD, O,P-DDT & P P-DDT expressed as DDT)		82.3 mg/L
BHC (sum of alpha-HCH, beta HCH, gamma HCH & delta HCH expressed as BHC)		12.4 mg/L
PAH (sum of fluoranthene, BbF, BkF, BaP, BgP and InD expressed as PAH)		24.12 ng/mL
Benzenes, tetrachloro- Methane, chlorodiphenyl- Methane Alkylated benzenes		Detected
Lower stretches (Water)		
DDT (sum of O,P-DDE, P,PDDE O,P-DDD, PP-DDD, O,P-DDT & P P-DDT expressed as DDT)		148.3 mg/L
BHC (sum of alpha-HCH, beta HCH, gamma HCH & delta HCH expressed as BHC)		117.1 mg/L
PAH (sum of fluoranthene, BbF, BkF, BaP, BgP and InD expressed as PAH)		10.6 ng/mL



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Benzenes, tetrachloro- Methane, chlorodiphenyl- Methane Alkylated benzenes	Detected



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Heavy metal analysis by ICP-MS

Samples	Cr (ppm)	Mn (ppm)	Fe (ppm)	Co (ppm)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Rb (ppm)	Cd (ppm)	Cs (ppm)	Pb (ppm)	U (ppm)
Fish – kothad	0.755	15.731	89.371	0.066	0.438	1.128	56.013	0.483	0.380	0.394	0.035	0.005	0.055	0.022
Fish - Virappuzha	0.562	0.211	7.885	0.010	0.375	0.570	6.988	0.320	0.297	1.911	0.010	0.019	<0.00 0	0.001
Fish – Paravur	0.568	0.491	8.408	0.022	0.397	0.511	8.745	1.662	0.473	2.101	0.002	0.017	0.003	0.002
Fish – MP	0.538	1.904	8.088	0.009	0.355	0.721	16.293	0.799	0.659	1.745	0.012	0.007	0.005	0.002
Water- Kothad	0.018	9.834	3.987	0.017	0.193	0.165	4.931	0.054	0.052	2.339	0.001	0.019	<0.00 0	0.016
Water – MP	0.034	0.605	0.878	0.009	0.084	0.037	0.414	0.105	0.061	4.549	0.003	0.027	<0.00 0	0.036
Water - Varapp	0.039	10.402	3.296	0.042	0.253	0.096	2.614	0.074	0.054	3.668	0.006	0.016	<0.00 0	0.017
Water - Varapp (2)	0.031	29.351	37.536	0.028	0.212	0.066	0.625	0.084	0.072	3.727	0.0006	0.014	<0.00 0	0.003
Sediment - Kothad	28.081	62.271	10449. 470	3.120	7.822	9.378	218.82 2	1.095	0.779	6.739	1.836	0.155	4.224	0.674
Sediment - M P	29.636	28.028	11215. 863	2.558	7.917	8.011	88.906	1.729	0.755	8.033	0.773	0.204	5.472	0.801
Sediment - Varap	25.392	52.343	10254. 935	2.806	7.345	8.889	206.60 5	0.834	0.734	7.790	1.660	0.150	4.585	1.188



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MP - Moolampilly region

Varapp - Varappuzha region

Kothad fishes - Pallathi, Kozhuvu

Varappuzha fish - Etroplus, Seabass

Samples	Cr (ppm)	Mn (ppm)	Fe(ppm)	Co (ppm)	Ni(ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Cs (ppm)	Pb (ppm)
Station 1	0.514	5.065	2.376	0.024	0.516	0.537	3.012	0.019	0.000	0.001	0.004	0.040
Station 2	0.5346	4.491	3.967	0.021	0.546	0.620	1.775	0.013	0.012	0.018	0.002	0.031
Station 3	0.543	2.788	2.351	0.051	0.677	0.586	3.355	0.012	0.006	0.025	0.002	0.023
Station 4	0.531	1.083	2.453	0.018	0.451	0.507	0.700	0.009	0.009	0.005	0.001	0.047
Station 5	0.522	3.669	6.681	0.047	0.534	0.573	1.900	0.010	0.003	0.014	0.002	0.027
Station 7	0.440	9.191	11.782	0.034	0.334	0.363	0.633	0.089	0.011	0.004	0.004	0.028
Station 8	0.565	1.912	8.272	0.016	0.449	0.576	2.474	0.013	0.002	0.009	0.008	0.028
Station 9	0.548	1.072	3.300	0.010	0.490	0.616	1.058	0.013	0.009	0.009	0.002	0.029



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Remarks

The samples tested indicated a higher level of multispecies heavy metal and organic toxicant pollution. However, the results do not signify an acute cause of fish kill due to these pollutants. The fish kill incident might be due to a cumulative action of these factors along with sudden variation in water quality evident by low DO, high ammonia and H_2S levels in the water.

Report Date: 31-05-24



***** KUFOS the Report *****

Authorized signatory
 PRINCIPAL INVESTIGATOR
 AQUATIC REFERRAL LAB
 KUFOS

REGISTRAR
 KERALA UNIVERSITY OF
 FISHERIES & OCEAN STUDIES
 PANANGAD, KOCHI-682 506

OA No.184 of 2024 (SZ) SUO MOTU based on the News items related to fish kill in Periyar River – Report - Reg.

ks kspcbholegal1@gmail.com
🕒 Tue, 12 Nov 2024 5:36:11 PM +0530 •
To "CPCB Regional Directorate Bengaluru" <zobangalore.cpcb@nic.in>
Cc "J Chandra Babu" <jcb.cpcb@nic.in>, "Vivek K" <vivek.cpcb@gov.in>
Tags Not in Contacts

☑ ☐ ☐ **12 Attachment(s)** • [Download as Zip](#) • [Add To](#) >

**LETTER TO RD.pdf**

86.2 KB • 🗑

**ANNEXURE 3-eloor fish deat....pdf**

2.8 MB • 🗑

**ANNEXURE 1 - esceloor fish... .pdf**

3.8 MB • 🗑

**ANNEXURE 4 -esc eloor fish... .pdf**

6.2 MB • 🗑

**ANNEXURE 2-eloor fish deat....pdf**

7.8 MB • 🗑

**ANNEXURE 6-NABL SCOPE.pdf**

317.4 KB • 🗑

**ANNEXURE 7-SAMPLING LO... .pdf**

191.1 KB • 🗑

**ANNEXURE 8 (1) (1).pdf**

253.4 KB • 🗑

**ANNEXURE 9 DIRECTIONS.pdf**

193.5 KB • 🗑



ANNEXURE 10 TCC.pdf

1.2 MB •



ANNEXURE 11 TCC REPLY.pdf

1 MB •



ANNEXURE 14 DIRECTIONS.pdf

167.2 KB •

Sir,
Please see the attachments enclosed below.

[_ANNEXURE 12.pdf](#)[_ANNEXURE 13-1.pdf](#)[_ANNEXURE 14A.pdf](#)[_Annexure 15.pdf](#)[_ANEXURE 5.pdf](#)

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Regards,
Senior Environmental Engineer-1,
Legal Section Head Office,
Kerala State Pollution Control Board
Mob: 9447975719

[_ANNEXURE 9A.pdf](#)

Ph: General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman:
2318150 Member Secretary: 2318151
e-mail: chn.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web:
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**KERALA STATE POLLUTION CONTROL BOARD****കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്**

Pattom P.O., Thiruvananthapuram – 695 004
പട്ടം പി.ഒ, തിരുവനന്തപുരം 695 004



KSPCB/1164/2024-SEE-1

Date : 12-11-2024

From

The Member Secretary

To

The Regional Director,
Regional Directorate,
Central Pollution Control Board,
Bengaluru.

Sub:- Order dated 20.08.2024 by the Hon'ble NGT (SZ) Bench in OA No. 184 of 2024 (SZ) along with OA No.233 & 234 of 2024 – Tribunal on its own motion SUO MOTU based on the News items related to fish kill in Periyar River – Reg.

Ref: 1. That Office Letter No. Tech/39/Legal/RDS/NGT/2024-25 dated 30.10.2024.

2. Minutes of the meeting held on 05.11.2024.

Sir,

Kind attention is invited to the subject matter. With reference to the minutes of the meeting referred (2), the following documents are submitted herewith.

1. Analysis reports of samples collected on 20.05.2024 morning- 5 stations- KSPCB ESC Eloor Laboratory (Annexure 1)
2. Analysis reports of samples collected on 20.05.2024 night- 4 stations- KSPCB Eloor Laboratory and KSPCB Central laboratory (Annexure 2)
3. Analysis reports of samples collected on 21.05.2024 morning - 6 stations- KSPCB ESC Eloor Laboratory (Annexure 3)
4. Analysis reports of samples collected on 21.05.2024 Boat sampling- 12 stations- KSPCB Eloor Laboratory and KSPCB Central laboratory

(Annexure 4)

5. Analysis reports received from M/s Cochin Test House- Heavy Metal analysis reports of 4 samples of 20.05.2024 night and 12 samples from boat sampling of 21.05.2024 (Annexure 5)
6. NABL accreditation of M/s Cochin Test House (Annexure 6)
7. Latitude and Longitude of sampling locations (Annexure 7)

Eloor and Edayar are located on the either banks of the river Periyar. In Eloor, there are four large scale industrial units generating effluent. They are FACT-UD, FACT-PD, Indian Rare Earths Limited (IREL) and Travancore Cochin Chemical (TCC). There is direct discharge of effluent into the river by FACT-UD, FACT-PD and IREL. For TCC, it is reported that the entire effluent is reused in process and irrigation. The details of effluent discharging units of Eloor are given in Annexure 8. Directions dated 07.09.2024 under section 33A of Water Act were given to these major three industries in Eloor area with permitted effluent discharge into the river to achieve zero liquid discharge (Annexure 9). The reply submitted by the industries is attached as Annexure 9A. The status of progress on the directions based on the replies of these industries is given below.

Sl No.	UNIT	Date of Direction	Date of Reply	Quantity of Effluent as per consent (in KLD)	Adopted measures as suggested and planned measures by the company	Remarks
1	FACT-UD	07.09.2024	16.09.2024	16800	Process modifications, reduction in water consumption, effluent reuse and recycle, modernising effluent handling area etc. It is reported that the average discharge through Outlet I is 570 KL/day, against the permitted limit of 4800 KL/day, and the average discharge through Outlet 2 is 671 KL/day, against the limit of 12000 KL/day. Currently,	Detailed report to be called for from ESC Eloor Timelines for the different actions are also to be specified by the company.

					FACT is discharging only 12% and 6% of the consented values, respectively. Currently planning a new study with an external competent agency to explore the latest technologies for recycling and reusing treated effluents in the process, with the goal of further reducing discharge.	
2	FACT - PD	07.09.2024	16.09.2024	5040	Recycling 200 KLD treated waste water — 120 KLD for dilution of incoming waste water based on analysis and 80 KLD for development of green belt during summer season. Since the restart of Petrochemical Plants in September 2021, the daily average treated effluent discharged to the river is 4316 KLD, against consented quantity of 5040 KLD. Planned to carry out a techno-economic feasibility study engaging a competent agency, considering the technological advancements evolved during this period in this field. The recommendations of the agency, after evaluation, will be implemented in a time bound manner in the unit.	Detailed report to be called for from ESC Eloor Timelines for the different actions are also to be specified by the company.
				400	DM plant for product leaching, improved filtration, recycling, process optimization etc .	Detailed report to be called for from ESC Eloor

3	IREL	07.09.2024	18.09.2024	With these measures, unit could reduce the daily average effluent generation from 130KLD in 2022 to 95 KLD in 2023 against an authorized discharge limit of 400KLD. They are in the process of continuous improvement and are implementing latest technologies for the achievement of Zero Liquid Discharge.	Timelines for the different actions are also to be specified by the company.

Regarding Travancore Cochin Chemicals Limited, during the inspection of the Board officials on 02.07.2024, effluent was seen discharged through the storm water drain and hence direction dated 03-07-2024 under Section 33A of the Water Act was issued to the unit (Annexure 10). The company vide letter dated 08-07-2024 informed that normally storm water and cooling tower overflow into the lagoon and reuse this water for irrigation purpose by operating pumps at storm water outlet area and continuously monitoring the water quality there. The company informed that they have provided one more pump at the lagoon outlet for ensuring continuous reuse of water into the lagoon and for stoppage of any discharge into the river (Annexure 11).

In Edayar industrial area there are 75 no. of effluent generating industries generating around 1.47MLD. Out of this 75 units, three units namely Cochin Minerals and Rutile Limited (Large); Sudchemie India Private Limited (Large) and TMS Leathers (Small) are generating 1.21.MLD and having own effluent treatment plant. Large scale units Cochin Minerals and Rutile Ltd (CMRL) and Sud Chemie are discharging effluent into river

Periyar downstream of Pathalam regulator. The remaining 72 units are generating 1.26MLD of effluent, of which 0.89 MLD is generated by five rubber processing units namely Alpha Golden Crumb Rubber Essar Enterprises; Malaya Rub Tech Industries Njavellil Latex Private Limited and Sunrise TSR factory. These five rubber units are recirculating treated effluent. Remaining 67 medium and small scale units are generating 0.37MLD of effluent and having treatment system. The details of effluent discharging units of Edayar are given in Annexure 12.

In the Edayar area, directions dated 07.09.2024 under section 33A of Water Act were given to the three six industries with permitted effluent discharge into the river to achieve zero liquid discharge. The status of progress on the directions based on the replies of these industries is given below.

Sl No.	UNIT	Date of Direction	Date of Reply	Quantity of Effluent as per consent (in KLD)	Adopted measures as suggested and planned measures by the company	Remarks
1	Sud chemie	07.09.2024	23.09.2024	450	Reduced the discharge quantities by recycling a substantial portion of process water through water management systems. It was reported that they have installed 380 m³/day capacity Zero Liquid Discharge (ZLD) system in 2020 for the treatment of effluents generated by the newly constructed Cu Zn plant. They have placed an order for a Reverse Osmosis (RO) plant, expected to complete installation in next 3 months.	Detailed report to be called for from ESC Eloor Timelines for the different actions are also to be specified by the company.

				659		It may please be noted that Kerala Water Authority proposed 2MLD ETP at a cost of Rs. 42 crore in the Edayar area. A total of 1.47MLD is generated from 75 industrial units of which three major units namely Sud Chemie Limited, Cochin Minerals and Rutilles Limited and TMS leathers are generating 1.21 MLD and they are having effluent treatment plants. Of the remaining 72 units, 1.21 MLD is generated of which 0.89MLD is generated by five rubber processing units namely Alpha Golden Crumb Rubber, Essar Enterprises, Malaya Rub Tech Industries, Njavellil latex private limited and Sunrise TSR factory and they are having treating and recirculating 0.89 MLD of effluent. The unit has informed that the treated effluent discharged by CMRL enters the estuarine zone (Class E) downstream of the Pathalam Regulator-cum-Bridge It was also informed that they are open to government initiatives, including joining a common effluent
2	CMRL	07.09.2024	20.09.2024			The remaining 67 medium and small scale units are generating

					treatment plant (CETP) for industries in the region and will continue our R&D efforts to further reduce treated effluent discharge in future 0.37MLD and these units are disposing in soakpit/irrigation after treatment. In the meeting held on 24-11-2022 at Government level, DIC officials informed that industries are not willing to share the huge project cost since they have already provided treatment plants and it was also pointed out that it will be difficult to collect the huge amount from the industries as they are all small scale units. As per Government level meeting on 21-12-2024, the CEE, RO,EKM with instruction to submit urgent report with specific remarks. (Annexure 13). Detailed report to be called for from ESC Eloor on ZLD. Timelines for the different actions for ZLD are to be specified by the company
				101	Chrome Recovery plant is in operation. The reclaimed chrome is reused in the production line Reuse soaking water for fresh Detailed report to be called for from ESC Eloor Timelines for the different actions are

3	TMS Leathers	07.09.2024	24.09.2024 25.10.2024	hides, thus reducing effluent generation. Unit has informed that they have contracted M/s Erode Enviro Care, Erode, Tamil Nadu, a professional team based at Erode with a proven track record in implementing innovative methodologies for hide processing, which will significantly reduce process water consumption, further decreasing effluent generation. Unit has sought 30 day extension for the submission of the proposal.	also to be specified by the company.

Copies of directions given to the above 3 industries and their replies received are attached as Annexures 14 and 14A respectively.

It may kindly be noted that the condition to provide Zero Liquid discharge had already been specified in the consent issued to the major units. Recently Direction was also issued to the major effluent generating units and follow up on the reply is being taken. Direction was also issued to provide delay pond for the storm water drains before discharge and to ensure compliance with effluent quality standards to all the major units generating effluent (Annexure 15). The matter is being followed up.

These are reported for further necessary action.

Yours faithfully,

Signed by
Sheela A M

Date: 12-11-2024 10:09:04

MEMBER SECRETARY

Copy to:

The Member Secretary

Central Pollution Control Board (with cover letter)



KERALA STATE POLLUTION CONTROL BOARD **ENVIRONMENTAL SURVEILLANCE CENTRE**

FACT-Or.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501,

Phone: 0484 2545678, E-mail: esceloor@yahoo.co.in

കേരളസംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ടുകാർട്ടേജ്സ് നമ്പർ 5-5, ഉദ്യോഗമണ്ഡലം പി.ഒ.,

എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2783/2024 Date: 24.05.2024	
Source	RIVER PERIYAR- PATHALAM DOWNSTREAM	Sample received from	EE-ELOOR
Sample Identification no.	HM		
Date of sample Collection	20.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	20.05.2024 to 24.05.2024
Date of Receipt	20.05.2024		
Scientist – In – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.85	APHA-H+B 24 th edition 2023
2	BOD	mg/L	1.9	IS 3024(PART 44)1993
3	COD	mg/L	32	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	11.320	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	1400	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	2528.3	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	46	APHA 2320B 24th edition 2023
8	TDS	mg/L	6552.01	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	2.7	APHA 4500B, C 24th edition 2023
Details of samples: PATHALAM DOWNSTREAM MORNING SAMPLE -20.05.2024				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
 Assistant Scientist

BRINSHAW M.P.
Kendal, Cumbria



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

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കേരളസംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട്കാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി. ഒ.,
എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2782/2024 Date: 24.05.2024	
Source:	RIVER PERIYAR- PATHALAM UPSTREAM	Sample received from	EE-ELOOR
Sample identification no.	MP		
Date of sample Collection	20.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	20.05.2024 to 24.05.2024
Date of Receipt	20.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.75	APHA-H+B 24 th edition 2023
2	BOD	mg/L	1	IS 3024(PART 44)1993
3	COD	mg/L	24	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	268.6	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	40	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	49.75	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	32	APHA 2320B 24th edition 2023
8	TDS	mg/L	155.47	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	1.3	APHA 4500B, C 24th edition 2023
Details of samples: PATHALAM UPSTREAM MORNING SAMPLE -20.05.2024				
Remarks:				

BINEESHA M.P.
 Assistant Scientist

BINEE SHA M.B.
Assistant Secretary



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

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Phone : 0484 2545678 , E-mail: esceloor@yahoo.co.in

കേരളസംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

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ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2781/2024 Date: 24.05.2024	
Source	RIVER PERIYAR- PUTHALAMKADAVU	Sample received from	EE-ELOOR
Sample identification no.	NR		
Date of sample Collection	20.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	20.05.2024 to 24.05.2024
Date of Receipt	20.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.72	APHA-H+B 24 th edition 2023
2	BOD	mg/L	2.9	IS 3024(PART 44)1993
3	COD	mg/L	12	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	92.63	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	16	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	17.94	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	20	APHA 2320B 24th edition 2023
8	TDS	mg/L	53.61	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	4.2	APHA 4500B, C 24th edition 2023
Details of samples: PUTHALAMKADAVU MORNING SAMPLE -20.05.2024				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist

BIJESH K. S.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

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ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2780/2024 Date: 24.05.2024	
Source	RIVER PERIYAR- VETTUKADAVU	Sample received from	EE-ELOOR
Sample identification no.	VTU		
Date of sample Collection	20.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	20.05.2024 to 24.05.2024
Date of Receipt	20.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.89	APHA-H+B 24 th edition 2023
2	BOD	mg/L	3.9	IS 3024(PART 44)1993
3	COD	mg/L	34	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	10690	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	1500	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	2691.41	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	44	APHA 2320B 24th edition 2023
8	TDS	mg/L	6187.37	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	6.8	APHA 4500B, C 24th edition 2023
Details of samples: VETTUKADAVU MORNING SAMPLE-20.05.2024				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

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ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2779/2024 Date: 24.05.2024	
Source	RIVER PERIYAR- PATHALAM BRIDGE	Sample received from	EE-ELOOR
Sample identification no.	PBD		
Date of sample Collection	20.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	20.05.2024 to 24.05.2024
Date of Receipt	20.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.87	APHA-H+B 24 th edition 2023
2	BOD	mg/L	0.2	IS 3024(PART 44)1993
3	COD	mg/L	16	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	301.2	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	42	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	48.12	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	26	APHA 2320B 24th edition 2023
8	TDS	mg/L	174.33	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	0.7	APHA 4500B, C 24th edition 2023
Details of samples :PATHALAM BRIDGE MORNING SAMPLE-20.05.2024				
Remarks:				

BINEESHA M.P.
 Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD **ENVIRONMENTAL SURVEILLANCE CENTRE**

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ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2772/2024 Date: 24.05.2024	
Source	RIVER PERIYAR- PATHALAM DOWNSTREAM	Sample received from	EE-ELOOR
Sample identification no.	EF-3		
Date of sample Collection	20.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.68	APHA-H+B 24 th edition 2023
2	BOD	mg/L	0.8	IS 3024(PART 44)1993
3	COD	mg/L	56	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	2538	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	500	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	244.67	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	30	APHA 2320B 24th edition 2023
8	TDS	mg/L	1469	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	2.1	APHA 4500B, C 24th edition 2023
Details of samples: BASED ON FISH KILL-PATHALAM DOWNSTREAM- (9.30PM)-20.05.2024				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
 Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Of.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501.

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എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2771/2024 Date: 24.05.2024	
Source	RIVER PERIYAR- PATHALAM BUND UPSTREAM	Sample received from	EE-ELOOR
Sample identification no.	EF-4		
Date of sample Collection	20.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.58	APHA-H+B 24 th edition 2023
2	BOD	mg/L	0.5	IS 3024(PART 44)1993
3	COD	mg/L	44.8	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	354.80	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	39	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	179.4	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	26	APHA 2320B 24th edition 2023
8	TDS	mg/L	205.36	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	1.0	APHA 4500B, C 24th edition 2023
Details of samples: BASED ON FISH KILL-PATHALAM BUND UPSTREAM -9.30PM -20.05.2024				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

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Phone: 0484 2545678, E-mail: esceloor@yahoo.co.in

കേരളസംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ടുകാർട്ടേജ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി. ഒ.,
എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2770/2024 Date: 24.05.2024	
Source	RIVER PERIYAR- VETTUKADAVU	Sample received from	EE-ELOOR
Sample identification no.	VET		
Date of sample Collection	20.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.75	APHA-H+B 24 th edition 2023
2	BOD	mg/L	0.9	IS 3024(PART 44)1993
3	COD	mg/L	50.4	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	8120	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	1100	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	2120.5	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	42	APHA 2320B 24th edition 2023
8	TDS	mg/L	4699.86	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	3.2	APHA 4500B, C 24th edition 2023
Details of samples: BASED ON FISH KILL-NEAR VETTUKADAVU-(9.30PM) -20.05.2024				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501,

Phone: 0484 2545678, E-mail: esceloor@yahoo.co.in

കേരളസംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ടുകാർട്ടേജ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി.ഒ.,

എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)				No:2769/2024	Date: 24.05.2024
Source	RIVER PERIYAR-ELOOR FERRY			Sample received from	EE-ELOOR
Sample Identification no.	EFER				
Date of sample Collection	20.05.2024				
Ref. No.	PCB/ESC/CO-33/08			Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024				
Scientist – in – charge of analysis				Assistant Scientist	
Sl. No.	Parameter	Unit	Value	Test method	
1	pH	---	6.85	APHA-H+B 24 th edition 2023	
2	BOD	mg/L	0.5	IS 3024(PART 44)1993	
3	COD	mg/L	61.4	APHA 5220B 24 th Ed., 2023	
4	Electrical conductivity	µS/cm	101.60	APHA 2510-B 24th edition 2023	
5	Hardness	mg/L	1300	APHA 2340 C 24th edition 2023	
6	Chloride	mg/L	2202.07	APHA 4500-Cl-B 24th edition 2023	
7	Alkalinity	mg/L	46	APHA 2320B 24th edition 2023	
8	TDS	mg/L	5880.61	APHA 2540 C 24th edition 2023	
9	Dissolved oxygen	mg/L	2.1	APHA 4500B, C 24th edition 2023	
Details of samples: BASED ON FISH KILL SEEN NEAR ELOOR FERRY-(9.30PM)-20.05.2024					
Remarks:					

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD CENTRAL LABORATORY

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കേന്ദ്ര പരീക്ഷണശാല

Recognised as an Environmental Laboratory Under E(P)A 1986

Ref. PCB/CL/AR/2009

Date: 24.05.2024

From

The Chief Environmental Scientist

To

The Environmental Engineer,
Kerala State Pollution Control Board,
Environmental Surveillance Centre,
Eloor.

Sub: Analysis Report of water Samples – reg

Sir,

I am enclosing here with the analysis report of water Samples received from that office. The bill for the analysis charge is also enclosed herewith. The details are given below:

Sl. No.	That Office Reference	Source Name	No. of Samples
1	PCB/ESC/CM-33/08 dated 21.05.2024	River Periyar	04

Yours faithfully,

CHIEF ENVIRONMENTAL SCIENTIST

GANDHI NAGAR, KOCHI – 682 020 ഗാന്ധിനഗർ, കൊച്ചി – 682 020

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Certified for OHSMS (ISO 45001:2018)

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**KERALA STATE POLLUTION CONTROL BOARD
CENTRAL LABORATORY**

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TC 8525

99

TEST REPORT

Analysis Report No.	PCB/CL/220/2024-25	Date	24s.05.2024	Format No.	PCB/CL/CH/F-7
Ref. No.	PCB/ESC/CM-33/08 dated 21.05.2024	Date of Collection	20.05.2024		
Received From	Environmental Surveillance Centre, Eloor	Date of Receipt	22.05.2024		
No. of Sample	01	Period of Analysis	22.05.2024 – 22.05.2024		
Source	River Periyar	Scientist-in-charge	Dr. Josemin		
Sample Condition	Fit for analysis	Sample Type	Water Samples		
Sample collected by	The Environmental Engineer, Environmental Surveillance Cente, Eloor	Sample volume & container type	Plastic Can		
Sample preservation	As per APHA/IS:3025 (Part-1)	Type of Test	Chemical		

SAMPLE ID: EF-3

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Nitrite	mg/L	BDL	APHA, 4500-NO ₂ -B, 23 rd Ed., 2017	0.02 mg/L
2	Nitrates	mg/L	1.3	APHA, 4500-NO ₃ , 23 rd Ed., 2017	0.01 mg/L
3	Phosphate	mg/L	0.05	APHA, 4500-P/D E, 23 rd Ed., 2017	0.01 mg/L
4	Sulphate	mg/L	9	APHA,4500-SO ₄ 2-e,23 rd Ed., 2017	1 mg/L
5	Free Chlorine	mg/L	BDL	APHA,4500-Cl O ₂ B,4-82 to4-83,	1 mg/L
6	Sulphide	mg/L	BDL	APHA, 4500 S ₂ , 23 rd Ed., 2017	1 mg/L
7	Free Ammonia	mg/L	0.003	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
8	Total Kjeldahl Nitrogen	mg/L	3.36	APHA, 4500-N org B, 23 rd Ed. 2017,	0.2 mg/L
9	Ammoniacal Nitrogen	mg/L	0.56	APHA-4500 NH ₃ -C, 23 rd Ed., 2017	0.02 mg/L
10	Phenolic Compounds	mg/L	0.04	APHA, 5530-C,23 rd Ed., 2017	0.001 mg/L
11	Sodium	mg/L	86.4	APHA, 3111-B, 23 rd Ed., 2017	1 mg/L
12	Potassium	mg/L	5.5	APHA,3500-K B, (ISE method), 23 rd Ed., 2017	0.5 mg/L
13	SAR (Sodium Absorption Ratio)	mg/L	4.6	APHA, 2310-B, 23 rd Edn.2017	0.2 mg/L

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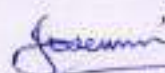
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14	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L
15	Cyanide	mg/L	BDL	IS: 3025(Pt.27)	0.02mg/L
16	Fluorides	mg/L	0.17	APHA,4500-FC, 23 rd Ed., 2017	0.1 mg/L

--End of report--



Checked By
Assistant Scientist
Kerala State Pollution Control Board
Central Laboratory
Gandhinagar, Cochin-20



Authorised By

Dr. JOSEMIN
Environmental Scientist

Note: The test results relate only to the sample submitted for analysis and it shouldn't be reproduced except in full without the written permission of the authorised signatory of the lab.



KERALA STATE POLLUTION CONTROL BOARD CENTRAL LABORATORY

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101

TC 8525

TEST REPORT

Analysis Report No.	PCB/CL/226/2024-25	Date	24.05.2024	Format No.	PCB/CL/CH/F-7
Ref. No.	PCB/ESC/CM-33/08 dated 21.05.2024	Date of Collection	20.05.2024		
Received From	Environmental Surveillance Centre, Eloor	Date of Receipt	23.05.2024		
No. of Sample	01	Period of Analysis	23.05.2024 – 24.05.2024		
Source	River Periyar	Scientist-in-charge	Dr. Josemin		
Sample Condition	Fit for analysis	Sample Type	Water Samples		
Sample collected by	The Environmental Engineer, Environmental Surveillance Cente, Eloor	Sample volume & container type	Plastic Can		
Sample preservation	As per APHA/IS:3025 (Part-1)	Type of Test	Chemical		

SAMPLE ID: EFER

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Nitrite	mg/L	BDL	APHA, 4500-NO ₂ -B, 23 rd Ed., 2017	0.02 mg/L
2	Nitrates	mg/L	16	APHA, 4500-NO ₃ , 23 rd Ed., 2017	0.01 mg/L
3	Phosphate	mg/L	1.08	APHA, 4500-P/D E, 23 rd Ed., 2017	0.01 mg/L
4	Sulphate	mg/L	340	APHA, 4500-SO ₄ -e, 23 rd Ed., 2017	1 mg/L
5	Sulphide	mg/L	BDL	APHA, 4500 S ₂ , 23 rd Ed., 2017	1 mg/L
6	Free Ammonia	mg/L	BDL	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
7	Total Kjeldahl Nitrogen	mg/L	1.12	APHA, 4500-N org B, 23 rd Ed. 2017,	0.2 mg/L
8	Ammoniacal Nitrogen	mg/L	BDL	APHA-4500 NH ₃ -C, 23 rd Ed., 2017	0.02 mg/L
9	Residual Chlorine	mg/L	7.09	APHA, 4500-ClO ₂ B, 23 rd Ed., 2017	1 mg/L
10	Phenolic Compounds	mg/L	0.698	APHA, 5530-C, 23 rd Ed., 2017	0.001 mg/L
11	Fluoride	mg/L	0.57	APHA, 4500-FC, 23 rd Ed., 2017	0.1 mg/L
12	Sodium	mg/L	148.2	APHA, 3111-B, 23 rd Ed., 2017	1 to 100mg/L
13	Potassium	mg/L	8.7	APHA, 3500-K B, (ISE method), 23 rd Ed., 2017	0.5 to 50 mg/L
14	SAR (Sodium Absorption Ratio)	mg/L	6	APHA, 2310-B, 23 rd Edn. 2017	0.2 mg/L

GANDHI NAGAR, KOCHI - 682 020 ഗാന്ധിനഗർ, കൊച്ചി - 682 020

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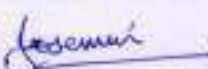
E Mail: kspcbelekm@gmail.com, kspcbtnwmp@gmail.com Web: www.keralapcb.nic.in

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15	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L
16	Cyanide	mg/L	BDL	IS: 3025(Pt.27)	0.02mg/L

--End of Report--


 Checked By
 Assistant Scientist
 Kerala State Pollution Control Board
 Central Laboratory
 Gandhinagar, Cochin-20


 Authorised By
 Dr. JOSEMIN
 Environmental Scientist

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103

TC 8525

TEST REPORT

Analysis Report No.	PCB/CL/221/2024-25	Date	24.05.2024	Format No.	PCB/CL/CH/F-7
Ref. No.	PCB/ESC/CM-33/08 dated 21.05.2024	Date of Collection	20.05.2024		
Received From	Environmental Surveillance Centre, Eloor	Date of Receipt	22.05.2024		
No. of Sample	01	Period of Analysis	22.05.2024 – 22.05.2024		
Source	River Periyar	Scientist-in-charge	Dr. Josemin		
Sample Condition	Fit for analysis	Sample Type	Water Samples		
Sample collected by	The Environmental Engineer, Environmental Surveillance Centre, Eloor	Sample volume & container type	Plastic Can		
Sample preservation	As per APHA/IS:3025 (Part-1)	Type of Test	Chemical		

SAMPLE ID: EF-4

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Nitrite	mg/L	BDL	APHA, 4500-NO ₂ -B, 23 rd Ed., 2017	0.02 mg/L
2	Nitrates	mg/L	1.8	APHA, 4500-NO ₃ , 23 rd Ed., 2017	0.01 mg/L
3	Phosphate	mg/L	0.17	APHA, 4500-P/D E, 23 rd Ed., 2017	0.01 mg/L
4	Sulphate	mg/L	101	APHA, 4500-SO ₄ -e, 23 rd Ed., 2017	1 mg/L
5	Free Chlorine	mg/L	BDL	APHA, 4500-Cl O ₂ B, 4-82 to 4-83,	1 mg/L
6	Sulphide	mg/L	BDL	APHA, 4500 S ₂ , 23 rd Ed., 2017	1 mg/L
7	Free Ammonia	mg/L	BDL	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
8	Total Kjeldahl Nitrogen	mg/L	2.24	APHA, 4500-N org B, 23 rd Ed. 2017,	0.2 mg/L
9	Ammoniacal Nitrogen	mg/L	BDL	APHA-4500 NH ₃ -C, 23 rd Ed., 2017	0.02 mg/L
10	Phenolic Compounds	mg/L	0.04	APHA, 5530-C, 23 rd Ed., 2017	0.001 mg/L
11	Sodium	mg/L	85.1	APHA, 3111-B, 23 rd Ed., 2017	1 mg/L
12	Potassium	mg/L	5.45	APHA, 3500-K B, (ISE method), 23 rd Ed., 2017	0.5 mg/L
13	SAR (Sodium Absorption Ratio)	mg/L	4.5	APHA, 2310-B, 23 rd Edn. 2017	0.2 mg/L

GANDHI NAGAR, KOCHI – 682 020 ഞാമ്പിനഗർ, കൊച്ചി – 682 020

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Certified for OHSMS (ISO 45001:2018)

14	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L
15	Cyanide	mg/L	BDL	IS: 3025(Pt.27)	0.02 mg/L
16	Fluorides	mg/L	0.12	APHA, 4500-FC, 23 rd Ed., 2017	0.1 mg/L

--End Of Report--


 Checked By
 Assistant Scientist
 Kerala State Pollution Control Board
 Central Laboratory
 Gandhinagar, Cochin-20


 Authorised By
 Dr. JOSEMIN
 Environmental Scientist

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**KERALA STATE POLLUTION CONTROL BOARD
CENTRAL LABORATORY**

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105

TC 8525

TEST REPORT

Analysis Report No.	PCB/CL/227/2024-25	Date	24.05.2024	Format No. PCB/CL/CH/F-7
Ref. No.	PCB/ESC/CM-33/08 dated 21.05.2024	Date of Collection	20.05.2024	
Received From	Environmental Surveillance Centre, Eloor	Date of Receipt	23.05.2024	
No. of Sample	01	Period of Analysis	23.05.2024 – 24.05.2024	
Source	River Periyar	Scientist-in-charge	Dr. Josemin	
Sample Condition	Fit for analysis	Sample Type	Water Samples	
Sample collected by	The Environmental Engineer, Environmental Surveillance Centre, Eloor	Sample volume & container type	Plastic Can	
Sample preservation	As per APHA/IS:3025 (Part-1)	Type of Test	Chemical	

SAMPLE ID: VET

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L
2	Nitrate Nitrogen	mg/L	2.26	APHA, 4500-NO ₃ , 23rd Ed, 2017	0.02 mg/L
3	Fluoride	mg/L	0.54	APHA, 4500-FC, 23rd Ed., 2017	0.1 mg/L
4	Nitrites	mg/L	0.3	APHA, 4500-NO ₂ -B, 23rd Ed., 2017	0.02 mg/L
5	Nitrates	mg/L	10	APHA, 4500-NO ₃ , 23rd Ed., 2017	0.01 mg/L
6	Phosphate	mg/L	0.68	APHA, 4500-P/D E, 23rd Ed., 2017	0.01 mg/L
7	Sulphate	mg/L	590	APHA, 4500-SO ₄ -e, 23rd Ed., 2017	1 mg/L
8	Free Chlorine	mg/L	3.55	APHA, 4500-Cl O ₂ B, 4-82 to 4-83,	1 mg/L
9	Sulphide	mg/L	BDL	APHA, 4500 S ₂ , 23rd Ed., 2017	1 mg/L
10	Free Ammonia	mg/L	BDL	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
11	Total Kjeldahl Nitrogen	mg/L	2.24	APHA, 4500-N org B, 23rd Ed. 2017,	0.2 mg/L
12	Ammoniacal Nitrogen	mg/L	BDL	APHA-4500 NH ₃ -C, 23rd Ed., 2017	0.02 mg/L
13	Phenolic Compounds	mg/L	0.62	APHA, 5530-C, 23rd Ed., 2017	0.001 mg/L

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Certified for OHSMS (ISO 45001:2018)

14	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L
15	Cyanide	mg/L	BDL	IS: 3025(Pt.27)	0.02 mg/L
16	Sodium	mg/L	112	APHA, 3111-B, 23 rd Ed., 2017	1 mg/L
17	Potassium	mg/L	2.64	APHA, 3500-K B, (ISE method), 23 rd Ed., 2017	0.5 mg/L
18	SAR (Sodium Absorption Ratio)	mg/L	1.1	APHA, 2310-B, 23rd Edn.2017	0.2 mg/L

--End of Report--

Checked By

Assistant Scientist
Kerala State Pollution Control Board
Central Laboratory
Gandhinagar, Cochin-20

Authorised By

Dr. JOSEMIN
Environmental Scientist

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TEST REPORT

Page 1

Report No.: CTH/LR/24/05/610

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000610F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/610

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: EF 4

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.062 ✓
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010] ✓
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001] ✓
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005] ✓
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001] ✓
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	0.012 ✓
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	0.032 ✓
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.056 ✓
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010] ✓
10	Boron as B	mg/l	IS : 3025 [Pt.02]	0.040 ✓
11	Vanadium as V	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010] ✓

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/612

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000612F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi - 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/612

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 - 24.05.2024

Description of the sample by the customer

: EF 3

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.015 ✓
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010] ✓
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001] ✓
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005] ✓
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001] ✓
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010] ✓
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010] ✓
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.042 ✓
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010] ✓
10	Boron as B	mg/l	IS : 3025 [Pt.02]	0.020 ✓
11	Vanadium as V	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010] ✓

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/611

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000611F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/611

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: EFER

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010] ✓
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010] ✓
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001] ✓
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005] ✓
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001] ✓
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010] ✓
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010] ✓
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.041 ✓
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010] ✓
10	Boron as B	mg/l	IS : 3025 [Pt.02]	0.020 ✓
11	Vanadium as V	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010] ✓

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/619

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000619F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/619

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: VET

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.035 ✓
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010] ✓
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001] ✓
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005] ✓
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	0.020 ✓
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	0.072 ✓
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010] ✓
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.043 ✓
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	0.064 ✓
10	Boron as B	mg/l	IS : 3025 [Pt.02]	0.509 ✓
11	Vanadium as V	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010] ✓

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.



KERALA STATE POLLUTION CONTROL BOARD **ENVIRONMENTAL SURVEILLANCE CENTRE**

FACT-Or.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683561,

Phone: 0484 2545678, E-mail: esceloor@yahoo.co.in

കേരളസംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

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എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2778/2024 Date: 24.05.2024	
Source	RIVER PERIYAR-ELOOR FERRY	Sample received from	EE-ELOOR
Sample Identification no.	EFER-1		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	7.1	APHA-H+B 24 th edition 2023
2	BOD	mg/L	1.7	IS 3024(PART 44)1993
3	COD	mg/L	28	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	1254	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	38	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	55.46	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	14	APHA 2320B 24th edition 2023
8	TDS	mg/L	725.82	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	5.4	APHA 4500B, C 24th edition 2023
Details of samples: ELOOR FERRY-MORNING SAMPLE-21.05.2024				
Remarks:				

BINEESHA M.P.
 Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

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കേരളസംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

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എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2777/2024 Date: 24.05.2024	
Source	RIVER PERIYAR- PUTHALAM KADAVU	Sample received from	EE-ELOOR
Sample identification no.	PKV		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	7.04	APHA-H+B 24 th edition 2023
2	BOD	mg/L	1.8	IS 3024(PART 44)1993
3	COD	mg/L	8	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	71.49	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	19	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	13.86	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	24	APHA 2320B 24th edition 2023
8	TDS	mg/L	41.38	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	3.9	APHA 4500B, C 24th edition 2023
Details of samples: PUTHALAM KADAVU-MORNING SAMPLE-21.05.2024				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

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ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2776/2024 Date: 24.05.2024	
Source	RIVER PERIYAR- PATHALAM BUND DOWNSTREAM	Sample received from	EE-ELOOR
Sample identification no.	PBD		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.91	APHA-H+B 24 th edition 2023
2	BOD	mg/L	2.5	IS 3024(PART 44)1993
3	COD	mg/L	18	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	74.57	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	16	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	163.12	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	16	APHA 2320B 24th edition 2023
8	TDS	mg/L	43.16	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	4.6	APHA 4500B, C 24th edition 2023

Details of samples: BASED ON FISH KILL –PATHALAM BUND DOWNSTREAM (MORNING)-21.05.2024

Remarks:

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD **ENVIRONMENTAL SURVEILLANCE CENTRE**

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ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2774/2024 Date: 24.05.2024	
Source	RIVER PERIYAR-PATHALAM BRIDGE	Sample received from	EE-ELOOR
Sample identification no.	PBR		
Date of sample Collection	20.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	7.1	APHA-H+B 24 th edition 2023
2	BOD	mg/L	2.5	IS 3024(PART 44)1993
3	COD	mg/L	6	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	70.29	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	18	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	12.23	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	20	APHA 2320B 24th edition 2023
8	TDS	mg/L	40.68	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	5.3	APHA 4500B, C 24th edition 2023
Details of samples: PATHALAM BRIDGE (MORNING)-21.05.2024				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
 Assistant Scientist



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Phone: 0484 2545678, E-mail: esceloor@yahoo.co.in

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ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2773/2024 Date: 24.05.2024	
Source	RIVER PERIYAR- VETTUKADAVU	Sample received from	EE-ELOOR
Sample identification no.	VET		
Date of sample Collection	20.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	7.21	APHA-H+B 24 th edition 2023
2	BOD	mg/L	1.9	IS 3024(PART 44)1993
3	COD	mg/L	24	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	296.8	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	38	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	163.12	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	16	APHA 2320B 24th edition 2023
8	TDS	mg/L	171.79	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	4.0	APHA 4500B, C 24th edition 2023
Details of samples: VETTUKADAVU MORNING -21.05.2024				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist



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എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No:2775/2024 Date: 24.05.2024	
Source	RIVER PERIYAR- PATHALAM BUND UPSTREAM	Sample received from	EE-ELOOR
Sample identification no.	PBU		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	7.18	APHA-H+B 24 th edition 2023
2	BOD	mg/L	2.4	IS 3024(PART 44)1993
3	COD	mg/L	8	APHA 5220B 24 th Ed., 2023
4	Electrical conductivity	µS/cm	61.25	APHA 2510-B 24th edition 2023
5	Hardness	mg/L	20	APHA 2340 C 24th edition 2023
6	Chloride	mg/L	9.79	APHA 4500-Cl-B 24th edition 2023
7	Alkalinity	mg/L	20	APHA 2320B 24th edition 2023
8	TDS	mg/L	35.45	APHA 2540 C 24th edition 2023
9	Dissolved oxygen	mg/L	4.4	APHA 4500B, C 24th edition 2023
Details of samples: BASED ON FISH KILL –PATHALAM BUND UPSTREAM(MORNING)				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501.

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എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No: MAY21/2024-1 Date: 24.05.2024	
Source	RIVER PERIYAR-BOATING-AMRITA PUMPING STATION	Sample received from	EE-ELOOR
Sample identification no.	AMR		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.5	APHA-H+B 24 th edition 2023
2	COD	mg/L	82.08	APHA 5220B 24 th Ed., 2023
3	SS	mg/L	32.8	APHA 2540 D 24th edition 2023
4	Chloride	mg/L	93	APHA 4500-Cl-B 24th edition 2023
5	Calcium	mg/L	10	APHA 2340 C 24th edition 2023
6	Magnesium	mg/L	5.35	APHA 2340 C 24th edition 2023 FOLLOWED BY CALCULATION
7	Hardness	mg/L	47	APHA 2340 C 24th edition 2023
8	TDS	mg/L	20	APHA 2540 C 24th edition 2023
9	Colour	Hazen	312.55	APHA 2120B, C 24th edition 2023
10	Electrical conductivity	µS/cm	540	APHA 2510-B 24th edition 2023
11	Oil & Grease	mg/L	2.88	APHA 5520B 24 th Edition 2023
Details of samples: AMR- AMRITA PUMPING STATION				
Remarks:				

BINEESHA M.P.
 Assistant Scientist



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എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No: MAY21/2024-2 Date: 24.05.2024	
Source	RIVER PERIYAR-BOATING-FACT-PD	Sample received from	EE-ELOOR
Sample identification no.	FAP		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.7	APHA-H+B 24 th edition 2023
2	COD	mg/L	112.32	APHA 5220B 24 th Ed., 2023
3	SS	mg/L	31.6	APHA 2540 D 24th edition 2023
4	Chloride	mg/L	407.8	APHA 4500-Cl-B 24th edition 2023
5	Calcium	mg/L	12	APHA 2340 C 24th edition 2023
6	Magnesium	mg/L	21.870	APHA 2340 C 24th edition 2023 FOLLOWED BY CALCULATION
7	Hardness	mg/L	120	APHA 2340 C 24th edition 2023
8	TDS	mg/L	20	APHA 2540 C 24th edition 2023
9	Colour	Hazen	495.279	APHA 2120B, C 24th edition 2023
10	Electrical conductivity	µS/cm	855.7	APHA 2510-B 24th edition 2023
11	Oil & Grease	mg/L	0.64	APHA 5520B 24 th Edition 2023
Details of samples: FAP -FACT PD				
Remarks:				

BINEESHA M.P.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

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എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No: MAY21/2024-3 Date: 24.05.2024	
Source	RIVER PERIYAR-BOATING-KUZHICKANDOM THODU	Sample received from	EE-ELOOR
Sample identification no.	KUT		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.6	APHA-H+B 24 th edition 2023
2	COD	mg/L	129.60	APHA 5220B 24 th Ed., 2023
3	SS	mg/L	36.4	APHA 2540 D 24th edition 2023
4	Chloride	mg/L	24.5	APHA 4500-Cl-B 24th edition 2023
5	Calcium	mg/L	20	APHA 2340 C 24th edition 2023
6	Magnesium	mg/L	21.870	APHA 2340 C 24th edition 2023 FOLLOWED BY CALCULATION
7	Hardness	mg/L	140	APHA 2340 C 24th edition 2023
8	TDS	mg/L	20	APHA 2540 C 24th edition 2023
9	Colour	Hazen	676.62	APHA 2120B, C 24th edition 2023
10	Electrical conductivity	µS/cm	1169	APHA 2510-B 24th edition 2023
11	Oil & Grease	mg/L	0.08	APHA 5520B 24 th Edition 2023
Details of samples: KUT-KUZHICKANDOM THODU				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD

ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Or.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501.

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കേരളസംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ടോർയ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി. ഒ.,

എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No: MAY21/2024-4 Date: 24.05.2024	
Source	RIVER PERIYAR-BOATING- ELOOR FERRY	Sample received from	EE-ELOOR
Sample identification no.	ELF		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.8	APHA-H+B 24 th edition 2023
2	COD	mg/L	99.36	APHA 5220B 24 th Ed., 2023
3	SS	mg/L	50.8	APHA 2540 D 24th edition 2023
4	Chloride	mg/L	342.5	APHA 4500-Cl-B 24th edition 2023
5	Calcium	mg/L	20	APHA 2340 C 24th edition 2023
6	Magnesium	mg/L	26.730	APHA 2340 C 24th edition 2023 FOLLOWED BY CALCULATION
7	Hardness	mg/L	160	APHA 2340 C 24th edition 2023
8	TDS	mg/L	20	APHA 2540 C 24th edition 2023
9	Colour	Hazen	985.12	APHA 2120B, C 24th edition 2023
10	Electrical conductivity	µS/cm	1702	APHA 2510-B 24th edition 2023
11	Oil & Grease	mg/L	11.8	APHA 5520B 24 th Edition 2023
Details of samples: ELF- ELOOR FERRY				
Remarks:				

BINEESHA M.P.
 Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Of.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501.

Phone: 0484 2545678, E-mail: esceloor@yahoo.co.in

കേരളസംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ടുകാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി. ഓ.,

എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No: MAY21/2024-5 Date: 24.05.2024	
Source	RIVER PERIYAR-BOATING-MUTTINAKAM	Sample received from	EE-ELOOR
Sample identification no.	MUT		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.9	APHA-H+B 24 th edition 2023
2	COD	mg/L	108	APHA 5220B 24 th Ed., 2023
3	SS	mg/L	16.4	APHA 2540 D 24th edition 2023
4	Chloride	mg/L	81.6	APHA 4500-Cl-B 24th edition 2023
5	Calcium	mg/L	12	APHA 2340 C 24th edition 2023
6	Magnesium	mg/L	9.720	APHA 2340 C 24th edition 2023 FOLLOWED BY CALCULATION
7	Hardness	mg/L	70	APHA 2340 C 24th edition 2023
8	TDS	mg/L	30	APHA 2540 C 24th edition 2023
9	Colour	Hazen	252.88	APHA 2120B, C 24th edition 2023
10	Electrical conductivity	µS/cm	436.9	APHA 2510-B 24th edition 2023
11	Oil & Grease	mg/L	3.16	APHA 5520B 24 th Edition 2023
Details of samples: MUT- MUTTINAKAM				
Remarks:				

BINEESHA M.P.
 Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Gr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501.

Phone : 0484 2545678 , E-mail: esceloor@yahoo.co.in

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എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ടറിമന്ദിരം നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി. ഒ.,

എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No: MAY21/2024-6 Date: 24.05.2024	
Source	RIVER PERIYAR-BOATING-VETTUKADAVU	Sample received from	EE-ELOOR
Sample identification no.	VET		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.9	APHA-H+B 24 th edition 2023
2	COD	mg/L	95.04	APHA 5220B 24 th Ed., 2023
3	SS	mg/L	2.8	APHA 2540 D 24th edition 2023
4	Chloride	mg/L	32.6	APHA 4500-Cl-B 24th edition 2023
5	Calcium	mg/L	8	APHA 2340 C 24th edition 2023
6	Magnesium	mg/L	9.72	APHA 2340 C 24th edition 2023 FOLLOWED BY CALCULATION
7	Hardness	mg/L	60	APHA 2340 C 24th edition 2023
8	TDS	mg/L	30	APHA 2540 C 24th edition 2023
9	Colour	Hazen	73.86	APHA 2120B, C 24th edition 2023
10	Electrical conductivity	µS/cm	127.6	APHA 2510-B 24th edition 2023
11	Oil & Grease	mg/L	0.72	APHA 5520B 24 th Edition 2023
Details of samples: VET-VETTUKADAVU				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Qt.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501.

Phone : 0484 2545678 , E-mail: esceloor@yahoo.co.in

കേരളസംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട്ക്വാർട്ടേഴ്സ് നമ്പർ 5-5, ഉദ്യോഗമണ്ഡലം പി.ഒ.,

എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No: MAY21/2024-7 Date: 24.05.2024	
Source	RIVER PERIYAR-BOATING-INDIAN RARE EARTHS Ltd.	Sample received from	EE-ELOOR
Sample identification no.	IRE		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.5	APHA-H+B 24 th edition 2023
2	COD	mg/L	108	APHA 5220B 24 th Ed., 2023
3	SS	mg/L	3.2	APHA 2540 D 24th edition 2023
4	Chloride	mg/L	24.5	APHA 4500-Cl-B 24th edition 2023
5	Calcium	mg/L	12	APHA 2340 C 24th edition 2023
6	Magnesium	mg/L	2.43	APHA 2340 C 24th edition 2023 FOLLOWED BY CALCULATION
7	Hardness	mg/L	40	APHA 2340 C 24th edition 2023
8	TDS	mg/L	30	APHA 2540 C 24th edition 2023
9	Colour	Hazen	86.59	APHA 2120B, C 24th edition 2023
10	Electrical conductivity	µS/cm	149.6	APHA 2510-B 24th edition 2023
11	Oil & Grease	mg/L	1.08	APHA 5520B 24 th Edition 2023
Details of samples: IRE - INDIAN RARE EARTHS Ltd.				
Remarks:				

BINEESHA M.P.
Assistant Scientist



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എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ടുകാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി. ഓ.,

എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No: MAY21/2024-08 Date: 24.05.2024	
Source	RIVER PERIYAR-BOATING-FACT-UD	Sample received from	EE-ELOOR
Sample identification no.	FAU		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.4	APHA-H+B 24 th edition 2023
2	COD	mg/L	86.40	APHA 5220B 24 th Ed., 2023
3	SS	mg/L	17.2	APHA 2540 D 24th edition 2023
4	Chloride	mg/L	40.8	APHA 4500-Cl-B 24th edition 2023
5	Calcium	mg/L	8	APHA 2340 C 24th edition 2023
6	Magnesium	mg/L	7.29	APHA 2340 C 24th edition 2023 FOLLOWED BY CALCULATION
7	Hardness	mg/L	50	APHA 2340 C 24th edition 2023
8	TDS	mg/L	30	APHA 2540 C 24th edition 2023
9	Colour	Hazen	76.69	APHA 2120B, C 24th edition 2023
10	Electrical conductivity	µS/cm	132.5	APHA 2510-B 24th edition 2023
11	Oil & Grease	mg/L	1.92	APHA 5520B 24 th Edition 2023
Details of samples: FAU-FACT UD				
Remarks:				

BINEESHA M.P.
 Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501,

Phone: 0484 2545678, E-mail: esceloor@yahoo.co.in

കേരളസംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട്ക്വാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡൽ പി. ഒ.,

എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No: MAY21/2024-09 Date: 24.05.2024	
Source	RIVER PERIYAR-BOATING- BINANI ZIC Ltd	Sample received from	EE-ELOOR
Sample identification no.	BIN		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.9	APHA-H+B 24 th edition 2023
2	COD	mg/L	108	APHA 5220B 24 th Ed., 2023
3	SS	mg/L	BDL	APHA 2540 D 24th edition 2023
4	Chloride	mg/L	24.5	APHA 4500-Cl-B 24th edition 2023
5	Calcium	mg/L	4	APHA 2340 C 24th edition 2023
6	Magnesium	mg/L	2.43	APHA 2340 C 24th edition 2023 FOLLOWED BY CALCULATION
7	Hardness	mg/L	20	APHA 2340 C 24th edition 2023
8	TDS	mg/L	30	APHA 2540 C 24th edition 2023
9	Colour	Hazen	65.98	APHA 2120B, C 24th edition 2023
10	Electrical conductivity	µS/cm	114	APHA 2510-B 24th edition 2023
11	Oil & Grease	mg/L	13.96	APHA 5520B 24 th Edition 2023
Details of samples: BIN-BINANI ZINC Ltd				
Remarks:				

BINEESHA M.P.
 Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Or.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501,

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എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ടോർമേന്റൽ നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി. ഒ.,

എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No: MAY21/2024-10 Date: 24.05.2024	
Source	RIVER PERIYAR-BOATING-SUD CHEMIE	Sample received from	EE-ELOOR
Sample identification no.	SUC		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.9	APHA-H+B 24 th edition 2023
2	COD	mg/L	82.08	APHA 5220B 24 th Ed., 2023
3	SS	mg/L	BDL	APHA 2540 D 24 th edition 2023
4	Chloride	mg/L	46.3	APHA 4500-Cl-B 24 th edition 2023
5	Calcium	mg/L	12	APHA 2340 C 24 th edition 2023
6	Magnesium	mg/L	2.43	APHA 2340 C 24 th edition 2023 FOLLOWED BY CALCULATION
7	Hardness	mg/L	40	APHA 2340 C 24 th edition 2023
8	TDS	mg/L	30	APHA 2540 C 24 th edition 2023
9	Colour	Hazen	64.88	APHA 2120B, C 24 th edition 2023
10	Electrical conductivity	µS/cm	112.1	APHA 2510-B 24 th edition 2023
11	Oil & Grease	mg/L	11.36	APHA 5520B 24 th Edition 2023
Details of samples: SUC-SUD CHEMIE				
Remarks:				

BINEESHA M.P.
 Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Gr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501,

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എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട് ക്വാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡൽ പി. ഒ.,

എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No: MAY21/2024-11 Date: 24.05.2024	
Source	RIVER PERIYAR-BOATING-COCHIN MINERALS AND RUTILE LTD.	Sample received from	EE-ELOOR
Sample identification no.	CMRL		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.9	APHA-H+B 24 th edition 2023
2	COD	mg/L	90.72	APHA 5220B 24 th Ed., 2023
3	SS	mg/L	BDL	APHA 2540 D 24th edition 2023
4	Chloride	mg/L	48.9	APHA 4500-Cl-B 24th edition 2023
5	Calcium	mg/L	20	APHA 2340 C 24th edition 2023
6	Magnesium	mg/L	4.860	APHA 2340 C 24th edition 2023 FOLLOWED BY CALCULATION
7	Hardness	mg/L	70	APHA 2340 C 24th edition 2023
8	TDS	mg/L	30	APHA 2540 C 24th edition 2023
9	Colour	Hazen	115.93	APHA 2120B, C 24th edition 2023
10	Electrical conductivity	µS/cm	200.3	APHA 2510-B 24th edition 2023
11	Oil & Grease	mg/L	2.24	APHA 5520B 24 th Edition 2023
Details of samples: CMRL- COCHIN MINERAL AND RUTILE LTD.				
Remarks:				

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

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എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട് ക്വാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി. ഒ.,

എറണാകുളം-683 501



ANALYSIS REPORT (WATER / EFFLUENT / SOLID WASTE)		No: MAY21/2024-12 Date: 24.05.2024	
Source	RIVER PERIYAR-BOATING- TRAVANCORE COCHIN CHEMICALS	Sample received from	EE-ELOOR
Sample identification no.	TCC		
Date of sample Collection	21.05.2024		
Ref. No.	PCB/ESC/CO-33/08	Period of analysis	21.05.2024 to 24.05.2024
Date of Receipt	21.05.2024		
Scientist – in – charge of analysis		Assistant Scientist	

Sl. No.	Parameter	Unit	Value	Test method
1	pH	---	6.9	APHA-H+B 24 th edition 2023
2	COD	mg/L	86.40	APHA 5220B 24 th Ed., 2023
3	SS	mg/L	47.6	APHA 2540 D 24th edition 2023
4	Chloride	mg/L	24.5	APHA 4500-Cl-B 24th edition 2023
5	Calcium	mg/L	8	APHA 2340 C 24th edition 2023
6	Magnesium	mg/L	2.430	APHA 2340 C 24th edition 2023 FOLLOWED BY CALCULATION
7	Hardness	mg/L	30	APHA 2340 C 24th edition 2023
8	TDS	mg/L	30	APHA 2540 C 24th edition 2023
9	Colour	Hazen	53.92	APHA 2120B, C 24th edition 2023
10	Electrical conductivity	µS/cm	93.2	APHA 2510-B 24th edition 2023
11	Oil & Grease	mg/L	7.92	APHA 5520B 24 th Edition 2023

Details of samples: TCC- TRAVANCORE COCHIN CHEMICALS

Remarks:

Bineesha M.P.
BINEESHA M.P.
Assistant Scientist



KERALA STATE POLLUTION CONTROL BOARD
CENTRAL LABORATORY

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 കേന്ദ്ര പരീക്ഷണശാല

Recognised as an Environmental Laboratory Under E(P)A 1986

Ref. PCB/CL/AR/2009

Date: 29.05.2024

From

The Chief Environmental Scientist

To

The Environmental Engineer,
 Kerala State Pollution Control Board,
 Environmental Surveillance Centre,
 Eloor.

Sub: Analysis Report of water Samples – reg

Sir,

I am enclosing here with the analysis report of 12 water Samples received from that office. The bill for the analysis charge is also enclosed herewith. The details are given below:

Sl. No.	That Office Reference	Source Name	No. of Samples
1	PCB/ESC/CM-33/06 dated 27.05.2024	River Periyar Boating Samples	12

Yours faithfully,

CHIEF ENVIRONMENTAL SCIENTIST



**KERALA STATE POLLUTION CONTROL BOARD
CENTRAL LABORATORY**

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കേന്ദ്ര പരീക്ഷണശാല**

An Environmental Laboratory recognised under E(P)A 1986



TC 8525

130

TEST REPORT

Analysis Report No.	PCB/CL/0256/2024-25	Date	29.05.2024	Format No.	PCB/CL/CH/F-7
Ref. No.	PCB/ESC/CM-33/06 dated 27.05.2024	Date of Collection	21.05.2024		
Received From	Environmental Surveillance Centre, Eloor	Date of Receipt	27.05.2024		
No. of Sample	01	Period of Analysis	27.05.2024 – 29.05.2024		
Source	River Periyar	Scientist-in-charge	Dr. Josemin		
Sample Condition	Fit for analysis	Sample Type	Water Samples		
Sample collected by	The Environmental Engineer, Environmental Surveillance Cente, Eloor	Sample volume & container type	Plastic Can		
Sample preservation	As per APHA/IS:3025 (Part-1)	Type of Test	Chemical		

SAMPLE ID: AMR

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Turbidity	NTU	0.9	APHA, 2130-B, 23rd Ed., 2017	0.2
2	Sulphide	mg/L	BDL	APHA, 4500 S2, 23rd Ed., 2017	1 mg/L
3	Ammoniacal Nitrogen	mg/L	0.25	APHA-4500 NH3-F, 23 rd Ed., 2017	0.02 mg/L
4	Free Ammonia	mg/L	0.09	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
5	Sulphate	mg/L	13	APHA,4500-SO42-e,23 rd Ed., 2017	1 mg/L
6	Phosphate	mg/L	0.08	APHA, 4500-P/D E, 23 rd Ed., 2017	0.01 mg/L
7	Fluoride	mg/L	0.13	APHA,4500-FC, 23 rd Ed., 2017	0.1 mg/L
8	Phenolic Compounds	mg/L	0.02	APHA, 5530-C,23 rd Ed., 2017	0.001 mg/L
9	Nitrates	mg/L	4.5	APHA, 4500-NO3, 23 rd Ed., 2017	0.01 mg/L
10	Iron	mg/L	0.59	APHA, 3111-B, 23 rd Ed., 2017	0.05 mg/L
11	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L

GANDHI NAGAR, KOCHI - 682 020 ഗാന്ധിനഗർ, കൊച്ചി - 682 020

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Certified for OHSMS (ISO 45001:2018)

SAMPLE ID: FAP

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Turbidity	NTU	0.4	APHA, 2130-B, 23rd Ed., 2017	0.2
2	Sulphide	mg/L	BDL	APHA, 4500 S2, 23rd Ed., 2017	1 mg/L
3	Ammoniacal Nitrogen	mg/L	0.6	APHA-4500 NH3-F, 23rd Ed., 2017	0.02 mg/L
4	Free Ammonia	mg/L	0.19	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
5	Sulphate	mg/L	4	APHA, 4500-SO42-e, 23rd Ed., 2017	1 mg/L
6	Phosphate	mg/L	1.40	APHA, 4500-P/D E, 23rd Ed., 2017	0.01 mg/L
7	Fluoride	mg/L	0.13	APHA, 4500-FC, 23rd Ed., 2017	0.1 mg/L
8	Phenolic Compounds	mg/L	0.04	APHA, 5530-C, 23rd Ed., 2017	0.001 mg/L
9	Nitrates	mg/L	3.7	APHA, 4500-NO3, 23rd Ed., 2017	0.01 mg/L
10	Iron	mg/L	0.14	APHA, 3111-B, 23rd Ed., 2017	0.05 mg/L
11	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L

SAMPLE ID: KUT

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Turbidity	NTU	0.7	APHA, 2130-B, 23rd Ed., 2017	0.2
2	Sulphide	mg/L	BDL	APHA, 4500 S2, 23rd Ed., 2017	1 mg/L
3	Ammoniacal Nitrogen	mg/L	0.4	APHA-4500 NH3-F, 23rd Ed., 2017	0.02 mg/L
4	Free Ammonia	mg/L	0.21	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
5	Sulphate	mg/L	128	APHA, 4500-SO42-e, 23rd Ed., 2017	1 mg/L
6	Phosphate	mg/L	0.09	APHA, 4500-P/D E, 23rd Ed., 2017	0.01 mg/L
7	Fluoride	mg/L	0.13	APHA, 4500-FC, 23rd Ed., 2017	0.1 mg/L
8	Phenolic Compounds	mg/L	1.23	APHA, 5530-C, 23rd Ed., 2017	0.001 mg/L
9	Nitrates	mg/L	3.8	APHA, 4500-NO3, 23rd Ed., 2017	0.01 mg/L
10	Iron	mg/L	0.22	APHA, 3111-B, 23rd Ed., 2017	0.05 mg/L
11	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L

SAMPLE ID: MUT

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Turbidity	NTU	1.4	APHA, 2130-B, 23rd Ed., 2017	0.2
2	Sulphide	mg/L	BDL	APHA, 4500 S2, 23rd Ed., 2017	1 mg/L
3	Ammoniacal Nitrogen	mg/L	0.5	APHA-4500 NH3-F, 23rd Ed., 2017	0.02 mg/L
4	Free Ammonia	mg/L	0.27	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
5	Sulphate	mg/L	BDL	APHA, 4500-SO42-e, 23rd Ed., 2017	1 mg/L
6	Phosphate	mg/L	0.16	APHA, 4500-P/D E, 23rd Ed., 2017	0.01 mg/L
7	Fluoride	mg/L	0.11	APHA, 4500-FC, 23rd Ed., 2017	0.1 mg/L
8	Phenolic Compounds	mg/L	1.70	APHA, 5530-C, 23rd Ed., 2017	0.001 mg/L
9	Nitrates	mg/L	3.8	APHA, 4500-NO3, 23rd Ed., 2017	0.01 mg/L
10	Iron	mg/L	0.43	APHA, 3111-B, 23rd Ed., 2017	0.05 mg/L
11	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L

SAMPLE ID: IRE

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Turbidity	NTU	1.4	APHA, 2130-B, 23rd Ed., 2017	0.2
2	Sulphide	mg/L	BDL	APHA, 4500 S2, 23rd Ed., 2017	1 mg/L
3	Ammoniacal Nitrogen	mg/L	0.3	APHA-4500 NH3-F, 23rd Ed., 2017	0.02 mg/L
4	Free Ammonia	mg/L	0.08	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
5	Sulphate	mg/L	63	APHA, 4500-SO42-e, 23rd Ed., 2017	1 mg/L
6	Phosphate	mg/L	0.1	APHA, 4500-P/D E, 23rd Ed., 2017	0.01 mg/L
7	Fluoride	mg/L	0.12	APHA, 4500-FC, 23rd Ed., 2017	0.1 mg/L
8	Phenolic Compounds	mg/L	2.1	APHA, 5530-C, 23rd Ed., 2017	0.001 mg/L
9	Nitrates	mg/L	3.7	APHA, 4500-NO3, 23rd Ed., 2017	0.01 mg/L
10	Iron	mg/L	1.12	APHA, 3111-B, 23rd Ed., 2017	0.05 mg/L
11	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L

SAMPLE ID: FAU

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Turbidity	NTU	1.1	APHA, 2130-B, 23rd Ed., 2017	0.2
2	Sulphide	mg/L	BDL	APHA, 4500 S2, 23rd Ed., 2017	1 mg/L
3	Ammoniacal Nitrogen	mg/L	0.3	APHA-4500 NH3-F, 23rd Ed., 2017	0.02 mg/L
4	Free Ammonia	mg/L	0.08	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
5	Sulphate	mg/L	19	APHA,4500-SO42-e,23rd Ed., 2017	1 mg/L
6	Phosphate	mg/L	0.1	APHA, 4500-P/D E, 23rd Ed., 2017	0.01 mg/L
7	Fluoride	mg/L	0.09	APHA,4500-FC, 23rd Ed., 2017	0.1 mg/L
8	Phenolic Compounds	mg/L	2.34	APHA, 5530-C,23rd Ed., 2017	0.001 mg/L
9	Nitrates	mg/L	3.9	APHA, 4500-NO3, 23rd Ed., 2017	0.01 mg/L
10	Iron	mg/L	0.64	APHA, 3111-B, 23rd Ed., 2017	0.05 mg/L
11	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L

SAMPLE ID: SUC

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Turbidity	NTU	1.2	APHA, 2130-B, 23rd Ed., 2017	0.2
2	Sulphide	mg/L	BDL	APHA, 4500 S2, 23rd Ed., 2017	1 mg/L
3	Ammoniacal Nitrogen	mg/L	BDL	APHA-4500 NH3-F, 23rd Ed., 2017	0.02 mg/L
4	Free Ammonia	mg/L	BDL	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
5	Sulphate	mg/L	BDL	APHA,4500-SO42-e,23rd Ed., 2017	1 mg/L
6	Phosphate	mg/L	0.27	APHA, 4500-P/D E, 23rd Ed., 2017	0.01 mg/L
7	Fluoride	mg/L	0.07	APHA,4500-FC, 23rd Ed., 2017	0.1 mg/L
8	Phenolic Compounds	mg/L	1.27	APHA, 5530-C,23rd Ed., 2017	0.001 mg/L
9	Nitrates	mg/L	3.6	APHA, 4500-NO3, 23rd Ed., 2017	0.01 mg/L
10	Iron	mg/L	1	APHA, 3111-B, 23rd Ed., 2017	0.05 mg/L
11	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L

SAMPLE ID: BIN

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Turbidity	NTU	1.1	APHA, 2130-B, 23rd Ed., 2017	0.2
2	Sulphide	mg/L	BDL	APHA, 4500 S2, 23rd Ed., 2017	1 mg/L
3	Ammoniacal Nitrogen	mg/L	0.3	APHA-4500 NH3-F, 23rd Ed., 2017	0.02 mg/L
4	Free Ammonia	mg/L	0.13	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
5	Sulphate	mg/L	6	APHA, 4500-SO42-e, 23rd Ed., 2017	1 mg/L
6	Phosphate	mg/L	0.1	APHA, 4500-P/D E, 23rd Ed., 2017	0.01 mg/L
7	Fluoride	mg/L	0.09	APHA, 4500-FC, 23rd Ed., 2017	0.1 mg/L
8	Phenolic Compounds	mg/L	2.8	APHA, 5530-C, 23rd Ed., 2017	0.001 mg/L
9	Nitrates	mg/L	3.5	APHA, 4500-NO3, 23rd Ed., 2017	0.01 mg/L
10	Iron	mg/L	0.84	APHA, 3111-B, 23rd Ed., 2017	0.05 mg/L
11	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L

SAMPLE ID: CMRL

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Turbidity	NTU	1.0	APHA, 2130-B, 23rd Ed., 2017	0.2
2	Sulphide	mg/L	BDL	APHA, 4500 S2, 23rd Ed., 2017	1 mg/L
3	Ammoniacal Nitrogen	mg/L	0.3	APHA-4500 NH3-F, 23rd Ed., 2017	0.02 mg/L
4	Free Ammonia	mg/L	0.11	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
5	Sulphate	mg/L	7	APHA, 4500-SO42-e, 23rd Ed., 2017	1 mg/L
6	Phosphate	mg/L	0.27	APHA, 4500-P/D E, 23rd Ed., 2017	0.01 mg/L
7	Fluoride	mg/L	0.08	APHA, 4500-FC, 23rd Ed., 2017	0.1 mg/L
8	Phenolic Compounds	mg/L	1.62	APHA, 5530-C, 23rd Ed., 2017	0.001 mg/L
9	Nitrates	mg/L	2.3	APHA, 4500-NO3, 23rd Ed., 2017	0.01 mg/L
10	Iron	mg/L	0.32	APHA, 3111-B, 23rd Ed., 2017	0.05 mg/L
11	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L

SAMPLE ID: ELF

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Turbidity	NTU	0.8	APHA, 2130-B, 23rd Ed., 2017	0.2
2	Sulphide	mg/L	BDL	APHA, 4500 S2, 23rd Ed., 2017	1 mg/L
3	Ammoniacal Nitrogen	mg/L	0.3	APHA-4500 NH3-F, 23rd Ed., 2017	0.02 mg/L
4	Free Ammonia	mg/L	0.11	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
5	Sulphate	mg/L	125	APHA, 4500-SO42-e, 23rd Ed., 2017	1 mg/L
6	Phosphate	mg/L	0.12	APHA, 4500-P/D E, 23rd Ed., 2017	0.01 mg/L
7	Fluoride	mg/L	0.15	APHA, 4500-FC, 23rd Ed., 2017	0.1 mg/L
8	Phenolic Compounds	mg/L	1.85	APHA, 5530-C, 23rd Ed., 2017	0.001 mg/L
9	Nitrates	mg/L	3.5	APHA, 4500-NO3, 23rd Ed., 2017	0.01 mg/L
10	Iron	mg/L	0.66	APHA, 3111-B, 23rd Ed., 2017	0.05 mg/L
11	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L

SAMPLE ID: VET

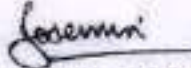
Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Turbidity	NTU	1	APHA, 2130-B, 23rd Ed., 2017	0.2
2	Sulphide	mg/L	BDL	APHA, 4500 S2, 23rd Ed., 2017	1 mg/L
3	Ammoniacal Nitrogen	mg/L	0.1	APHA-4500 NH3-F, 23rd Ed., 2017	0.02 mg/L
4	Free Ammonia	mg/L	0.05	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
5	Sulphate	mg/L	BDL	APHA, 4500-SO42-e, 23rd Ed., 2017	1 mg/L
6	Phosphate	mg/L	0.12	APHA, 4500-P/D E, 23rd Ed., 2017	0.01 mg/L
7	Fluoride	mg/L	0.09	APHA, 4500-FC, 23rd Ed., 2017	0.1 mg/L
8	Phenolic Compounds	mg/L	2.7	APHA, 5530-C, 23rd Ed., 2017	0.001 mg/L
9	Nitrates	mg/L	3.9	APHA, 4500-NO3, 23rd Ed., 2017	0.01 mg/L
10	Iron	mg/L	0.32	APHA, 3111-B, 23rd Ed., 2017	0.05 mg/L
11	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L

SAMPLE ID: TCC

Sl. No	Parameters	Unit	Value	Test Method	Detection Limit
1	Turbidity	NTU	0.8	APHA, 2130-B, 23rd Ed., 2017	0.2
2	Sulphide	mg/L	BDL	APHA, 4500 S2, 23rd Ed., 2017	1 mg/L
3	Ammoniacal Nitrogen	mg/L	0.1	APHA-4500 NH3-F, 23rd Ed., 2017	0.02 mg/L
4	Free Ammonia	mg/L	0.03	GEMS OPERATIONAL GUIDE WHO	0.003 mg/L
5	Sulphate	mg/L	BDL	APHA, 4500-SO42-e, 23rd Ed., 2017	1 mg/L
6	Phosphate	mg/L	0.46	APHA, 4500-P/D E, 23rd Ed., 2017	0.01 mg/L
7	Fluoride	mg/L	0.1	APHA, 4500-FC, 23rd Ed., 2017	0.1 mg/L
8	Phenolic Compounds	mg/L	1.13	APHA, 5530-C, 23rd Ed., 2017	0.001 mg/L
9	Nitrates	mg/L	2.4	APHA, 4500-NO3, 23rd Ed., 2017	0.01 mg/L
10	Iron	mg/L	0.76	APHA, 3111-B, 23rd Ed., 2017	0.05 mg/L
11	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 23rd Ed., 2017	0.01 mg/L

--End of report--


 Assistant Scientist
 Kerala State Pollution Control Board
 Central Laboratory
 Gandhinagar, Cochin-20


 Authorised By
 Dr. JOSEMIN
 Environmental Scientist

Note: The test results relate only to the sample submitted for analysis and it shouldn't be reproduced except in full without the written permission of the authorised signatory of the lab.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/620

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000620F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/620

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: AMR

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.024
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.040
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/607

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000607F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/607

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: FAP

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.032
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.143
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/615

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000615F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/615

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: KUT

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.014
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.040
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/613

Issue Date: May 24, 2024

Unique Lab Report Number

: **TC772024000000613F**

Name and Address of customer

: **M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020**

Sample Drawn By

: Customer

Particulars of the sample

: **Water Sample**

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/613

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: **ELF**

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.038
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.045
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/614

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000614F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/614

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: MUT

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.020
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.042
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/622

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000622F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/622

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: VET [B]-S-D

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.226
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.299
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/617

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000617F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/617

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: IRE

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.013
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.032
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/606

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000606F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/606

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: FAU

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.021
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.034
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/609

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000609F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/609

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: BIN

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.013
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.030
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/608

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000608F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/608

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: SUC

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.020
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.047
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/621

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000621F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/621

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: CMRL

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.029
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/616

Issue Date: May 24, 2024

Unique Lab Report Number

: TC772024000000616F

Name and Address of customer

: M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi – 682020

Sample Drawn By

: Customer

Particulars of the sample

: Water Sample

Location of Sampling

: NA

Sampling Method

: NA

Sample Quantity

: 25 ml

Sample code

: 24/05/616

Date of receipt of sample

: 23.05.2024

Dates of Analysis

: 23.05.2024 – 24.05.2024

Description of the sample by the customer

: TCC

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.033
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]

BDL – Below Detection Limit, MDL – Minimum Detection Limit.

End Of Report.



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TEST REPORT

Page 1

Report No.: CTH/LR/24/05/606

Unique Lab Report Number

Name and Address of customer

Issue Date: May 24, 2024

TC772024000000606F

M/s. Kerala State Pollution

Control Board [KSPCB],

Central Laboratory,

Gandhi Nagar, Kochi - 682020

Customer

Water Sample

Sample Drawn By

Particulars of the sample

Location of Sampling

Sampling Method

Sample Quantity

Sample code

Date of receipt of sample

Dates of Analysis

Description of the sample by the customer

NA

NA

25 ml

24/05/606

23.05.2024

23.05.2024 - 24.05.2024

FAU

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.021
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.034
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.

[Signature]
Verified By



[Signature]
Henry Michel
Authorised Signatory
Chemical
COCHIN TEST HOUSE

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150

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/607

Unique Lab Report Number

Name and Address of customer

Issue Date: May 24, 2024

TC7720240000000607F

M/s. Kerala State Pollution

Control Board [KSPCB],

Central Laboratory,

Gandhi Nagar, Kochi - 682020

Customer

Water Sample

NA

NA

25 ml

24/05/607

23.05.2024

23.05.2024 - 24.05.2024

FAP

Sample Drawn By

Particulars of the sample

Location of Sampling

Sampling Method

Sample Quantity

Sample code

Date of receipt of sample

Dates of Analysis

Description of the sample by the customer

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.032
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.143
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit, MDL - Minimum Detection Limit

End Of Report.



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Authorised Signatory
Chemical
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TEST REPORT

Page 1

Report No.: CTH/LR/24/05/608

Issue Date: May 24, 2024

Unique Lab Report Number

TC772024000000608F

Name and Address of customer

M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi - 682020

Sample Drawn By

Customer

Particulars of the sample

Water Sample

Location of Sampling

NA

Sampling Method

NA

Sample Quantity

25 ml

Sample code

24/05/608

Date of receipt of sample

23.05.2024

Dates of Analysis

23.05.2024 - 24.05.2024

Description of the sample by the customer

SUC

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.020
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.047
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.



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Authorized Signatory
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TEST REPORT

Page 1

Report No.: CTH/LR/24/05/609

Issue Date: May 24, 2024

Unique Lab Report Number

TC772024000000609F

Name and Address of customer

M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi - 682020

Sample Drawn By

Customer

Particulars of the sample

Water Sample

Location of Sampling

NA

Sampling Method

NA

Sample Quantity

25 ml

Sample code

24/05/609

Date of receipt of sample

23.05.2024

Dates of Analysis

23.05.2024 - 24.05.2024

Description of the sample by the customer

BIN

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.013
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.030
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit; MDL - Minimum Detection Limit.

End Of Report.



[Signature]
Verified By

[Signature]
Henry Michel
Authorised Signatory
Chemical
COCHIN TEST HOUSE

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TEST REPORT

Page 1

Report No.: CTH/LR/24/05/610

Unique Lab Report Number

Name and Address of customer

Issue Date: May 24, 2024

TC772024000000610F

M/s. Kerala State Pollution
Control Board [KSPCB],

Central Laboratory,

Gandhi Nagar, Kochi - 682020

Customer

Water Sample

NA

NA

25 ml

24/05/610

23.05.2024

23.05.2024 - 24.05.2024

EF 4

Sample Drawn By

Particulars of the sample

Location of Sampling

Sampling Method

Sample Quantity

Sample code

Date of receipt of sample

Dates of Analysis

Description of the sample by the customer

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.062
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	0.012
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	0.032
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.056
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
10	Boron as B	mg/l	IS : 3025 [Pt.02]	0.040
11	Vanadium as V	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
12	Iron as Fe	mg/l	IS : 3025 [Pt.53]	0.070

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.

Henry Michel
Verified By



Henry Michel
Authorised Signatory
Chemical
COCHIN TEST HOUSE

NOTE : This test results relate only to the sample submitted for analysis.

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TC - 7780

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TEST REPORT

Report No.: CTH/LR/24/05/611

Unique Lab Report Number

Name and Address of customer

Page 1

Issue Date: May 24, 2024

TC772024000000611F

M/s. Kerala State Pollution
Control Board [KSPCB],

Central Laboratory,

Gandhi Nagar, Kochi - 682020

Customer

Water Sample

NA

NA

25 ml

24/05/611

23.05.2024

23.05.2024 - 24.05.2024

EFER

Sample Drawn By

Particulars of the sample

Location of Sampling

Sampling Method

Sample Quantity

Sample code

Date of receipt of sample

Dates of Analysis

Description of the sample by the customer

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.041
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
10	Boron as B	mg/l	IS : 3025 [Pt.02]	0.020
11	Vanadium as V	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
12	Iron as Fe	mg/l	IS : 3025 [Pt.53]	0.126

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.

Verified By



Henry Michel
Authorised Signatory
Chemical
COCHIN TEST HOUSE

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TC - 7728

Laboratory Approved by Kerala State Pollution Control Board ('A' Grade)

TEST REPORT

Report No.: CTH/LR/24/05/612

Unique Lab Report Number

Name and Address of customer

Page 1

Issue Date: May 24, 2024

TC772024000000612F

M/s. Kerala State Pollution
Control Board [KSPCB],

Central Laboratory,

Gandhi Nagar, Kochi - 682020

Customer

Water Sample

NA

NA

25 ml

24/05/612

23.05.2024

23.05.2024 - 24.05.2024

EF 3

Sample Drawn By

Particulars of the sample

Location of Sampling

Sampling Method

Sample Quantity

Sample code

Date of receipt of sample

Dates of Analysis

Description of the sample by the customer

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.015
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.042
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
10	Boron as B	mg/l	IS : 3025 [Pt.02]	0.020
11	Vanadium as V	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
12	Iron as Fe	mg/l	IS : 3025 [Pt.53]	0.635

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.

Henry Michel
Verified By



Henry Michel
Authorised Signatory
Chemical
COCHIN TEST HOUSE

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TEST REPORT

Page 1

Report No.: CTH/LR/24/05/613

Issue Date: May 24, 2024

Unique Lab Report Number

TC772024000000613F

Name and Address of customer

M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi - 682020

Sample Drawn By

Customer

Particulars of the sample

Water Sample

Location of Sampling

NA

Sampling Method

NA

Sample Quantity

25 ml

Sample code

24/05/613

Date of receipt of sample

23.05.2024

Dates of Analysis

23.05.2024 - 24.05.2024

Description of the sample by the customer

ELF

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.038
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.045
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit. MDL - Minimum Detection Limit.

End Of Report.

[Signature]
Verified By



[Signature]
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Authorised Signatory
Chemical
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TEST REPORT

Page 1

Report No.: CTH/LR/24/05/614

Unique Lab Report Number

Name and Address of customer

Issue Date: May 24, 2024

TC772024000000614F

M/s. Kerala State Pollution

Control Board [KSPCB],

Central Laboratory,

Gandhi Nagar, Kochi - 682020

Sample Drawn By

Particulars of the sample

Location of Sampling

Sampling Method

Sample Quantity

Sample code

Date of receipt of sample

Dates of Analysis

Description of the sample by the customer

Customer

Water Sample

NA

NA

25 ml

24/05/614

23.05.2024

23.05.2024 - 24.05.2024

MUT

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.020
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.042
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.

Amis
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Henry Michel
Authorised Signatory
Chemical
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TEST REPORT

Page 1

Report No.: CTH/LR/24/05/615

Unique Lab Report Number

Name and Address of customer

Issue Date: May 24, 2024

TC772024000000615F

M/s. Kerala State Pollution

Control Board [KSPCB],

Central Laboratory,

Gandhi Nagar, Kochi - 682020

Sample Drawn By

Particulars of the sample

Location of Sampling

Sampling Method

Sample Quantity

Sample code

Date of receipt of sample

Dates of Analysis

Description of the sample by the customer

Customer

Water Sample

NA

NA

25 ml

24/05/615

23.05.2024

23.05.2024 - 24.05.2024

KUT

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.014
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.040
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.

[Signature]
Verified By



[Signature]
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Authorised Signatory
Chemical
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TEST REPORT

Page 1

Report No.: CTH/LR/24/05/616

Issue Date: May 24, 2024

Unique Lab Report Number

TC7720240000000616F

Name and Address of customer

M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi - 682020

Sample Drawn By

Customer

Particulars of the sample

Water Sample

Location of Sampling

NA

Sampling Method

NA

Sample Quantity

25 ml

Sample code

24/05/616

Date of receipt of sample

23.05.2024

Dates of Analysis

23.05.2024 - 24.05.2024

Description of the sample by the customer

TCC

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.033
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.

Henry Michel
Verified By



Henry Michel
Authorised Signatory
Chemical
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160

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/617

Issue Date: May 24, 2024

Unique Lab Report Number

TC7720240000000617F

Name and Address of customer

M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi - 682020

Sample Drawn By

Customer

Particulars of the sample

Water Sample

Location of Sampling

NA

Sampling Method

NA

Sample Quantity

25 ml

Sample code

24/05/617

Date of receipt of sample

23.05.2024

Dates of Analysis

23.05.2024 - 24.05.2024

Description of the sample by the customer

IRE

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.013
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.032
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.

Verified By



Henry Michel
Authorised Signatory
Chemical
COCHIN TEST HOUSE

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161

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/618

Issue Date: May 24, 2024

Unique Lab Report Number

TC772024000000618F

Name and Address of customer

M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi - 682020

Sample Drawn By

Customer

Particulars of the sample

Water Sample

Location of Sampling

NA

Sampling Method

NA

Sample Quantity

25 ml

Sample code

24/05/618

Date of receipt of sample

23.05.2024

Dates of Analysis

23.05.2024 - 24.05.2024

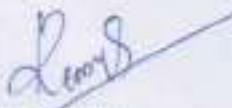
Description of the sample by the customer

IREL

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.


Verified By




Henry Michel
Authorised Signatory
Chemical
COCHIN TEST HOUSE

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TEST REPORT

Page 1

Report No.: CTH/LR/24/05/619

Issue Date: May 24, 2024

Unique Lab Report Number

TC772024000000619F

Name and Address of customer

M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi - 682020

Sample Drawn By

Customer

Particulars of the sample

Water Sample

Location of Sampling

NA

Sampling Method

NA

Sample Quantity

25 ml

Sample code

24/05/619

Date of receipt of sample

23.05.2024

Dates of Analysis

23.05.2024 - 24.05.2024

Description of the sample by the customer

VET

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.035
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL[MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	0.020
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	0.072
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.043
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	0.064
10	Boron as B	mg/l	IS : 3025 [Pt.02]	0.509
11	Vanadium as V	mg/l	IS : 3025 [Pt.02]	BDL[MDL-0.010]
12	Iron as Fe	mg/l	IS : 3025 [Pt.53]	0.324

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.


Verified By




Honey Nichel
Authorised Signatory
Chemical
COCHIN TEST HOUSE

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TEST REPORT

Page 1

Report No.: CTH/LR/24/05/620

Issue Date: May 24, 2024

Unique Lab Report Number

TC772024000000620F

Name and Address of customer

M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi - 682020

Sample Drawn By

Customer

Particulars of the sample

Water Sample

Location of Sampling

NA

Sampling Method

NA

Sample Quantity

25 ml

Sample code

24/05/620

Date of receipt of sample

23.05.2024

Dates of Analysis

23.05.2024 - 24.05.2024

Description of the sample by the customer

AMR

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.024
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.040
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit, MDL - Minimum Detection Limit,

End Of Report.

[Signature]
Verified By



[Signature]
Henry Kischel
Authorised Signatory
Chemical
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164

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/621

Issue Date: May 24, 2024

Unique Lab Report Number

TC772024000000621F

Name and Address of customer

M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi - 682020

Sample Drawn By

Customer

Particulars of the sample

Water Sample

Location of Sampling

NA

Sampling Method

NA

Sample Quantity

25 ml

Sample code

24/05/621

Date of receipt of sample

23.05.2024

Dates of Analysis

23.05.2024 - 24.05.2024

Description of the sample by the customer

CMRL

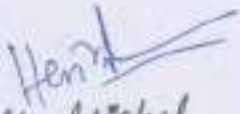
Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.029
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.


Verified By




Henry Michel
Authorised Signatory
Chemical
COCHIN TEST HOUSE

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165

TEST REPORT

Page 1

Report No.: CTH/LR/24/05/622

Issue Date: May 24, 2024

Unique Lab Report Number

TC772024000000622F

Name and Address of customer

M/s. Kerala State Pollution
Control Board [KSPCB],
Central Laboratory,
Gandhi Nagar, Kochi - 682020

Sample Drawn By

Customer

Particulars of the sample

Water Sample

Location of Sampling

NA

Sampling Method

NA

Sample Quantity

25 ml

Sample code

24/05/622

Date of receipt of sample

23.05.2024

Dates of Analysis

23.05.2024 - 24.05.2024

Description of the sample by the customer

VET [B]-S-D

Sl. No.	Parameters	Unit	Method	Result
1	Zinc as Zn	mg/l	IS : 3025 [Pt.02]	0.226
2	Lead as Pb	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
3	Mercury as Hg	mg/l	CTH/CH/SOP/416	BDL [MDL-0.001]
4	Arsenic as As	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.005]
5	Cadmium as Cd	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.001]
6	Copper as Cu	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
7	Chromium as Cr	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]
8	Manganese as Mn	mg/l	IS : 3025 [Pt.02]	0.299
9	Nickel as Ni	mg/l	IS : 3025 [Pt.02]	BDL [MDL-0.010]

BDL - Below Detection Limit, MDL - Minimum Detection Limit.

End Of Report.

Verified By



Henry Michel
Authorised Signatory
Chemical
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Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	1 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
Permanent Facility				
1	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Air Sample	Aerobic Microbial Count	CTH/MB/SOP/302, Date of Issue 15.06.2020 Issue No.6
2	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Air Sample	Yeast and Mold	CTH/MB/SOP/302, Date of Issue 15.06.2020 Issue No.6
3	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Effluents/ Waste Water	E.coli	IS : 1622
4	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Effluents/ Waste Water	Faecal Coliforms	IS : 1622
5	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Effluents/Waste Water	Coliforms	IS : 1622
6	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Effluents/Waste water	Total Plate Count at 37°C for 48 hours	IS : 1622
7	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Sewage	E.coli water	IS : 1622
8	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Sewage water	Coliforms	IS : 1622
9	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Sewage water	Faecal Coliforms	IS : 1622
10	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Sewage water	Total Plate Count at 37°C for 48 hours	IS : 1622
11	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Surface Swab	Aerobic Microbial Count	SOP - CTH/MB/SOP/302
12	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Surface swab	Coliforms	SOP - CTH/MB/SOP/302
13	BIOLOGICAL-ENVIRONMENT AND POLLUTION	Surface swab	E.coli	SOP - CTH/MB/SOP/302



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	2 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
14	BIOLOGICAL- ENVIRONMENT AND POLLUTION	Surface swab	Salmonella	SOP - CTH/MB/SOP/302
15	BIOLOGICAL- ENVIRONMENT AND POLLUTION	Surface swab	Staphylococcus aureus	SOP - CTH/MB/SOP/302
16	BIOLOGICAL- ENVIRONMENT AND POLLUTION	Surface swab	Yeast and mold	SOP - CTH/MB/SOP/302
17	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereal, Pluses & Cereal Products	Coliforms	BAM Chapter - 4, 8th Ed
18	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereal, Pluses & Cereal Products	Coliforms	IS : 5401 (Part - 1)
19	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereal, Pluses & Cereal Products	Coliforms	IS : 5401 (Part - 2)
20	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereal, Pluses & Cereal Products	E.coli	IS : 5887 (Part - 1)
21	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereal, Pluses & Cereal Products	Enterobacteriaceae	IS 17112 (part 2)
22	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereal, Pluses & Cereal Products	Salmonella spp.	BAM Chapter - 5,8th Ed
23	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereal, Pluses & Cereal Products	Salmonella spp.	IS : 5887 (Part - 3)
24	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereal, Pluses & Cereal Products	Staphylococcus aureus	BAM Chapter - 12, 8th Ed
25	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereal, Pluses & Cereal Products	Staphylococcus aureus	IS : 5887 (Part - 2)
26	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereal, Pluses & Cereal Products	Total Plate Count	BAM Chapter - 3, 8th Ed
27	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereal, Pluses & Cereal Products	Total Plate Count	IS 5402 (Part 1)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA	Page No	3 of 27
Accreditation Standard	ISO/IEC 17025:2017	Last Amended on	27/09/2023
Certificate Number	TC-7720		
Validity	12/09/2023 to 11/09/2025		

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
28	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereal, Pluses & Cereal Products	Yeast and Mold	IS : 5403
29	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Cereals, Pulses & Cereal Products	Bacillus cereus	IS 5887 (part 6)
30	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Fruit & Fruit Products	Bacillus cereus	IS 5887(part 6)
31	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Fruit & Fruit Products	Coliforms	IS : 5401 (Part - 1)
32	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Fruit & Fruit Products	E.coli	IS : 5887 (Part -1)
33	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Fruit & Fruit Products	E.coli	IS 5887 (Part -1))
34	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Fruit & Fruit Products	Salmonella spp.	IS : 5887 (Part -3)
35	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Fruit & Fruit Products	Staphylococcus aureus	IS : 5887 (Part -2)
36	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Fruit & Fruit Products	Total Plate Count	IS 5402 (Part 1)
37	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Fruit & Fruit Products	Yeast and mould	IS 5403
38	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herb, Spices& Condiments(whole ground And oleoresins)	Bacillus cereus	IS 5887 (Part 6)
39	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs, spices & Condiments (whole ,ground and oleoresins)	Staphylococcus aureus	IS : 5887 (Part -2)
40	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs, Spices & Condiments (whole,ground and Oleoreins)	Staphylococcus aureus	BAM Chapter - 12 8th Ed
41	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs, Spices & Condiments(Whole, Ground and Oleoresins)	Coliforms	BAM Chapter - 4 8th Ed



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	4 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
42	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs, Spices & Condiments(whole,Ground and Oleoresins)	Total Plate Count	IS : 5402 (Part 1)
43	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs, spices & Condiments(whole,ground and oleoresins)	Enterobacteriaceae	IS 17112(Part 2)
44	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs, spices & Condiments(whole,ground and oleoresins)	Salmonella spp.	BAM Chapter - 5 8th Ed
45	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs,Spices & Condiments(whole,ground and oleoresins)	E.coli	IS : 5887 (Part -1)
46	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs,Spices & Condiments(whole ground and oleoresins)	E.coli	IS 5887 (Part -1)
47	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs,Spices & Condiments(whole ground and oleoresins)	Salmonella spp.	IS : 5887 (Part -3)
48	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs,Spices & Condiments(whole, ground and oleoresins)	Coliforms	BAM Chapter - 48th Ed
49	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs,Spices & Condiments(whole, ground and oleoresins)	Coliforms	IS : 5401 (Part - 2)
50	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs,Spices& Condiments(Whole,Ground and Oleoresins)	Coliforms	IS : 5401 (Part - 1)
51	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Herbs,Spices&Condiments(Whole,Ground and Oleoresins)	Yeast and Mold	IS : 5403
52	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Meat & Meat Products	Bacillus cereus	IS 5887 (Part 6)
53	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Meat & Meat Products	Coliforms	IS : 5401 (Part - 1)
54	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Meat & Meat Products	Coliforms	IS : 5401 (Part -2)
55	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Meat & Meat products	E.coli	IS : 5887 (Part -1)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	5 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
56	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Meat & Meat Products	E.coli	IS : 5887 (Part -1)
57	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Meat & Meat Products	Salmonella spp.	IS : 5887 (Part - 3)
58	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Meat & Meat Products	Staphylococcus aureus	IS : 5887 (Part -2)
59	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Meat & meat Products	Total Plate Count	IS 5402 (Part 1)
60	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Meat & Meat Products	Yeast and Mold	IS : 5403
61	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Milk & Dairy Product	Coliforms	IS : 5401 (Part - 1)
62	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Milk & Dairy Products	Bacillus cereus	IS 5887 (Part 6)
63	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Milk & Dairy products	Coliforms	IS : 5401 (Part - 2)
64	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Milk & Dairy Products	E.coli	IS : 5887 (Part -1)
65	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Milk & Dairy Products	Salmonella spp.	IS : 5887 (Part -3)
66	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Milk & Dairy Products	Staphylococcus aureus	IS : 5887 (Part -2)
67	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Milk & Dairy Products	Total Plate Count	IS : 5402 (Part 1)
68	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Milk & Dairy Products	Yeast and Mold	IS : 5403
69	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Non alcoholic carbonated beverages	Coliforms	IS 5401 (Part 1)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	6 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
70	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Non alcoholic carbonated beverages	Total Plate Count	IS 5402
71	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Non alcoholic carbonated beverages	Yeast & Mould	IS 5403
72	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Non- alcoholic carbonated beverages	E.coli	IS 5887 (1 Part 01
73	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Snacks and instant Mixes	E.coli	IS : 5887 (Part -1)
74	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Snacks and instant Mixes	Bacillus cereus	IS 5887 (Part 6)
75	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Snacks and Instant Mixes	Coliforms	IS : 5401 (Part - 1)
76	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Snacks and Instant Mixes	Staphylococcus aureus	IS : 5887 (Part -2)
77	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Snacks and Instant mixes	Total Plate Count	IS : 5402
78	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Snacks and Instant Mixes	Yeast and Mold	IS : 5403
79	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Snacks and Instant Mixes.	Salmonella spp.	IS : 5887 (Part -3)
80	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Vegetable & Vegetable products	Coliforms	IS : 5401 (Part - 1)
81	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Vegetable and Vegetable Products	Coliforms	IS : 5401 (Part - 2)
82	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Vegetable and Vegetable Products	E.coli	IS : 5887 (Part - 1)
83	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Vegetable and Vegetable Products	Salmonella spp.	IS : 5887 (Part - 3)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	7 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
84	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Vegetables & vegetable Products	Bacillus cereus	IS 5887 (part 6)
85	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Vegetables & Vegetable Products	E.coli	IS : 5887 (Part -1)
86	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Vegetables & Vegetable Products	Staphylococcus aureus	IS : 5887 (Part - 2)
87	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Vegetables & Vegetable Products	Total Plate Count	IS : 5402
88	BIOLOGICAL- FOOD AND AGRICULTURAL PRODUCTS	Vegetables & Vegetable Products	Yeast and Mold	IS : 5403
89	BIOLOGICAL- WATER	Drinking Water	Coliforms	IS : 15185
90	BIOLOGICAL- WATER	Swimming Pool Water	E.coli	IS : 1622
91	BIOLOGICAL- WATER	Drinking Water	E.coli	IS : 15185
92	BIOLOGICAL- WATER	Drinking Water	Faecal Coliforms	IS : 1622
93	BIOLOGICAL- WATER	Drinking Water	Faecal Streptococci	IS : 15186
94	BIOLOGICAL- WATER	Drinking Water	Salmonella spp.	IS : 15187
95	BIOLOGICAL- WATER	Drinking Water	Total Plate Count at 37°C for 48 hours	IS : 1622
96	BIOLOGICAL- WATER	Drinking Water	Yeast and Mold	IS : 5403
97	BIOLOGICAL- WATER	Packaged Drinking Water	Coliforms	IS : 15185
98	BIOLOGICAL- WATER	Packaged Drinking Water	E.coli	IS : 15185
99	BIOLOGICAL- WATER	Packaged Drinking Water	Faecal Streptococci	IS : 15186
100	BIOLOGICAL- WATER	Packaged Drinking Water	Pseudomonas aeruginosa	IS : 13428 (Annex - D)
101	BIOLOGICAL- WATER	Packaged Drinking Water	Salmonella spp.	IS : 15187
102	BIOLOGICAL- WATER	Packaged Drinking Water	Shigella spp.	IS : 5887 (Part - 7)
103	BIOLOGICAL- WATER	Packaged Drinking Water	Staphylococcus aureus	IS : 5887 (Part - 2)
104	BIOLOGICAL- WATER	Packaged Drinking Water	Total Plate Count at 37±1°C for 24 hours	IS : 5402
105	BIOLOGICAL- WATER	packaged Drinking Water	Total Viable Count at 20 to 22°C for 72 hours	IS : 5402
106	BIOLOGICAL- WATER	Packaged Drinking Water	Vibrio cholerae	IS : 5887 (Part - 5)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	8 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
107	BIOLOGICAL- WATER	Packaged Drinking Water	Vibrio parahaemolyticus	IS : 5887 (Part - 5)
108	BIOLOGICAL- WATER	Packaged Drinking Water	Yeast and Mold	IS : 5403
109	BIOLOGICAL- WATER	Packaged Natural mineral water	Sulphite Reducing Anaerobes	Is : 13428 (Annex - C)
110	BIOLOGICAL- WATER	Surface Water, Well Water, Bore - Well Water	Coliforms	IS : 1622
111	BIOLOGICAL- WATER	Surface Water, Well Water, Bore - Well Water	E.coli	IS : 1622
112	BIOLOGICAL- WATER	Surface Water, Well Water, Bore - Well Water	Faecal Coliforms	IS : 1622
113	BIOLOGICAL- WATER	Surface Water, Well Water, Bore - Well Water	Faecal Streptococci	IS : 15186
114	BIOLOGICAL- WATER	Surface Water, Well Water, Bore - Well Water	Salmonella spp.	IS : 15187
115	BIOLOGICAL- WATER	Surface Water, Well Water, Bore - Well Water	Total Plate Count at 37°C for 48 hours	IS : 1622
116	BIOLOGICAL- WATER	Surface water,Well Water,Bore Well Water	Yeast and Mold	Is 5403
117	BIOLOGICAL- WATER	Swimming Pool Water	Coliforms	IS : 1622
118	BIOLOGICAL- WATER	Swimming Pool Water	Faecal Coliforms	IS : 1622
119	BIOLOGICAL- WATER	Swimming Pool Water	Total Plate Count at 37°C for 48 hours	IS : 1622
120	BIOLOGICAL- WATER	Water	Coliforms	IS : 15185
121	BIOLOGICAL- WATER	Water	E.coli	IS : 15185
122	BIOLOGICAL- WATER	Water for Processed Food Industry	Coliforms	IS : 15185
123	BIOLOGICAL- WATER	Water for Processed Food Industry	Coliforms	IS : 1622
124	BIOLOGICAL- WATER	Water for Processed Food Industry	E.coli	IS : 15185
125	BIOLOGICAL- WATER	Water for Processed Food Industry	E.coli	IS : 1622
126	BIOLOGICAL- WATER	Water for Processed Food Industry	Faecal Coliforms	IS : 1622
127	BIOLOGICAL- WATER	Water for Processed Food Industry	Faecal Streptococci	IS : 15186
128	BIOLOGICAL- WATER	Water for Processed Food Industry	Lypolytic Bacteria	IS : 4251 (Appendix - A)
129	BIOLOGICAL- WATER	Water for Processed Food Industry	Proteolytic Bacteria	IS : 4251 (Appendix - A)
130	BIOLOGICAL- WATER	Water for Processed Food Industry	Salmonella spp.	IS : 15187
131	BIOLOGICAL- WATER	Water for Processed Food Industry	Total Plate Count at 37°C for 48 hours	IS : 1622
132	BIOLOGICAL- WATER	Water for Processed Food Industry	Yeast and Mold	IS : 5403
133	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air Quality Monitoring	Ammonia	SOP No. CTH/CH/SOP/447,Issue no.3,Date of Issue 01/06/2020



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	9 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
134	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air quality monitoring	Arsenic	SOP No. CTH/CH/SOP/491, Issue No.2, Date of Issue-01/06/2020
135	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air Quality Monitoring	Benzene	IS 5182 (Part 11)
136	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air Quality Monitoring	Benzo (a) Pyrene	IS 5182 (Part 12):
137	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air Quality Monitoring	Carbon Monoxide(CO)	SOP No. CTH/CH/SOP/473 , Issue No.2, Date of Issue 01/01/2021
138	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air Quality Monitoring	Hydrogen sulphide	IS 5182 (Part 7)
139	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air Quality Monitoring	lead	SOP No. CTH/CH/SOP/491 , Issue No.2, Date of Issue 01/06/2020
140	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air Quality Monitoring	Nickel	SOP No. CTH/CH/SOP/491 , Issue No.2, Date of Issue .01/06/2020
141	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air Quality Monitoring	Nitrogen dioxide (NOx)	IS 5182 (Part 6)
142	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air Quality Monitoring	PM10 Particulate matter (Size<10 µm)	IS 5182 (Part 23)
143	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air Quality Monitoring	PM2.5 Particulate Matter(Size<2.5 µm)	IS 5182 part 24
144	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air Quality Monitoring	Sulphur dioxide (SO2)	IS 5182 (Part 2)
145	CHEMICAL- ATMOSPHERIC POLLUTION	Ambient Air Quality Monitoring	Suspended particulate matter(SPM)	IS 5182 (Part 4)
146	CHEMICAL- ATMOSPHERIC POLLUTION	Noise level Monitoring	Ambient Noise Levels	SOP No. CTH/CH/SOP/467, Issue No.3, Date of Issue .01/06/2020
147	CHEMICAL- ATMOSPHERIC POLLUTION	Noise Level Monitoring	Source(DG Set Only)	SOP No. CTH/CH/SOP/468, Issue No.3, Date of Issue.01/06/2020
148	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Acid mist	SOP No. CTH/CH/SOP/474 , Issue No.2, Date of Issue.01/01/2021
149	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Ammonia (NH3)	IS 11255 (Part 6)
150	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Carbon dioxide (CO2)	SOP No. CTH/CH/SOP/466, Issue No.3, Date of Issue.01/06/2020



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	10 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
151	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Carbon Monoxide as CO	SOP No. CTH/CH/SOP/458 ,Issue No.3,Date of Issue 01/06/2020
152	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Flow rate	IS 11255(Part 3)
153	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Hydrogen Fluoride	USEPA (Method 13A -1191)
154	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Hydrogen sulphide	IS 11255 (Part 4)
155	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Nickel	USEPA (Method 29-1191)
156	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Nitrogen dioxide(NOx)	IS 11255 (Part 7)
157	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Oxygen (O2)	SOP No. CTH/CH/SOP/465,Issue No.3,Date of Issue-01/06/2020
158	CHEMICAL- ATMOSPHERIC POLLUTION	stack emission monitoring	Particulate Matter	IS 11255 (Part 1)
159	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Sulphur dioxide	IS 11255 (Part 2)
160	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Temperature	IS 11255(Part 3)
161	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Vanadium	USEPA (Method 29-1191)
162	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	velocity	IS 11255(Part 3)
163	CHEMICAL- ATMOSPHERIC POLLUTION	Stack Emission Monitoring	Volume of Emission	IS 11255(Part 3)
164	CHEMICAL- ATMOSPHERIC POLLUTION	Work Environment and Indoor Air Quality	Carbon Dioxide (CO2)	CTH/CH/SOP/514,Issue No.1 ,Date of Issue 01/01/2021
165	CHEMICAL- ATMOSPHERIC POLLUTION	Work Environment and Indoor Air Quality	Carbon Monoxide (CO)	CTH/CH/SOP/473,Issue No.2,Date of Issue-01/01/2021
166	CHEMICAL- ATMOSPHERIC POLLUTION	Work Environment and Indoor Air Quality	Humidity	CTH/CH/SOP/512,Issue No.1,date of Issue.01/01/2021
167	CHEMICAL- ATMOSPHERIC POLLUTION	Work Environment and Indoor Air Quality	Indoor PM 10	CTH/CH/SOP/515 ,Issue No.1,Date of Issue.01/01/2021
168	CHEMICAL- ATMOSPHERIC POLLUTION	Work Environment and Indoor Air Quality	Indoor PM 2.5	CTH/CH/SOP/511 ,Issue No.1,Date of Issue.01/01/2021



SCOPE OF ACCREDITATION

Laboratory Name : COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA
Accreditation Standard ISO/IEC 17025:2017
Certificate Number TC-7720
Validity 12/09/2023 to 11/09/2025

Page No 11 of 27
Last Amended on 27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
169	CHEMICAL- ATMOSPHERIC POLLUTION	Work Environment and Indoor Air Quality	light illumination	CTH/CH/SOP/510 ,Issue No.1,Date of Issue.01/01/2021
170	CHEMICAL- ATMOSPHERIC POLLUTION	Work Environment and Indoor Air Quality	Nitrogen Dioxide (NOx)	CTH/CH/SOP/516 ,Issue No.1,Date of Issue.01/01/2021
171	CHEMICAL- ATMOSPHERIC POLLUTION	Work Environment and Indoor Air Quality	Sulphur Dioxide (SO ₂)	CTH/CH/SOP/517,Issue No.1,Date of Issue.01/01/2021
172	CHEMICAL- ATMOSPHERIC POLLUTION	Work Environment and Indoor Air Quality	Temperature	CTH/CH/SOP/513 ,Issue No.1,Date of Issue.01/01/2021
173	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Bakery & confectionery products	Protein content	IS 7219
174	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Bakery & confectionery products	Carbohydrate	SOP No. CTH/CH/SOP/622,Issue No.1,Date of issue-25/06/2021
175	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Bakery & confectionery products	Energy Value	SOP No. CTH/CH/SOP/631,Issue No.1,Date of issue-25/06/2021
176	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Bakery & confectionery products	fat content	IS 12711
177	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Beverages, sugar and Confectionary product	Sucrose	FSSAI Manual of Beverages, sugar and Confectionary product,page No.33 -35,Part A, Clause 6.4
178	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Coconut Oil	Polenske value	IS 548 (Part 1/Sec 2)
179	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Coconut Oil	Refractive Index	IS 548 (Part 1/Sec 2)
180	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Edible oil and fats	Moisture Content	IS 548 (Part 1/Sec 2)
181	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Edible oils and fats	Acid Value	IS 548 (Part 1/Sec 2)
182	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Edible oils and fats	Free Fatty acid	IS 548 (Part 1/Sec 2)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	12 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
183	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Edible oils and fats	Iodine value	IS 548 (Part 1/Sec 2)
184	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Edible oils and fats	Saponification value	IS 548 (Part 1/Sec 2)
185	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Herbs, spices & condiments	Ash insoluble in dil Hcl	IS 1797
186	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Herbs, spices & condiments	moisture	IS 1797
187	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Herbs, spices & condiments	Total ash	IS 1797
188	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Tea (raw, processed, instant)	Alkalinity of water soluble ash	IS 13856
189	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Tea (raw, processed, instant)	Ash insoluble in dilute HCl	IS 13854
190	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Tea (raw, processed, instant)	CRUDE FIBRE	FSSAI Manual of Beverages(Tea,Coffee,Chicory products)Clause 5.8,Page no.24-26
191	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Tea (raw, processed, instant)	Total ash	IS 13854
192	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Tea (raw, processed, instant)	Water Extract	FSSAI Manual of Beverages(Tea,Coffee,Chicory products)Clause 5.8,Page no.24
193	CHEMICAL- FOOD & AGRICULTURAL PRODUCTS	Tea (raw, processed, instant)	Water soluble Ash	IS 13855
194	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid /Aqueous Urea solution	Urea content	ISO 22241-2:Annex B
195	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Aldehyde Content	ISO 22241-2 Annex F
196	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Alkalinity	ISO 22241-2 Annex D



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	13 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
197	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Aluminium	ISO 22241-2 Annex-1
198	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Biuret	ISO 22241-2 Annex E
199	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Calcium	ISO 22241-2 Annex-1
200	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Chromium	ISO 22241-2 Annex-1
201	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Copper	ISO 22241-2 Annex-1
202	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Density @20 degree celsius	ISO 22241-1
203	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Insoluble Matter	ISO 22241-2 Annex G
204	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Iron	ISO 22241-2 Annex-1
205	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Magnesium	ISO 22241-2 Annex-1
206	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Nickel	ISO 22241-2 Annex-1
207	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Phosphate as PO4	ISO 22241-2 Annex H
208	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Potassium	ISO 22241-2 Annex-1
209	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Refractive Index	ISO 22241-2 Annex C
210	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Sodium	ISO 22241-2 Annex-1
211	CHEMICAL- INDUSTRIAL & FINE CHEMICALS	Diesel Exhaust Fluid/Aqueous Urea solution	Zinc	ISO 22241-2 Annex-1
212	CHEMICAL- POLLUTION & ENVIRONMENT	Soil	organic matter	IS 2720 (Part 22)
213	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	Arsenic	USEPA 3050 B
214	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	Cadmium	USEPA 3050 B
215	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	chromium	USEPA -3050B



SCOPE OF ACCREDITATION

Laboratory Name : COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA
Accreditation Standard ISO/IEC 17025:2017
Certificate Number TC-7720
Validity 12/09/2023 to 11/09/2025

Page No 14 of 27
Last Amended on 27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
216	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	cobalt	USEPA-3050 B
217	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	copper	USEPA 3050 B
218	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	lead	USEPA 3050B
219	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	manganese	USEPA-3050B
220	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	molybdenum	USEPA-3050B
221	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	nickel	USEPA-3050 B
222	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	permeability	IS 2720 (Part 17)
223	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	pH	IS 2720(Part 26)
224	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	porosity	CTH/CH/SOP/504 ,Issue No.1,Date of Issue 01/01/2021
225	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	Selenium	USEPA 3050 B
226	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	soil texture	CTH/CH/SOP/507,Issue no.1,Date of Issue 01/01/2021
227	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	specific conductance	IS14767
228	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	Water content	IS 2720 (Part 2)
229	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	water holding capacity	CTH/CH/SOP/505 ,Issue No.1,Issue Date 01/01/2021:
230	CHEMICAL- POLLUTION & ENVIRONMENT	Soil/Sediment/Sludge	Zinc	USEPA 3050 B
231	CHEMICAL- POLLUTION & ENVIRONMENT	SOIL/SEDIMENT/SLUDGE/MANURE	ORGANIC CARBON	CTH/CH/SOP/570, Issue no.1,Date of issue 01.01.2023
232	CHEMICAL- POLLUTION & ENVIRONMENT	soil/sediment/sludge/soil manure	Nitrogen	IS14684
233	CHEMICAL- POLLUTION & ENVIRONMENT	soil/sediment/sludge/soil manure	sodium adsorption ratio	SOP N0. CTH/CH/SOP/550,Issue N0.1,Date of Issue-01/01/2023



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	15 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
234	CHEMICAL- POLLUTION & ENVIRONMENT	soil/sediment/sludge/soil manure	Soluble Calcium	FAO method for soil of arid and semiarid regions,Chapter -6, Page no.44
235	CHEMICAL- POLLUTION & ENVIRONMENT	soil/sediment/sludge/soil manure	Soluble Magnesium	FAO method for soil of arid and semiarid regions,Chapter -6,Page no.44
236	CHEMICAL- POLLUTION & ENVIRONMENT	soil/sediment/sludge/soil manure	Soluble Potassium	FAO method for soil of Arid &semi Arid regions,Chapter-6, Page No.44
237	CHEMICAL- POLLUTION & ENVIRONMENT	soil/sediment/sludge/soil manure	Soluble Sodium	FAO method for arid and semi arid soils,Chapter -6 Page NO.44
238	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water	Mixed Liquor Suspended Solids (MLSS)	IS 3025 (Part 17)
239	CHEMICAL- POLLUTION & ENVIRONMENT	waste water	Aluminium	IS 3025 (Part 55)
240	CHEMICAL- POLLUTION & ENVIRONMENT	waste water	Barium	IS 3025 (Part 2)
241	CHEMICAL- POLLUTION & ENVIRONMENT	waste water	Boron	IS 3025 (Part 2)
242	CHEMICAL- POLLUTION & ENVIRONMENT	Waste water	Colour	IS 3025 (Part 4)
243	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water	Dissolved Oxygen (DO)	IS 3025 (Part 38)
244	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water	Mixed Liquor Volatile Suspended Solids (MLVSS)	IS 3025 (Part 18)
245	CHEMICAL- POLLUTION & ENVIRONMENT	waste water	pH at 25 degree centigrade	IS 3025 (Part 11)
246	CHEMICAL- POLLUTION & ENVIRONMENT	Waste water (Effluents/Sewage)	Temperature	IS 3025 (Part 9)
247	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Ammoniacal Nitrogen as NH ₃ -N	IS 3025 (Part 34)
248	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Antimony	IS 3025 (Part 2)
249	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Arsenic as As	IS 3025 (Part 2)
250	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	BOD @ 27°C 3 days	IS 3025 (Part 44)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA	Page No	16 of 27
Accreditation Standard	ISO/IEC 17025:2017	Last Amended on	27/09/2023
Certificate Number	TC-7720		
Validity	12/09/2023 to 11/09/2025		

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
251	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Cadmium as Cd	IS 3025 (Part 2)
252	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Calcium as Ca	IS 3025 (Part 40)
253	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Chemical Oxygen Demand	IS 3025 (Part 58)
254	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Chloride as Cl	IS 3025 (Part 32)
255	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Chromium as Cr	IS 3025 (Part 2)
256	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Copper as Cu	IS 3025 (Part 2)
257	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Electrical Conductivity @ 25°C	IS 3025 (Part 14)
258	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Flouride as F	APHA 23 rd Edition 4500 F- D Spadns method
259	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Hexavalent Chromium as Cr 6+	APHA 23 rd Edition 3500 Cr B
260	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Iron as Fe	IS 3025 (Part 53)
261	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Lead as Pb	IS 3025 (Part 2)
262	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Magnesium as Mg	IS 3025 (Part 46)
263	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Manganese as Mn	IS 3025 (Part 2)
264	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Mercury as Hg	CTH/CH/SOP/416,Issue No.3,Date of Issue-01.06.2020
265	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Molybdenum	IS 3025 (Part 2)
266	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Nickel as Ni	IS 3025 (Part 2)
267	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Nitrate as NO ₃	IS 3025 (Part 34)
268	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Nitrite	IS 3025 (Part 34)
269	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Odour	IS 3025 (Part 5)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	17 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
270	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Oil and Grease	IS 3025 (Part 39)
271	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Phenolic Compounds	IS 3025 (Part 43)
272	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Potassium as K	IS 3025 (Part 45)
273	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Residual free Chlorine	IS 3025 (Part 26)
274	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Selenium as Se	IS 3025 (Part 2)
275	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Silver as Ag	IS 3025 (Part 2)
276	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Sodium as Na	IS 3025 (Part 45)
277	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Sulphate as SO ₄	APHA 23 rd Edition 4500 SO42-E
278	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Sulphide	APHA 23 rd Edition 4500 S- D /F
279	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Total Alkalinity as CaCO ₃	IS 3025 (Part 23)
280	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Total Dissolved Solids	IS 3025 (Part 16)
281	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Total Hardness as CaCO ₃	IS 3025 (Part 21)
282	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Total kjeldhal Nitrogen as N	IS 3025 (Part 34)
283	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Total Nitrogen	IS 3025 (Part 34)
284	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Total Phosphate as P	APHA 23 rd Edition 4500 P (C)
285	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Total Suspended Solids	IS 3025 (Part 17)
286	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Turbidity in treated effluent	IS 3025 (Part 10)
287	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Vanadium	IS 3025 (Part 2)
288	CHEMICAL- POLLUTION & ENVIRONMENT	Waste Water(Sewage/Effluent)	Zinc as Zn	IS 3025 (Part 2)



SCOPE OF ACCREDITATION

Laboratory Name : COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA
Accreditation Standard ISO/IEC 17025:2017
Certificate Number TC-7720
Validity 12/09/2023 to 11/09/2025

Page No 18 of 27
Last Amended on 27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
289	CHEMICAL- POLLUTION & ENVIRONMENT	Waste water(Sewage/Effluents)	Cyanide as CN	IS 3025 (Part 27)
290	CHEMICAL- RESIDUES IN WATER	Construction Water	Iron	IS 3025 (Part 53)
291	CHEMICAL- RESIDUES IN WATER	Drinking water	Aluminum as Al	IS 3025 (Part 55)
292	CHEMICAL- RESIDUES IN WATER	Drinking Water	Antimony as Sb	IS 3025 (Part 2)
293	CHEMICAL- RESIDUES IN WATER	Drinking water	Arsenic	IS 3025 (Part 2)
294	CHEMICAL- RESIDUES IN WATER	Drinking Water	Barium as Ba	IS 3025 (Part 2)
295	CHEMICAL- RESIDUES IN WATER	Drinking Water	Boron as B	IS 3025 (Part 2)
296	CHEMICAL- RESIDUES IN WATER	Drinking Water	Cadmium as Cd	IS 3025 (Part 2)
297	CHEMICAL- RESIDUES IN WATER	Drinking Water	Chromium as Cr	IS 3025 (Part 2)
298	CHEMICAL- RESIDUES IN WATER	Drinking Water	Copper as Cu	IS 3025 (Part 2)
299	CHEMICAL- RESIDUES IN WATER	Drinking Water	Cyanide as CN	IS 3025 (Part 27)
300	CHEMICAL- RESIDUES IN WATER	Drinking Water	Iron as Fe	IS 3025 (Part 53)
301	CHEMICAL- RESIDUES IN WATER	Drinking Water	Lead as Pb	IS 3025 (Part 2)
302	CHEMICAL- RESIDUES IN WATER	Drinking Water	Manganese as Mn	IS 3025 (Part 2)
303	CHEMICAL- RESIDUES IN WATER	Drinking Water	Mercury as Hg	CTH/CH/SOP/416 ,Issue NO.3,Issue Date-01/06/020
304	CHEMICAL- RESIDUES IN WATER	Drinking Water	Molybdenum as Mo	IS 3025 (Part 2)
305	CHEMICAL- RESIDUES IN WATER	Drinking Water	Nickel as Ni	IS 3025 (Part 2)
306	CHEMICAL- RESIDUES IN WATER	Drinking Water	Selenium as Se	IS 3025 (Part 2)
307	CHEMICAL- RESIDUES IN WATER	Drinking Water	Silver as Ag	IS 3025 (Part 2)



SCOPE OF ACCREDITATION

Laboratory Name : COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA
Accreditation Standard ISO/IEC 17025:2017
Certificate Number TC-7720
Validity 12/09/2023 to 11/09/2025

Page No 19 of 27
Last Amended on 27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
308	CHEMICAL- RESIDUES IN WATER	Drinking Water	Vanadium as V	IS 3025 (Part 2)
309	CHEMICAL- RESIDUES IN WATER	Drinking Water	Zinc	IS 3025 (Part 2)
310	CHEMICAL- RESIDUES IN WATER	Ground Water	Aluminium as Al	IS 3025 (Part 55)
311	CHEMICAL- RESIDUES IN WATER	Ground Water	Antimony	IS 3025 (Part 2)
312	CHEMICAL- RESIDUES IN WATER	Ground Water	Arsenic as As	IS 3025 (Part 2)
313	CHEMICAL- RESIDUES IN WATER	Ground Water	Barium	IS 3025 (Part 2)
314	CHEMICAL- RESIDUES IN WATER	Ground Water	Boron	IS 3025 (Part 2)
315	CHEMICAL- RESIDUES IN WATER	Ground Water	Cadmium as Cd	IS 3025 (Part 2)
316	CHEMICAL- RESIDUES IN WATER	Ground Water	Chromium as Cr	IS 3025 (Part 2)
317	CHEMICAL- RESIDUES IN WATER	Ground Water	Copper as Cu	IS 3025 (Part 2)
318	CHEMICAL- RESIDUES IN WATER	Ground Water	Cyanide as CN	IS 3025 (Part 27)
319	CHEMICAL- RESIDUES IN WATER	Ground water	Iron as Fe	IS 3025 (Part 53)
320	CHEMICAL- RESIDUES IN WATER	Ground Water	Lead as Pb	IS 3025 (Part 2)
321	CHEMICAL- RESIDUES IN WATER	Ground water	Manganese as Mn	IS 3025 (Part 2)
322	CHEMICAL- RESIDUES IN WATER	Ground Water	Mercury	CTH/CH/SOP/416 ,Issu No.3.Date of Issue01/06/2020
323	CHEMICAL- RESIDUES IN WATER	Ground Water	Molybdenum	IS 3025 (Part 2)
324	CHEMICAL- RESIDUES IN WATER	Ground water	Nickel as Ni	IS 3025 (Part 2)
325	CHEMICAL- RESIDUES IN WATER	Ground water	Selenium as Se	IS 3025 (Part 2)
326	CHEMICAL- RESIDUES IN WATER	Ground water	Silver	IS 3025 (Part 2)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	20 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
327	CHEMICAL- RESIDUES IN WATER	Ground water	Vanadium as V	IS 3025 (Part 2)
328	CHEMICAL- RESIDUES IN WATER	Ground water	Zinc as Zn	IS 3025 (Part 2)
329	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Aluminium as Al	IS 3025 (Part 55)
330	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Antimony as Sb	IS 3025 (Part 2)
331	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Arsenic as As	IS 3025 (Part 2)
332	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Barium as Ba	IS 3025 (Part 2)
333	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Boron as B	IS 3025 (Part 2)
334	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Cadmium as Cd	IS 3025 (Part 2)
335	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Chromium as Cr	IS 3025 (Part 2)
336	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Copper as Cu	IS 3025 (Part 2)
337	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Cyanide as CN	IS 3025 (Part 27)
338	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Iron as Fe	IS 3025 (Part 53)
339	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Lead as Pb	IS 3025 (Part 2)
340	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Manganese as Mn	IS 3025 (Part 2)
341	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Mercury as Hg	CTH/CH/SOP/416 ,Issue NO.3,date of Issue-01/06/2020
342	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Molybdenum as Mo	IS 3025 (Part 2)
343	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Nickel as Ni	IS 3025 (Part 2)
344	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Selenium as Se	IS 3025 (Part 2)
345	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Silver as Ag	IS 3025 (Part 2)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TC-7720	Page No	21 of 27
Validity	12/09/2023 to 11/09/2025	Last Amended on	27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
346	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Vanadium as V	IS 3025 (Part 2)
347	CHEMICAL- RESIDUES IN WATER	Packaged Drinking Water	Zinc as Zn	IS 3025 (Part 2)
348	CHEMICAL- RESIDUES IN WATER	Surface water/Marine water	Aluminium	IS 3025 (Part 55)
349	CHEMICAL- RESIDUES IN WATER	Surface water/Marine water	Antimony	IS 3025 (Part 2)
350	CHEMICAL- RESIDUES IN WATER	Surface water/Marine water	Arsenic as As	IS 3025 (part 2)
351	CHEMICAL- RESIDUES IN WATER	Surface Water/Marine Water	Barium	IS 3025 (Part 2)
352	CHEMICAL- RESIDUES IN WATER	Surface water/Marine water	Boron	IS 3025 (Part 2)
353	CHEMICAL- RESIDUES IN WATER	Surface water/Marine water	Cadmium as Cd	IS 3025 (part 2)
354	CHEMICAL- RESIDUES IN WATER	Surface water/Marine water	Chromium as Cr	IS 3025 (Part 2)
355	CHEMICAL- RESIDUES IN WATER	surface water/Marine water	Copper as Cu	IS 3025 (Part 2)
356	CHEMICAL- RESIDUES IN WATER	Surface water/Marine water	Cyanide as CN	IS 3025 (Part 27)
357	CHEMICAL- RESIDUES IN WATER	surface water/marine water	Iron as Fe	IS 3025 (Part 53)
358	CHEMICAL- RESIDUES IN WATER	surface water/Marine water	Lead as Pb	IS 3025 (Part 2)
359	CHEMICAL- RESIDUES IN WATER	Surface Water/Marine Water	Manganese	IS 3025 (Part 2)
360	CHEMICAL- RESIDUES IN WATER	surface water/Marine water	Mercury as Hg	CTH/CH/SOP/416 ,Issue NO.3,date of Issue 01/06/2020
361	CHEMICAL- RESIDUES IN WATER	Surface water/Marine water	Molebdenum	IS 3025 (Part 2)
362	CHEMICAL- RESIDUES IN WATER	surface water/Marine water	Nickel as Ni	IS 3025 (Part 2)
363	CHEMICAL- RESIDUES IN WATER	surface water/Marine water	Selenium as Se	IS 3025 (Part 2)
364	CHEMICAL- RESIDUES IN WATER	Surface water/Marine water	Silver	IS 3025 (Part 2)



SCOPE OF ACCREDITATION

Laboratory Name : COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA
Accreditation Standard ISO/IEC 17025:2017
Certificate Number TC-7720
Validity 12/09/2023 to 11/09/2025

Page No 22 of 27
Last Amended on 27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
365	CHEMICAL- RESIDUES IN WATER	surface water/Marine water	Vanadium as V	IS 3025 (Part 2)
366	CHEMICAL- RESIDUES IN WATER	surface water/Marine water	Zinc as Zn	IS 3025 (Part 2)
367	CHEMICAL- RESIDUES IN WATER	Swimming Pool water	Iron as Fe	IS 3025 (Part 53)
368	CHEMICAL- RESIDUES IN WATER	Swimming Pool water	Aluminium as Al	IS 3025 (Part 55)
369	CHEMICAL- RESIDUES IN WATER	Swimming Pool Water	LEAD as Pb	IS 3025 (Part 2)
370	CHEMICAL- WATER	Construction Water	Acidity	IS 3025 (Part 22)
371	CHEMICAL- WATER	Construction Water	Chloride	IS 3025 (Part 32)
372	CHEMICAL- WATER	Construction Water	Inorganic Solids	IS 3025 (Part 18)
373	CHEMICAL- WATER	Construction Water	Organic Solids	IS 3025 (Part 18)
374	CHEMICAL- WATER	Construction Water	Sulphate	APHA 23rd Edition-4500 SO ₄ E
375	CHEMICAL- WATER	Construction Water	Total Alkalinity	IS 3025 (Part 23)
376	CHEMICAL- WATER	Construction Water	Total Dissolved Solids	IS 3025 (Part 16)
377	CHEMICAL- WATER	Construction Water	Total Hardness	IS 3025 (Part 21)
378	CHEMICAL- WATER	Construction Water	Total suspended Soilds	IS 3025 (Part 17)
379	CHEMICAL- WATER	Construction Water	Turbidity	IS 3025 (Part 10)
380	CHEMICAL- WATER	Drinking Water	Anionic Surfactive agent	APHA 24th edition 5540 C
381	CHEMICAL- WATER	Drinking Water	Calcium as Ca	IS 3025 (Part 40)
382	CHEMICAL- WATER	Drinking Water	Chloramine	IS 3025 (Part 26)
383	CHEMICAL- WATER	Drinking Water	Chloride as Cl	IS 3025 (Part 32)
384	CHEMICAL- WATER	Drinking Water	Colour	IS 3025 (Part 4)
385	CHEMICAL- WATER	Drinking Water	Electrical Conductivity	IS 3025 (Part 14)
386	CHEMICAL- WATER	Drinking Water	Flouride as F	APHA 24th Edition 4500 F ⁻ D
387	CHEMICAL- WATER	Drinking Water	Hexa valent Chromium as Cr 6+	APHA 23 rd Edition 3500 Cr B
388	CHEMICAL- WATER	Drinking Water	Magnesium as Mg	IS 3025 (Part 46)
389	CHEMICAL- WATER	Drinking Water	Nitrate as NO ₃	IS 3025 (Part 34)
390	CHEMICAL- WATER	Drinking Water	Odour	IS 3025 (Part 5)



SCOPE OF ACCREDITATION

Laboratory Name : COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA
Accreditation Standard ISO/IEC 17025:2017
Certificate Number TC-7720
Validity 12/09/2023 to 11/09/2025

Page No 23 of 27
Last Amended on 27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
391	CHEMICAL- WATER	Drinking Water	Oxygen absorbed in 4 hrs @27°C	IS 3025 (Part 63)
392	CHEMICAL- WATER	Drinking Water	pH	IS 3025 (Part 11)
393	CHEMICAL- WATER	Drinking Water	Phenolic compounds as C ₆ H ₅ OH	IS 3025 (Part 43)
394	CHEMICAL- WATER	Drinking Water	Potassium as K	IS 3025 (Part 45)
395	CHEMICAL- WATER	Drinking Water	Reactive Silica as SiO ₂	IS 3025 (Part 35)
396	CHEMICAL- WATER	Drinking Water	Residual free Chlorine	IS 3025 (Part 26)
397	CHEMICAL- WATER	Drinking Water	Sodium as Na	IS 3025 (Part 45)
398	CHEMICAL- WATER	Drinking Water	Sulphate as SO ₄	APHA 24th Edition 4500-SO ₄ -E
399	CHEMICAL- WATER	Drinking Water	Sulphide	APHA 24th Edition 4500 S ₂ - F
400	CHEMICAL- WATER	Drinking Water	Taste	IS 3025 (Part 7)
401	CHEMICAL- WATER	Drinking Water	Total Alkalinity as CaCO ₃	IS 3025 (Part 23)
402	CHEMICAL- WATER	Drinking Water	Total Dissolved Solids	IS 3025 (Part 16)
403	CHEMICAL- WATER	Drinking Water	Total Hardness as CaCO ₃	IS 3025 (Part 21)
404	CHEMICAL- WATER	Drinking Water	Total suspended solids	IS 3025 (Part 17)
405	CHEMICAL- WATER	Drinking Water	Turbidity	IS 3025 (Part 10)
406	CHEMICAL- WATER	Ground water	Biological Oxygen Demand	IS 3025 (Part 44)
407	CHEMICAL- WATER	Ground Water	Calcium as Ca	IS 3025 (Part 40)
408	CHEMICAL- WATER	Ground water	Calcium Hardness as CaCO ₃	IS 3025 (Part 40)
409	CHEMICAL- WATER	Ground water	Chemical oxygen demand	IS 3025 (Part 58)
410	CHEMICAL- WATER	Ground Water	Chloramines	IS 3025 (Part 26)
411	CHEMICAL- WATER	Ground Water	Chloride as Cl	IS 3025 (Part 32)
412	CHEMICAL- WATER	Ground Water	Colour	IS 3025 (Part 4)
413	CHEMICAL- WATER	Ground water	Dissolved Oxygen	IS 3025 (Part 38)
414	CHEMICAL- WATER	Ground Water	Electrical Conductivity	IS 3025 (Part 14)
415	CHEMICAL- WATER	Ground Water	Fluoride as F	APHA 24th Edition 4500 F- D
416	CHEMICAL- WATER	Ground Water	Hexavalent Chromium as Cr ⁶⁺	APHA 24th Edition -3500 Cr B
417	CHEMICAL- WATER	Ground Water	Magnesium as Mg	IS 3025 (Part 46)
418	CHEMICAL- WATER	Ground water	Magnesium Hardness as CaCO ₃	IS 3025 (Part 46)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA	Page No	24 of 27
Accreditation Standard	ISO/IEC 17025:2017	Last Amended on	27/09/2023
Certificate Number	TC-7720		
Validity	12/09/2023 to 11/09/2025		

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
419	CHEMICAL- WATER	Ground water	Nitrate as NO ₃	IS 3025 (Part 34)
420	CHEMICAL- WATER	Ground water	Odour	IS 3025 (Part 5)
421	CHEMICAL- WATER	Ground water	Oil & Grease	IS 3025 (Part 39)
422	CHEMICAL- WATER	Ground water	Oxygen absorbed in 4 Hours at 27°C	IS 3025 (Part 63)
423	CHEMICAL- WATER	Ground water	pH	IS 3025 (Part 11)
424	CHEMICAL- WATER	Ground Water	Phenolic compounds as C ₆ H ₅ OH	IS 3025 (Part 43)
425	CHEMICAL- WATER	Ground Water	Potassium as K	IS 3025 (Part 45)
426	CHEMICAL- WATER	Ground Water	Reactive Silica as SiO ₂	IS 3025 (Part 35)
427	CHEMICAL- WATER	Ground Water	Residual Free Chlorine	IS 3025 (Part 26)
428	CHEMICAL- WATER	Ground water	Salinity	CTH/CH/SOP/522, Issue No.1, Date of Issue-01/01/2021
429	CHEMICAL- WATER	Ground Water	Sodium as Na	IS 3025 (Part 45)
430	CHEMICAL- WATER	Ground Water	Sulphate as So ₄	APHA : 24th Edition 4500-SO ₄₂ - /E
431	CHEMICAL- WATER	Ground Water	Sulphide	APHA: 24th Edition 4500- S ₂ - F
432	CHEMICAL- WATER	Ground water	Taste	IS 3025 (Part 7)
433	CHEMICAL- WATER	Ground water	Temperature	IS 3025 (Part 9)
434	CHEMICAL- WATER	Ground Water	Total Alkalinity as CaCO ₃	IS 3025 (Part 23)
435	CHEMICAL- WATER	Ground Water	Total Dissolved Solids	IS 3025 (Part 16)
436	CHEMICAL- WATER	Ground Water	Total Hardness as CaCO ₃	IS 3025(Part 21)
437	CHEMICAL- WATER	Ground Water	Total Suspended Solids	IS 3025 (Part 17)
438	CHEMICAL- WATER	Ground Water	Turbidity	IS 3025 (Part 10)
439	CHEMICAL- WATER	Packaged Drinking water	Hexavalent Chromium as Cr ₆₊	APHA 24th Edition 3500-Cr-B
440	CHEMICAL- WATER	Packaged Drinking Water	Anionic Surface active agent	APHA 24th edition 5540 C
441	CHEMICAL- WATER	Packaged Drinking Water	Calcium as Ca	IS 3025 (Part 40)
442	CHEMICAL- WATER	Packaged Drinking Water	Chloramine	IS 3025 (Part 26)
443	CHEMICAL- WATER	Packaged Drinking Water	Chloride as Cl	IS 3025 (Part 32)
444	CHEMICAL- WATER	Packaged Drinking water	Colour	IS 3025 (Part 4)
445	CHEMICAL- WATER	Packaged Drinking water	Electrical Conductivity	IS 3025 (Part 14)



SCOPE OF ACCREDITATION

Laboratory Name : COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA
Accreditation Standard ISO/IEC 17025:2017
Certificate Number TC-7720
Validity 12/09/2023 to 11/09/2025

Page No 25 of 27
Last Amended on 27/09/2023

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
446	CHEMICAL- WATER	Packaged Drinking water	Fluoride as F	APHA 24th Edition 4500 F- D SPADNS Method
447	CHEMICAL- WATER	Packaged Drinking water	Magnesium as Mg	IS 3025 (Part 46)
448	CHEMICAL- WATER	Packaged Drinking water	Nitrate as NO ₃	IS 3025 (Part 34)
449	CHEMICAL- WATER	Packaged Drinking water	Odour	IS 3025 (Part 5)
450	CHEMICAL- WATER	Packaged Drinking water	Oxygen absorbed in 4 hrs @ 27°C	IS 3025 (Part 63)
451	CHEMICAL- WATER	Packaged Drinking water	pH	IS 3025 (Part 11)
452	CHEMICAL- WATER	Packaged Drinking Water	Phenolic compounds as C ₆ H ₅ OH	IS 3025 (Part 43)
453	CHEMICAL- WATER	Packaged Drinking water	Potassium as K	IS 3025 (Part 45)
454	CHEMICAL- WATER	Packaged Drinking water	Reactive Silica as SiO ₂	IS 3025 (Part 35)
455	CHEMICAL- WATER	Packaged Drinking water	Residual free Chlorine	IS 3025 (Part 26)
456	CHEMICAL- WATER	Packaged Drinking water	Sodium as Na	IS 3025 (Part 45)
457	CHEMICAL- WATER	Packaged Drinking water	Sulphate as SO ₄	APHA 23rd Edition 4500 SO ₄ E
458	CHEMICAL- WATER	Packaged Drinking water	Sulphide	APHA 23rd Edition 4500 S- D/F
459	CHEMICAL- WATER	Packaged Drinking Water	Taste	IS 3025 (Part 7)
460	CHEMICAL- WATER	Packaged Drinking water	Total Alkalinity as CaCO ₃	IS 3025 (Part 23)
461	CHEMICAL- WATER	Packaged Drinking water	Total Dissolved Solids	IS 3025 (Part 16)
462	CHEMICAL- WATER	Packaged Drinking water	Total Hardness as CaCO ₃	IS 3025 (Part 21)
463	CHEMICAL- WATER	Packaged Drinking water	Total Suspended Solids	IS 3025 (Part 17)
464	CHEMICAL- WATER	Packaged Drinking water	Turbidity	IS 3025 (Part 10)
465	CHEMICAL- WATER	Reagent Grade Water	Colour Retention	IS 1070 Annex A
466	CHEMICAL- WATER	Reagent Grade Water	pH	IS 3025 Part 11
467	CHEMICAL- WATER	Reagent Grade Water	Silica as SiO ₂	IS 3025 Part 35
468	CHEMICAL- WATER	Reagent Grade Water	Specific Conductivity	IS 3025 Part 14
469	CHEMICAL- WATER	Reagent Grade Water	Total Solids	IS 3025(Part 15)
470	CHEMICAL- WATER	Surface water/Marine water	Anionic Surface Active agent	APHA 24th edition 5540 C
471	CHEMICAL- WATER	Surface water/Marine water	Biological oxygen Demand	IS 3025 (Part 44)
472	CHEMICAL- WATER	surface water/Marine water	Calcium as Ca	IS 3025 (Part 40)
473	CHEMICAL- WATER	Surface water/Marine water	Calcium Hardness as CaCO ₃	IS 3025 (Part 40)
474	CHEMICAL- WATER	Surface water/Marine water	Chemical Oxygen Demand	IS 3025 (Part 58)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA	Page No	26 of 27
Accreditation Standard	ISO/IEC 17025:2017	Last Amended on	27/09/2023
Certificate Number	TC-7720		
Validity	12/09/2023 to 11/09/2025		

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
475	CHEMICAL- WATER	surface water/Marine water	Chloramines	IS 3025 (Part 26)
476	CHEMICAL- WATER	Surface Water/Marine water	Chloride as Cl	IS 3025 (Part 32)
477	CHEMICAL- WATER	Surface Water/Marine water	Colour	IS 3025 (Part 4)
478	CHEMICAL- WATER	Surface water/Marine water	Dissolved Oxygen	IS 3025 (Part 38)
479	CHEMICAL- WATER	surface water/Marine water	Electrical Conductivity	IS 3025 (Part 14)
480	CHEMICAL- WATER	surface water/Marine water	Fluoride as F	APHA 24th Edition 4500- F- D
481	CHEMICAL- WATER	surface water/Marine water	Hexavalent Chromium as Cr6+	APHA 24th Edition -3500- Cr B
482	CHEMICAL- WATER	surface water/Marine water	Magnesium as Mg	IS 3025 (Part 46)
483	CHEMICAL- WATER	Surface water/Marine water	Magnesium Hardness as CaCO ₃	IS 3025 (Part 46)
484	CHEMICAL- WATER	surface water/Marine water	Nitrate as NO ₃	IS 3025 (Part 34)
485	CHEMICAL- WATER	surface water/Marine water	Odour	IS 3025 (Part 5)
486	CHEMICAL- WATER	Surface water/Marine water	Oil & Grease	IS 3025 (Part 39)
487	CHEMICAL- WATER	surface water/Marine water	Oxygen absorbed in 4 Hours at 27°C	IS 3025 (Part 63)
488	CHEMICAL- WATER	surface water/Marine water	pH	IS 3025 (Part 11)
489	CHEMICAL- WATER	surface water/Marine water	Phenolic compounds as C ₆ H ₅ OH	IS 3025 (Part 43)
490	CHEMICAL- WATER	surface water/Marine water	Potassium as K	IS 3025 (Part 45)
491	CHEMICAL- WATER	surface water/Marine water	Reactive Silica as SiO ₂	IS 3025 (Part 35)
492	CHEMICAL- WATER	surface water/Marine water	Residual free chlorine	IS 3025 (Part 26)
493	CHEMICAL- WATER	Surface water/Marine water	Salinity	CTH/CH/SOP/522, Issue No.1, Date of Issue 01.01.2021
494	CHEMICAL- WATER	surface water/Marine water	Sodium as Na	IS 3025 (Part 45)
495	CHEMICAL- WATER	surface water/Marine water	Sulphate as SO ₄	APHA: 23rd Edition -4500 SO ₄ - E
496	CHEMICAL- WATER	surface water/Marine water	Sulphide	APHA: 23 rd Edition 4500 S D/F
497	CHEMICAL- WATER	Surface water/Marine water	Taste	IS 3025 (Part 7)
498	CHEMICAL- WATER	Surface water/Marine water	Temperature	IS 3025 (Part 9)
499	CHEMICAL- WATER	surface water/Marine water	Total Alkalinity as CaCO ₃	IS 3025 (Part 23)
500	CHEMICAL- WATER	surface water/Marine water	Total Dissolved Solids	IS 3025 (Part 16)
501	CHEMICAL- WATER	surface water/Marine water	Total Hardness as CaCO ₃	IS 3025 (Part 21)



SCOPE OF ACCREDITATION

Laboratory Name :	COCHIN TEST HOUSE, V/78, KOLLANPADY, IRUMPANAM, KOCHI, KERALA, INDIA	Page No	27 of 27
Accreditation Standard	ISO/IEC 17025:2017	Last Amended on	27/09/2023
Certificate Number	TC-7720		
Validity	12/09/2023 to 11/09/2025		

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
502	CHEMICAL- WATER	surface water/Marine water	Total Suspended Solids	IS 3025 (Part 17)
503	CHEMICAL- WATER	surface water/Marine water	Turbidity	IS 3025 (Part 10)
504	CHEMICAL- WATER	Swimming Pool Water	Chloride as Cl	IS 3025 (Part 32)
505	CHEMICAL- WATER	Swimming Pool Water	Colour	IS 3025 (Part 4)
506	CHEMICAL- WATER	Swimming Pool Water	Odour	IS 3025 (Part 5)
507	CHEMICAL- WATER	Swimming Pool Water	Oxygen Absorbed in 4 hrs at 27°C	IS 3025 (Part 63)
508	CHEMICAL- WATER	Swimming Pool Water	pH	IS 3025 (Part 11)
509	CHEMICAL- WATER	Swimming Pool Water	Residual Free Chlorine	IS 3025 (Part 26)
510	CHEMICAL- WATER	Swimming Pool Water	Total Alkalinity as CaCO ₃	IS 3025 (Part 23)
511	CHEMICAL- WATER	Swimming Pool Water	Total Dissolved Solids	IS 3025 (Part 16)
512	CHEMICAL- WATER	Swimming pool water	Turbidity	IS 3025 (Part 10)

NOTE- The Laboratory has demonstrated competence for the stated scope for WATER. This however does not fully cover the specification requirements of BIS for the Packaged Drinking Water as per IS 14543 and the Packaged Natural Mineral Water IS 13428.

ANNEXURE-7

SL NO.	SAMPLING LOCATIONS	LATITUDE	LONGITUDE
1	River Periyar Pathalam Bridge	10° 4'52.39"N	76°19'2.64"E
2	River Periyar Pathalam Bund Upstream	10° 4'34.77"N	76°18'34.55"E
3	River Periyar Pathalam Bund Downstream	10° 4'34.72"N	76°18'28.37"E
4	River Periyar Vettukadavu	10° 5'16.31"N	76°17'51.39"E
5	River Periyar Eloor Ferry	10° 4'24.61"N	76°16'56.39"E
6	River Periyar Puthalam Kadavu	10° 3'47.74"N	76°19'6.13"E
Samples collected from river periyar on 21.05.2024 (Boat Sampling)			
1	Amrutha Pumping station	10° 3'51.68"N	76°17'40.18"E
2	FACT PD	10° 4'8.44"N	76°17'25.92"E
3	KuzhikandomThodu	10° 4'14.49"N	76°17'6.95"E
4	Eloor Ferry	10° 4'24.61"N	76°16'56.39"E
5	Muttinakam	10° 4'55.00"N	76°17'6.31"E
6	Vettukadavu	10° 5'16.31"N	76°17'51.39"E
7	IRE	10° 4'57.55"N	76°17'56.00"E
8	FACT-UD	10° 3'58.32"N	76°17'38.67"E
9	Binani Zinc Ltd.	10° 4'48.96"N	76°18'0.76"E
10	Sudchemie	10° 4'37.72"N	76°18'11.90"E
11	CMRL	10° 4'36.82"N	76°18'28.35"E
12	TCC	10° 4'33.31"N	76°18'17.24"E

List of Effluent generating industries in Eloor with details of Disposal / Reuse										
Sl. No.	Name and Address of the unit	Type of unit	Category	Scale	Water Consumption (Litres/day)	Sewage/Effluent generation (Litres/day)	ETP Details	Sewage disposal details	whether obtained consent or not.	Consent Validity
1	FACT Ltd., Udyogamandal Division, Eloor, Udyogamandal	Chemical Fertilizer	Red	Large	48000000	16800000	Neutralisation, Equalisation, Bio pond, Guard pond, Final clarifier, Denitrification reactor	To periyar	yes	30.06.2028
2	FACT Ltd., Petrochemical Division, Eloor, Udyogamandal	Petroche mical unit	Red	Large	13970000	5040000	Neutralisation, Equalisation, Bio pond, Guard pond, Final clarifier, Denitrification reactor	To periyar	yes	30.06.2028
3	Indian Rare Earths Ltd, Eloor, Udyogamandal P.O.	Chemical	Red	Large	422000	400000	Settling tank, Acidic and alkaline effluent pretreatment tank, Clarifloculator, filtration	To periyar	yes	30.06.2028
4	Travancore Cochin Chemicals Ltd. (TCC), Eloor, Udyogamandal	"chlor alkali - Sodium Chlorate Plant"	Red	Large	5565200	498000	pH correction facility ,lagoon,septic tank soak pit sytem for sewage effluent	reuse in process and irrigation	yes	6/30/2028



KERALA STATE POLLUTION CONTROL BOARD

ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501

Phone : 0484 2545678 , E-mail: esceloor@yahoo.co.in



കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട് ക്വാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി.ഒ.

എറണാകുളം-683 501

PCB/ESC/CO-30/07

Date: 07.09.2024

Sub: Direction issued under section 33A of Water (Prevention & Control of Pollution) Act, 1974 in the matter of achieving zero liquid discharge at M/s. The Fertilisers And Chemicals Travancore Limited (FACT), Udyogamandal Complex- Petrochemical Plants, P.B No.17, Udyogamandal, Ernakulam

- Ref : 1. Consent No: PCB/HO/EKM-3/ICO-R/03/2023 dated 16/05/2023 and valid upto 30.06.2028
2. Consent No: PCB/HO/EKM/ICO/95/09 dated 29.09.2009
3. Order dated 27/05/2022 of Hon'ble NGT in the original application No: 395/2013/SZ(THC) and connected matters.

DIRECTION

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of Environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act in the state;

WHEREAS M/s. The Fertilisers And Chemicals Travancore Limited (FACT), Udyogamandal Complex- Petrochemical Plants, P.B No.17, Udyogamandal, Ernakulam - 683501 (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS in the Hon'ble NGT order referred 3 above, it is directed that all industries in the catchment area of the Periyar River should adopt zero liquid discharge (ZLD);

WHEREAS you are discharging 5040 KLD of treated effluent into river Periyar;

WHEREAS a condition was given in the consent referred 2 above to reduce the effluent discharge in a time bound manner and to achieve zero liquid discharge and the proposal for the same to be submitted to Board;

WHEREAS you have not complied with the above condition till date and not submitted the proposal for reducing the effluent discharge to achieve zero liquid discharge;

NOW THEREFORE on the basis of the above violations, in exercise the power conferred under section 33A of Water Act, 1974 it is hereby directed that.

Proposal for compliance of above direction to achieve zero liquid discharge in a time bound manner shall be submitted to this office within 15 days of the receipt of this direction failing which Board will be forced to initiate actions as per section 33 A Water (Prevention & Control of Pollution) Act 1974.

Dated this the 7th day of September 2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD

SENIOR ENVIRONMENTAL ENGINEER

To

M/s. The Fertilisers And Chemicals Travancore Limited (FACT),
Udyogamandal Complex- Petrochemical Plants,
P.B No.17, Udyogamandal, Ernakulam - 683 501

- Copy to: 1. The Chairperson
Kerala State Pollution Control Board
Head Office
Thiruvananthapuram
1. The Member Secretary
Kerala State Pollution Control Board
Head Office
Thiruvananthapuram
3. The Chief Environmental Engineer
Kerala State Pollution Control Board
Regional Office, Ernakulam



**KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE**

FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501,
Phone : 0484 2545678, E-mail: esceloor@yahoo.co.in

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട് ക്വാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി. ഒ.,
എറണാകുളം-683 501



PCB/ESC/CO-31/07

Date : 07.09.2024

Sub: Direction issued under section 33A of Water (Prevention & Control of Pollution) Act, 1974 in the matter of achieving zero liquid discharge at

M/s. FACT, Udyogamandal complex, Udyogamandal P.O., Eloor, Ernakulam.

- Ref: 1. Consent No : PCB/HO/EKM-3/ICO-R/05/2023 dated 26.05.2023 and valid upto 30.06.2028.
2. Consent No: PCB/HO/EKM/ICO/98/2009 dated 25.10.2009.
3. Order dated 27/05/2022 of Hon'ble NGT in the original application
No: 395/2013/SZ(THC) and connected matters.

DIRECTION

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of Environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act in the state;

WHEREAS M/s. The Fertilisers And Chemicals Travancore Limited (FACT), Udyogamandal Complex- Fertilizer Plants, Udyogamandal, Eloor, Kerala 683501(here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act,1986 and is bound to comply with the provisions of the said Acts;

WHEREAS in the Hon'ble NGT order referred 3 above, it is directed that all industries in the catchment area of the Periyar River should adopt zero liquid discharge (ZLD);

WHEREAS you are discharging 16800 KLD of treated effluent into river Periyar;

WHEREAS a condition was given in the consent referred 2 above to reduce the effluent discharge in a time bound manner and to achieve zero liquid discharge and the proposal for the same to be submitted to Board;

WHEREAS you have not complied with the above condition till date and not submitted the proposal for reducing the effluent discharge to achieve zero liquid discharge;

NOW THEREFORE on the basis of the above violations, in exercise the power conferred under section 33A of Water Act, 1974 it is hereby directed that.

Proposal for compliance of above direction to achieve zero liquid discharge in a time bound manner shall be submitted to this office within 15 days of the receipt of this direction failing which Board will be forced to initiate actions as per section 33 A Water (Prevention & Control of Pollution) Act 1974.

Dated this the 7th day of September 2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD

SENIOR ENVIRONMENTAL ENGINEER

To

M/s Fertilizers and Chemicals Travancore Ltd
Udyogamandal Complex (Fertilizer Plant)
Ernakulam - 683 501

Copy to: 1. The Chairperson
Kerala State Pollution Control Board
Head Office
Thiruvananthapuram

1. The Member Secretary
Kerala State Pollution Control Board
Head Office
Thiruvananthapuram

3. The Chief Environmental Engineer
Kerala State Pollution Control Board
Regional Office
Ernakulam



KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501

Phone : 0484 2545678 , E-mail: esceloor@yahoo.co.in



കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ് എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട് ക്വാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡൽ പി.ഒ.

എറണാകുളം-683 501

PCB/ESC/CO-124/06

Date: 07.09.2024

Sub: Direction issued under section 33A of Water (Prevention & Control of Pollution) Act, 1974 in the matter of achieving zero liquid discharge at M/s IREL (India) Ltd., Rare Earths Division, Udyogamandal, Kochi

- Ref : 1. Consent No: PCB/HO/EKM-3/ICO-R/02/2023 dated 03/05/2023 and valid upto 30.06.2028
2. Consent No: PCB/HO/EKM/ICO/104/2010 dated 22.01.2010
3. Order dated 27/05/2022 of Hon'ble NGT in the original application No: 395/2013/SZ(THC) and connected matters.

DIRECTION

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of Environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act in the state;

WHEREAS M/s IREL (India) Ltd., Rare Earths Division, Udyogamandal, Kochi - 683501 (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS in the Hon'ble NGT order referred 3 above, it is directed that all industries in the catchment area of the Periyar River should adopt zero liquid discharge (ZLD);

WHEREAS you are discharging 400 KLD of treated effluent into river Periyar;

WHEREAS a condition was given in the consent referred 2 above to reduce the effluent discharge in a time bound manner and to achieve zero liquid discharge and the proposal for the same to be submitted to Board;

WHEREAS you have not complied with the above condition till date and not submitted the proposal for reducing the effluent discharge to achieve zero liquid discharge;

NOW THEREFORE on the basis of the above violations, in exercise the power conferred under section 33A of Water Act, 1974 it is hereby directed that.

Proposal for compliance of above direction to achieve zero liquid discharge in a time bound manner shall be submitted to this office within 15 days of the receipt of this direction failing which Board will be forced to initiate actions as per section 33 A Water (Prevention & Control of Pollution) Act 1974.

Dated this the 7th day of September 2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD

SENIOR ENVIRONMENTAL ENGINEER

To

M/s IREL (India) Ltd.,
Rare Earths Division, Udyogamandal,
Kochi - 683501

- Copy to: 1. The Chairperson
Kerala State Pollution Control Board
Head Office
Thiruvananthapuram
1. The Member Secretary
Kerala State Pollution Control Board
Head Office
Thiruvananthapuram
3. The Chief Environmental Engineer
Kerala State Pollution Control Board
Regional Office, Ernakulam



प्रगति के पथप्रदर्शक
PIONEERS IN PROGRESS

दि फ़र्टिलाइज़र्स एण्ड केमिकल्स ट्रावन्कोर लिमिटेड
THE FERTILISERS AND CHEMICALS TRAVANCORE LTD.

(भारत सरकार का उद्यम) (A Government of India Enterprise)

पंजीकृत कार्यालय: एलूर, उद्योगमंडल, कोच्ची - 683 501, केरल राज्य, भारत
Regd. Office: Eloor, Udyogamandal, Kochi-683501, Kerala State, India. Website: www.fact.co.in CIN: L24129KL1943GO1000371

GM(T)UC-193

16.09.2024

The Senior Environmental Engineer,
Environmental Surveillance Centre,
Kerala State Pollution Control Board,
FACT Qr.No: S-5,
Udyogamandal P.O., PIN: 683501

Sub: Direction issued under section 33A of Water (Prevention & control of Pollution)
Act, 1974 in the matter of achieving Zero liquid discharge.

Ref: PCB/ESC/CO-30/07 dated 07.09.2024.

FACT Udyogamandal Complex - Petrochemical Plants Effluent Treatment Plant (ETP) is a rain and drain water treatment system. Because of the unprecedented rains in Kerala, it is practically difficult to reduce the effluent generated in our unit at these times. In spite of this, FACT UC Petrochemical Plants, over the years, have implemented several schemes for recycling and reuse of effluent, thereby reducing the quantity of effluent discharged. Our unit is recycling 200 m³/day treated waste water – 120 m³/day for dilution of incoming waste water based on analysis and 80 m³/day for development of green belt during summer season. Since the restart of Petrochemical Plants in September 2021, the daily average treated effluent discharged to the river is 4316 m³/day, against consented quantity of 5040 m³/day.

In view of the directive from your good office and Honorable NGT's order to achieve ZLD, FACT will initiate necessary actions at the earliest, to carry out a techno-economic feasibility study engaging a competent agency, considering the technological advancements evolved during this period in this field. The recommendations of the agency, after evaluation, will be implemented in a time bound manner in our unit.

FACT reiterates that we are committed to comply with every directive from KSPCB and adhere to all environmental rules and regulations.

Thanking you,

Very truly yours,
For FACT Udyogamandal Complex-Petrochemical Plants

Joy-MA
General Manager (Technical)-UC

CC: The Chairperson
Kerala State Pollution Control Board,
Head office, Thiruvananthapuram.

The Member Secretary
Kerala State Pollution Control Board,
Head Office, Thiruvananthapuram

manu
The Chief Environmental Engineer,
Kerala State Pollution Control Board,
Regional Office, Ernakulam



प्रगति के पथप्रदर्शक
PIONEERS IN PROGRESS

दि फ़र्टिलाइज़र्स एण्ड केमिकल्स ट्रावन्कोर लिमिटेड THE FERTILISERS AND CHEMICALS TRAVANCORE LTD.

(भारत सरकार का उद्यम) (A Government of India Enterprise)

पंजीकृत कार्यालय: एलूर, उद्योगमंडल, कोच्चि - 683 501, केरल राज्य, भारत
Regd Office: Eloor, Udyogamandal, Kochi-683501, Kerala State, India. Website: www.fact.co.in CIN: L24129KL1943GOI000371

GM(T)-UC- 191

15.09.2024

Senior Environmental Engineer
Environmental Surveillance Centre
Kerala State Pollution Control Board
FACT Quarters No: S5
Udyogamandal P.O., Eloor - 683 501

Dear Sir,

Sub: Direction issued under section 33 A of Water (Prevention & control of pollution) Act 1974 in a matter of achieving zero liquid discharge at M/s. FACT, Udyogamandal complex - reg.

Ref: PCB/ESC/CO-31/07 dated 07.09.2024

With reference to the letter cited above, we would like to bring to the notice of your good office that FACT Udyogamandal division has been actively working for reduction in discharge to river Periyar. For the past few years consistent efforts were taken by FACT to reduce effluent generation. This includes process modifications, reduction in water consumption, effluent reuse and recycle, modernising effluent handling area etc. The major efforts in this direction are summarised as below.

- Effective utilisation of condensate produced in Ammonia plant: Reuse of process and steam condensate was planned at design level itself and implemented during plant commissioning. Process condensate recovery and polishing units recovers and reused in plant itself.
- Delay pond for Sulphuric acid plant effluents: As the effluents from sulphuric acid plants are mainly regeneration and cleaning effluents, only pH correction may be required. Hence all effluents from Sulphuric acid plant is collected in a separate delay pond of about 60 m³ capacity and pumped to ETP. It can be directly taken to spray pond, without lime treatment in most of the cases, where it act as a neutralization agent, as the lime treated effluent will be of higher pH. By providing this additional facility, ETP load and chemicals are reduced to a greater extent.
- Guard pond modification: As per the suggestions from KSPCB, 14 compartment guard pond (capacity of 2300 m³) was constructed for handling emergency situations. The overflow/underflow arrangement in each compartment ensures 8 hrs residence time in guard pond, for ensuring proper mixing of treated effluents. Guard pond is also provided with auto pH control system by adding acid/alkali to control the pH

Erani
V. V. V.

with in permissible limits and the effluent recirculation to treatment section. Guard pond also serves as a storage of treated effluent from where it can be utilized if required.

- Construction of Slipway tank: In order to maximize recycle and reuse of effluent in Factamfos plants, slip way effluent tank of 1080 m³ constructed. Effluents generated in both Factamfos plants are collected in effluent pits, which is pumped to Slipway effluent collection tank. These effluents are reused for dilution of acid and as make up water in scrubber systems of Factamfos plants. As the system was successful, effluents from Ammonium Sulphate plant also diverted to slipway effluent collection tank, utilised in Factamfos plant. This modification resulted in two major advantages such as effective utilization of resources (reprocessing of raw materials and ammonium sulphates and phosphates, which are major components of Factamfos) and successful recycling of effluents generated. During summer and normal plant operation, the Factamfos plants generates zero effluents and utilizes almost all effluents generated in both fertilizer plants.
- Installation of Compact heat exchanger in Sulphuric acid plant: Plate Heat Exchangers for cooling product Sulphuric acid are installed at DCDA Sulphuric acid plant and SO₂ – Acid plant instead of trombone type cooler. Replacement of heat exchangers reduced cooling tower load, which reduced make up water and blow down quantity.
- Utilisation of Vapour condensate & Steam Condensate in Petrochemical plants for Direct neutralisation process: The vapour and steam condensate produced Ammonium Sulphate plant is consumed in Petrochemical plants. pipe line modifications were done to reuse it in Hyam plant and Lactam plant for the preparation of Ammonium Hydroxide solution and Ammonium sulphate solution respectively.
- Steam condensate recovery system in Sulphuric Acid plant: A condensate recovery system was implemented to recover steam condensate and flash steam from the melting pit of the Sulphuric Acid Plant. The recovered condensate is utilized as boiler feed water, while the flash steam is reused in the boiler deaerator. The key benefits of this system include reduced DM water consumption, effective utilization of thermal energy, reduced chemical consumption, and reduced effluent generation from the DM plant.

Due to these process modifications, the quantity of treated effluents discharged into the River Periyar has significantly decreased. Treated effluents from the Ammonia Complex and Fertiliser Plants are discharged through authorized outlets 1 and 2, respectively. The average discharge through Outlet 1 is 570 KL/day, against the permitted limit of 4800 KL/day, and the average discharge through Outlet 2 is 671 KL/day, against the limit of 12000 KL/day. Currently, FACT is discharging only 12% and 6% of the consented values, respectively. The details of treated effluents discharged into the River Periyar from January 2022 to August 2024 are attached as Annexure 1.

Emi
Nishu

We are currently planning a new study with an external competent agency to explore the latest technologies for recycling and reusing treated effluents in the process, with the goal of further reducing discharge.

In the meantime, we are focusing on reducing effluent discharge by exercising strict control over water usage and recycling effluents wherever possible.

We once again request your good office to consider our action plan as above favourably.

FACT is thankful to KSPCB for the guidance provided to us from time to time. FACT once again reiterates that we are committed to complying with every directive from KSPCB and adhering to all environmental rules and regulations.

Thanking you,

Yours Faithfully,

For **THE FERTILISERS AND CHEMICALS TRAVANCORE LIMITED**



Joy M. A.
General Manager(Technical)-UC

Copy to:

1. The Chairperson,
Kerala State Pollution Control Board,
Head Office, Thiruvanthapuram.
2. The Member Secretary,
Kerala State Pollution Control Board,
Head Office, Thiruvanthapuram.
3. The Chief Environmental Engineer,
Kerala State Pollution Control Board,
Regional Office, Ernakulam.

Quantity of treated effluent discharged to the river periyar during 2021-2024

Month	Outlet 2	% of outlet flow against consent quantity	Outlet 1	% of outlet flow against consent quantity
	KL/day		KL/day	
Consent qty	12000		4800	
Aug-24	602	5	589.77	12
Jul-24	925.3	8	689.19	14
Jun-24	784	7	553.78	12
May-24	958.5	8	214	4
Apr-24	437.7	4	138.2	3
Mar-24	705.4	6	420.9	9
Feb-24	445.7	4	772.9	16
Jan-24	698.4	6	577.8	12
Dec-23	474.1	4	802.4	17
Nov-23	993	8	750	16
Oct-23	805	7	662	14
Sep-23	1080	9	538	11
Aug-23	268	2	100	2
Jul-23	849	7	703	15
Jun-23	488	4	653	14
May-23	449	4	551	11
Apr-23	398	3	663	14
Mar-23	314	3	626	13
Feb-23	373	3	692	14
Jan-23	474	4	578	12
Dec-22	753	6	728	15
Nov-22	761	6	734	15
Oct-22	396	3	611	13
Sep-22	532	4	545	11
Aug-22	936	8	461	10
Jul-22	870	7	282	6
Jun-22	1160	10	586	12
May-22	1343	11	587	12
Apr-22	769	6	485	10
Mar-22	465	4	420	9
Feb-22	517	4	767	16
Jan-22	443	4	772	16
Dec-21	346	3	618	13
Nov-21	936	8	743	15

Direction issued under 33A of Water (Prevention & Control of Pollution) Act, 1974 in the matter of achieving zero liquid discharge

From: Head RED (head-red@irel.co.in)

To: esceloor@yahoo.co.in

Date: Wednesday 18 September, 2024 at 05:38 pm IST

Dear Sir / Madam,

Please find attachment on the subject cited above.

सादर Regards

मुख्य महा प्रबंधक एवं प्रधान, रे.अ. प्रभाग CGM & Head, R.E. Division
आईआरईएल (इंडिया) लिमिटेड IREL (India) Limited
रेअर अर्थ्स प्रभाग Rare Earths Division
उद्योगमंडल Udyogamandal, कोचीन Cochin-683501



Direction issued under section 33A of Water (Prevention & Control of Pollution).pdf
945.3kB



अज्ञानी का अमृत महीलाय

आईआरईएल (इंडिया) लिमिटेड IREL (India) Limited

(Formerly Indian Rare Earths Limited)

(भारत सरकार का उपक्रम)

(A Govt. of India Undertaking)

CIN : U15100MH1950GOI008187 Website : www.irel.co.in

ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018 Company



IRE/RED/Production/2024/3/589

Date: 18.09.2024

The Senior Environmental Engineer,
Kerala State Pollution Control Board,
Environmental Surveillance Centre,
Udyogamandal-683501

5/9

Sub: Direction issued under section 33A of Water (Prevention & Control of Pollution) Act, 1974 in the matter of achieving zero liquid discharge.

Ref: 1. Letter No. PCB/ESC/CO-124/06 dt.07.09.2024 received on 09.09.2024

2. Order dated 27.05.2022 of Hon'ble NGT in the original application No. 395/213/SZ(THC) & connected matters

As you are aware IREL (India) Limited, formerly Indian Rare Earths Limited is a CPSU under Department of Atomic Energy, Govt carrying out separation of Rare Earths compounds catering to the requirements of critical elements and strategic supply.

In response to the order dated 27.05.2022 of Hon'ble NGT in the original application No. 395/213/SZ(THC) & connected matters and as per conditions given in the consent to operate, we are pleased to report that during past couple of years we have taken proactive measures to reduce effluent discharge from our Effluent Treatment Plant (ETP). Key actions include:

1. Installation of DM water plant for product leaching in place of process water.
Benefits: By introducing the above, number of water leaching reduced from twelve to eight resulting in reduction of 33 % water consumption in leaching sections. Reduced water consumption in leaching operations resulted in reduction of liquid effluent.
2. Introduction of improved technology for slurry filtration using centrifuge in place of conventional vacuum filtration (Agitated nutsche filter) and diesel fired drying system for all major products Lanthanum carbonate, Cerous carbonate and Nd-Pr oxalate
Benefits:
 - a. By introducing the above improved technology number of water leaching reduced from eight to two resulting in reduction of further 62 % water consumption in leaching sections.

रेअर अर्थ्स प्रभाग, उद्योगमंडल, कोच्ची - 683 501

Rare Earths Division, Udyogamandal, Kochi - 683 501

फोन / Tel.: 0484 - 2545062 - 65 फैक्स / Fax : 0484 - 2545269

पंजीकृत कार्यालय: प्लॉट नं. 1207, वीर सावरकर मार्ग, सिद्धिविनायक मंदिर के पास, प्रभादेवी, मुंबई - 400 028

Regd. Office: Plot No. 1207, Veer Savarkar Marg, Near Siddhivinayak Temple, Prabhadevi, Mumbai - 400 028

फोन / Tel.: 022 - 2421 1630 / 2438 2042 फैक्स / Fax : 022 - 2422 0236

- b. Recycling of centrifuge filtrate for initial leaching resulted in 20% reduction in water consumption in leaching.
 - c. Stoppage of vacuum pump operation in filtration areas resulted in 5% reduction in water consumption of cooling water.
3. Process parameter of scrub solutions changed from 100gpl to 200 gpl with suitable process and equipment modifications
Benefits: By introducing the above, water consumption reduced by 50% in scrub preparation section.
 4. Process parameter of scrub solutions changed from 1N, 1.5N, 2N and 4N hydrochloric acid to stream generated solution.
Benefits: By introducing the above, water consumption eliminated for dilution of commercial HCl for scrubbing purpose.
 5. Batch concentration of soda ash solution & oxalic acid solution increased from 100 gpl to 150 gpl
Benefits: By introducing the above, water consumption reduced by 33% in soda ash and oxalic acid dissolution section.
 6. Process improvement by utilizing system generated weak RE solution in place process water for RE flakes dissolution
Benefits: By introducing the above, 120 m³ per month water consumption reduced in RE flakes dissolution.

These initiatives have led to a significant reduction in average effluent discharge from 130 KLD during 2022 to 95 KLD during 2023, well within the authorized discharge limit of 400 KLD. We would like to put on record that we have not violated any conditions of the integrated consent to operate and have taken various actions as stated above for reduction of treated effluent discharge. We are in the process of continuous improvement and implementation of advanced technologies towards achieving zero liquid discharge.

Yours Truly
For IREL (India) Limited


CGM & Head, RE Division 18/09/24



KERALA STATE POLLUTION CONTROL BOARD

ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Or.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501.

Phone: 0484 2545678, E-mail: esceloor@yahoo.co.in



LiFE
Lifestyle for
Environment

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട് ക്വാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി.ഒ.,

എറണാകുളം-683 501

PCB/ESC/CO/106/06

Date: 03.07.2024

Ref: Consent No:PCB/HO/EKM-3/ICO-R/06/2023 issued on 30/06/2023, valid upto 30/06/2028

CLOSURE INTENTION NOTICE

WHEREAS the Government of Kerala have constituted the Kerala State Pollution control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of Environmental legislations, in the Water (Prevention & control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environmental (Protection) Act in the state;

WHEREAS M/s. Travancore-Cochin Chemicals Ltd P.B No. 4004, Udyogamandal P.O., Kochi - 683501, Industrial Development Area, Edayar, Muppathadom P.O, Ernakulam hereinafter referred to as the unit, comes under the purview of the Water (Prevention and Control of Pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981, and Environment (Protection) Act 1986;

WHEREAS as per reference above, Board had issued consent to you for operating chlor-alkali industry;

WHEREAS you were bound to comply with the conditions of the consent issued by the Board as per Section 21 of Air (Prevention and Control of Pollution) Act 1981 and Section 25 of Water (Prevention and Control of Pollution) Act 1974;

WHEREAS inspection was conducted by Board officials in the unit on 02.07.2024 at around 8.30 p.m;

WHEREAS during the inspection, even without any rain on the day, effluent was found discharging through the storm water drain from the unit into the river;

WHEREAS since there was no rain on that day, any discharge through storm water drain is suspected to be effluent from the unit;

WHEREAS you are not permitted to discharge any effluent / treated effluent into the river other than storm water;

WHEREAS Unauthorized discharge of effluent through the storm water drain into the river Periyar is a serious offence under the relevant provisions of Water (Prevention and Control of Pollution) Act 1974 and you have discharged the effluent intentionally to the water body which may affect the aquatic life adversely;

WHEREAS as per Section 32 -1 (c) of Water Act 1974, where it appears to the State Board that any poisonous, noxious or polluting matter is present in any stream or well or on land by reason of the discharge of such matter in such stream or well or on such land or has entered into that stream or well due to any accident or other unforeseen act or event, Board can issue orders immediately restraining or prohibiting the person concerned from discharging any poisonous, noxious or polluting matter into the stream or well or on land;

NOW THEREFORE you are hereby directed to stop the discharge noticed as above immediately as per Section 32-1(c) of Water (Prevention and Control of Pollution) Act, 1974 and report the action taken to this office at the earliest.

Also you are hereby directed to show cause if any within 15 days of receipt of this order why Board shall not issue direction under Section 33A of Water (Prevention and Control of Pollution) Act, 1974 including

- (a) the closure, prohibition or regulation of any industry, operation or process; or
- (b) the stoppage or regulation of supply of electricity, water or any other service;

(c) any other appropriate direction under section 33 of Water (Prevention and Control of Pollution) Act, 1974.

Dated this the 3rd day of July, 2024.



For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


SENIOR ENVIRONMENTAL ENGINEER

SENIOR ENVIRONMENTAL ENGINEER
KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
FLOOR, UDYOGAMANDAL - 683 501

To

The General Manager Technical
M/s. Travancore-Cochin Chemicals Ltd,
P.B No. 4004, Udyogamandal P.O., Kochi - 683501

- Copy to: 1. The Chairperson, KSPCB
2. The Member Secretary, KSPCB
3. The Chief Environmental Engineer
KSPCB, Regional Office, Ernakulam



THE TRAVANCORE - COCHIN CHEMICALS LTD.

(A GOVERNMENT OF KERALA UNDERTAKING)

P.B. NO. 4, UDYOGAMANDAL P.O., KOCHI - 683 501, KERALA.

CIN:U24299KL1951SGC001237



TCC/PCB/DGME /CIN/01/2024

8th July 2024

**The Senior Environmental Engineer,
Environment Surveillance Centre,
Kerala State Pollution Control Board,
Udyogamandal P.O, Eloor**

Respected Sir,

Sub: Closure Intention Notice issued to TCC LTD -reg:

Ref: PCB/ESC/CO/106/06 dated 03/07/2024 received on 03/07/2024.

Kindly note that we are in receipt of the above Closure intension notice; we have taken immediate steps to ensure complete compliance of the points mentioned. Therefore, with reference to the above, the measures taken on the notice is submitted for your kind consideration.

As per the above referred letter.

WHEREAS inspection was conducted by Board officials in the unit on 02.07.2024 at around 8.30 p.m;

WHEREAS during the inspection, even without any rain on the day, effluent was found discharging through the storm water drain from the unit into the river

WHEREAS since there was no rain on that day, any discharge through storm water drain is suspected to be effluent from the unit.



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CIN:U24299KL19515GC001237



Kindly note that as per the consent No. PCB/HO/EKM-3/ ICO-R/06/2023 issued on 30.06.2023, valid upto 30.06.2028, existing lagoon is to be used for storm water and cooling water overflow. Normally we take storm water and cooling tower overflow into the lagoon and reuse this water for irrigation purposes by operating pumps at storm water outlet area and ensures that there is no discharge through authorized outlet. We have also installed a pH meter at the outlet of the lagoon and continuously monitor the pH and other parameters (Chloride, TSS, Oil & grease) to ensure that the values are within limit.

Please note that one of our process cooling tower was under mechanical maintenance for the last two weeks and because of this, for controlling temperature we were maintaining more overflow of water in other cooling towers than normal rate. The quality of this overflow water was ensured to maintain within the statutory limits. As indicated above on 02.07.2024, there was more quantity of cooling water overflow, and this increased the water level in the lagoon than in the normal condition. The quantity was beyond the limit of pumps which we have installed in the lagoon outlet for reuse. This resulted in the discharge of water for which quality was ensured into the river.

We took parallel samples during the time of inspection by KSPCB officers on 02.07.2024 and analyzed the parameters in our lab and values of all the parameters were found within the limit as per the consent.

Immediately after this incident, we provided one more pump at the lagoon outlet in addition to the existing pump for ensuring continuous reuse of water coming into the lagoon and for stoppage of any discharge into the river.

WHEREAS you are not permitted to discharge any effluent / treated effluent into the river other than storm water;

WHEREAS Unauthorized discharge of effluent through the storm water drain into



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CIN:U24299KL1951SGC001237



the river Periyar is a serious offence under the relevant provisions of Water (Prevention and Control of Pollution) Act 1974 and you have discharged the effluent intentionally to the water body which may affect the aquatic life adversely.

Kindly note that all the effluents generated in the plants are being taken into effluent treatment plant and we are completely reusing treated effluent water to ensure zero effluent discharge. We have an online continuous effluent monitoring system installed at ETP with continuous data transmission to CPCB & KSPCB portals. The effluents from different plants are being collected through pipes lines and the entire system is continuously monitored, thus preventing any entry of effluent/ treated water into the storm water system. Hence, we confirm that no effluent / treated water is discharged into the storm water system.

TCC is always committed to the environment's well-being, and we are bound to abide by the Directions of KSPCB. Corrections/preventive measures as indicated above have been taken to address the issues mentioned in the Closure Intention Notice and to avoid recurrence of such incidents in future.

For your kind consideration for revocation of the Closure Intention Notice, please.

Thanking you,

Yours faithfully,

E. B Francis

Deputy General Manager Engineering



CETP - Edgier

List of Effluent generating Industries in Edayar Industrial Area

S.No	Sl. No.	Name and Address of the unit	Type of unit	Category	Capital Investment	Scale	Water Consumption (Litres/day)	Sewage/Effluent generation (Litres/day)	ETP Details	Sewage disposal details
		INDUSTRIES HAVING FULL FLUDGED ETP AND PERMITTED OUTLET TO RIVER PERIYAR								
1	1	Sud Chemie India Private Limited Edayar Industrial Development Area, Binanipuram P.O., Pin - 683 502	chemical catalyst industry	Red	Rs. 6988.35 lakhs	Large	450000	450000	1.oil traps 2.equalisation tank 3.flash mixer 4 clarifier 5.filter press 6. Delay tank	To river periyar (Downstream of Puthalam)
2	2	Cochin Minerals and Rutile Ltd., Industrial Development Area, Edayar, Muppalthadam P.O.	Mining and ore beneficiation (ore - Ilmenite)	Red	Rs. 6670.48 Lakhs	Large	1995000	659000	Neutralisation, Equalisation, Flash mixer, Secondary clarifier, vaccumbelt filter, filter press	To River periyar (Downstream of puthalam)
3	3	TMS Leathers Industrial Development Area Edayar, Muppalthadam P.O.	Leather	Red	Rs 179.87 Lakhs	Large	123600	101000	Solar evaporation beds, Chrome recovery plant collection tank, Effluent collection tank, Equalisation	To river Periyar (upstream side of puthalam)
		TOTAL						1210000		
		ACTIVATED CARBON								
4	1	Active Char Product Pvt. Ltd., Industrial Development Area, Edayar	Activated carbon	Red	Rs.1342.46 Lakhs	Medium	1,00,000	4500	No trade effluent generated (only boiler blow down/back wash return after the process) STP (10 KLD) with MBR	Percolation pit
5	2	Cocisin Surfactants Pvt. Ltd., Industrial Development Area, Edayar, Muppalthadam P.O.	Activated Carbon production unit	Red	Rs. 368.45 Lakhs	Small	30400 (Process: 400LPD, Domestic: 1500LPD)	6500 (domestic - 5000LPD & boiler blow down: 1500LPD)	No ETP	Septic tank soak pit system provided for
6	3	Indo German Carbon Ltd., Industrial Development Area, Edayar, Binanipuram P.O.	Activated carbon	Red	Rs 1987.07 Lakhs	Large	139300	8600	collection tank, neutralisation, sand filter, and carbon filter and ultrafiltration system	For irrigation and percolation pit
		TOTAL						19600		

Bone meal/rendering units/fish processing units										
7	1	Alliance Marine Products Industrial Development Area, Edayar	RENDERING UNIT	Red	Rs. 550 Lakhs	Medium	53,750	45,000	ETP of 100 KLD capacity - Screen chamber, grit chamber, fat & oil removal with DAF, fat & oil trap, High Rate	Reuse & Soak Pit
8	2	Ashan Exports & Furnishers Industrial Development Area, Edayar, Muppachadam P.O.	Bone Meal and Rendering unit	Red	Rs. 178.23 Lakhs	Small	13,000	12,000	Multiple Effect Evaporator and Agitated Thin Film Drier	Reuse
9	3	Biocore Industries Industrial Development Area, Edayar, Muppachadam P.O.	Bone Meal Unit	Red	Rs. 1.13 CRORES	Small	2500	Not Available	No ETP	Effluent mixed with Lime and sell as manure
10	4	Marismen marine products Pvt. Ltd, SyNo.61/6-10, IDA, Edayar	Fish meal & Fish oil Manufacturing	Orange	Rs. 608.52 LAKHS	Medium	35000	52000	screen chamber, oil trap, collection tank, anaerobic system, equalisation tank, aeration tank, secondary	Reuse
11	5	National Industries Industrial Development Area, Edayar, Muppachadam P.O.	Bone Meal Unit	Red	Rs. 20.25 lakhs	Small	900	Not Available	No ETP	Effluent mixed with Lime and sell as manure
12	6	Nelkadhir Bone Industries Industrial Development Area, Edayar, Muppachadam P.O.	Bone Meal Unit	Red	Rs. 44.37 lakhs	Small	1400	Not Available	No ETP	Effluent mixed with Lime and sell as manure
13	7	Organo Fertilizers (India) Pvt. Ltd., Industrial Development Area, Edayar, Muppachadam P.O.	Bone meal	Red	Rs. 689.77 lakhs	Medium	5000	10000		
14	8	Pancham Agro Industries Industrial Development Area, Edayar, Muppachadam P.O.	Bone Meal Unit	Red	Rs. 24.81 Lakhs	Small	1000	Not Available	No ETP	Effluent mixed with Lime and sell as manure
15	9	PARAKKAL INDUSTRIES VI, 592 A, IDA BINANIPURAM P.O. EDAYAR - 683502	Bone meal	RED	Rs. 17.57 Lakhs	Small	8000	7000	screen chamber, oil trap, equalisation tank, flash mixer, primary settling tank, recirculation tank, anaerobic	Soak pit

16	10	Sigma Fertilizers Industrial Development Area, Edayar, Muppalthadam P.O.	Bone Meal Unit	Red	Rs.7.61 Lakhs	Small	2000 (Domestic - 1000, Boiler - 1000)	Not Available	No ETP	Effluent mixed with Lime and sell as manure
17	11	Varkey's Industries Industrial Development Area, Edayar, Muppalthadam P.O.	Bone Meal Unit	Red	Rs. 6.39 Lakhs	Small	Domestic - 500	Domestic - 300	No ETP	Effluent mixed with Lime and sell as manure
18	12	Yeoman Bone and Allied Products, Industrial Development Area, Edayar, Muppalthadam P.O.	Bone Meal Unit	Red	Rs. 150 Lakhs	Small	8900	2000	No ETP, Provided shell and tube water condenser	Reuse in boiler
19	13	Five Star Industries Industrial Development Area, Edayar, Muppalthadam P.O.	Manufacturing of animal tallow	Red	Rs.9.78 Lakhs	Small	Domestic - 200	Not Available	No ETP	Effluent mixed with Lime and sell as manure
20	14	FORMAL TRADE LINKS LLP Industrial Development Area Edayar, Binanipuram P.O.	Tallow unit	Red	Rs.21.50 Lakhs	Small	1200	200	screen chamber, collection tank, oil removal, aeration tank, clarifier, filter feed tank, pressure sand filter, activated carbon adsorption	Reuse
21	15	HS INDUSTRIES V/597 INDUSTRIAL DEVELOPEMENT AREA EDAYAR MUPPATHADAM ALIYA	Tallow unit	Red	Rs. 14.37 Lakhs	Small	200	500	Anaerobic Digester 1, Anaerobic Digester 2, Aeration Tank 1, Aeration Tank 2, settling tank, filter feed tank, pressure sand	Soak pit
22	16	Saya Enterprises Industrial Development Area, Edayar, Muppalthadam P.O.	Tallow unit	Red	Rs.11.22 LAKHS	Small	620	Not Available	No ETP	Effluent mixed with Lime and sell as manure
TOTAL								139,100		
Paint unit/thinner etc										
23	1	Allied Coating Industries Building No. 253, Industrial Development Area, Edayar, Binanipuram P.O.	Water based paints	Orange	Rs. 22.50 Lakhs	Small	1000	750	Settling tank - soak pit	Soak pit

24	2	AMCOS XL PAINTS (INDIA) PVT. LTD, Unit 1, Industrial Development Area, Bund Road, Edayar, Muppalthadam P.O.	Water based & solvent based paints	Orange	Rs. 54.45 Lakhs	Small	1000	500	Collection tank, mixing channel, settling tanks, sand filter, filter press	Reused for floor cleaning
25	3	Cochin Petromins, Industrial Development Area, Edayar	Manufacturing of Thinner, Turpentine, Wall primer	Red	Rs. 124.5 lakhs	Small	500	100	collection tank, settling tank, chemical precipitation tank, aeration tank and filtration	Reuse
		TOTAL						1350		
		Rubber industries (crumb/crepe/centrifuged latex)								
26	1	ALPHARUB CRUMB RUBBER P LTD V/793, IDA, EDAYAR, ALUVA - 683110	Crumb rubber	Orange	Rs. 799 LAKHS	Medium	100000	65000	Rubber trap (2 nos), collection tank, lime mixing tank, parallel plate settler, aeration tank, secondary	Reused in the process
27	2	Essar Enterprises Building No. 654 A Industrial Development Area Pin - 683 502	Crepe rubber	Orange	Rs. 24 LAKHS	Small	10000	5000	rubber trap, chemical treatment, primary settling tank, aeration tank, secondary settling tank, disinfection,	Treated water reused in the process
28	3	Malaya Rub Tech Industries Industrial Development Area Edayar, Muppalthadam P.O.	Rubber	Orange	Rs. 1571.50 lakhs	Large	720800	710000	bar screen, rubber trap, oil & grease trap, primary settling tank, aeration tank, secondary settling tank, pressure sand	Reuse
29	4	Sunrise TSR Factory Industrial Development Area, Edayar, Muppalthadam P.O.	Crumb rubber unit	Orange	Rs. 300 Lakh	Small	302000	45000	rubber trap, collection tank, chemical treatment tank, primary settling tank, aeration tank (2)	Reuse
30	5	Njavallil Latex Pvt. Ltd. Industrial Development Area, Edayar, Binanipuram P.O.	Centrifuged latex	Red	Rs. 4.28 lakhs	Small	51500	41300	Rubber trap, chemical treatment, primary settling tank, final holding tank, pressure sand filter, activated	Reuse
		TOTAL						885300		

	COMPOUND RUBBER									
31	1	JRS Intermix and Rubber Products Pvt. Ltd., Industrial Development Area, Near KSEB Substation, Edayar,	Rubber unit	Orange	Rs 142.73 Lakhs	Medium	2500	2500	collection tank, aeration tank, settling tank, filter feed tank, filtration, and treated water tank	Soak pit
32	2	Rubber D Malabar Products Pvt. Ltd. IDA, Edayar, Muppathadam P.O.	Rubber	Orange	Rs. 947.63 Lakhs	Medium	6250	1000	Collection tank, Settling tank, Aeration tank, filtration, final tank *waste water from bath	reuse
	TOTAL							3500		
	Electroplating/powder coating units									
33	1	Aristo Steel Fabricators Door V/688D, Edayar, Industrial Development Area, Muppathadam P.O.	Engineering fabrication, powder coating	Red	Rs. 9.22 Lakhs	Small	850	780	Collection tank, equalisation tank, aeration tank, settling tank and filtration and treated water tank	Reuse
34	2	Bright Coats, Edayar, Industrial Development Area, Binanipuram P.O., Pin - 683502	Anodising unit	Red	Rs. 1.94 Lakhs	Small	500	50	collection tank, lime addition and settling tank	Soak pit
35	3	BRIGHT POWDER COATINGS, DOOR NO. 6/175, IDA, EDAYAR, ALLIYA-EDAYAR ROAD	Powder coating unit	Orange	Rs. 80 LAKHS	Small	1300	200	No ETP	Directly disposed to drain
36	4	Exelon Hi-Fabs and Contractors Pvt. Ltd. (Matsen Electro coats Pvt. Ltd), Industrial Development Area, Edayar, Muppathadam P.O.	Powder coating unit	Red	Rs 48.87 Lakhs	Small	4000	3000	collection cum equalisation tank, reduction and precipitation tank, alkali addition tank, settling tank,	Reuse
37	5	NEW ALUMINIUM AND ALLIED INDUSTRIES, V/807, IDA, EDAYAR, MUPPATHADAM 683110	Aluminium powder coating	Red	Rs.30 lakhs	Small	250	250	Waste water is collected in a collection tank and after chemical mixing and disposed to the drain	disposed to the drain

38	6	Poly-Coat Industries (Ramanand Electrocoats), Industrial Development Area, Edayar, Mappathadam P.O.	Powder coating unit	Red	Rs.23.24 Lakhs	Small	4000	2000	collection cum neutralisation tank, oil trap, settling tank, filter feed tank, pressure sand filter, activated carbon filter.	Reuse
39	7	Popular Industries Industrial Development Area, Edayar, Binanipuram P.O.	Electroplating unit	Red	Rs.10.81 Lakhs	Small	200	150	the effluent and after that the effluent disposed to the treatment system of nearby service station. But the treatment system of	Soak pit
40	8	Success Spinning Pvt Ltd, V/752, (B. No. 21, 21A, 21B), Industrial Development Area, Edayar, Mappathadam P. O.	Powder coating unit	Red	Rs. 35 lakhs	Small	350	250	Some tanks provided for the treatment of effluent which is not adequate	Reuse
41	9	KEWO GRAVURES IDA, EDAYAR, BINANIPURAM	PRINTING ROLLERS	Red	Rs.8.24 lakhs	Small	940	250	Neutralisation and precipitation tank, settling tank, filter, treated water tank *Provided an ETP in the unit.	Soak pit
42	10	St. George Industries, Industrial Development Area, Edayar, Binanipuram P.O.	Engineering unit	Red	Rs.21.96 lakhs	Small	1000	250	Waste water generated during the pre-treatment is collected in the tank and neutralised and settled sludge is	reuse
43	11	Wisdom Associates & Co Industrial Development Area, Edayar, Binanipuram P.O.	Aluminium powder coating	Red	Rs.48 Lakhs	Small	1700	1000	collection tank, coagulation and settling tank, filter feed tank, pressure sand filter, activated carbon filter and	Reuse
TOTAL								8180		
Oleo resins										
44	1	Arjuna Natural Limited, Industrial Development Area, Binanipuram P.O., Edayar.	Oleo resins manufacturing unit	Orange	Rs.12.43 Crore	Medium	51,000	20,000	Collection tank, neutralisation tank, flocculation tank, aeration tank, settling tank, filtration, triple effect	Land percolation and reuse
45	2	TMV Natural Oils and Extracts (P), Industrial Development Area, Edayar, Mappathadam P.O.	Herbal extracts	Orange	Rs.403.75 lakhs	Small	1700	1000	screen chamber, oil trap, equalisation, flocculation tank, primary settling tank, anaerobic tank, aeration tank.	Soak pit

46	TOTAL							21,000		
	Nitrous oxide									
	1	Atchuth Nitrous Company, V/549C, Industrial Development Area, Edayar, Binanipuram P.O.	Nitrous Oxide manufacturing	Green	Rs. 37 Lakhs	Small	1400	1200	Waste water generated is the condensed steam and scrubbed water which is collected in a settling tank	Reuse - recirculated in the process
47	TOTAL							1200		
	Oil recycler									
	1	Cee Jee Lubricants, Industrial Development Area, Edayar, Binanipuram P.O.	Oil re-refining	Orange	Rs. 250 Lakhs	Small	11,000	No effluent generation	Provided oil trap in the storm water drain and disposed to public drain after settling tank/collection tank.	Cooling water is completely recirculated
48	TOTAL							nil		
	Ware house/ go down									
	1	CELLA SPACE LTD Industrial Development Area, Mupathadam Edayar, Ernakulam.	Ware House/ Godown	Orange	Rs. 1710 Lakhs	Medium	20000	20000	ETP of 25 KLD capacity - screen chamber, septic tank, up flow anaerobic reactor, collection/ equalisation tank.	Soakpit
TOTAL							20000			

	Gold purification									
49	1	CGR Metallurgy Pvt. Ltd., (Cheramanur Gold Refinery (P) Ltd., Century Castings & Rubber Works) No. Industrial	Gold purification	Red	Rs. 45 Lakhs	Small	100	50	equalisation tank, chemical treatment tank, collection tank, final pH correction tank and filtration	Treated water reused for gold washing
	TOTAL							50		
	Dyeing unit									
50	1	Classic Concepts Home India Pvt. Ltd., VI/565, Industrial Development Area, Edayar, Binanipuram P.O.	Dyeing unit	Red	Rs. 76.3 Lakhs	Small	37000	34000	oil & grease trap, flesh mixer, clarifier, aeration tank, clarifier, pressure sand filter, activated carbon filter, treated	soak pit
	TOTAL							34000		
	Formaldehyde Resin units									
51	1	Cloud Chemicals Door No. 18/770, Industrial Development Area, Edayar, Binanipuram P.O., Ernakulam -	Formalin & Urea formaldehyde Resin	Red	Rs. 545 Lakhs	Medium	7500	2000	screening, equalisation, anaerobic system, aerobic system, flocculation, settling and filtration	Treated effluent reused in the process
52	2	Deccan Industries Industrial Development Area Edayar, Binanipuram P.O., Ernakulam - 683 502	Urea formaldehyde Resin	Red	Rs. 50 Lakhs	Small	2000	2000	collection tank, electro- coagulation, settling cum clarifier, sand filter, carbon filter, treated water tank	Treated effluent reused in the process
53	3	Travancore Polymers V/779, Industrial Development Area, Edayar, Binanipuram P.O., Ernakulam - 683 110	Urea formaldehyde Resin	Red	Rs. 20 Lakhs	Small	2000	2000	collection tank, electrocoagulation, poly dosing system, clarifier, pressure sand filter, activated	Soak pit

54	4	Vinayaka Industries, V/685, Industrial Development Area, Edayar, Muppalthadam P.O.	Urea formaldehyde Resin	Red	Rs. 18.54 LAKHS	Small	2400	350	collection tank, electrocoagulation, settling cum clarifier, sand filter, carbon filter, treated water tank	Treated effluent reused in the process
55	5	Euro Polymers Industrial Development Area, Edayar, Binanipuram P.O.	Chemical	Red	Rs.42 LAKHS	Small	2000	1000	Collection tank, electrocoagulation, poly dosing system, clarifier, pressure sand filter, activated	Reuse
56	6	Gayathri Industries V/622, Industrial Development Area, Edayar, Muppalthadam P.O. Ernakulam	Chemical	Red	Rs. 27.74 LAKHS	Small	1750	1035	collection tank, electrocoagulation, settling cum clarifier, sand filter, carbon filter, treated water tank &	Reuse
57	7	Hs Power Industries VI/652, Industrial Development Area, Edayar, Binanipuram P.O. Pin - 683 502,	Chemical	Red	Rs. 50 lakhs	Small	2000	1000	Collection tank, Electrocoagulation, Settling cum clarifier, Sludge drying bed, Sludge storage tank, Sand	Reuse
58	8	KV5 Polymers (Fai's Chemicals) V/715A, Industrial Development Area, Edayar, Muppalthadam P.O. Ernakulam - 683 110	Chemical	Red	Rs.24.27 lakhs	Small	1100	1100	collection tank, electrocoagulation, settling cum clarifier, sand filter, carbon filter, treated water tank	Reuse
59	9	Ridha Polymers VI/599, Development Area, Edayar, Binanipuram P.O.	Chemical	Red	Rs. 298.71 Lakhs	Small	15.8 KL	2.5 KL	screen chamber, oil separator, equalisation, anaerobic tank, aeration tank, flocculation tank, settling, filter feed tank,	Reuse
60	10	Inter Decore Industries, Industrial Development Area, Edayar Binanipuram P.O.	Fabrication unit	Orange	Rs.138.5 lakhs	Medium	250	150	collection tank, chemical treatment facility & filter provided	Reuse
TOTAL								13135		
Ready mix/concrete allied/sand unit										
61	1	DURATECH CONCRETE AND PRODUCTS 63/2 C, Edayar Kara, Kadungaloor	Readymix	GREEN	Rs. 212 Lakhs	Small	27000	5000	Settling tanks	clear water reused in the process

Battery									
1	National battery industries, Industrial Development Area, Edayar, Muppalthadam P.O.	Battery unit	Red	Rs. 10.5 lakhs	Small	500	500	Waste water generated during the battery cure is disposed to an underground tank covered with concrete slab	disposed to an underground tank
TOTAL							500		

STEEL

1	Premium Ferro Alloys Limited, Industrial Development Area Edayar, Binanipuram P.O. Ernakulam District	Steel industry	Red	Rs. 850 Lakhs	Medium	21500	20000	Scrubber water collected in the settling tank and recirculated	recirculated
TOTAL							20000		

Cleaning materials

1	Jonaris Jaliz & Company Plot NO. 91/7A, NO. V/684A IDA, Edayar, Muppalthadam P.O.	Cleaning materials	Green	Rs 55.25 lakhs	Small	5340	1500	collection tank, neutralisation and equalisation tank and sludge settling tank	soak pit
TOTAL							1500		

Barrel cleaning

72

1	GLOBAL TRADERS Old Mosque Road, Edayar Industrial Area, Binanipuram P.O.	Cleaning and Storage of Plastic barrels and Cans	Green	Rs.9.50 Lakhs	Small	2300	2000	ETP of 2KLD with the units such as grit chamber, three chambered collection tank, chemical addition and settling	Soak pit
TOTAL							2000		
Cattle field									
1	Prima Agro Ltd, Industrial Development Area, Edayar Mappothadom P.O.	Cattle feed	Orange	Rs. 919.18 Lakhs	Medium	10000	2000	Collection tank, settling tank, filtration	Reuse
TOTAL							2000		

73

Copper oxy chloride									
2	CHEMICAL MANUFACTURING CORPORATION	Chemical	Red	Rs 19.70 lakhs	Small	300	300	Collection tank, reaction cum settling tank, filter feed tank, pressure sand filter, pressure carbon filter, sludge drying bed	Reuse
TOTAL							300		
Distillation of solvents/chemical packing									
1	Sterling Industrial Chemical & Allied Industries, Industrial Development Area, Edayar, Binnapuram P.O.	Chemical	Red	Rs. 22.9 lakhs	Small	4000	NA	Cooling water completely recirculated	reuse
TOTAL							NIL		
	TOTAL QUANTITY OF EFFLUENT	2,420,815							
	PRODUCED IN INDUSTRIES HAVING FULL FLUGHED ETP AND PERMITTED OUTLET TO RIVER PERIYAR	1210000							
	PRODUCED EXCLUDING INDUSTRIES HAVING FULL FLUGHED ETP AND PERMITTED OUTLET TO RIVER PERIYAR	1,210,815							
	PRODUCED BY READY MIX CONCRETE PLANT, STEEL UNIT, ACTIVATED CARBON (THAT DOES NOT NEED MUCH TREATMENT)	75200							
	THAT NEED FULL FLUGHED TREATMENT	1,135,615							

☎ : General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
E-mail: ms.aspcb@gov.in FAX: 0471- 2318134, 2318152 web: www.keralapcb.nic.in



KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram - 695 004
പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004

PCB/HO/EE1/CETP-EDAYAR/2021-22

Date: 04/02/2023

From

The Chairman

To

The Chief Environmental Engineer
Regional Office
Ernakulam



Sub:- Action as per Chief Secretary's meeting with RRC/Stakeholder department /Authorities in the matter of NGT order in OA.No.673/2018 held on 21/12/2022 CETP in Edayar -reg.

Ref:- Minutes of the meeting held on 21/12/2022.

Sir,

Copy of the minutes of Chief Secretary's meeting with RRC/ Stakeholder, department/Authorities in the matter of NGT Order in OA. 673/2018 held, on 21/01/2022 is enclosed. As per the decision taken in the meeting, you are requested to review the status of operation of industries in Edayar Area and to furnish an urgent report with specific remarks on, whether the industries are disposing the effluent as per law, after necessary treatment.

Yours faithfully,

CHAIRMAN

012



Minutes of the monthly meeting chaired by the Chief Secretary with Department/Authorities concerned on 21/12/2022 to review the progress made in the projects taken up as per orders of the Hon'ble National Green Tribunal in OA No. 673/2018 (PZ) and connected matters.

The meeting commenced at 04:00 PM with the Chief Secretary in chair. The following officials were present during the meeting: Additional Chief Secretaries of Environment and Local Self Government Departments, Secretaries of Agriculture, & Finance Departments, Additional Secretary, Revenue Department, Commissioner, Land Revenue, Managing Director, Kerala Water Authority, Principal Director, LSGD, Directors of Panchayats, Urban Affairs and Environment, District Collectors / DDCs, DCP, Kozhikkode, Chairman & Member Secretary, Kerala State Pollution Control Board, CE, Irrigation Department, Secretaries of local bodies and other officials concerned.

Member Secretary, KSPCB presented the status of the proposed / ongoing projects.

Following decisions/suggestions were made after detailed discussions and deliberations:

1.Contract default in sanitation projects to be examined & blacklisting of contractors failing to meet the agreement provisions:

MD, KWA informed that they have in an instance, in recent past, issued notice blacklisting one contractor and that matter is under stay in the Hon'ble High Court. This has been communicated to the Water Resources Department on 15/10/2022. Director, Urban Affairs also conveyed that the same will be followed by the LSGD if any violations are noticed. Principal Director, LSGD informed that instructions were issued in this regard to LSGIs.

(Action: Water Resources Department, Kerala Water Authority, Directorate of Urban Affairs, Local Self Government Department)

2. Projects stayed by the High court:

A D.O letter dated 17.12.2022 was issued to the Advocate General by ACS , LSGD , on vacating stay in cases involving waste management projects. The

State Government have made commitments before the National Green Tribunal for facilitating waste management projects in a time bound manner. The National Green Tribunal has been imposing environmental compensation against States, not providing for waste management facilities as is required under law.

The Departments/Authorities concerned shall expeditiously ensure the proper representation of the Government Pleaders concerned before the judicial forums. Statements/Affidavits/Memorandums in detail, containing the dire necessity of such projects and the damages to the environment / public / Government, that would be incurred due to the inordinate delay in implementing the projects shall also be invariably included in the reports/affidavits to be submitted before the judicial forums. The financial loss with interest on account of delay in execution of projects is to be worked out and prayer for recovering the same from the petitioner shall also be included. If the cases are decided in favour of the Government in such cases, then petitions may be filed against the persons/organizations (who have filed unwanted, unnecessary, public nuisance litigations) who file litigation without any valid & genuine reasons for recovery of damages caused to Government. The details of GPs who are not properly representing the Government may be forwarded to LSGD (lsg.wmdept@kerala.gov.in & lsg.wm7427@gmail.com). KWA/WRD shall also forward details of such cases to LSGD for transmission to AG's office. Chief Secretary also directed the concerned to file caveat before various judicial forums wherever, possibility of cases being filed against the waste management projects are anticipated.

(Action: Local Self Government Department (AMRUT, Suchitwa Mission), IND (DIC), Water Resources Department (Kerala Water Authority), any other Departments concerned).

3.STP/FSTP projects:

(a) Thrissur Corporation- Decentralized Sewerage Treatment Scheme :

Additional Chief Secretary, Environment Department informed that the nature of the land in question was clarified as paddy land and not wetland. Chief Secretary directed the Corporation Secretary to apply immediately for conversion of land & to get the project implemented expeditiously.

(Action: Local Self Government / Revenue/ Agriculture Departments, Directorate of Urban Affairs, DoECC, SWAK, District Collector, Thrissur, Thrissur Corporation)

(B) Guruvayur Municipality:

MD, KWA informed that the works for dilution tank was tendered on 30/11/2022

after recasting the estimate. Work order for the same was issued on 20/12/2022. Project expected to be completed by 30/06/2023. Progress noted.

(Action: Water Resources Department, Kerala Water Authority, Finance, Local Self Government Department, District Collector, Thrissur)

(C) STP at Yakkara, Palakkad:

Additional Chief Secretary, LSGD conveyed that the Hon' High Court had disposed the petitions (WPC 14660/2022 & WPC 15105/2022), filed against the project, in favour of the ULB. The ULB's core committee decided to select a new consultant for the preparation of the revised DPR and to place it in the council for approval. The ULB had also approached the IRTC regarding preparation of DPR and the reply is awaited. Directed to expedite the works and file caveat before the judicial forum for the smooth conduct of the work, in case further litigations are filed.

(Action: Local Self Government Revenue Departments, Directorate of Urban Affairs, District Collector, Palakkad)

(D) STP/FSTP in Railways land at Shoranur :

Additional Chief Secretary, LSGD informed that the Railways have conveyed that they have received instruction from GoI that certain percentage of Railway land be set apart for STP/FSTP projects and that the procedure for handing over the land on lease agreement basis has been devised. Suitable lands may be identified. MD, KWA informed that one suitable land is identified at Shornur in Palakkad and the DPR of the project is being prepared and expected to be submitted by the end of next month before the Government. Additional Chief Secretary, Environment Department opined that FSTPs rather than STPs may be beneficial as network laying is not involved. Action to be expedited.

(Action: Local Self Government Department, Directorate of Urban Affairs, Kerala Water Authority, District Collector, Palakkad, Transport Department)

(E) Kozhikode Corporation: Zone A-Package A & Zone A-Package B:

(i) Zone A- Package A:

Secretary, Kozhikkode Corporation informed that vide an interim judgment in OS No. 459/2022 the Munsiff Court had restrained the ULB from doing the work. The works can be started only after disposal of the suit. And also conveyed that the vetted design is awaited from the Government Engineering College, Thrissur. Secretary, Kozhikkode Corporation also reported that damages were incurred to

the properties of the contractor by miscreants protesting at the site. Adequate Police protection is to be ensured to avert such situation. Chief Secretary directed the Corporation to file a appeal immediately for vacating the stay proceedings. The loss incurred for the delay in execution of work and orders of NGT may be mentioned in the report / affidavit being filed.

(Action: Local Self Government, HOME Departments , Directorate of Urban Affairs, SUCHITWA MISSION, District Collector Kozhikkode, SP Kozhikkode, Kozhikkode Corporation)

(ii) Zone A- Package B:

Secretary, Kozhikkode Corporation conveyed that the Hon'ble High Court had disposed of the petition (WPC 8986/ 2022) filed against the work in favour of the ULB. But the new petitions have been filed before the Hon'ble High Court (WPC 40164/ 2022) & Munsiff Court (OS No. 450/ 2022) against the work. The Contractor has also requested for price escalation.

(Action: Local Self Government Department, Directorate of Urban Affairs, District Collector, Kozhikkode, Kozhikkode Corporation)

(F) Karamana Sewer Network:

MD, KWA informed that DPR of cluster 1 comprising of 5 wards (Kalady, Kallipankulam, Ambalathara, Kamaleswaram & Attukal) was submitted to the Government on 15/10/2022 for Administrative Sanction. MS, KSPCB informed that the same has also been submitted to the Ministry of Jal Shakti for NRCD funding on 24/11/2022. MD, KWA also informed that the DPR of Cluster 3 - Zone 1- sewerage network for Puthenpally ward (for 1.6 MLD and network length 16.2 km) has been completed and AS is expected from the AMRUT 1 balance fund. Total estimate of the project is Rs 62.5 Crore. Noted and action is to be expedited.

(Action: Water Resources Department (KWA), Local Self Government Department, Finance Departments)

(G) Sarovaram STP Project:

LSGD has to convene an urgent meeting with KWA and local body concerned to resolve the impasse related to centage charge in connection with the Sarovaram plant proposed in Kozhikkode District.

(Action: Local Self Government Department, Kerala Water Authority, LSGI concerned).

4.STP Kureppuzha & Elamkulam:

(a) Kureppuzha:

MD, KWA brought to the notice that the 73% of the work has been completed so far. Supply order was issued to all electro mechanical items. Strict directions were given to the contractor for the timely completion of the project. The expected date of completion of the work is 31/03/2023. MD, KWA also informed that AS and permission from LSGD and Revenue (B) Department respectively are being awaited with respect to land acquisition for control unit. The file in this regard is under process in the LSGD. Regarding providing sewer network connection, urgent priority to be given such that STP can be utilized at the earliest. Action to be expedited.

(Action: Water Resources Department, Local Self Government Department, Kerala Water Authority, District Collector, Kollam, Kollam Corporation)

(b) Elamkulam:

MD, KWA conveyed that the HLEC had approved the proposal for the construction of underground sewerage network and allied components subject to the approval of the Council of Ministers. And also informed that the old plant existing there is to be demolished and there is a proposal for starting a 17 MLD plant by KMRL. MS, KSPCB informed that communications were issued to KWA and Kochi Corporation for making arrangements for full utilization of installed capacity ie. 5 MLD. A note in this regard was also given to ACS, LSGD on 14/12/2022 as decided in RRC meeting held on 02/12/2022. Action taken noted. Further progress to be expedited.

(Action: Water Resources Department, Local Self Government Department, Kerala Water Authority, District Collector Ernakulam, RKI)

5.CETP- Edayar & Aroor:**(a).CETP- Edayar:**

The capacity of CETP proposed by KWA is 2 MLD with project cost of Rs. 42 Cr. and yearly O&M cost of more than Rs15 cr.. In this context it was conveyed by the Chairman KSPCB that there are 75 effluent generating units in Edayar. Out of these, 3 are major units (generating 1.21 MLD effluent) which already have full-fledged treatment plants. The total quantity of effluent generated from the remaining 72 units is 1.26 MLD, of which 0.89 MLD effluent from 5 rubber processing units is treated and recirculated bringing the balance quantity to 0.37 MLD. Balance 0.37 MLD comes from 67 medium and small scale units, of which 57 units are having treatment facility, 8 units need slight modification in the existing treatment facilities and the remaining 2 units need to provide treatment facility for a total capacity of 0.7 KLD.

Chairman, KSPCB informed that based on the decisions taken during the last monthly meeting held on 18/10/2022, preliminary meeting was conducted by CEE, RO, EKM with SE, KWA on 24/11/2022. It was also conveyed that the DIC had informed that the project cost cannot be collected from the industries as they have own facilities and also the O&M cost being too high cannot not be borne by units. Only a polishing pond at the most is required so that the entire effluent after treatment is collected from the units, given a final treatment and discharged from a fixed point to the river. MD, KWA objected by conveying that, providing only a polishing pond in place of a complete treatment plant by KWA will not be a safe option as it may not be able to handle any shock loading if any units fail to provide requisite treatment at their end.

Chief Secretary directed the Chairman, KSPCB to review the status of operation of industries. If the industries are disposing the effluent as per law after necessary treatment, the proposal of CETP may be dropped.

(Action: Kerala Water Authority, IND, Kerala State Pollution Control Board)

(b) CETP- Aroor:

Additional Director, I&C informed that the stay is still continuing. The Hon'ble Court has adjourned the case. This writ petition has also been mentioned in the D.O letter issued to the Advocate General.

(Action: IND, I&C, Local Self Government Department)

6.Eviction of encroachments:

CE, Irrigation Department informed that public grievance reporting form has been developed on the Department website. No complaints were received so far.**(Action: Water Resources Department (IRRIGATION).**

7.E-Flow of rivers:

Chief Secretary directed CE, Irrigation Department to expedite the procedures and to complete the DPRs in a time bound manner. Funding sources also have to be identified while preparing DPRs.

(Action: Water Resource Department, Finance, RKI, CE Irrigation)

8.Land policy:

Commissioner, Land Revenue informed that the draft land policy after modifications was resubmitted to the Minister.

(Action: Revenue, LRC).

9.STP projects in ULBs:

MD, KWA informed that 16 DPRs were prepared so far. Of which for 13 ULBs Government land is available. MD, KWA informed that one project was submitted to Ministry of Jal Shakti for NRCD funding, six projects can be placed in AMRUT 2, one project can be placed under RKI, one project can be placed in AMRUT 1 balance fund and other DPRs are modifying into SBM 2 norms giving priority to ULBs where there are polluted river stretches. Chief Secretary directed the KSPCB to present the details of ULBs in a tabular form including the stages of DPR, land availability, cost of the project, source of funding, whether TS/AS accorded or not, tendered or not, litigations filed against if any and progress of work etc. The Departments/Authorities concerned shall forward the details in this format to KSPCB.

(Action: Local Self Government Department, Water Resources Department, Kerala Water Authority, RKI, Directorate of Urban Affairs, Suchitwa Mission).

10.Septage Waste Management:

New FSTP projects were taken up by Karungappally and Cherthala Municipalities. KWA has reported that the Elamkulam 5 MLD plant proposed under AMRUT 2 has septage facility and the same can be started after getting AS. Chief Secretary opined that the existing FSTPs functioning in the State is grossly inadequate to meet the present need. Additional Chief Secretary, LSGD informed that about 41 abandoned quarries across the State suitable for FSTPs were identified of which 6 or 7 are in public land. Chief Secretary directed LSGD to list these quarries based on District, ownership and local body wise and to furnish during the next meeting with details of progress achieved. And also directed District Collectors to take urgent action to commence projects at the sites, where govt land is available. Meanwhile, District Collectors shall prioritize the waste management projects within their jurisdictions. Chief Secretary opined that there shall be atleast one FSTP to cater to 3 LSGIs (Panchayats). Such options may be worked out. Action in this regard has been initiated by LSGD.

(Action: Local Self Government Department, Water Resources Department, Directorate of Urban Affairs, Kerala Water Authority, District Collectors, Kerala State Pollution Control Board)

11.Waste to Energy Plants:

Biomining process have been completed at Kollam and Kozhikkode Corporations, W2E projects can be started there. Biomining process is ongoing at

Kannur and Thrissur Corporations. Kochi Corporation has completed only 25% of the biomining and Council has yet to approve the concessionaire agreement. Progress noted and action to be expedited.

(Action: Local Self Government Department, Directorate of Urban Affairs, DCs Concerned, LSGIs Concerned).

12.Preparation of list of viable STP/FSTP projects which can be taken up immediately:

Vide order dated 01/12/2022 in OA No. 606/2018 (PZ) the Hon'ble National Green Tribunal refrained from levying environmental compensation on the State on the basis of the commitments made by the State. The State has to submit 6 monthly reports before the Tribunal. There must be tangible results in both liquid & solid waste management in the next 6 months.

The STP/FSTP projects reported by AMRUT are as follows:

- a. 5 MLD STP at Medical College, Trivandrum – work completed & commissioned
- b. 5 MLD STP at Elamkulam, Kochi – 99% completed, works are almost completed & the STP has been commissioned
- c. 12 MLD STP at Kureepuzha with septage co-treatment, Kollam – 73% completed, works are in progress. Expected to be completed by 31/03/2023
- d. 1 MLD STP at Padanna Palam, Kannur – 45% completed, works are in progress. Expected to be completed by 31/05/2023
- e. 240 KLD STP at General Hospital, Alappuzha – 40% completed, works are in progress. Expected to be completed by 31/05/2023
- f. 2.1 MLD STP with septage co-treatment & 1 MLD STP at Medical College, Kozhikode – 32% completed, works are in progress. Expected to be completed by 30/06/2023.

Viable projects reported by KWA that can be placed for AS under AMRUT 2, RKI, Balance fund in AMRUT 1 and SBM 2 are as follows:

- a. As part of 100% utilization of 107 MLD Plant at Muttathara (i) Cluster network with total amount Rs 353.87 Cr. (ii) Cluster 3 - Zone 1- estimate amount Rs 62.5 Cr. and (iii) Line extension small 23 works for Rs 109 Cr.

- b. Elamkulam 5 MLD full utilization - 1.75 MLD network for the full utilization of plant for Rs 63.91 Cr.
- c. Elamkulam 5 MLD plant proposed near the newly constructed 5 MLD plant for Rs 211.5 Cr.
- d. Kureeppuzha West & Vallikeezhu Divisions of Kollam Corporation -12 MLD plant network- Rs.81.70 Cr.
- e. Sewerage scheme in Alappuzha Municipality with STP – Phase 1 .Total Amount- Rs. 68.9 Cr.
- f. Up-gradation of the existing 3 MLD Capacity STP to 5 MLD and Sewerage System for Guruvayur Municipality- Rs.30.8 Cr.
- g. Kottappuram- DPR under preparation expected amount Rs 90 Cr.
- h. Construction of 27 MLD Capacity STP and Laying Sewerage Network to Zone B-; Total Amount- Rs.161 Cr.
- i. Construction of STP Aluva Municipality Zone I- DPR revision to SBM2 norms
- j. Sewerage System to Kattappana- DPR under revision to SBM2 norms
- k. Sewerage System for Ponnani (Harbor Zone)- DPR revision to SBM2 norms
- l. Sewerage System for Pattambi- DPR under revision to SBM2 norms
- m. Sewerage System for Mananthavady Municipality- DPR under revision for getting sanction under SBM 2

(Action: Local Self Government Department, Directorate of Urban Affairs, Kerala Water Authority, AMRUT, Kerala State Pollution Control Board, Suchitwa Mission).

The meeting came to a close by 05:15 PM

CHIEF SECRETARY



KERALA STATE POLLUTION CONTROL BOARD

ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501

Phone : 0484 2545678 , E-mail: esceloor@yahoo.co.in



കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട് ക്വാരിട്ടി നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി.ഒ.
എറണാകുളം-683 501

PCB/ESC/CO-104/08

Date: 07.09.2024

Sub: Direction issued under section 33A of Water (Prevention & Control of Pollution) Act, 1974 in the matter of achieving zero liquid discharge at M/s. Sud Chemie India Pvt Ltd, Edayar Industrial Developement Area, Binanipuram P.O.

- Ref :
1. Consent No: KSPCB/ER/ICO/10038512/2023 dated 20-10-2023 and valid upto 30-06-2028
 2. Consent No: PCB/HO/EKM/IC/CO/46/08 dated 07.08.2008
 3. Order dated 27/05/2022 of Hon'ble NGT in the original application No: 395/2013/SZ(THC) and connected matters.

DIRECTION

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of Environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act in the state;

WHEREAS M/s. Sud Chemie India Pvt Ltd, Edayar Industrial Developement Area, Binanipuram P.O, Cochin-683502, (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS in the Hon'ble NGT order referred 3 above, it is directed that all industries in the catchment area of the Periyar River should adopt zero liquid discharge (ZLD);

WHEREAS you are discharging 450 KLD of treated effluent into river Periyar;

WHEREAS a condition was given in the consent referred 2 above to reduce the effluent discharge in a time bound manner and to achieve zero liquid discharge and the proposal for the same to be submitted to Board;

WHEREAS you have not complied with the above condition till date and not submitted the proposal for reducing the effluent discharge to achieve zero liquid discharge;

NOW THEREFORE on the basis of the above violations, in exercise the power conferred under section 33A of Water Act, 1974 it is hereby directed that.

Proposal for compliance of above direction to achieve zero liquid discharge in a time bound manner shall be submitted to this office within 15 days of the receipt of this direction failing which Board will be forced to initiate actions as per section 33 A Water (Prevention & Control of Pollution) Act 1974.

Dated this the 7th day of September 2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD

SENIOR ENVIRONMENTAL ENGINEER

To

M/s. Sud Chemie India Pvt Ltd,
Edayar Industrial Developement Area,
Binanipuram P.O, Cochin-683502

- Copy to: 1. The Chairperson
Kerala State Pollution Control Board
Head Office
Thiruvananthapuram
1. The Member Secretary
Kerala State Pollution Control Board
Head Office
Thiruvananthapuram
3. The Chief Environmental Engineer
Kerala State Pollution Control Board
Regional Office, Ernakulam



KERALA STATE POLLUTION CONTROL BOARD

ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501

Phone : 0484 2545678 , E-mail: esceloor@yahoo.co.in



കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട് ക്വാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി.ഒ.
എറണാകുളം-683 501

PCB/ESC/CO-95/07

Date: 07.09.2024

Sub: Direction issued under section 33A of Water (Prevention & Control of Pollution) Act, 1974 in the matter of achieving zero liquid discharge at M/s TMS Leathers, I.D.A., Edayar, Muppathadom, Ernakulam

- Ref :
1. Consent No: PCB/ESC/CO/IC-690/R1/23 dated 01/09/2023 and valid upto 30.06.2028
 2. Consent No: PCB/RO-EKM/ELR-EKM/ICO/04-11 dated 03.09.2011
 3. Order dated 27/05/2022 of Hon'ble NGT in the original application No: 395/2013/SZ(THC) and connected matters.

DIRECTION

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of Environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act in the state;

WHEREAS M/s TMS Leathers, I.D.A., Edayar, Muppathadom, Ernakulam-683110., (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS in the Hon'ble NGT order referred 3 above, it is directed that all industries in the catchment area of the Periyar River should adopt zero liquid discharge (ZLD);

WHEREAS you are discharging 75 KLD of treated effluent into river Periyar;

WHEREAS a condition was given in the consent referred 2 above to reduce the effluent discharge in a time bound manner and to achieve zero liquid discharge and the proposal for the same to be submitted to Board;

WHEREAS you have not complied with the above condition till date and not submitted the proposal for reducing the effluent discharge to achieve zero liquid discharge;

NOW THEREFORE on the basis of the above violations, in exercise the power conferred under section 33A of Water Act, 1974 it is hereby directed that.

Proposal for compliance of above direction to achieve zero liquid discharge in a time bound manner shall be submitted to this office within 15 days of the receipt of this direction failing which Board will be forced to initiate actions as per section 33 A Water (Prevention & Control of Pollution) Act 1974.

Dated this the 7th day of September 2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD

SENIOR ENVIRONMENTAL ENGINEER

To

M/s TMS Leathers, I.D.A.,
Edayar, Muppathadom,
Ernakulam-683110.

- Copy to: 1. The Chairperson
Kerala State Pollution Control Board
Head Office
Thiruvananthapuram
1. The Member Secretary
Kerala State Pollution Control Board
Head Office
Thiruvananthapuram
3. The Chief Environmental Engineer
Kerala State Pollution Control Board
Regional Office, Ernakulam



KERALA STATE POLLUTION CONTROL BOARD

ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501

Phone : 0484 2545678 , E-mail: esceloor@yahoo.co.in



കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട് ക്വാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡലം പി.ഒ.

എറണാകുളം-683 501

PCB/ESC/CO-19/08

Date : 07.09.2024

Sub: Direction issued under section 33A of Water (Prevention & Control of Pollution) Act, 1974 in the matter of achieving zero liquid discharge at M/s. Cochin Minerals and Rutile Limited, Industrial Development Area, Edayar, Muppathodam P O, Ernakulam.

- Ref :
1. Consent No: PCB/HO/EKM-3/ICO-R/01/2023 dated 17/04/2023 and valid upto 30.06.2028
 2. Consent No: PCB/HO/EKM/IC/11/07 dated 20.09.2007
 3. Order dated 27/05/2022 of Hon'ble NGT in the original application No: 395/2013/SZ(THC) and connected matters.

DIRECTION

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of Environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act in the state;

WHEREAS M/s. Cochin Minerals and Rutile Limited, Industrial Development Area, Edayar, Muppathodam P O, Ernakulam - 680 110 (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS in the Hon'ble NGT order referred 3 above, it is directed that all industries in the catchment area of the Periyar River should adopt zero liquid discharge (ZLD);

WHEREAS you are discharging 659 KLD of treated effluent into river Periyar;

WHEREAS a condition was given in the consent referred 2 above to reduce the effluent discharge in a time bound manner and to achieve zero liquid discharge and the proposal for the same to be submitted to Board;

WHEREAS you have not complied with the above condition till date and not submitted the proposal for reducing the effluent discharge to achieve zero liquid discharge;

NOW THEREFORE on the basis of the above violations, in exercise the power conferred under section 33A of Water Act, 1974 it is hereby directed that.

Proposal for compliance of above direction to achieve zero liquid discharge in a time bound manner shall be submitted to this office within 15 days of the receipt of this direction failing which Board will be forced to initiate actions as per section 33 A Water (Prevention & Control of Pollution) Act 1974.

Dated this the 7th day of September 2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD

SENIOR ENVIRONMENTAL ENGINEER

To

M/s. Cochin Minerals and Rutile Limited,
Industrial Development Area, Edayar,
Muppathodam P O, Ernakulam - 680 110

- Copy to: 1. The Chairperson
Kerala State Pollution Control Board
Head Office
Thiruvananthapuram
1. The Member Secretary
Kerala State Pollution Control Board
Head Office
Thiruvananthapuram
3. The Chief Environmental Engineer
Kerala State Pollution Control Board
Regional Office, Ernakulam



COCHIN MINERALS AND RUTILE LIMITED (100% E.O.U.)

★★★ THREE STAR EXPORT HOUSE

Regd. Office: P.B.No.73, VIII/224, Market Road, Alwaye-683 101, Kerala, India

Office : 0484 - 2626789 (6 Lines)

Factory : 0484 - 2532186, 2532207

Web : www.cmrlindia.com

E-mail : cmrlexim@cmrlindia.com

info@cmrlindia.com

CIN : L24299KL1989PLC005452



INDIA'S MOST
TRUSTED COMPANY



2008 - 2012 PRIZ
2017 - 2017 PRIZ



2008
INDIA'S MOST
TRUSTED COMPANY



2008 - 2007
2011 - 2014
2015 - 2014



2008 - 2007
2011 - 2014
2015 - 2014

01046/CMRL/2024/1075

20th September 2024

To

The Senior Environmental Engineer

Kerala State Pollution Control Board

Environmental Surveillance Centre

FACT - Qr No. S-5, Udyogamandal P.O.,

Ernakulam - 683501



Sub: Response to Direction u/s 33A of Water (Prevention & Control of Pollution) Act, 1974 in achieving Zero Liquid Discharge.

Ref: Your letter No. PCB/ESC/CO-19/08 dated 07.09.2024, received by us on 09.09.2024.

Sir,

This has reference to the direction issued by the Kerala State Pollution Control Board (KSPCB) dated 07.09.2024 under section 33A of the Water (Prevention & Control of Pollution) Act, 1974, regarding the requirement and proposal to achieve Zero Liquid Discharge (ZLD) from our factory at Edayar, in a time bound manner. We may inform you as follows:



CERTIFIED
FERRY & FERRIES CHAIRS



From Nature With Nature Towards Nature

AN ISO 9001:2015 AND ISO 45001:2018 COMPANY GSTIN: 32AABCC1950D1ZD A MODEL ECO-FRIENDLY COMPANY

47025

COCHIN MINERALS AND RUTILE LTD. (100% E. O. U.)

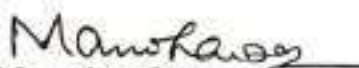
We have been operating within the Consent parameters stipulated in the Consent to Operate (Consent No: PCB/HO/EKM-3/ICO-R/01/2023 dated 17.04.2023). Over the years, CMRL has maintained a solid commitment to environmental sustainability by continuously improving its effluent treatment process and maximising the reuse of treated effluent, thereby reducing its discharge. It is important to highlight that the treated effluent discharged by CMRL enters the estuarine zone(Class E) downstream of the Pathalam Regulator-cum-Bridge, where saline water intrusion occurs. The treated effluent consistently meets all prescribed norms, as mandated in the Consent issued. We are open to government initiatives, including joining a common effluent treatment plant (CETP) for industries in the region. We will continue our R&D efforts to further reduce treated effluent discharge in future.

We reaffirm our commitment to compliance with all relevant environmental regulations and standards. The company is fully committed to continually improving its effluent treatment process and will take all necessary measures to reduce further treated effluent discharge. We shall also fully co-operate with the Common Effluent Treatment Plant proposal for the Edayar Industrial Development Area(IDA), which was put forward by the State Govt. for environmental protection and compliance with regulations and standards.

Thanking you,

Yours faithfully,

For Cochin Minerals and Rutile Limited,


Manohardas

General Manager


SUD CHEMIE INDIA PVT. LTD.

Registered Office:
 Edayar Industrial Development Area,
 P. O. Binanipuram, Kochi, Dist. Ernakulam,
 Kerala - 683 502, India.
 Tel : +91 484 6646000,
 E-mail: cochin@sud-chemie-india.com,
 Web : www.sud-chemie-india.com,
 CIN: U24299KL1969PTC002217



September 23, 2024

The Senior Environmental Engineer
 Kerala State Pollution Control Board
 Environment Surveillance Centre
 Udyogamandal

Subject: Proposal to achieve zero liquid discharge

Ref: Your direction PCB/ESC/CO-104/08 dated 07.09.2024

Sir

We acknowledge receipt of your direction PCB/ESC/CO-104/08 dated 07.09.2024 regarding the requirement for an action plan to achieve Zero Liquid Discharge (ZLD).

In this regard, we would like to inform you of the significant steps we have already taken to minimize liquid discharge from our facility. Currently, our liquid discharge is limited to a single production line, where sodium sulphate is the major constituent in the discharge water. Sodium sulphate, as you are aware, is also a major component of seawater.

To date, we have successfully reduced the discharge quantities by recycling a substantial portion of our process water. This recycling initiative has been implemented through efficient water management systems that have yielded positive results and contributed significantly toward our sustainability goals.

Apart from recycling of process water we at SCIL have installed 380 m³/day capacity Zero Liquid Discharge (ZLD) system in 2020 for the treatment of effluents generated by the newly constructed CuZn plant. The system includes a five-stage multiple effect evaporator and a polishing reverse osmosis (RO) unit, which successfully handles the effluent load from the CuZn plant

Further to these efforts, we are pleased to inform you that after extensive trials for six months we have placed an order for a Reverse Osmosis (RO) plant, costing us 1.75 Corore. (copy of Purchase order is attached) and expected to complete installation in next 3 months. Once operational, this system will further reduce our liquid discharge levels by enabling advanced water treatment and reuse within our processes. We are confident that this will make a significant contribution toward further minimizing our liquid discharge levels.

Many other states in India have successfully established centralized effluent treatment plants (CETPs) to manage such liquid effluents from industries. We kindly request that you take up this matter with the government authorities to explore the possibility of setting up a centralized effluent treatment facility in our region to address this critical issue in a sustainable and cost-effective manner. EIA also being consulted for setting up such a CETP.

In light of the above, we request your kind consideration and suggest a phased approach to achieving further reductions, wherein we will continue to implement the best available technologies to minimize liquid discharge to the greatest extent possible.

We assure you of our commitment to environmental sustainability and compliance with regulatory requirements.

Yours truly

For Sud Chemie India Pvt.Ltd.


Saji V Mathew
AVP-HR & Site Head

PURCHASE ORDER



SUD-CHEMIE INDIA PVT. LTD

Order To 105540 ROCHEM SEPARATION SYSTEMS (INDIA) PVT LTD VASAI (EAST) PLOT NO.50, SECTOR-II, GAURAIKADA VILLAGE THE VASAI TALUKA CO-OP. IND. ESTATE LTD. THANE-401208, Maharashtra, India Ph. 0250 2458000/01/63 Mob 9152002347 Email: jansheid.mamdapur@rochem.in Kind Attn : GSTIN : 27AABCR1955P1ZV	P. O. No. 5500005289 Our Ref 2500005174 Bud. Ref ECTPRO095 CIN No. U24299KL1969PTC002217 GSTIN 32AAACU3342E1ZW	PO Date 02.05.2024 Date 19.04.2024

Dear Madam/Sir,

We are pleased to place order for purchasing the items listed below subject to the terms and conditions stated below and overleaf

S.no	Material Code / Description	Quantity	UOM	Rate/Unit	Discount %	Discount Amount	Net Amount INR
1.	85913 RO-sulphate-stage-1 RO plant-sulphate-stage1- 250KLPD upgradable to 500KLPD as per the approved specification document-RSS/0499/2023-24 Rev 05 Date 25.04.2024 HSN Code: IGST: 18.00 % Value: 2,556,000.00 Delivery on date: 17.08.2024 Sched. Qty: 1.000	1.00	NOs	14,200,000.00	0.00	0.00	14,200,000.00
2.	85914 RO-sulphate-stage-2 RO plant-sulphate-stage2- 250KLPD upgradable to 500KLPD as per the approved specification document-RSS/0499/2023-24 Rev 05 Date 25.04.2024 HSN Code: IGST: 18.00 % Value: 594,000.00 Delivery on date: 17.08.2024 Sched. Qty: 1.000	1.00	NOs	3,300,000.00	0.00	0.00	3,300,000.00



Scan the QR code for delivery location

SUD-CHEMIE INDIA PVT. LTD

Address: Edayar Industrial Development Area, P.O. Binanipuram, Ernakulam Dist., Dist. Kochi, Kerala, India, PIN-683502

Tel: +91 0484-6646000 Fax: +91 0484-6646099

PURCHASE ORDER



SUD-CHEMIE INDIA PVT. LTD

Continuation Sheet of P.O No. 5500005289 Date 02.05.2024

Terms & Conditions

1	Warrantes	:	12 months from the date of commissioning or 18 months from the date of supply if the commissioning gets delayed for one month from the date of supply as per standard form
2	Shipping instructions	:	Supplier must intimate the concerned buyer on material readiness along with images to provide dispatch clearance & transporter nominations. Packing details are required to arrange suitable transporter for the pickup.
3	Inspection	:	at site However, SCIL can plan the inspection visit at supplier's manufacturing site if required during the manufacturing of system with a prior intimation of 3-4 days.
4	L/D Clause	:	Applicable at standard rates of 0.5% to max 5% per week for delayed weeks above 14 weeks
5	Vendor memo	:	as per final revised offer:RSS/0499/2023-24 Rev 05 & discussions dated 18.04.2024.
6	Special Conditions	:	Payment Terms: 20% advance against ABG 65% with 100% taxes against delivery. 15% against submission of PBG after successful commissioning of system valid for the warranty period.

--> Price for upgradation to 529 cum/day will be Rs 87,00,000+ taxes and these prices are the final negotiated prices valid for 1 year from date of successful commissioning. Further extension is subject to discussion/price escalations.

--> Key Performance Indicator's to ensure the performance of suggested system.
a. Output TDS requirement less than 90ppm
b. 131KLPD should be the required output per day for 22 hour operations.
c. Net recovery in the 1st stage shall be 55% and second stage at 90%, hence a net recovery of 50%.

--> Supply Terms & Conditions:

- 1) Conductivity & pH meters : Forbes Marshall
- 2) Flow meter : Forties Marshall, paddle wheel type
- 3) VFD : ABB ACS series
- 4) Panel : Rittal Make with HMI (Siemens). Provision in panel will be made for Modbus over TCP/IP communication protocol. Further communication cable/protocol in SCIL scope.
- 5) Pump Grundfos
- 6) Degasser is in Rochem scope, however Degasser structure is in client scope.
- 7) Commissioning support by Rochem Team for 72 hrs & operational support will be provided for 2 months on as needed basis at no extra cost.
- 8) In case of Flow meter break down within 1 year, Rochem will replace the same

SUD-CHEMIE INDIA PVT. LTD

Address : Edayar Industrial Development Area , P.O. Bnanipuram, Ernakulam Dist., Dist. Kochi, Kerala, India, PIN-683502

Tel +91 0484-6846000 Fax +91 0484-6846099

PURCHASE ORDER

SUD-CHEMIE



SUD-CHEMIE INDIA PVT. LTD

Continuation Sheet of P.O.No. 5500005289 Date 02.05.2024

will suitable flow meter.

9) PLC Rittal make. Surge protection to be provided at the incomer side. All switch gears preferred Schneider / L & T make. Multi function Energy meter at incomer Schneider make EM.

10) Online programming support as and when required and in case it doesn't work, site engineer has to be there in our site within 24 hours time with the program backup. Otherwise, Supplier can submit the program backup to SCIL for attending unexpected breakdowns.

11) For feedpump, spare pump has not considered in the proposal & in case of any failures, M/s Rochem will rectify the issue on immediate basis.

12) System must be supplied as per the approved specification & discussion against MOM dated 16.04.2024.

13) Prefiltration components like sand filters & micron filters will be in supplier scope.

14) Supplier must submit the plant layout drawings, P&ID, net power requirements within 7 days from order receipt.

7 Our Contact Person

PAUL RAPHY

Additional Terms and Condition

- 1 Order Acknowledgement should be sent to us within three days of the receipt of order or it will be deemed as the order is acceptable to you.
- 2 Compliance to Statutory and Regulatory requirements is mandatory, please mention Country of Manufacturing, Country of Receipt, Country of Shipment, Country of Customer identified destination (wherever provided). Please ensure Compliance to ISO 14001-2015 requirements.
- 3 In case of rejection the material will be send back to you at your cost.
- 4 Following documents to be scanned immediately after shipment and subsequently original should be couriered:

a) Invoice	b) Packing list	c) Bill of lading/Airway bill/LR. Copy
d) Certificate of Analysis	e) MSDS	f) Certificate of Origin.
- 5 All documents must have our PO reference on the same.
- 6 All Tax Invoice should have GSTIN of the vendor & GSTIN of our company along with HSN code of material and Place of supply.
- 7 Tax invoice to be sent in Duplicate, "Original for Recipient" and "Duplicate for Transporter".
- 8 In case tax credit is not available due to non-compliance of GST provisions, the same shall be deducted from your payment or recovered suitably.
- 9 Supplier Declaration regarding timely GST Return filing is mandatory.
- 10 Please ensure that suitable measures are taken by you to curtail the spread of Covid-19 virus as directed by Government of India and WHO during manufacturing, packing and dispatch of goods.
- 11 Tax Invoice should clearly mention the PAN No. of Buyer and Seller. Our PAN No is AAACU3342E

SUD-CHEMIE INDIA PVT. LTD

Address: Edappal Industrial Development Area, P.O. Biranipuram, Ernakulam Dist. Dist. Kochi, Kerala, India, PIN-683502

Tel +91 9484-6646000 Fax +91 9484-6646099



TMS LEATHERS

D.A. Edayar, Muppathadom, Aluva - 683 110, Kerala, India.

☎ +91 484 2532233 | ✉ tms@tmsleathers.com | 🌐 www.tmsleathers.com

ACT/H.TMS/KPCB/2014 02

24-09-2024

The Senior Environmental Engineer,
Kerala State Pollution Control Board,
Environmental Surveillance Centre,
Udyogamandal, Ernakulam - 683 501.
☎ +91 484 2545678



Dear Sir,

Sub : Achieving Zero Liquid Discharge - regRef : Your office letter PCB/ESC/CO-95/07 dt 07-09-24

We would like to clarify that our current discharge of treated effluent is between 38 to 45 KLD, and not 75 KLD mentioned in your letter. The latter reflects the permitted quantity based on our full production capacity of 800 hides per day. Since COVID-19, our capacity utilization has been average 350 to 450 hides per day, and all discharge data is metered and uploaded online to the CPCB and KSPCB servers.

Our facility is equipped with a Chrome Recovery plant, which is actively in operation. The reclaimed chrome is reused in the production line, and we also reuse soakir g water for fresh hides, (one more soaking with the same water) successfully reducing effluent generation.

Additionally, we have contracted M/s Erode Enviro Care, Erode, Tamil Nadu, a professional team based at Erode with a proven track record in implementing innovative methodologies for hide processing. We are confident that their proposal will significantly reduce process water consumption, further decreasing effluent generation. A comprehensive proposal from the team will be submitted within 30 days.

Considering the above-stated facts, we kindly request a 30-day extension for the submission of our proposal.

Thanking you

For TMS Leathers

Jose Sebastian,
GM - Fin. & Admn.

H:\use\jose\conf\PCBs\KPCB- New V1\doc P27

ERODE

26/3, Bhavani Main Road, B.P. Agraharam,
Erode - 636 005, Tamil Nadu, India.

☎ +91 424 2293006 | ✉ tms@tmsleathers.com

DINDIGUL

553-554, Pallapatti Village, Segampul,
Dindigul - 624 002, Tamil Nadu, India.

☎ +91 451 6533155 | ✉ tms@tmsleathers.com



TMS LEATHERS

D.A. Edayar, Muppathadom, Aluva - 683 110, Kerala, India.

☎ +91 484 2532233 | ✉ tms@tmsleathers.com | 🌐 www.tmsleathers.com

ACT/H.TMS/KPCB/2014 02

25-10-2024

The Senior Environmental Engineer,
Kerala State Pollution Control Board,
Environmental Surveillance Centre,
Udyogamandal, Ernakulam - 683 501.
☎ +91 484 2545678



Dear Sir,

Ref : 1. Your office letter PCB/ESC/CO-95/07 dt 07-09-24
2. Our letter ACT/H.TMS/KPCB/2014 02 dt 24-09-24

Further to our above referred letter, we hereby submit the following.

1. Our consultant visited our site on 15-10-24 and suggested few measures to reduce consumption of water.
2. Further to their suggestion, we have upgraded our Fleshing Machines, which will decrease the consumption of 6000 liters of water per day.
3. Apart from that, we have approached two more consultants to find out more effective measures to reduce water consumption.
4. Our current discharge of treated effluent is between 38 to 45 KLD, Further to the upgradation of fleshing machine, discharge of treated effluent will be 32 to 39 KLD.
5. We once again confirm that our unit is equipped with a Chrome Recovery plant, which is actively in operation. The reclaimed chrome is reused in the production line, and we also reuse soaking water for fresh hides, (one more soaking with the same water) successfully reducing effluent generation.
6. Data is uploaded automatically to both servers by a sensor "CarboVis 701 TS" by Bestatigung, Germany and certified by TUV.
7. TMS Leathers is a Gold rated Tannery under Leather Working Group Environmental Stewardship Audit. (Leather Working Group, Northampton, UK). This rating is awarded for maintaining International Standards fixed for Tannery, worldwide. We are holding our Gold Certificate under Protocol 7.2.4. Periodical visits are conducted by LWG audit staff to ensure that we are maintaining the suggested protocol.

Thanking you

For TMS Leathers

Shajahan T M
Proprietor.

H:\use\josehconf\PCBs\KPCB- New VI\doc P29

ERODE

25/3, Bhavani Main Road, B.P. Agraharam,
Erode - 638 005, Tamil Nadu, India.

☎ +91 424 2293006 | ✉ tms@tmsleathers.com

DINDIGUL

553-554, Palapatti Village, Begampet,
Dindigul - 624 002, Tamil Nadu, India.

☎ +91 451 6533155 | ✉ tms@tmsleathers.com

ANNEXURE 15

Annexure 7 (e) - Directions issued to Industries under Section 5 of EP Act

☎: General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: chn.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: www.kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD



കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Patton P.O., Thiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1372/2024-SEE-1

Date: 23.10.2024

To

Reg. with A/D

M/s Fertilizers and Chemicals Travancore Ltd.,
Udyogamandal Complex (Fertilizer Plant),
Ernakulam - 683501.

Sub:- Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board

WHEREAS during the inspection of the Committee and subsequent sampling of river Periyar and storm water drains from industrial premises, on 25.06.2024, 29.06.2024, 02.07.2024 and 03.07.2024, it was observed that there are chances of contamination of the river due to surface run off from storm water drains.

Based on the observations of the Committee, in exercise of the powers conferred under Section 5 of the Environment (Protection) Act, 1986, you are hereby directed to comply with the following.

- Provide delay ponds in storm water drains flowing through your premises to the outlets to river and ensure that no contaminants are discharged through the drains.

NOW THEREFORE, you are hereby directed to submit action taken report to the Board within thirty days of receipt of this Direction, failing which further action would be initiated under The Environment (Protection) Act, 1986.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to:

- 1) The Chief Environmental Engineer,
KSPCB Regional Office,
Ernakulam.
- 2) The Senior Environmental Engineer,
KSPCB, ESC Eloor.

☎: General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: cha.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: www.kspcb.kerala.gov.in



KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1372/2024-SEE-1

Date: 23.10.2024

To

Reg. with A/D

M/s IREL (India) Ltd.,
Rare Earths Division,
Udyogamandal,
Kochi-683501.

Sub:- Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board

WHEREAS during the inspection of the Committee and subsequent sampling of river Periyar and storm water drains from industrial premises, on 25.06.2024, 29.06.2024, 02.07.2024 and 03.07.2024, it was observed that there are chances of contamination of the river due to surface run off from storm water drains.

Based on the observations of the Committee, in exercise of the powers conferred under Section 5 of the Environment (Protection) Act, 1986, you are hereby directed to comply with the following.

- Provide delay ponds in storm water drains flowing through your premises to the outlets to river and ensure that no contaminants are discharged through the drains.

NOW THEREFORE, you are hereby directed to submit action taken report to the Board within thirty days of receipt of this Direction, failing which further action would be initiated under The Environment (Protection) Act, 1986.

For and on behalf of the

KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to:

- 1) The Chief Environmental Engineer,
KSPCB Regional Office,
Ernakulam.
- 2) The Senior Environmental Engineer,
KSPCB, ESC Eloor.

☎: General: 0471-2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: chn.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: www.kspcb.kerala.gov.in



KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1372/2024-SEE-1

Date: 23.10.2024

To

Reg. with A/D

✓ The Travancore Cochin Chemicals Ltd.,
Udyogamandal P.O.,
Kochi - 683 501.

Sub:- Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board

WHEREAS during the inspection of the Committee and subsequent sampling of river Periyar and storm water drains from industrial premises, on 25.06.2024, 29.06.2024, 02.07.2024 and 03.07.2024, it was observed that there are chances of contamination of the river due to surface run off from storm water drains.

Based on the observations of the Committee, in exercise of the powers conferred under Section 5 of the Environment (Protection) Act, 1986, you are hereby directed to comply with the following.

- Provide delay ponds in storm water drains flowing through your premises to the outlets to river and ensure that no contaminants are discharged through the drains.

NOW THEREFORE, you are hereby directed to submit action taken report to the Board within thirty days of receipt of this Direction, failing which further action would be initiated under The Environment (Protection) Act, 1986.

For and on behalf of the

KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to:

- 1) The Chief Environmental Engineer,
KSPCB Regional Office,
Ernakulam.
- 2) The Senior Environmental Engineer,
KSPCB, ESC Eloor.

☎ Genert: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: chn.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: www.kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD



കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Patton P.O., Thiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1372/2024-SEE-1

Date: 23.10.2024

To

Reg. with A/D

M/s. Sud Chemie India Pvt Ltd.,
Edayar Industrial Development Area,
Binanipuram P.O.,
Cochin-683502.

Sub:- Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board

WHEREAS during the inspection of the Committee and subsequent sampling of river Periyar and storm water drains from industrial premises, on 25.06.2024, 29.06.2024, 02.07.2024 and 03.07.2024, it was observed that there are chances of contamination of the river due to surface run off from storm water drains.

Based on the observations of the Committee, in exercise of the powers conferred under Section 5 of the Environment (Protection) Act, 1986, you are hereby directed to comply with the following.

- Provide delay ponds in storm water drains flowing through your premises to the outlets to river and ensure that no contaminants are discharged through the drains.

NOW THEREFORE, you are hereby directed to submit action taken report to the Board within thirty days of receipt of this Direction, failing which further action would be initiated under The Environment (Protection) Act, 1986

For and on behalf of the

KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to:

- 1) The Chief Environmental Engineer,
KSPCB Regional Office,
Ernakulam.
- 2) The Senior Environmental Engineer,
KSPCB, ESC Eloor.

☎: General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: cha.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: www.kspcb.kerala.gov.in



KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram – 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1372/2024-SEE-1

Date: 23.10.2024

To

Reg. with A/D

M/s. The Fertilisers And Chemicals Travancore Limited (FACT),
Udyogamandal Complex- Petrochemical Plants,
P.B No.17, Udyogamandal,
Ernakulam - 683501.

Sub:- Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board

WHEREAS during the inspection of the Committee and subsequent sampling of river Periyar and storm water drains from industrial premises, on 25.06.2024, 29.06.2024, 02.07.2024 and 03.07.2024, it was observed that there are chances of contamination of the river due to surface run off from storm water drains.

Based on the observations of the Committee, in exercise of the powers conferred under Section 5 of the Environment (Protection) Act, 1986, you are hereby directed to comply with the following.

- Provide delay ponds in storm water drains flowing through your premises to the outlets to river and ensure that no contaminants are discharged through the drains.

NOW THEREFORE, you are hereby directed to submit action taken report to the Board within thirty days of receipt of this Direction, failing which further action would be initiated under The Environment (Protection) Act, 1986.

For and on behalf of the

KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to:

- 1) The Chief Environmental Engineer,
KSPCB Regional Office,
Ernakulam.
- 2) The Senior Environmental Engineer,
KSPCB, ESC Eloor.

☎ General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318156 Member Secretary: 2318151
e-mail: chn.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1078/2024-SEE-1

Date: 29/07/2024

Reg. with A/D

Ref: Consent No :PCB/ESC/IC-681/R4/2023 dated 02.03.2023

SHOW CAUSE NOTICE

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of The Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in The Water (Prevention & Control of Pollution) Act 1974, The Air (Prevention & Control of Pollution) Act 1981 and The Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS M/s Alpharub Crumb Rubber (P) Ltd, Industrial Development Area , Edayar, Aluva, 683110 (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS your unit were bound to comply with the conditions of the Consent referred (1) issued by the Board as per Section 21 of Air (Prevention and Control of Pollution) Act, 1981 and Section 25 of Water (Prevention and Control of Pollution) Act, 1974;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change,
Government of Kerala
2. Director, Directorate of Environment & Climate Change

3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board.

WHEREAS an inspection was conducted by the said Committee to the ETP Area and effluent discharge area of your unit on 10.07.2024 and observed the following violations and non-compliance of compliance conditions;

- i) ETP unit operation levels are just at the ground level and may lead to submergence of ETP during the monsoon period,
- ii) An unauthorised discharge provision and untreated effluent discharge from industry premises to storm water drain was observed which raises suspicion of an unauthorized discharge of effluent from your unit.
- iii) Wastes or sledges are stored in open area adjacent to the ETP
- iv) Very Poor housekeeping in the ETP and the surrounding areas

Now **THEREFORE**, you are directed to **SHOW CAUSE** why action under relevant clauses of The Water(Prevention and Control of Pollution) Act,1974 shall not be taken against you for the above mentioned reason

Dated this the 29th day of July, 2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

To

✓ M/s Alpharub Crumb Rubber PLtd,
V/793, Industrial Development Area,
Edayar, Aluva, 683110

Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office, Emakulam

2) The Senior Environmental Engineer
KSPCB, GSC Floor

General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318159 Member Secretary: 2318151
e-mail: cln.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD



പാതമംഗലം മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram - 695 004



LIFE
Lifestyle for
Environment

KSPCB/1078/2024-SEE-1

Date: 29/07/2024

To

Reg. with A/D

M/s. Malaya Rub Tech Industries,
Industrial Development Area, Edayar,
Muppathadam P. O., Aluva, Kerala

Sub :-Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of The Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in The Water (Prevention & Control of Pollution) Act 1974, The Air (Prevention & Control of Pollution) Act 1981 and The Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change,
Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional
Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board.

WHEREAS the Committee inspected your unit (i.e., EIP area) on 10.07.2024. Based on the inspection findings of the Committee and in exercise of the powers conferred under Section 5 of The Environment (Protection) Act, 1986, you are hereby directed to ensure the following and submit a compliance report:

1. Construct and maintain proper drains to direct entire the storm waters into a common drain and fix the stormwater outlet point to river Periyar complying to the discharge norms as per granted Consents/ common drain of DIC whichever possible with clear visibility and easy access. Provide a delay pond before the discharge point.
2. A pH meter is also connected to the discharging water at the discharge outlets and the pH values are displayed for public notice and records maintained.
3. Flowmeters are also fitted at the outlet discharge point (s) to know the total volume of water being discharged into the riverine system/drain and records maintained.
4. Prepare and submit a latest lay out plan (PDF document) of your industry showing all the buildings, machineries, individual ETP tanks, raw material/products/ by products / hazardous waste storage area, storm water drains with its outlet point marked etc. All the above shall be clearly indicated and labelled in the above drawing.
5. Submit average monthly production details with quantity for the last one year.
6. Submit water balance data based on actual water consumption/ effluent generation/ reuse for the last six months.
7. Performance evaluation of the existing ETP be carried out through an institute of repute and modification/ rectification / latest technology adaptation as per requirement shall be carried out if required and submit the performance evaluation report to Board.
8. Prepare a flow chart of ETP showing all unit operations including tank capacities, retention time etc. and the same shall be displayed at the ETP area.
9. Maintain log book in which the flow meter readings are regularly entered.
Ensure that flow meter provided are functioning properly.
10. Maintain stock register for chemicals used in the ETP if chemical addition is

provided.

11. Provide 360° rotating night vision camera in the back yard of the unit and at the ETP area and share the live visuals with the Board.
12. Ensure adequate lighting in the ETP area upto river side of your unit.
13. Keep the industry premises always hygienic and ensure that adequate sanitation facilities are provided to the workers. Facilities shall be provided for the collection and disposal of solid waste including garbage/food waste.
14. Ensure that the domestic effluent is discharged through properly designed septic tank- soakpit facility of adequate capacity.

NOW THEREFORE, you are hereby directed to submit compliance report to the Board on the above within fifteen days of receipt of this directions, failing which further action would be initiated under The Environment (Protection) Act, 1986

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office
Ernakulam

2) The Senior Environmental Engineer
KSPCB, E.S.C. Elloor

General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318154
e-mail: chn.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Patton P.O., Thiruvananthapuram 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



Lifestyle to Environment

KSPCB/1078/2024-SEE-1

Date: 29/07/2024

To

Reg. with A/D

M/s Cochin Minerals and Rutile Limited,
Industrial Development Area, Edayar,
Muppathadam P O,
Emakulam – 680110, Kerala

Sub :-Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of The Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in The Water (Prevention & Control of Pollution) Act 1974, The Air (Prevention & Control of Pollution) Act 1981 and The Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change,
Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional
Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board.

WHEREAS the Committee inspected your unit (i.e., ETP and CEMOX storage area) on 10.07.2024. Based on the inspection findings of the Committee and in exercise of the powers conferred under Section 5 of The Environment (Protection) Act, 1986, you are hereby directed to ensure the following and submit a compliance report:

1. A separate and designated area shall be earmarked for proper storage or stacking of raw material i.e., Ilmenite and CEMOX with adequate lining and leachate collection facilities. Ilmenite and CEMOX storage areas are well maintained and shall be covered during the monsoon period to avoid rainwater coming in contact with the Ilmenite and CEMOX.
2. Submit the utilization details of CEMOX in the last five years.
3. The underground pipe provided at the stormwater drain leading to river Periyar, at the boundary of the Industry shall be removed urgently and the open drain shall be extended up to river Periyar by providing a delay pond before discharging into the river Periyar. Also, provide a delay pond to all the other stormwater drains before being discharged.
4. Properly designed garland drain all around the CEMOX storage area and the industry shall be constructed to direct the entire storm water into a common drain and fix the stormwater outlet point to the river with clear visibility and easy access. Provide a delay pond before the discharge point and the storm water free from pollutants only should be discharged into the river periyar.
5. A pH meter is also connected to the discharging water at the discharge outlets and the pH values are displayed for public notice and records maintained.
6. Flowmeters are also fitted at the outlet discharge point (s) to know the total volume of water being discharged into the riverine system and records maintained.
7. Prepare and submit a latest layout plan (PDF document) of your industry showing all the buildings, machineries, individual ETP tanks, raw material/ products/ by products/ hazardous waste storage area, storm water drains with its outlet point marked etc. All the above shall be clearly indicated and labelled in the above drawing.
8. Submit average monthly production details with quantity for the last one year, provide a modified mass balance.

9. Submit water balance data based on actual water consumption/ effluent generation/ reuse for the last six months.
10. Performance evaluation of the existing ETP be carried out through an institute of repute and modification/ rectification / latest technology adaptation as per requirement shall be carried out if required and submit the performance evaluation report to Board. Ensure that a pH meter provided at ETP (final collection pond of treatment plant) shall be calibrated periodically and functioning properly at all times. Also, a camera focussing towards sensors immersed in a treated water tank shall be arranged and connected to the server of Board.
11. Prepare a flow chart of ETP showing all unit operations including tank capacities, retention time etc. and the same shall be displayed at the ETP area.
12. Log book in which the flow meter readings are regularly entered and records maintained. Ensure that flow meters provided at the ETP outlet are functioning properly.
13. Maintain a stock register for chemicals used in the ETP and made available during the visits of officials of the Board.
14. Provide 360° rotating night vision cameras in the backyard of the unit and at the ETP area and share the live visuals with the server of Board.
15. Ensure adequate lighting in the ETP area up to the river side of the unit.
16. The bushes and trees at the riverside boundary inside the premises of the company shall be cleared urgently.
17. Keep the industry premises always hygienic and ensure that good housekeeping is maintained all the time.
18. Adequate Sanitation facilities are provided to the workers.
19. Facilities shall be provided for the collection and disposal of solid waste including garbage/food waste.

NOW THEREFORE, you are hereby directed to submit compliance report to the Board on the above within fifteen days of receipt of this directions, failing which further action would be initiated under The Environment (Protection) Act, 1986.

**For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD**


CHAIRPERSON

Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office
Emakulam
2) The Senior Environmental Engineer
KSPCB, ESC Eloor

General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: chn.kspcb@gov.in, ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Patton P.O., Thiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1078/2024-SEE-1

Date: 29/07/2024

To

Reg with A/D

M/s .Organo Fertilizers (India) Pvt.Ltd,
Industrial Development Area,Edayar,
Muppathadam.P.O.,Aluva

Sub :-Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of The Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in The Water (Prevention & Control of Pollution) Act 1974, The Air (Prevention & Control of Pollution) Act 1981 and The Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change,
Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional
Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board.

WHEREAS the Committee inspected your unit (i.e., ETP area) on 10.07.2024. Based on the inspection findings of the Committee and in exercise of the powers conferred under Section 5 of The Environment (Protection) Act, 1986, you are hereby directed to ensure the following and submit a compliance report":

1. Construct and maintain proper drains to direct entire the storm waters into a common drain and fix the stormwater outlet point to river Periyar complying to the discharge norms as per granted Consents/ common drain of DIC whichever possible with clear visibility and easy access. Provide a delay pond before the discharge point.
2. A pH meter is also connected to the discharging water at the discharge outlets and the pH values are displayed for public notice and records maintained.
3. Flowmeters are also fitted at the outlet discharge point (s) to know the total volume of water being discharged into the riverine system/drain and records maintained.
4. Prepare and submit a latest lay out plan (PDF document) of your industry showing all the buildings, machineries, individual ETP tanks, raw material/products/ by products / hazardous waste storage area, storm water drains with its outlet point marked etc. All the above shall be clearly indicated and labelled in the above drawing.
5. Submit average monthly production details with quantity for the last one year.
6. Submit water balance data based on actual water consumption/ effluent generation/ reuse for the last six months.
7. Performance evaluation of the existing ETP be carried out through an institute of repute and modification/ rectification / latest technology adaptation as per requirement shall be carried out if required and submit the performance evaluation report to Board.
8. Prepare a flow chart of ETP showing all unit operations including tank capacities, retention time etc. and the same shall be displayed at the ETP area.
9. Maintain log book in which the flow meter readings are regularly entered.
Ensure that flow meter provided are functioning properly.
- 10 Maintain stock register for chemicals used in the ETP if chemical addition is

provided.

11. Provide 360° rotating night vision camera in the back yard of the unit and at the ETP area and share the live visuals with the Board.
12. Ensure adequate lighting in the ETP area upto river side of your unit.
13. Keep the industry premises always hygienic and ensure that adequate sanitation facilities are provided to the workers. Facilities shall be provided for the collection and disposal of solid waste including garbage/food waste.
14. Ensure that the domestic effluent is discharged through properly designed septic tank- soakpit facility of adequate capacity.

NOW THEREFORE, you are hereby directed to submit compliance report to the Board on the above within fifteen days of receipt of this directions, failing which further action would be initiated under The Environment (Protection) Act, 1986

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office
Ernakulam

2) The Senior Environmental Engineer
KSPCB, ESC & LOR

☐ General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: chn.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram - 695 004

ഫ്ളൂ പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1078/2024-SEE-1

Date: 29/07/2024

Reg- with A/P

Ref: 1.Consent No : PCB/ESC/CO/IC-690/R1/23 dated 01/09/2023 valid up to 30/06/2028.

2. Letter PCB/ESC/CO/95/07 dated 18.06.2024 issued to you.

CLOSURE INTENTION NOTICE

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act, 1986 in the state;

WHEREAS M/s TMS Leathers,I.D.A.,Edayar, Muppathadom, Emakulam - 683110 (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & The Air (Prevention & Control of Pollution) Act, 1981 and The Environment (Protection) Act,1986 and is bound to comply with the provisions of the said Acts;

WHEREAS you were bound to comply with the conditions of the Consent referred (1) issued by the Board as per Section 21 of The Air (Prevention and Control of Pollution) Act,1981 and Section 25 of The Water (Prevention and Control of Pollution) Act, 1974;

WHEREAS directions were issued to you vide letter cited 2nd above based on the inspection conducted by Board officials on 27.05.2024;

WHEREAS an inspection to ETP Area and effluent discharge outlet of M/s TMS Leathers, I.D.A.,Edayar, Muppathadom, Ernakulam – 683110 was conducted on 10.07.2024 by the Committee constituted as per the Hon'ble High Court of Kerala order dated 10.06.2024 in WPC No. 9534/2020, 996/2012, 31236/2023 and during the visit to the ETP Area located within your industry premises, the Committee observed the following violations and/or non-compliance of conditions:

1. The probes provided in the Online Continuous Effluent monitoring system (OCEMS) was found kept in a bucket containing water which raises suspicion of manipulation in the actual reading.
2. A camera focussing towards the sensors (OCEMS) immersed in the treated effluent not been provided.
3. Storm water was flooded in the entire industry premises since there was no proper storm water drains or delay pond.
4. No action initiated to comply with the directions issued vide Boards letter cited 3rd ;
5. There was no easy and safe access to ETP area up to river bank where an your industry authorized effluent discharge outlet is provided.
6. Very Poor housekeeping in the ETP and the surrounding areas and approach to ETP area was not proper.
5. No provision/ access is provided to take sample from the authorized out let pipe immediately before reaching the river and also treated effluent pipe line to river was provided through underground which is not permitted.

NOW THEREFORE you are hereby directed to show cause, if any, within 15 days of receipt of this notice, as to why, under Section 33 A of the Water (Prevention and Control of Pollution) Act, 1974, direction for closure shall not be issued to the unit for the violations noticed.

Dated this the 29th day of July, 2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

To

M/s TMS Leathers
I.D.A., Edayar
Muppathadam
Ernakulam - 683110

Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office
Ernakulam

2) The Senior Environmental Engineer
KSPCB, ESC Floor

☎ General: 047 - 2312910, 2318133, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
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KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1078/2024-SEE-1

Date: 29/07/2024

To

Reg. with A/D

M/s Sunrise TSR Factory,
Industrial Development Area,
P.O., Edayar, Kerala

Sub :-Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of The Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in The Water (Prevention & Control of Pollution) Act 1974, The Air (Prevention & Control of Pollution) Act 1981 and The Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board.

WHEREAS the Committee inspected your unit (i.e., ETP area) on 10.07.2024. Based on the inspection findings of the Committee and in exercise of the powers conferred under Section 5 of The Environment (Protection) Act, 1986, you are hereby directed to ensure the following and submit a compliance report:

1. Construct and maintain proper drains to direct the entire storm water into a common drain and fix the storm water outlet point to river/ common drain

and fix the stormwater outlet point to river Petiyar complying to the discharge norms as per granted Consents/ common drain of DIC whichever possible with clear visibility and easy access. Provide a delay pond before the discharge point.

2. A pH meter is also connected to the discharging water at the discharge outlets and the pH values are displayed for public notice and records maintained.
3. Flowmeters are also fitted at the outlet discharge point (s) to know the total volume of water being discharged into the riverine system/drain and records maintained.
4. Prepare and submit a latest lay out plan (PDF document) of your industry showing all the buildings, machineries, individual ETP tanks, raw material/ products/ by products / hazardous waste storage area, storm water drains with its outlet point marked etc. All the above shall be clearly indicated and labelled in the above mentioned drawing.
5. Submit average monthly production details with quantity for the last one year.
6. Submit water balance data based on actual water consumption/ effluent generation/ reuse for last six months.
7. Performance evaluation of the existing ETP be carried out through an institute of repute and modification/ rectification / latest technology adaptation as per requirement shall be carried out if required and submit the performance evaluation report to Board.
8. Prepare a flow chart of ETP showing all unit operations including tank capacities, retention time etc. and the same shall be displayed at the ETP area.
9. Maintain log book in which the flow meter readings are regularly entered. Ensure that flow meter provided are functioning properly.
10. Maintain stock register for chemicals used in the ETP if chemical addition is provided.

11. Provide 360 ° rotating night vision camera in the back yard of the unit and at the ETP area and share the live visuals with the Board.
12. Ensure adequate lighting in the ETP area upto river side of your unit.
13. Keep the industry premises always hygienic and ensure that adequate sanitation facilities are provided to the workers. Facilities shall be provided for the collection and disposal of solid waste including garbage/food waste.
14. Ensure that the domestic effluent is discharged through properly designed septic tank- soakpit facility of adequate capacity.

NOW THEREFORE, you are hereby directed to submit compliance report to the Board on the above within fifteen days of receipt of this directions, failing which further action would be initiated under The Environment (Protection) Act, 1986

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office
Ernakulam

2) The Senior Environmental Engineers
KSPCB, ESC Elloor



E-CA NO : CA-2024-041824

E-FILING NO : EF-HCK-2023-052772

BEFORE THE HONOURABLE HIGH COURT OF KERALA AT ERNAKULAM

_____ Of Year 2024

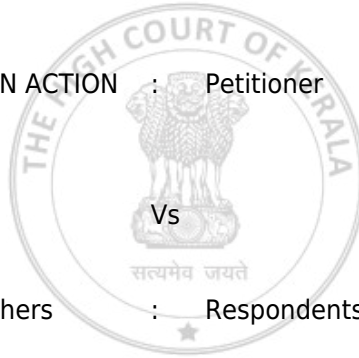
In

WP(C) No.31236/2023

ASSOCIATION OF GREEN ACTION : Petitioner
FORCE

Vs

UNION OF INDIA and others : Respondents



MEMO FILED BY THE SENIOR GOVERNMENT PLEADER

AS DIRECTED BY THIS HON BLE COURT ON 10/06/2024

Sd/-
E-VERIFIED
GOVERNMENT PLEADER
GP-2



BEFORE THE HONOURABLE HIGH COURT OF KERALA AT ERNAKULAM

_____ Of Year 2024

In

WP(C) No.31236/2023

ASSOCIATION OF GREEN ACTION : Petitioner
FORCE

V/S

UNION OF INDIA and others : Respondents

INDEX

SL Contents

Page Nos

1 MEMO FILED BY THE SENIOR GOVERNMENT PLEADER AS DIRECTED BY THIS HON BLE COURT ON 10/06/2024 1-281



Sd/-
E-VERIFIED
GOVERNMENT PLEADER
GP-2

**BEFORE THE HONOURABLE HIGH COURT OF KERALA
AT ERNAKULAM**

WRIT PETITION (Civil) No:31236/2023

Association of Green Action Force
represented by its Secretary: Petitioner

Vs.

Union of India & others : Respondents

**MEMO FILED BY THE SENIOR GOVERNMENT PLEADER
AS DIRECTED BY THIS HON'BLE COURT ON 10.06.2024**

As directed by this Hon'ble Court on 10.06.2024, I am producing herewith the report of the committee constituted by the Hon'ble High court of Kerala. The same may be kindly be accepted on the file as part of the records in the interest of justice.

Dated this the 30th day of October, 2024.


**NISHA BOSE
SENIOR GOVERNMENT PLEADER**

Le/P/US02

INDEX

Contents	Page No.
1 Introduction.....	1
2 Current Status of Periyar River Pollution.....	3
3 Fish Kill Incident In River Periyar on 20 th May 2024 and 21 st May 2024.....	9
4 Initiatives of The Committee in Compliance with Orders of the Honorable High Court Of Kerala.....	21
5 Existing Initiatives.....	42
6 Recommendations to Curb Pollution of River Periyar.....	45
 ANNEXURE1.....	 49
ANNEXURE2.....	52
ANNEXURE3.....	73
ANNEXURE3(a).....	79
ANNEXURE4.....	102
ANNEXURES.....	111
ANNEXURE6.....	114
ANNEXURE6(a).....	124
ANNEXURE6(b).....	154
ANNEXURE6(c).....	161
ANNEXURE7(a).....	170
ANNEXURE7(b).....	176
ANNEXURE7(c).....	184
ANNEXURE7(d).....	190



ANNEXURE7(a).....	192
ANNEXURE8(a)	202
ANNEXURE8(b).....	204
ANNEXURE8(c).....	207
ANNEXURE8(d).....	211
ANNEXURE8(e).....	214
ANNEXURE8(f).....	217
ANNEXURE8(g).....	220
ANNEXURE8(h).....	223
ANNEXURE9	226
ANNEXURE10(a).....	228
ANNEXURE10(b).....	229
ANNEXURE11.....	230
ANNEXURE12.....	253
ANNEXURE13.....	256 + 274



List of Tables

		Page No.
Table 3.1	Dissolved Oxygen Levels at Pathalam bund upstream, Pathalam bund downstream, Vettukadavu, Eloor Ferry.....	10
Table 3.2	Dissolved Oxygen Levels at Pathalam bund upstream from 01/04/2024 to 31/05/2024.....	11
Table 3.3	Dissolved Oxygen Levels at Pathalam bund downstream from 01/04/2024 to 31/05/2024.....	12
Table 3.4	Dissolved Oxygen Levels at Pathalamkaddu from 01/04/2024 to 31/05/2024.....	14
Table 3.5	Boat Sampling Locations.....	15
Table 3.6	Details Of Industries Permitted With Authorized Outlets into River.....	17
Table 3.7	Analysis Results of Treated Effluents Collected from 6 No. of Industries visited by Kerala SPCB during 23/05/2024 to 25/05/2024.....	18-19
Table 4.1	Details of sampling conducted during the visit of the Committee and sampling continued by the KSPCB Officials.....	32
Table 4.2	Analysis reports of water samples collected from Pethiyar river on 29.06.2024, 03.07.2024, 03.07.2024, 27.07.2024 and 19.08.2024.....	35-36
Table 4.3	Non-complying parameters of effluent samples collected from industries on 10.07.2024.....	39
Table 4.4	Significant parameters of storm water samples collected from industries on 10.07.2024.....	40
Table 4.5	Analysis results of the Effluent Samples collected from industries on 18.07.2024.....	41
Table 5.1	Completed Activities in the action plan prepared in OA 395/2013 and OA 673/2016.....	43-45

List of Figures

		Page No.
Figure 1.1	Map showing locations of urban local bodies in the catchment of Periyar.....	4
Figure 2.1	NWMP Stations on river Periyar in Kerala State.....	4
Figure 3.1	Map showing the locations of fish kill incidents and sampling stations.....	9
Figure 4.1	Hearing of the Petitioners by the Committee at Eluru Municipality Conference Hall on 24.06.2024.....	23
Figure 4.2	Site visit by the Committee along with the Petitioners and Amicus Curiae on 24.06.2024.....	24
Figure 4.3	Boat survey on 25-06-2024 by the Committee for assessing the discharges into the River Periyar.....	26
Figure 4.4	Sampling carried out on 29.06.2024, 05.07.2024, 03.07.2024, 27.07.2024, 19.08.2024 by Kerala SPCB.....	27
Figure 4.5	Photographs of inspection at M/S. Cochin Minerals And Rutile Limited, M/S. TMS Leathers, M/S. Sunrise TSR Factory, M/S. Organic Fertilizers (India) Pvt. Ltd.....	30

**REPORT OF THE COMMITTEE
CONSTITUTED BY THE
HONOURABLE HIGH COURT OF
KERALA
IN WP(C) Nos 9534 OF 2020, 31236 OF
2023 AND 996 OF 2012**



Committee Members

- 1. Dr. Rathnan U Kelkar IAS, Secretary to Government, Environment Department, Government of Kerala**
- 2. Sri. J Chandra Babu, Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore**
- 3. Sri. Suneel Pameedi IFS, Director, Environment & Climate Change, Government of Kerala**
- 4. Smt. S Sreekala, Chairperson, Kerala State Pollution Control Board**

Dated 28th October, 2024

**REPORT OF THE COMMITTEE CONSTITUTED BY THE
HONOURABLE HIGH COURT OF KERALA AS PER THE
ORDER DATED – 10.06.2024 IN WP(C) Nos 9534 OF 2020, 31236
OF 2023 AND 996 OF 2012**

1. INTRODUCTION

1.1 OVERVIEW OF RIVER PERIYAR

Periyar river is the longest river in the State of Kerala. The river functions as a source of drinking water, water for commercial uses, industrial purposes, irrigation as well as a source of hydroelectricity in addition to many other ecological functions. Periyar is of utmost significance to the life and economy of Kerala. Pollution of river Periyar at its lower stretch has been a grave issue faced by the State. Even though statutory and other Government agencies have been imparting coordinated efforts to alleviate the problem, the effects of pollution on the local population, aquatic ecology, and a few economic activities are frequently causing a huge public outcry. Consequently, several litigations are being pursued in various Honorable Courts and Tribunals in the matter of pollution of river Periyar. WP(C) Nos 9534 of 2020, 31236 of 2023, and 996 of 2012 are under the purview of the Hon'ble High Court of Kerala, related to the issue of pollution of Periyar. A map showing the locations of urban local bodies in the Periyar river catchment is shown in Fig 1.1. A detailed overview of river Periyar is attached as Annexure 1.



Fig 1.1 Map showing locations of urban local bodies in the catchment of Periyar

1.2 CONTEXT OF THE STUDY

The Periyar river stretches are vulnerable to pollution in many ways. It is an uttermost important job to find those potential chances of pollution and take control measures as the river stretch is the source of water for drinking and other civilian purposes. The major causes that might pollute the river bodies are the discharge of industrial effluents (untreated sewage disposals, unauthorized dumping of solid wastes, agricultural runoff, etc. Pilgrim centres situated on the banks of the river also contribute to the high organic load in the river. The Periyar river stretches have industrial belts on its banks at Perumbavur, Kalady, Eloor-Edayar region, and Kalamassery region.

River Periyar has witnessed fish kill incidents at lower stretches a few times over the years. One such incident of fish kill occurred in the river, in the region downstream of Eloor on 20.05.2024 and 21.05.2024. During the incident, the Kerala State Pollution Control Board's surveillance team inspected the site and observed fish, including varieties like Carp, Pearl spot, and Tilapia floating in the river struggling to breathe. By dawn, on 21.05.2024, fish were found dead in various locations, including Vettukadav, Eloor Ferry, Cheranalloor, Varpuzha, Kadamekudy, and Kothadu. Samples of water and dead fish were collected from the area where dead fish were found. From the analysis report, the dissolved oxygen (DO) level of the water sample was found to be lower than that required for the survival of the fish. On 20/05/2024, at 3 p.m., three shutters at the Pathalam regulator-cum-bridge had been opened by the Irrigation Department. It was observed that the water with high organic load and very low Dissolved Oxygen (DO) levels, along with the settled sludge, with biological waste settled at the bottom of the bund causing anaerobic condition upstream of the bund, gushed out through the 3 shutters and mixed up with the saline water at the downstream side of the bund. The situation had become more critical because of high-tide conditions on the downstream side within hours since the shutter was opened.

Immediately after this incident of fish kill, IA No. 2 of 2024 was filed in WP(C) No. 9534 of 2020 before the Hon'ble High Court of Kerala bringing the matter of this fish-kill incident to the notice of the Hon'ble Court. The Hon'ble Court ordered on 24.05.2024 the Kerala State Pollution Control Board to file a report on the Fish kill incident. Kerala State Pollution Control Board filed its report. The Hon'ble Court considered the report while considering the Writ Petition (Civil) Nos. 9534/2020 along with WP(C) 996/2012 and WP(C) 31236/2023, related to pollution of river Periyar and passed Order dated 10.06.2024 directing the formation of a Committee consisting of the Secretary,

Directorate of Environment and Climate Change, Government of Kerala, the Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore and the Chairman, Kerala State Pollution Control Board. The Committee was directed to visit the places visited by the Amicus Curiae appointed in WP(C) No. 31236 of 2020 and shall ensure that the representatives of the petitioners as well as the learned Amicus Curiae accompany them during such visits. The Hon'ble Court directed that the Committee shall file their report containing the suggestions and action to be taken to curb the pollution in the Periyar river. Consequently, the committee was formed with the four members comprising 1. Secretary to Government, Environment Department; 2. Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore; 3. Director, Environment & Climate Change, and 4. Chairperson, Kerala State Pollution Control Board

This report of the Committee aims to provide a thorough understanding of the Periyar River's current state, observations and recommendations enabling informed decision-making for its conservation and restoration

2. CURRENT STATUS OF PERIYAR RIVER POLLUTION

2.1 POLLUTION STATUS OF RIVER PERIYAR

An overview of pollution sources, types of pollutants, and environmental and social impacts affecting rivers, in relation to river Periyar is attached as Annexure-2.

2.2 STATUS OF PERIYAR RIVER QUALITY BASED ON DATA OF NATIONAL WATER QUALITY MONITORING PROGRAMME (NWMP) (2022-2024)

National Water Quality Monitoring Programme (NWMP): - The Central Pollution Control Board(CPCB) in collaboration with State Pollution Control Boards (SPCBs) in the States and Pollution Control Committees (PCCs) in Union Territories (UTs) has established a National Water Quality Monitoring Network (NWMP) to assess the status of water quality of water resources and to facilitate for prevention and control of pollution in water bodies. Water samples were analyzed for 9 core parameters, 19 general parameters, 9 trace metals and a set of pesticides as per Guidelines on Water Quality Monitoring, 2017 issued by the Ministry of Environment, Forest and Climate Change (MoEF& CC). Analyzed water quality parameters are compared with the 'Designated Best Use Water Quality Criteria' recommended by CPCB or Primary Water Quality

Criteria for Outdoor Bathing notified under The Environment (Protection) Rules, 1986, Water Quality Standards for Coastal Water depending on the sample source.

To assess the water quality of river Periyar, the Central Pollution Control Board (CPCB) in association with the Kerala State Pollution Control Board (KSPCB) has set up 9 water quality monitoring stations on the mainstream of river Periyar. The sampling stations of Periyar in Kerala are located in the upper, middle and lower stretches passing through Idukki and Ernakulam Districts. The sampling stations are at Eloor (Stn code:0017), Kalady (Stn code:0018), KWA water intake at Aluva (Stn code:3468), Sewage discharge point at Aluva (Stn code:1338), Pathalam (Stn code:2334), Kalamassery (Stn code: 2335), Purappillikadavu (Stn code: 2336), Muppathadam (Stn code: 2333) and Panamkutti Bridge (Stn code: 5209). A map showing the NWMP sampling stations on river Periyar in Kerala is given in Fig 2.1.



Fig 2.1 NWMP Stations in river Periyar in Kerala State

2.2.1. INFERENCE BASED ON NWMP WATER QUALITY MONITORING DATA OF RIVER PERIYAR

The NWMP water quality monitoring data of the river Periyar, at nine locations in Kerala, for the years 2022, 2023 and 2024 are attached as Annexure-3. The inferences from the observed values of 9 NWMP stations on river Periyar in Kerala are detailed in the subsequent paragraphs.

A IN THE YEAR 2022

Analysis results of the NWMP monitoring data of the river Periyar, at nine locations in Kerala in the Year 2022, reveal that

- pH ranges from 6 - 9.8 at all the monitored locations. The pH value exceeds the standard pH range of 6.5-8.5 at Pathalam, Purappalikkadavu, Kalamassery.
- Biological Oxygen Demand (BOD) ranges from 0.5- 2.7 mg/L and meets the water quality criteria for outdoor bathing notified under The Environment (Protection) Act, 1986 at all the monitoring locations
- Dissolved Oxygen (DO) varies from 3.1 - 8.4 mg/l at all the monitored locations. The minimum DO does not meet the outdoor bathing water quality criteria in river Periyar at Eloor station.
- The Faecal Coliform (FC) value ranges from 63 - 9200 MPN/100ml and exceeding the desirable value of 500 MPN/100 ml and the maximum permissible limit of 2500 MPN/100ml as per primary water quality criteria for outdoor bathing, at Kalady, KWA Aluva, SDP Aluva, Muppachadam, Eloor, Pathalam, Purappalikkadavu, Kalamassery, Panamikutty Bridge.

IN APRIL 2022 AT 9 NWMP STATIONS

Analysis results of the NWMP monitoring data of the river Periyar, at nine locations in Kerala in April 2022 reveal that.

- The pH values in the month of April at all stations were within the specified pH range of 6.5-8.5.
- The values of BOD meet the primary water quality criteria (3mg/L or less) for bathing water (water used for organized outdoor bathing), notified under the Environment (Protection) Rules, 1986 at all 9 monitoring locations.
- FC is found to be above the maximum permissible limit of 2500 MPN/100ml at SDP Aluva (2700 MPN/100 ml) and Eloor station (2700 MPN/100 ml). All stations except Kalamassery and Purappalikkadavu exceed the desirable value of 500 MPN/100 ml.

- DO value in the month of April at Eloor is 4.2 mg/L, which is only slightly below the minimum required Dissolved Oxygen value of 4.0mg/L as per primary water quality criteria for class SW-II water (for bathing, contact water sports and commercial fishing)
- At Eloor, Purappalikkadavu and Pathalam where tidal influence is significant, values of Magnesium, Sulphates, Chlorides, Total Dissolved Solids (TDS), Electrical Conductivity (EC) etc. are observed to be high.
- Heavy metals and Pesticides analysed are observed to be Below Detectable Limit (BDL). Values of Iron and Zinc are within the limit of Drinking Water standards as per IS 10500(2012).

From the observed value of Ammoniacal Nitrogen at 9 stations, the maximum value obtained is 1.05mg/L at Pathalam where the pH was 7.3. The calculated value of Free Ammonia is 0.01 mg/L which is less than 1.2mg/L, the maximum permissible limit for propagation of wildlife and fisheries (Designated Best Use water quality criteria as per CPCB).

B. IN THE YEAR 2023

Analysis results of the NWMP monitoring data of the river Periyar, at nine locations in Kerala in the Year 2023 reveal that

- pH ranges from 6.1 – 9.8 at all the 9 monitored locations. The maximum pH value exceeds the specified pH range of 6.5–8.5 at Kalady, KWA Aluva, Sewage discharge point Aluva, Muppathadam, Pathalam, and Kalamassery.
- BOD ranges from 0.2- 5.4 mg/l at all the 9 monitored locations. The highest BOD value 5.4 mg/l. is observed at Panamkutti bridge and the BOD value exceeds the limit of 3 mg/l at Pathalam, Eloor and Panamkutti bridge.
- DO varies from 3 – 8.4 mg/L at all the 9 monitored locations. The minimum DO level does not meet the outdoor bathing criteria in river Periyar at Eloor, Pathalam and Kalamassery stations.
- The Faecal Coliform value ranges from 10 - 7000 MPN/100ml and exceeding the desirable value of 500 MPN/100 ml at Kalady, KWA Aluva, Sewage discharge point Aluva, Muppathadam, Eloor, Pathalam, Purappalikkadavu, Kalamassery, Panamkutti bridge and exceeding the maximum permissible limit of 2500 MPN/100ml at Sewage discharge point Kalady, Sewage discharge point Aluva, Eloor, Pathalam, Purappalikkadavu, Panamkutti bridge as per the primary water quality criteria for bathing water (water used for organised outdoor bathing).

IN APRIL 2023 AT 9 NWMP STATIONS

Analysis results of the NWMP monitoring data of the river Periyar, at nine locations in Kerala in April 2023 show that:

- The pH values in the month of April 2023 at all 9 monitored stations except Mupathadam (9), Kalady (9) and Pathalam (9.6) were within the standard pH range of 6.5-8.5.
- The values of BOD meet the primary water quality criteria (3mg/L or less) for bathing water (water used for organized outdoor bathing), notified under Environment (Protection) Rules, 1986 at all monitoring locations, during the month of April 2023. FC is found to be above the maximum permissible limit of 2500 MPN/100ml at Purappalikkadavu (7000 MPN/100ml) and Kalady station (3100 MPN/100ml).
- DO value in the month of April 2023 at Eloor is 4.0 mg/L, which is only slightly above the minimum required Dissolved Oxygen value of 4.0mg/L as per primary water quality criteria for class SW-II water (for bathing, contact water sports and commercial fishing).
- Similar to the values of 2022, at Eloor, Purappalikkadavu and Pathalam values of Magnesium, Sulphates, Chlorides, Total Dissolved Solids (TDS), Electrical Conductivity(EC) etc are observed to be high.
- Heavy metals and Pesticides analysed are observed to be 'Below Detectable Limit' (BDL). Values of Iron and Zinc are within the limit of the Bureau of Indian Standard Drinking Water specifications as per IS 10500: 2012.
- From the observed values of Ammonical Nitrogen and corresponding pH values at 4 stations, the maximum value of Free Ammonia is 0.2 mg/L at Pathalam. The maximum permissible limit for propagation of wildlife and fisheries (Designated Best Use water quality criteria as per CPCB) is 1.2 mg/L.

C. IN THE YEAR 2024(JANUARY TO AUGUST)

Analysis results of the NWMP monitoring data of the river Periyar, at nine locations in Kerala observed from January to August 2024 reveal that

- Both the maximum and minimum values of pH exceed the standard pH range of 6.5-8.5 at all 9 monitored stations and the lowest DO being 3.8mg/L at Kalamassery. The maximum BOD value exceeds the limit of 3 mg/L at Pathalam, Kalady and Purappalikkadavu.
- The Faecal Coliform value ranges from 2 - 2800 MPN/100ml and exceeding the desirable value of 500 MPN/100 ml at Kalady, KWA Aluva, Sewage discharge point Aluva,

Muppaihadam, Eloor, Pathalam, Purappalikkadavu, Kalamassery, Panamkurry bridge and exceeding the maximum permissible limit of 2500 MPN/100ml at sewage discharge point Aluva. Eloor as per the primary water quality criteria for outdoor bathing (water used for organised outdoor bathing).

IN APRIL 2024 AT 9 NWMP STATIONS

Analysis results of the NWMP monitoring data of the river Periyar, at nine locations in Kerala in April 2023 indicate that

- The pH values in the month of April 2024 at all the monitored stations except Eloor (pH- 8.7) were within the standard pH range of 6.5-8.5. The values of BOD in the range of 1.4 to 3 mg/L, which meets the primary water quality criteria (3mg/L or less) for outdoor bathing (water used for organised outdoor bathing), notified under The Environment (Protection) Rules, 1986 at all monitoring locations, during the month of April 2024. The value of BOD at Kalamassery is observed as 3mg/L.
- FC at all stations were in the range of 20-1900MPN/100 ml. At KWA Intake Aluva, SDP Aluva, Eloor, Kalamassery, Pathalam and Panamkurry Bridge it exceeds the desirable FC value of 500 MPN/100 ml.
- DO value in the month of April is 4.4 mg/L at Eloor and 4.6 mg/l at Kalamassery, which is slightly above the minimum required Dissolved Oxygen value of 4.0mg/L as per primary water quality criteria for Class SW-II Water I for bathing, contact water sports and commercial fishing)
- Similar to the values of 2022 and 2023 at Eloor, Purappalikkadavu and Pathalam values of Magnesium, Sulphates, Chlorides, Total Dissolved Solids (TDS), Electrical Conductivity (EC) etc. are observed to be high.
- From the observed values of Ammonia, Nitrogen values at 9 stations, the maximum value of Free Ammonia is 0.07 mg/L at Eloor and is within the maximum permissible limit (1.2mg/L) for propagation of Wildlife and Fisheries (Designated Best Use Water Quality Criteria as per CPCB).

Observations based on the inferences on NWMP data of the years 2012, 2023 and 2024 (January to August)

Fecal contamination is significant in the river. This is an indication of pollution of river from urban/domestic sources. A trend of Low Dissolved Oxygen is seen in the river water, especially in the lower stretches during the summer months.

3. FISH KILL INCIDENT IN RIVER PERIYAR ON 20TH MAY 2024 AND 21ST MAY 2024

The fish kill incident of 20th and 21st May, 2024 is detailed below. These details were taken from the records of KSPCB related to the fish kill incident.

3.1. WATER QUALITY STATUS OF RIVER PERIYAR AFTER THE FISH KILL INCIDENT

Complaints were received from the Eloor Ferry area regarding fish death in the Periyar River on 20.05.2024, at around 9 p.m. Pollution Control Board's surveillance team inspected the site and observed fish, including varieties like carp, Pearl spot, and Tilapia floating in the river struggling to breathe. By dawn, on 21/05/2024, fish were found dead in various locations, including Vettukadav, Eloor Ferry, Cheranalloor, Varapuzha, Kadamakudy and Kothada. Samples of water and dead fish were collected from the area where dead fish were found. A map showing the locations of fish kill incidents and sampling stations is shown below in Fig 3.1.

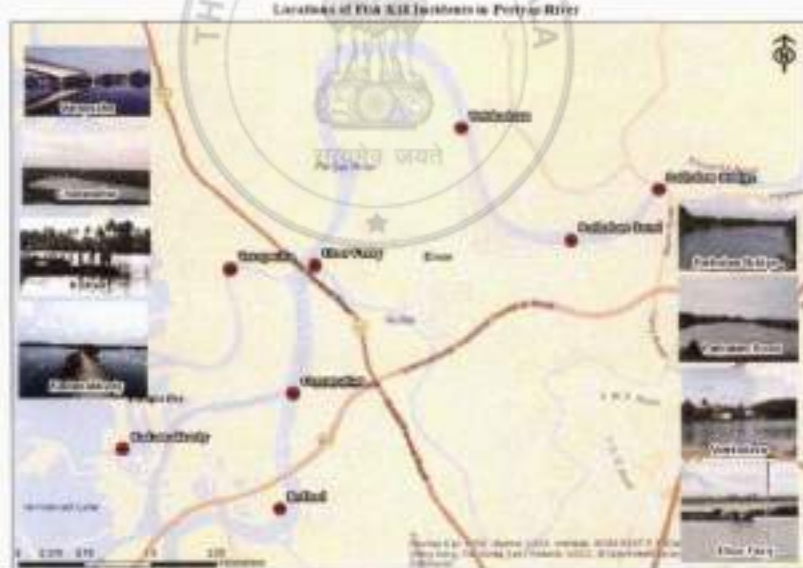


Fig 3.1 Map showing the locations of fish kill incidents and sampling stations

On 20/05/2024, at 3 pm., three shutters at the Puthalam regulator-cum-bridge were opened by the Irrigation Department. It was observed that the water with high organic load and very low Dissolved Oxygen (DO) levels, along with the settled sludge, with biological waste settled at the bottom of the bund causing anaerobic condition upstream of the bund, gushed out through the 3 shutters and mixed up with the saline water at the downstream side of the bund. The situation had become vulnerable because of high tide conditions on the downstream side within hours since the shutter had opened. The board's Surveillance Centre carries out daily monitoring of river sampling from five stations- Puthalam bridge, Puthalam bund upstream, Puthalam bund downstream, Vettukadavu (these four stations are in the Eloor branch) and Puthalamkadavu (in Edamula branch) of the river. The DO measurements at 4 locations taken on the morning and night of 20.05.2024 are given in Table 3.1 below.

Table 3.1 Dissolved Oxygen Levels at Puthalam bund upstream, Puthalam bund downstream, Vettukadavu, Eloor Ferry

Location	Dissolved Oxygen Levels in mg/L*	
	20.05.2024, 1.30 am	20.05.2024, 9.30 pm
Puthalam Bund Upstream	1.3	1.0
Puthalam Bund Downstream	2.7	2.1
Vettukadavu	6.8	3.2
Eloor Ferry	-	2.1

* mg/l.- milligrams per litre

Note: Minimum DO for propagation of aquatic life- 4.0 mg/l.

Samples of dead fish collected by KSPCB were handed over to Kerala University of Fisheries and Ocean Studies (KUFOS) on 21/05/2024 for further analysis to know the root cause of fish death. Analysis results of fish samples handed over to KUFOS are yet to be received by the Kerala State Pollution Control Board.

The opening of the Puthalam bund's shutter with the discharge of high organic load has led to depletion in dissolved oxygen (D.O.) levels in the downstream area. On 20.05.2024, at Vettukadavu, the D.O. concentration dropped from 6.8 mg/L in the morning to 3.2 mg/L at night, within hours after the opening of the shutter. It is presumed that the reduction in DO level is the result of the shutter opening. The reports of the Kerala State Pollution Control Board in the last few years regarding the water quality changes related to the Puthalam regulator were also examined. It

has been observed that during the summer months when the bund is closed for a long time, organic wastes reach the river from several residential/commercial areas ultimately deposited at the river bed of the upstream side of the bund.

Based on the facts stated above, this fish death is due to the sudden, continuous and strong flow of DO depleted water along with deposited sludge of high organic load that occurred when the bund was opened, which caused the drop of DO in downstream of the bund. It has been observed that the prolonged closure of the shutters in the Pathalam bund for several days results in the accumulation of organic load which subsequently causes depletion of DO levels in the upstream water of the bund. The daily sampling data of DO from 01/04/2024 to 31/05/2024 at Pathalam bund upstream and downstream is given in Table 3.2 and Table 3.3 respectively.

Table 3.2 Dissolved Oxygen Levels at Pathalam bund upstream from 01/04/2024 to 31/05/2024

PATHALAM BUND UPSTREAM														
DATE	01.04.24	02.04.24	03.04.24	04.04.24	05.04.24	06.04.24	07.04.24	08.04.24	09.04.24	10.04.24	11.04.24	12.04.24	13.04.24	14.04.24
DO Value (mg/L)	5.9	6.3	3.5	6.0	5.3	5.2	5.8	4.5	4.3	4.7	4.3	4.6	NA*	7.6
DATE	16.04.24	17.04.24	18.04.24	19.04.24	20.04.24	21.04.24	22.04.24	23.04.24	24.04.24	25.04.24	26.04.24	27.04.24	28.04.24	29.04.24
DO Value (mg/L)	3.6	3.2	2.8	3.3	2.0	1.6	3.0	3.8	3.4	3.6	5.3	4.7	5.2	4.6
DATE	01.05.24	02.05.24	03.05.24	04.05.24	05.05.24	06.05.24	07.05.24	08.05.24	09.05.24	10.05.24	11.05.24	12.05.24	13.05.24	14.05.24
DO Value (mg/L)	4.5	3.8	6.9	3.0	2.6	2.8	2.9	4.0	2.6	4.8	3.2	1.2	1.3	3.4
DATE	16.05.24	17.05.24	18.05.24	19.05.24	20.05.24	21.05.24	22.05.24	23.05.24	24.05.24	25.05.24	26.05.24	27.05.24	28.05.24	29.05.24
DO Value (mg/L)	2.8	4.0	2.0	2.6	1.3	4.4	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*
DATE	30.05.24	31.05.24												
DO Value (mg/L)	NA*	NA*												

NA*- NA stands for 'Not Analysed'. Samples are taken upstream and downstream of the Pathalam regulator separately when the regulator is fully closed. When the regulator is open, there is no difference between upstream and downstream values, hence upstream samples are not taken when the regulator is open.

Table 3.3 Dissolved Oxygen Levels at Pathalam bund downstream from 01/04/2024 to 31/05/2024

PATHALAM BUND DOWNSTREAM													
DATE	01.04.24	02.04.24	03.04.24	04.04.24	05.04.24	06.04.24	07.04.24	08.04.24	09.04.24	10.04.24	11.04.24	12.04.24	13.04.24
DO Value (mg/L)	1.4	1.7	4.1	2.5	2.1	1.2	2.0	0.4	2.4	0.0	1.1	1.0	0.0
DATE	16.04.24	17.04.24	18.04.24	19.04.24	20.04.24	21.04.24	22.04.24	23.04.24	24.04.24	25.04.24	26.04.24	27.04.24	28.04.24
DO Value (mg/L)	2.3	0.9	0.9	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.8
DATE	01.05.24	02.05.24	07.05.24	04.05.24	05.05.24	06.05.24	07.05.24	08.05.24	09.05.24	10.05.24	11.05.24	12.05.24	13.05.24
DO Value (mg/L)	2.4	4.5	3.0	6.0	6.1	3.0	0.5	1.2	0.4	1.2	0.0	1.4	2.2
DATE	16.05.24	17.05.24	18.05.24	19.05.24	20.05.24	21.05.24	22.05.24	23.05.24	24.05.24	25.05.24	26.05.24	27.05.24	28.05.24
DO Value (mg/L)	0.6	3.0	2.9	6.0	2.7	4.6	3.6	5.4	5.6	5.6	5.5	4.8	4.3
DATE	29.05.24	30.05.24	31.05.24										
DO Value (mg/L)	5.4	5	5.4										

From the table, it is observed that the DO values at Pathalam bund upstream and downstream are very low even depleting to 'Zero level' on some days, which indicates it could be due to the discharge of untreated wastewater/sewage into the river Periyar. It is also observed that the DO level has improved from 23.05 2024 onwards at Pathalam bund downstream i.e. above 4 mg/l, which is required for the survival of aquatic life.

The scientific reason behind the phenomena of DO depletion, which causes fish kill is briefly explained below. The deposited sludge of high organic load at the bottom of the river scoured along with the water during the opening of the shutters at the bund. On the course of its movement downwards the sludge causes further depletion of DO of water as per oxygen sag curve and finally

causes critical oxygen depletion in water which may lead to fish kill kilometers downstream of the river. In addition, the following factors may also affect fish kill:

- Fluctuation in climate and change in river water temperatures
- Disturbance in the ecosystem of aquatic life
- The fish used for the cage fish culture are of saline breeds
- The abrupt change in the concentration of salinity

A report on the loss of fish and other aquatic species has been prepared by the Fisheries Director, Thiruvananthapuram and was submitted to the Principal Secretary, Fisheries and Ports Department, Govt. of Kerala vide letter no. DFTVM/1740/2024-CI dated 25/05/2024. A copy of this report is attached as Annexure 3 (a).

Analysis report of the river water samples taken during 20/05/2024 & 21/05/2024 at 6 no. of locations as per Kerala State Pollution Control Board is enclosed as Annexure 4. Analysis report of the river Periyar water samples taken during 20/05/2024 and 21/05/2024 reveal that

- At Puthalam bridge, upstream of the industrial area, the pH is between 6.5 and 8.5. Dissolved oxygen was 0.7 only in the morning of 20/05/2024 showing that the river water was having very low DO immediately upstream of the regulator.
- At Puthalam bund downstream dissolved oxygen reduced from 2.7 to 2.1 mg/L between the morning and night of 20/05/2024 showing that water with low DO has flown through the regulator suddenly diminishing the DO.
- At Vettukadavu the effect of sudden depletion of DO due to flow of water with low DO from upstream of the regulator can be clearly seen where the DO during 20/05/2024 morning and evening were 6.8 mg/L and 1.2 mg/L respectively.
- Eloor Ferry is the area where the Edamula branch of the river meets the Eloor branch of the river. It is a point where fish kill was reported prominently. The DO at Eloor Ferry can be seen as low as 2.1 mg/L at 9:30 pm on 20/05/2024. pH value is 6.85, which is within the permissible limit of 6.5 to 8.5.
- Puthalamkadavu is a station in the Edamula branch, where there is no direct influence of the Eloor-Edayar industrial belt. Wastewater from Kalamassery municipal market, leachate from the solid waste dumping yard of Kalamassery Municipality, high organic load from wetlands near NAD Kalamassery through Thoomibungal thodu and also waste water from Edappallythodu discharge into Edamula branch. Incidents of fish kill have occurred in Edamula branch in the last 5 years.

- The data of DO at Puthalamkadavu from 1st March 2024 till the day of the fish kill showed low DO concentrations ranging from 1.9 to 4.6 mg/L. The data of DO at Puthalamkadavu is given in Table 3.4.

Table 3.4 Dissolved Oxygen Levels at Puthalamkadavu from 01/04/2024 to 31/05/2024

PUTHALAM KADAVU													
DATE	01.04.24	02.04.24	03.04.24	04.04.24	05.04.24	06.04.24	07.04.24	08.04.24	09.04.24	10.04.24	11.04.24	12.04.24	13.04.24
DO Value (mg/L)	4.1	4.3	4.8	5.0	1.8	5.0	2.5	3.5	3.4	4.2	3.7	3.2	3.1
DATE	16.04.24	17.04.24	18.04.24	19.04.24	20.04.24	21.04.24	22.04.24	23.04.24	24.04.24	25.04.24	26.04.24	27.04.24	28.04.24
DO Value (mg/L)	5.4	5.4	5.7	5.6	5.2	5.0	3.8	4.0	3.7	4.0	5.8	3.7	4.9
DATE	01.05.24	02.05.24	03.05.24	04.05.24	05.05.24	06.05.24	07.05.24	08.05.24	09.05.24	10.05.24	11.05.24	12.05.24	13.05.24
DO Value (mg/L)	4.4	4.5	3.9	4.2	4.0	4.0	4.1	4.5	4.4	6.2	4.5	5.1	4.5
DATE	16.05.24	17.05.24	18.05.24	19.05.24	20.05.24	21.05.24	22.05.24	23.05.24	24.05.24	25.05.24	26.05.24	27.05.24	28.05.24
DO Value (mg/L)	4.6	4.5	4.3	3.5	4.2	3.4	3.1	4.4	3.4	3.4	2.5	2.0	1.1
DATE	30.05.24	31.05.24											
DO Value (mg/L)													

- DO at Puthalamkadavu on morning of 20/05/2024 is 4.2 mg/L. This branch joins the DO depleted Eloor branch at Eloor Ferry making the water body susceptible to fish kill. Cheranalloor, Verapuzha, Kadumakudy and Kottadu where fish kill was observed are located downstream to Eloor Ferry.
- Values of Sulphate at Vettukadavu and Eloor Ferry were 590 and 340 mg/l. respectively at 9.30 pm on 20/05/2024. High Chloride values in the range of 2120.5 to 2691.4 mg/L were observed at Puthalam bund downstream, Vettukadavu and Eloor Ferry. Parameters like Nitrate and Nitrite were found in low concentrations at Vettukadavu.
- The following concentrations of metals were found in the river water:

- (i) Zinc- 0.062 mg/L at Pathalam Bund upstream, 0.013 mg/L at Pathalam Bund downstream, 0.035 mg/L at Venukadavu,
- (ii) Manganese-0.056 mg/L at Pathalam Bund upstream, 0.042 mg/L at Pathalam Bund downstream, 0.043 mg/L at Venukadavu, 0.041 mg/L at Eloor Ferry,
- (iii) Nickel-0.64 mg/L at Venukadavu,
- (iv) Boron-0.04 mg/L at Pathalam Bund upstream, 0.02 mg/L at Pathalam Bund downstream, 0.509 mg/L at Venukadavu, 0.02 mg/L at Eloor Ferry,
- (v) Copper-0.012 mg/L at Pathalam Bund upstream, 0.012 mg/L at Venukadavu

- In addition to the routine daily sampling and sampling based on the fish kill incident conducted at Pathalam bridge, Pathalam bund, Venukadavu, Eloor Ferry and Pathalamkadavu, detailed sampling from 12 stations was carried out on 21st May 2024.

SAMPLING AT 12 STATIONS CONDUCTED BY KSPCB ON 21.05.2024 USING BOAT

Sampling of 12 stations in river Periyar, downstream of Pathalam regulator, was carried out by the Kerala State Pollution Control Board on 21st May 2024. The sampling stations are given in the Table 3.5. The detailed results of analysis of the 12 collected samples are also given in Annexure 4.

Table 3.5 Boat Sampling Locations

Edamula Branch	Eloor Branch
Ammanam pumping station	Muttinkal
FACTPD	Venukadavu
KuzhikandamThodu	PREL
Eloor Ferry	FACT-LD
	DEANANZINC LTD
	SUDCHEMIE
	CTMRL
	TCC

The results of the analysis of the samples from 12 stations downstream of the regulator collected on 21.05.2024 given in Annexure-4 show that

- pH in all the monitored stations except FACT-PD (6.4) is within the limit of 6.5 to 8.5.
- COD values at all the monitored stations were observed to be between 82.08 mg/L and 129.6 mg/L. Further in-depth studies are needed to identify whether surface runoff due to heavy rain from the catchment area where industries are also located has contributed to the COD values at all stations.
- Free Ammonia at all the stations is less than 1.2mg/L (i.e., Maximum permissible for propagation of Wildlife and Fisheries as per CPCB Designated Best Use Water Quality Criteria)
- Chloride values at river Periyar monitored stations FACT PD and Eloor Ferry are 407.8 and 142.5 mg/L respectively, but all the other stations have low Chloride concentration. Sulphate concentration at river stations Kuzhikandam thodu and Eloor Ferry is found to be 128 mg/L and 125 mg/L respectively. Total Dissolved Solids (TDS) at river stations Kuzhikandam thodu and Eloor Ferry are found to be 676.62 mg/L and 985.12 mg/L respectively. Chlorides, Sulphates and TDS are observed in regions with saline intrusion and tidal influence.
- No significant concentrations were reported for heavy metals at all stations.

3.2 STATUS OF COMPLIANCE OF MAJOR EFFLUENT DISCHARGING INDUSTRIES AS PER INSPECTIONS IMMEDIATELY AFTER FISH KILL

There are 43 effluent generating industries in Eloor Edayar industrial area. All these industries are operating with the Board's Consent to Operate. The details of these industries are attached as Annexure 5. Of the above industries, only five industries have been permitted to discharge treated effluent with specified quality into the Periyar River. The other effluent generating industries are treating their effluent and either reusing or disposing of the treated effluent through soak pits. Only one industry (M/s TMS Leathers) is having discharge into the river at upstream of the Puthalana bund. The other four industries have outlets downstream of Puthalana bund. The details of industries permitted with authorized outlets to discharge treated effluent to river Periyar are given in Table 3.6.

Table 3.6 Details Of Industries Permitted With Authorized Outfalls into River

Sl No	Name	Authorized Discharge Quantity
1	M/s The Fertilizers and Chemicals Travancore Limited, Udyogamandal	12000 m ³ /day (D's of Parthalam bund), 9840 m ³ /day (Edamala Branch of Periyar)
2	M/s Indian Rare Earths (IRE) (India) Limited (IREL)	400 m ³ /day
3	M/s Sud Chemie India Pvt. Ltd	450 m ³ /day
4	M/s Cochin Minerals and Rutile Limited (CMRL)	650 m ³ /day
5	M/s TMS Leathers	75 m ³ /day

During the inspection on 21.05.2024, no unauthorized discharges were noticed from all the above five industries. However, traces of effluent discharge into the river Periyar were observed from a chicken waste rendering unit namely M/s Alliance Marine Products. Odour nuisance was also experienced. Hence closure order under section 33A of The Water (Prevention and Control of Pollution) Act, 1974 was issued to the afore-said unit on 22.05.2024. 6 no. of industries (i.e., M/s. Cochin Minerals And Rutiles Ltd ,M/s. FACT LTD PD, M/s. FACT Ltd UD, M/s. Sud Chemie Pvt Ltd, M/s. TMS Leathers and M/s. Travancore Cochin Chemicals) were inspected during 22/05/2024, 23/05/2024, 24/05/2024 and 25-05-2024. The effluent treatment plants were working in all the six industries. Samples of treated effluent were collected and analyzed for the consented parameters. The analysis results are tabulated and compared with prescribed limits as per Consent and given in Table 3.7.

Table 3.7 Analysis Results of Treated Effluents Collected from 6 No. of Industries visited by Kerala SPCH from 22/05/2024 to 25/05/2024

Industry	M/s. Codega Minerals And Buclos Ltd		M/s. FACT LTD PD		M/s. FACT Ltd UD		M/s. Sati Chem Pvt Ltd		M/s. TMS Lenders		M/s. Transcore Cochin Chemicals	
Date of sampling	24.5.2024		25.05.2024		22.5.2024		23.05.2024		23.05.2024		24.05.2024	
	Value	Limit	Value	Limit	Value	Limit	Value	Limit	Value	Limit	Value	Limit
pH	6.06	6-8.5	6.97	6.5-8.5	6.8	6.5-8	7.85	5.5-9	7.2	6.5-9	7.59	6-8.5
Chloride (mg/L)	-	-	-	-	-	-	-	-	-	-	BDL	1000
SS (mg/L)	98	100	56	100	21.2	100	74.4	100	56.8	50	62.1	30
Oil and Grease (mg/L)	1	10	BDL	10	5.44	10	3.16	10	10.68	10	BDL	10
COD (mg/L)	-	-	80	250	-	-	-	-	74.1	250	-	-
BOD (mg/L)	-	-	12	30	-	-	-	-	24	20	-	-
TDS (mg/L)	-	-	-	-	-	-	-	-	1230	2100	-	-
Fluoride (mg/L)	-	-	-	-	0.24	1.5	-	-	-	-	-	-
Sulphide (mg/L)	-	-	-	-	-	-	-	-	BDL	2	BDL	2
Free Ammonia (mg/L)	-	-	BDL	5	0.75	4	0.195	5	-	-	-	-
Ammoniacal nitrogen (mg/L)	-	-	0.7	50	75	50	1.5	50	-	-	-	-
Nitrate Nitrogen (mg/L)	-	-	20.99	20	-	10	-	-	-	-	-	-
TKN (mg/L)	-	-	5.6	100	84	150	-	-	-	-	-	-
Phosphate (mg/L)	-	-	-	-	0.02	5	-	-	-	-	-	-
Phenolic Compound	-	-	0.1	1	-	-	-	-	-	-	-	-
Zinc (mg/L)	-	-	-	-	-	-	BDL	5	-	-	-	-
Copper (mg/L)	-	-	-	-	-	-	BDL	3	-	-	-	-
Nickel (mg/L)	-	-	-	-	-	-	BDL	5	-	-	-	-
Arsenic (mg/L)	-	-	-	-	BDL	0.2	-	-	-	-	-	-
Vanadium (mg/L)	-	-	-	-	BDL	0.2	-	-	-	-	-	-
Lead (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-

Cyanide (mg/L)	-	-	-	-	BDL	0.2	-	-	-	-	-	-
Hexa Chromium (mg/L)	BDL	1	-	-	BDL	0.1	BDL	0.1	BDL	0.1	-	-
Total Chromium (mg/L)	BDL	2	-	-	BDL	2	BDL	2	BDL	2	-	-

The analysis results of the effluent samples collected from the six industries reveal that:

- Suspended Solids (56.8 mg/L), Oil and Grease (10.68 mg/L), and BOD (24 mg/L) were exceeding the prescribed limits as per Consent issued to M/s. TMS Leathers.
- The Ammoniacal Nitrogen value (75 mg/L) of M/s. FACT Ltd UD was exceeding the prescribed limit of 50 mg/L.
- Nitrate Nitrogen value (20.99 mg/L) of M/s. FACT Ltd PD was exceeding the prescribed limit of 20 mg/L.
- Suspended Solids (62.4 mg/L) were exceeding the prescribed limits as per Consent issued to M/s. Travancore Coshin Chemicals.

3.3 CONCLUSIONS BASED ON THE KERALA STATE POLLUTION CONTROL BOARD'S INSPECTIONS, SAMPLING AND ANALYSIS

- The deposited sludge of high organic load upstream of the Pathalam regulator cum bridge (Pathalam bund) was scoured along with the water during the opening of the regulator shutter. On the course of its movement downwards, the sludge caused further drastic depletion of dissolved oxygen (DO) of water as per the oxygen sag curve. This caused hypoxic conditions in the benthic region too, resulting in critical oxygen depletion in water which caused fish kill further downstream.
- The high organic load in the water along with surface runoff from the catchment area of those locations might have contributed to high COD values which are toxic to aquatic life.
- Planned and supervised operation of the shutters of the Pathalam Regulator throughout the year ensuring that there is no stagnation of water and organic matter in the upstream of the bund is utmost necessary. Environmental Flow or minimum regular flow shall be ensured by the concerned Departments on all days including summer months.
- *Samples of dead fish collected by KSPCB were handed over to the Kerala University of Fisheries and Ocean Studies (KUFOS) on 21/05/2024 itself for analysis. However, the results of the analysis of fish samples handed over have not been obtained till date even*

after repeated reminders dated 27.05.2024, 13.06.2024, 02.07.2024 and 30.07.2024. Hence an inference based on these results could not be derived yet.

3.4 ACTIONS OF THE KSPCB IMMEDIATELY BEFORE AND AFTER THE INCIDENT OF FISH KILL INCIDENT

Inspection of effluent-generating industries located in the Eloor Edayar industrial area was carried out by the Kerala State Pollution Control Board as part of regular compliance monitoring. Environmental Surveillance Centre of the Kerala SPCB conducts regular monitoring and sampling of effluent-generating industries and based on the non-compliances, letters/ notices/ orders/ directions were issued to the violating industries. From April to July 2024, 36 industries in Eloor Edayar industrial area were inspected, collected treated effluent samples from wastewater generating industries and the collected effluent samples were analysed for Consented parameters by the Kerala State Pollution Control Board. Based on the industry inspections and treated effluent monitoring results, actions initiated by the Kerala State Pollution Control Board are detailed below:

- 6 nos. of Industries (viz., M/S Amcooxl Paints (India) Pvt. Ltd., M/S Jonatin Chemicals, M/S Bright Coats, M/S Parakkal Industries, M/S.Cella Space, M/S Formal Trade Links) were found non-complying with the standards of treated effluent parameters.
- 12 nos. of Industries (viz., M/S. CMRL, M/S. Arjuna Natural Extracts Ltd., M/S. Sunrise TSR Factory, Edayar, M/S. Kemo Gravures, Edayar, M/S Alpharub Crumb Rubber, M/S Deccan Industries, M/S.Organo Fertilizers, M/S.Travancore Polymers, M/S Rubberco Malabar, M/S. CEEJEE Lubricants, M/S. Ashan Exporters & Industries, M/S. A K. Chemicals) were found non-complying with any of the other Consent conditions.
- 7 nos. of industries (viz., M/S. Fact – Fertilizer Unit, Udyogamandal, M/S.Travancore Cochlin Chemicals Ltd., M/S.TMS Leathers, M/S. Indian Rare Earths Ltd., M/S. Malaya Rub Tech, M/S. Hlpower Industries, M/S. Alliance Marine Products) were found non-complying with the standards of the treated effluent parameters and with other consent conditions.
- Directions were issued to 2 industries (viz., M/S. Fact – Fertilizer Unit, Udyogamandal, M/S. CEEJEE Lubricants) under Section 33A of The Water (Prevention and Control of Pollution) Act, 1974 and section 31A of the Air (Prevention and Control of Pollution) Act, 1981.
- Directions under section 5 of The Environment (Protection) Act, 1986 were issued to the 6 industries (viz., M/s.TMS Leathers, M/s CMRL, M/s. Sunrise TSR Factory, Edayar, M/s.Alpharub Crumb Rubber, M/s. Malaya Rub Tech Industries, M/s. Organo Fertilizers)

- Closure intention notices were issued to 3 industries (viz., M/S. Travancore Cochin Chemicals Ltd., M/S. Kemo Gravures, Edayar. M/S. A. K. Chemicals) under Section 33A of the Water (Prevention and Control of Pollution) Act, 1974 and section 31A of the Air (Prevention and Control of Pollution) Act, 1981.
- Closure orders were issued to 1 industry (viz., M/S. Alliance Marine Products) under section 33A of the Water (Prevention and Control of Pollution) Act, 1974 and section 31A of the Air (Prevention and Control of Pollution) Act, 1981.
- Consent revocation intention notices/Consent refusal intention notices were issued to 4 industries (viz., M/S. Arjuna Natural Extracts Ltd., M/S. Deccan Industries, M/S. Hipower Industries, M/S. Bright Coast) under Sections 25, 26 & 27 of the Water (Prevention and Control of Pollution) Act, 1975 and Section 21 of the Air (Prevention and Control of Pollution) Act, 1981.
- Letters/notices were issued to 9 industries (viz., M/S. Amcoaxl Paints (India) Pvt. Ltd., M/S. Ionarin Chemicals, M/S. Parakkal Industries, M/S. Cella Space, M/S. Formal Trade Links, M/S Travancore Polymers, M/S. Rubbero Malabar, M/S. Ashan Exporters & Industries, M/S Indian Rare Earths Ltd.
- The remaining 11 industries are complying with the consent conditions and standards of treated effluent parameters (in the case of wastewater generation units).

Details of such inspections, including dates of inspections, carried out in the months of April to July 2024 and subsequent actions initiated by Kerala SPCB against the violating industries in the form of letters/ notices/ orders/ directions given are attached as Annexure 6

4. INITIATIVES OF THE COMMITTEE IN COMPLIANCE WITH ORDERS OF THE HONORABLE HIGH COURT OF KERALA

Immediately after this incident of fish kill, IA No. 2 of 2024 was filed in WP(C) No. 9534 of 2020 before the Hon'ble High Court of Kerala bringing the matter of this fish-kill incident to the notice of the Hon'ble Court. The petitioner in IA No. 2 of 2024 was filed in WP(C) No. 9534 of 2020 had produced the newspaper report in The Hindu itself. The Hon'ble High Court while allowing the IA2 of 2024 directed the respondents including the Board to file counter affidavit in WP (C) No. 9534 of 2020 on or before 30-05-2024 vide Order dated 24-05-2024. Based on the Order dated 24-05-2024, the Board filed counter affidavit dated 31-05-2024 before the Hon'ble High Court on the matter of the fish kill that occurred on 26-05-2024 and 21-05-2024. A copy of the Counter Affidavit is attached as Annexure 6 (a). The Hon'ble Court considered the counter affidavit while

considering the Writ Petition (Civil) Nos. 9534/2020 along with WP(C) No. 996/2012 and WP(C) No. 31236/2023, related to pollution of river Periyar, and passed Order dated 10.06.2024 directing the following.

- (i) *Let a Committee consisting of the Secretary, Directorate of Environment and Climate Change, Government of Kerala, the Regional Director, Central Pollution Control Board, Regional Directorate Bangalore and the Chairman, Kerala State Pollution Control Board, be formed.*
- (ii) *The Committee shall visit all the places already visited by Mr Ananthakrishnan A. Kartha, learned Amicus Curiae*
- (iii) *The Committee shall ensure that the representatives of the petitioners as well as the learned Amicus Curiae accompany them during such visits*
- (iv) *The Committee shall file their report containing the suggestions and action to be taken to curb the pollution in the Periyar River*

It is respectfully submitted that in compliance with the Order of the Hon'ble High Court, a committee comprising the following members was constituted by the Kerala State Government vide G.O.(RT)No.43/2024/ENVT dated 20.6-2024:

1. Secretary to Government, Environment Department
2. Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
3. Director, Environment & Climate Change
4. Chairperson, Kerala State Pollution Control Board

The actions taken by the Committee for ensuring compliance with Hon'ble High Court of Kerala Order dated 10.06.2024 are detailed in subsequent paras.

4.1. MEETING HELD WITH THE PETITIONERS ON 24.06.2024

In compliance with the Hon'ble High Court of Kerala order dated 10.06.2024, the Committee held a meeting at 11 AM on 24.06.2024 at the 'Conference Hall of Eloor Municipality (Fig. 4.1) so as to hear the Petitioners. Apart from the Committee members, the officials viz., 1. Smt. Meera K. IAS, Sub Collector, Fort Kochi and 2. Sri. Ananthakrishnan A. Kartha, learned Amicus Curiae attended the meeting. Apart from the officials, the following petitioners and the persons representing the petitioners also attended the meeting.

1. Sri. Shibu Manuel- petitioner in WP (C) No. 31236 / 2023,
2. Sri. Sudheer Panicker, representing Sn. K.S R. Menon, petitioner in WP (C) No.9534/2020
3. Sn. Shebeer Q.V. representing Sri. Purushan Eloor, petitioner in WP (C) No.996/2012



Fig. 4.1 Hearing of the Petitioners by the Committee at Eloor Municipality Conference Hall on 24.06.2024

During the meeting, the Committee members heard the petitioners about their objections, their concerns and the suggestions for control of pollution in river Periyar. A copy of the minutes of the meeting held on 24.06.2024 is attached as **Annexure 6 (b)**.

4.2. SITE VISIT BY THE COMMITTEE ALONG WITH THE PETITIONERS ON 24.06.2024

After hearing the petitioners, The Committee visited places pointed out by petitioner (s) including the locations that were visited by Amicus Curiae in the Eloor Edayar industrial area, and the River Periyar on 24.06.2024 and 25.06.2024. During the site visit on 24.06.2024, the *Amicus Curiae*, the petitioners/representatives of the petitioners and officials of the Irrigation Department were also accompanied the Committee. On 24.06.2024, the Committee along with the petitioners and Amicus Curiae appointed by Hon'ble High Court of Kerala visited the following locations.

1. Kuzhikandam Creek at the boundary of HIL (India) Ltd
2. Panachithodu Creek
3. PallippuramChal Creek

4. Unthithodu Confluence point at River Periyar
5. Pathalam Regulator cum bridge at Periyar River
6. Container Terminal Road near Anavathil junction - Gypsum deposit of FACT
7. Manjummal Regulator cum bridge at Periyar River
8. M/s. HIL (India) Ltd, Eloor
9. M/s. Merchem Ltd, Eloor
10. Stormwater discharge point of M/s. Fertilizers and Chemicals Travancore Ltd., Udyogamandal
11. Land of M/s Cella Space close to the boundary of M/s Cochin Minerals and Rutile LtdEdayar

As per the request of the petitioners, water samples and sediment samples from Kuzhikandam thodu and other sub-drains joining Kuzhikandam thodu were also collected by the officials of Kerala State Pollution Control Board in the presence of the committee from the locations pointed out by the petitioners. Photographs taken during the site visit of the Committee and the petitioners are given in Fig.4.2.



Figure 4.2 Site visit by the Committee along with the Petitioners and Amicus Curiae on 24.06.2024

4.3. MEETING HELD ON 25.06.2024 WITH THE STAKEHOLDER DEPARTMENTS TO ASSESS THE PROGRESS MADE ON THE IMPLEMENTATION OF ACTION PLANS FOR RESTORATION OF RIVER PERIYAR

On 25.06.2024 the second day of the visit, the Committee convened a meeting in the Chamber of District Collector, Ernakulam with the stakeholders Departments of Periyar River Action plan prepared as per Hon'ble NGT orders in OA No. 673/2018 and OA No. 393/2013 such as local bodies, District Industries Centre, Irrigation Department, Agriculture Department and Kerala Water Authority. The Fisheries Department and KUPOS also attended as per request. The Committee reviewed the progress made by each department in the implementation of the Periyar River action plan. A copy of the minutes of the meeting held with the Stakeholder Departments on 25.06.2024 is attached as Annexure 6 (c).

4.4. BOAT SURVEY CONDUCTED BY THE COMMITTEE ALONG WITH THE PETITIONER (S) ON 25-06-2024 FOR ASSESSING THE DISCHARGE OF INDUSTRIAL EFFLUENTS AND STORMWATER DISCHARGES INTO THE RIVER PERIYAR

After a meeting with the stakeholder departments on 25.06.2024, the Committee conducted a boat survey in the river Periyar along with the petitioners/representatives of the petitioners in the Eloor Branch and Edamula branch of the river Periyar and observed various authorized outlet points of the industries and stormwater drain joining the river Periyar and locations of monthly river water sampling carried out by the Kerala State Pollution Control Board (Fig.4.3). The Committee also directed the Kerala SPCB to conduct a separate sampling for collection of industrial discharge into river Periyar and river water samples in Eloor- Edayar stretches in the presence of representatives of petitioners.



Fig 4.3 Boat survey on 25-06-2024 by the Committee for assessing the discharges into the River Periyar

4.5. SAMPLING CARRIED OUT ON 29.06.2024, 02.07.2024, 03.07.2024, 27.07.2024, 19.08.2024 BY KERALA SPCB AS PER DIRECTIONS OF THE COMMITTEE

As directed by the Committee, River water, sediments and stormwater discharges were collected by the officials of Kerala State Pollution Control Board in the presence of the petitioner (s) for further analysis. Photographs taken during the sampling are given in Fig 4.4. The results of the analysis of Kuzhikandam thodu and other sub-drains joining river Periyar, water samples of river Periyar, sediment samples from the river Periyar and storm water drains are attached as Annexures-7(a), 7 (b), 7 (c) & 7 (d) respectively. An inference based on the analysis results is detailed in Section 4.7.



Fig 4.4 Sampling carried out on 29.06.2024, 02.07.2024, 03.07.2024, 27.07.2024, 19.08.2024 by Kerala SPCB

4.6. INSPECTION OF SELECTED WATER POLLUTING INDUSTRIES BY THE COMMITTEE

Based on the meeting held with the Petitioners, site visit along with the Petitioners was made by the Committee on 24.06.2024, Boat survey was carried out by the Committee on 25-06-2024 for assessing the discharge of industrial effluents and stormwater discharges into the River Periyar, an interim status report of the Committee was filed before Hon'ble High Court of Kerala seeking time of two months for submission of the report and recommendations of the Committee for control of pollution in river Periyar. The Hon'ble High Court of Kerala considered the interim status report and passed an Order dated 03.07.2024 and the relevant portion of the Hon'ble High Court of Kerala is reproduced below.

The inspection being conducted by the Committee constituted as per the order dated 10.06.2024 should continue. The industries on the upstream portion of Periyar river should also be inspected" Further, the Hon'ble High Court of Kerala heard the matter on 14.10.2024 and passed the order dated 14.10.2024 and the relevant portion of the order is reproduced below:

" The learned Government Pleader submits that the final report will be placed before this Court within three weeks. We record this submission and pass an O/ 11/ 2024".

In compliance with the order dated 03.07.2024, as per the water polluting industries identified by the Kerala State Pollution Control Board, on 10.07.2024, the constituted Committee inspected six major water polluting industries in the Industrial Development Area of Edayar located in upstream of the Pathalam regulator cum bridge on Periyar river. The following industries and ETPs operated by the respective industries and the treated wastewater outlet discharge points were inspected on 10.07.2024 by the Committee in association with the officials of Kerala SPCB and in presence of the representatives of the petitioner(s)

- (A) M/s. Cochin Minerals and Rutile Ltd., Industrial Development Area, Edayar.
 - (B) M/s. TMS Leathers, Industrial Development Area, Edayar.
 - (C) M/s. Malaya Rub Tech, Industries Industrial Development Area Edayar
 - (D) M/s. Sunrise TSR Factory, Industrial Development Area, Edayar.
 - (E) M/s. Alpharub Crumb Rubber P Ltd, Industrial Development Area, Edayar.
 - (F) M/s. Organo Fertilizers (India) Pvt. Ltd., Industrial Development Area, Edayar.
- Industry-specific observations are given in the subsequent paragraphs.

(A) M/S. ALPHARUB CRUMB RUBBER P. LTD.

- ETP unit operation levels are just at the ground level and may lead to the submergence of ETP during the monsoon period.
- An unauthorised discharge provision from industry premises to the stormwater drain was observed which raises suspicion of an unauthorized discharge of effluent from the unit.
- Wastes or sludge are stored in open area adjacent to the ETP.
- Very poor housekeeping in the ETP and the surrounding areas

(B) M/S. MALAYA RUB TECH INDUSTRIES

- Proper drains to direct entire storm waters into a common drain were not constructed. Delay pond before the discharge point was not provided.

- Adequate lighting in the ETP area up to the river side of the unit was not provided.
- The industry premises need improvement in hygiene and sanitation facilities provided to the workers shall be made better.

(C) M/S. COCHIN MINERALS AND RUTILE LIMITED

- Adequate lining and leachate collection facilities are not provided for proper storage or stacking of raw material i.e., Ilmenite and CEMOX. The covering for Ilmenite and CEMOX storage is inadequate.
- There is an underground pipe provided at the stormwater drain leading to river Periyar, at the boundary of the industry, delay pond was not provided in the stormwater drain.
- Properly designed garland drains around the CEMOX storage area are not provided
- Lighting in the ETP area and up to the river side of the unit is inadequate.
- The bushes and trees at the riverside boundary inside the premises of the company are to be cleared.

(D) M/S.ORGANO FERTILIZERS (INDIA) PVT.LTD.

- Proper drains to direct entire storm waters into a common drain were not constructed. Delay pond before the discharge point was not provided.
- Adequate lighting in the ETP area and up to the river side of the unit was not provided.
- The industry premises need improvement in hygiene and sanitation facilities provided to the workers shall be made better.

(E) M/S. TMS LEATHERS

- The probes provided in the Online Continuous Effluent monitoring system (OCEMS) were found kept in a bucket containing water which raises suspicion of manipulation in the actual reading.
- A camera focusing towards the sensors (OCEMS) immersed in the treated effluent has not been provided.
- Stormwater flooded the entire industry premises since there were no proper stormwater drains or delay ponds
- There was no easy and safe access to the ETP area and up to the river bank where the industry's authorized effluent discharge outlet was provided.

- Very poor housekeeping in the ETP and the surrounding areas and the approach to the ETP area was not proper.
- No provision/access is provided to take samples from the authorized outlet pipe immediately before reaching the river and the treated effluent pipeline to the river was provided through underground.

(F) M/S SUNRISE TSR FACTORY

- Proper drains to direct entire storm waters into a common drain were not constructed. Delay pond before the discharge point was not provided.
- Adequate lighting in the ETP area and up to the river side of the unit was not provided.
- The industry premises need improvement in hygiene and sanitation facilities provided to the workers shall be made better.

Photographs taken during inspection and sampling at the above industries are given in Fig 4.5



Fig 4.5 (Clockwise from left) Photographs of inspection at M/S. Cochin Minerals And Rutile Limited, M/S. TMS Leathers, M/S. Sunrise TSR Factory, M/S.Organo Fertilizers (India) Pvt. Ltd.

Based on the observations made by the Committee during the visit, directions/ notices dated 29.07.2024 were issued by KSPCB to the above six industries. Directions were also given to the

Irrigation Department as well as the Industries Department. The directions/notices are marked and produced herewith as Annexure 8(a)-8(k).

All the industries and the two Departments that were issued directions/notices by KSPCB have submitted replies. Their compliance with the directions is being followed up by KSPCB.

During the visit of the Committee on 10.07.2024, the officials of Kerala State Pollution Control Board collected the samples (6 nos. of industry effluent and 5 nos. of storm water drain samples from the industry premises) in the presence of the Committee members as well as the representatives of the petitioner(s) for further analysis for relevant parameters (as prescribed in the Consent under The Water (Prevention and Control of Pollution) Act, 1974 granted to the respective industries). The results of the analysis of industry effluent and stormwater outlet samples collected from these six industries are attached as Annexure 9.

The Committee also directed the Kerala State Pollution Control Board to inspect any other water polluting industries located on the bank of river Periyar (Eloor -Edayar area) and also directed to collect samples of authorized industrial effluent outlet discharges and for compliance verification to the conditions of authorisation as well as consents granted to the industries and for submission of the detailed assessment reports in light of the format circulated by the Committee.

In pursuance to the directions of the Committee, Kerala SPCB officials of the Environmental Surveillance Centre inspected 7 industries located upstream of Periyar river (Poiyadam regulator cum bridge) on 18/07/2024, detailed below:

1. M/s Neptune Readymix Concrete Pvt. Ltd., IDA, Edayar.
2. M/s.Kuchiplast Solutions Pvt Ltd, IDA, Edayar.
3. M/s Southern Minerals & Chemicals, IDA, Edayar,
4. M/s.AmcoasXI Paints (India) Pvt. Ltd, IDA, Edayar
5. M/s.Ashan Exports & Furnishers, IDA, Edayar
6. M/s.Excel Petrochemicals, IDA, Edayar
7. M/s Five Star Industries IDA, Edayar

Locations of the industries visited are shown in Map-1 and Map- 2 which are marked and produced herewith as Annexure-10 (a)&(b).

4.7 INFERENCES BASED ON ANALYSIS REPORTS

The details of sampling conducted during the visit of the Committee and sampling continued by the KSPCB officials as per directions of the Committee are detailed in Table 4.1.

Table 4.1 Details of sampling conducted during the visit of the Committee and sampling continued by the KSPCB officials

Date	Activity of the Committee	Details of Sampling
24.06.2024	Inspection of Kuzhikandom Thodu	Water & sediment samples collected by KSPCB officials in the presence of the Committee and the Petitioner (1)
	Inspection of M/s. HIL (India) Ltd, Eloor, M/s. Merchem Ltd, Eloor, M/s. Fertilizers and Chemicals Travancore Ltd., Udyogamandal Division, Land of M/s Cello Space close to the boundary of M/s Cudim Minerals and Rutile Ltd, Edayar	Inspections only, no sampling.
25.06.2024	Boat survey by the Committee in the river downstream of Parthalam bund	Boat survey only, no sampling.
25.06.2024 & 26.06.2024		KSPCB continued sampling of Kuzhikandom thodu as instructed by the Committee
29.06.2024, 01.07.2024, 03.07.2024, 27.07.2024, 19.08.2024		KSPCB conducted sampling of river water, river sediments & storm water drains opening to the river as instructed by the Committee
10.07.2024	Inspection of 6 industries upstream of Parthalam regulator by the Committee	Effluent and stormwater discharges sampled by KSPCB officials in the presence of Committee Members and the Petitioner (3)
18.07.2024	Inspection of 7 industries upstream of Parthalam regulator by the KSPCB as instructed by the Committee	As directed by the Committee, effluent samples were collected from 2 out of the 7 industries by KSPCB. The other 5 industries are not generating industrial effluent.

The results of the analysis of water and sediment from Kuzhikandam thodu and other sub-drains are attached as Annexure-7 (a), analysis results of river Periyar is annexed as Annexure-7(b), sediment samples from river Periyar (Eloor and Edamula branch) is annexed as Annexure-7 (c) and Storm water drain discharging industrial effluents into river Periyar is annexed as Annexure 7(d).

4.7.1 ANALYSIS REPORTS OF WATER AND SEDIMENT SAMPLES COLLECTED FROM KUZHIKANDAMTHODU ON 24.06.2024, 25.06.2024, AND 26.06.2024

WATER SAMPLES OF KUZHIKANDAM THODU AND SUB-DRAINS

Analysis results of the water Samples collected from Kuzhikandam thodu and other sub-drains joining river Periyar reveal that,

- Concentrations of TDS observed at Panachuthodu - 753mg/L, Uruthodu 50m from confluence point-716mg/L
- Concentrations of Chloride observed at Panachuthodu- 287.9 mg/L, Uruthodu 50m from confluence point- 243.2mg/L
- Concentrations of Cyanide observed at Kuzhikandam thodu (Near HIL Discharge) - 0.07mg/L, Kuzhikandam thodu 50m behind from confluence point- 0.05mg/L, Panachuthodu 50m behind from confluence point- 0.03mg/L
- Concentrations of Iron obtained as Kuzhikandam thodu (Near HIL Discharge) - 4.64 mg/L, Kuzhikandam thodu 50m behind from confluence point -3.23mg/L
- Concentrations of Pesticide parameter' sum of DDD/DDE/DDT' obtained as Kuzhikandam thodu (Near HIL Discharge) - 0.00152 mg/L, Kuzhikandam thodu 50m behind from confluence point - 0.00077mg/L
- Concentrations of the metal Manganese obtained as Kuzhikandam thodu (Near M/s. HIL Discharge) - 0.73 mg/L, Kuzhikandam thodu 50m behind from confluence point - 0.45mg/L
- Concentrations of the metal Zinc obtained as Kuzhikandam thodu (Near HIL Discharge) - 0.23 mg/L, Kuzhikandam thodu 50m behind from confluence point - 0.1 mg/L

SEDIMENT SAMPLES OF KUZHIKANDAMTHODU AND SUB-DRAINS

Analysis results of the sediment samples collected from Kuzhikandam thodu and other sub-drains joining river Periyar reveal that,

- Sulphate concentration in samples collected from Panachithodu- 471.7mg/Kg and Uthuthodu 50m from confluence point – 1190.7 mg/Kg were observed to be on the higher side.
- Concentrations of various metals in the collected sediments were observed as
 - (a) Copper {Kuzhikandam thodu (Near HIL Discharge) – 48.64 mg/Kg, Panachithodu – 35.97 mg/Kg.}
 - (b) Zinc{Kuzhikandam thodu (Near HIL Discharge) – 391.23 mg/Kg, Panachithodu – 233.8 mg/Kg.}
 - (c) Lead{Kuzhikandam thodu (Near HIL Discharge) – 76.66 mg/Kg, Panachithodu – 28.31mg/Kg.}
 - (d) Iron{Panachithodu – 47819 mg/Kg, Kuzhikandam thodu (Near HIL Discharge) – 23914 mg/Kg.}
 - (e) Manganese{Panachithodu – 103.86 mg/Kg, Kuzhikandam thodu (Near HIL Discharge) – 74.67 mg/Kg.}
 - (f) Total Chromium {Panachithodu – 66.3 mg/Kg, Kuzhikandam thodu (Near HIL Discharge) – 47.36 mg/Kg.}
 - (g) Mercury, Arsenic, Cadmium and Hexavalent Chromium were observed as 'Absent'.
- The sum of DDD/DDE/DDT obtained in all the collected sediment samples, the highest being Kuzhikandam thodu(Near HIL discharge)- 210.418 mg/Kg
- BHC was observed in all the collected sediment samples, the highest being Kuzhikandam thodu(Near HIL discharge) where Alpha BHC was 43.726 mg/Kg
- Endosulphan was present in all samples, the highest being Kuzhikandam thodu(Near HIL discharge) where Alpha Endosulphan was 57.066mg/Kg.

4.7.2 ANALYSIS REPORTS OF PERIYAR RIVER WATER, RIVER SEDIMENT AND STORM WATER SAMPLES COLLECTED ON 29.06.2024, 02.07.2024,03.07.2024, 27.07.2024, 19.08.2024 BY KSPCB UPON INSTRUCTIONS OF THE COMMITTEE

Analysis reports of water samples collected from Periyar river on 29.06.2024, 02.07.2024,03.07.2024, 27.07.2024 and 19.08.2024 by the KSPCB are given in Table 4.2.

Table 4.2 Analysis reports of water samples collected from Periyar river on 29.06.2024, 02.07.2024,03.07.2024, 27.07.2024 and 19.08.2024

Sl. No	Source of sample	Faecal Coliforms	Faecal Streptococci	pH (at 25°C)	DO (mg/L)	BOD (mg/L)
		500 MPN/100 mL (desirable), 2500 MPN/100 mL (Maximum Permissible)	100 MPN/100 mL (desirable), 240 MPN/100 mL (Maximum Permissible)	Between 6.5-8.5	5 mg/L or more	3 mg/L or less
1	River Periyar near combined Sewerage outlet between Kilaya Bolech & Alappukumbam Rubber.	200	100	6.9	1.4	0.5
2	River Periyar near 16.5 Leather authorized under River Periyar near the common sewer of CMRL, Shree Sripathi boundary.	200	80	6.8	1.2	1.2
3		140	20	4.61	4.2	0.2
4	River Periyar near Stormwater outlet at CMRL & National Industries boundary.	400	500	7.14	4.4	1.4
5	River Periyar near Shree Sripathi River junction.	140	20	4.44	4.2	1.1
6	River Periyar near CMRL authorized outlet.	140	40	7.00	4.3	2.1
7	River Periyar near SubChinnila	200	300	7.02	4.6	0.5
8	River Periyar near FCC Storm water drain at FCC-FACT boundary.	Nil	Nil	4.94	4.6	0.5
9	River Periyar near FACT drain storm water outlet.	Nil	Nil	1.12	4.2	0.1
10	River Periyar near FACT common sewer outlet.	Nil	Nil	4.95	4.5	0.2
11	River Periyar near storm water drain at MBL at MBL-FACT Boundary.	Nil	20	4.90	4.6	2.1
12	River Periyar near MBL outlet.	Nil	20	4.96	4.4	0.5
13	River Periyar near River Puzh common sewer outlet.	Nil	140	7.04	1.0	2.1
14	River Puzh near Fact authorized pond outlet (Edamala Borewell).	920	240	7.07	5.1	1.6
15	River Puzh near Fact FD authorized outlet (Edamala).	720	80	7.01	5.2	0.9

	Sampling				
	River Periyar at Ongathodu Periyar confluence point (Edamula Branch)	400	90	70	5.3
16					1.0
17	River Periyar at Elloor Ferry junction (Edamula Branch)	20	130	64	3.4

Analysis results of the river Periyar samples collected on 29.06.2024, 02.07.2024, 03.07.2024, 27.07.2024 and 19.08.2024 indicates that

- pH at 16 out of the 17 sampling locations is observed in the order of 6.5 -8.5 and complying with the Water Quality Criteria for Outdoor Bathing except at the sampling location near the stormwater outlet of FACT Limited (pH:4.95)
- Faecal Coliform (FC) at M/s. FACT ammonia gunni pond outlet (Edamula Branch) (520 CFU/100ml) and at M/s.FACT PD authorized outlet (Edamula Branch)(720CFU/100ml) is exceeding the desirable limit, indicating fecal contamination.
- Faecal Streptococci (FS) at 6 out of 17 stations are exceeding desirable standard of 100 CFU/100ml. Out of these 6 stations, FS at the River water sampling point near the Stormwater outlet at M/s.CMRL& National Industries boundary (520 CFU/100ml) exceeds the permissible standard of 500 CFU/100ml.
- DO and BOD at all river water stations were within the permissible limit of Outdoor Bathing Water Quality Criteria.
- COD values at sampling location near stormwater outlet at M/s. CMRL& National Industries boundary (48.48 mg/L), sampling location near Combined stormwater outlet between M/s. Malaya Rubtech & M/s. Alphonrub Crumb Rubber (96.96 mg/L) and sampling location near stormwater outlet of M/s. CMRL-Shree Shakti boundary (113.12 mg/L) Further in-depth studies are needed to identify whether surface runoff due to heavy rain from the catchment area where industries are also located has contributed to the COD values at all stations.
- Significant concentrations of TDS, Sodium and Chloride were observed at river water sampling locations downstream of Puthalam regulator: TDS-2031mg/L near M/s. IREL Outlet, Sodium-376.1mg/L near M/s.TCC Storm Water drain at M/s. TCC-M/s. FACT boundary and Chloride-1091.9mg/L near M/s. IREL Outlet.
- Phosphate concentration 28mg/Lis observed in river water sampling location downstream of Puthalam regulator near FACT stormwater outlet.

- Sulphide concentration is observed in 2 river water sampling locations upstream of Puthalam regulator: 1.6mg/L near the TMS Leather authorized outlet and 1.12 mg/L near the Stormwater outlet at CMRL & National Industries boundary
- Trace concentrations of Zinc-0.35mg/L near the FACT stormwater outlet, Arsenic- 0.02mg/L near the combined Stormwater outlet between Malaya Rubtech & Alphanub Crumb Rubber and Manganese - 0.22 mg/L near the FACT stormwater outlet were observed.
- Trace levels of DDT were observed near CMRL Authorized outlet- 0.00012 mg/L and near Sud Chemie - 0.00006 mg/L.

SEDIMENT SAMPLES COLLECTED ON 29.06.2024, 02.07.2024, 03.07.2024 AND 27.07.2024

The analysis results of the sediment samples collected on 29.06.2024, 02.07.2024, 03.07.2024, 27.07.2024 from the river Periyar (given in Annexure 7(c)) reveals the following:

- River Periyar bed contains considerable concentrations of Iron, Zinc, Manganese, Copper and Total Chromium.
- The highest concentration of Iron was 77203 mg/kg near the stormwater drain of M/s. IREL at IREL-FACT Boundary.
- The highest concentration of Zinc was 14022 mg/kg near M/s. Binan. Zinc storm water outlet.
- The highest concentration of Copper was 1040 mg/kg near the stormwater drain of M/s. IREL at IREL-FACT Boundary
- The highest concentration of Manganese was 675.64 mg/kg near the Stormwater outlet at M/s. CMRL & National Industries boundary
- The highest concentration of Total Chromium was 750.6 mg/kg near the combined Stormwater outlet between M/s. Malaya Rubtech & M/s. Alphanub Crumb Rubber.
- Heavy metals like mercury, arsenic, hexavalent chromium were 'not detected'

STORM WATER DRAIN SAMPLES COLLECTED ON 19.06.2024, 03.07.2024, 27.07.2024, 19.08.2024

The analysis results of samples of stormwater drain opening into the river (given in Annexure 7(d)) when compared with the General Standards for Discharge of Environmental Pollutants Part-A: Effluents of The Environment (Protection) Rules, 1986 Schedule-VI, reveal the following.

- Sample from M/s. IREL Stormwater outlet (southern side of IREL) showed a pH of 10.62 which is high compared with the standards. Values of Nitrate and Free Ammonia were also high being 740mg/L and 8.44mg/L respectively at this drain.
- The BOD, FC and FS in stormwater outlet between M/s. Malaya Rubtech & M/s. Alpharub Crumb Rubber were 23.52 mg/L, 1060-CFU/100 mL and 5020 CFU/100 mL respectively, pointing to high organic load.
- Significant concentrations of TDS (11356 mg/L), EC 4430 mg/L and Chloride 6849 mg/L at M/s. IREL stormwater outlet(Northern side of the unit) was observed.

Based on the above findings, directions dated 23.10.2024 under Section 5 of the Environment (Protection) Act, 1986 were issued to M/s. Cochin Minerals And Rutiles Ltd, M/s. FACT Ltd PD, M/s.FACT Ltd UD, SudChemie Pvt Ltd, M/s. TMS Leathers, and M/s.Travancore Cochin Chemicals. Copies of these directions are attached as Annexure 7 (e).

Their compliance with the directions is being followed up by KSPCB

4.7.3 ANALYSIS REPORT OF EFFLUENT AND STORMWATER SAMPLES COLLECTED FROM INDUSTRIES ON UPSTREAM OF THE REGULATOR DURING THE VISIT OF THE COMMITTEE ON 10/07/2024

The results of the analysis of effluent and stormwater outlet samples collected from the 6 no. of industries are attached as Annexure-9.

EFFLUENT SAMPLES COLLECTED ON 10.07.2024 DURING THE VISIT OF THE COMMITTEE

The non-complying parameters concerning each industry are tabulated in Table 4.3

Table 4.3 Non-complying parameters of effluent samples collected from industries on 10.07.2024

Industry	M/s. Alphanub Crumb Rubber TSR Factory	M/s. Sunrise Rubber TSR Factory	M/s. TMS Leathers	M/s. Malaya Rubber Tech Industries	M/s. Organo Fertilizers	M/s. Cochin Minerals And Rutile Ltd
Non complying parameters	TSS(106 mg/L) Oil & Grease (14 mg/L) BOD(59.6 mg/L) TKN (53.70mg/L) Sulphide (15.2mg/L) Sulphide (15.7 mg/L) Ammoniacal Nitrogen 44.21 mg/L		Sulphide (8 mg/L)	CrOD(400 mg/L) BOD(62.8 mg/L) TKN(81.76 mg/L) Sulphide (15.2 mg/L) Ammoniacal Nitrogen 56.56 mg/L	Sulphide (15.2 mg/L) Ammoniacal Nitrogen (139.6 mg/L)	TSS (121 mg/L)

Show Cause Notices dated 22.10.2024 under Section 27 of The Water (Prevention and Control of Pollution) Act, 1974 were issued by KSPCB to the above industries and are annexed as Annexure II.

STORMWATER SAMPLES COLLECTED ON 10.07.2024 DURING THE VISIT OF THE COMMITTEE

Storm water drains flowing through the premises of M/s Alphanub Crumb Rubber, M/s Sunrise TSR Factory -1, M/s Sunrise TSR Factory -2, and M/s Organo Fertilizers are common storm water drains entering the particular industry premises after passing through one or more other industrial plots. The stormwater drains of M/s TMS Leathers and M/s Cochin Minerals And Rutile Ltd are specific to their premises. The analysis results of the samples collected from stormwater from industries when compared with the General Standards for Discharge of Environmental Pollutants Part-A: Effluents of Environment (Protection) Rules, 1986 Schedule-VI is given in Table 4.4.

Table 4.4 Significant parameters of stormwater samples collected from industries on 10.07.2024

Stormwater drain of Industry	M/s Algharub Crumb Rubber	M/s Sunrise TSE Factory -I	M/s Sunrise TSE Factory -2 Leathers	M/s TMS Leathers	M/s Organic Fertilizers	M/s Cochin Minerals And Ruile Lad (near Cells Space Ind)
Significant contaminants	Sulphide (15.2 mg/L)	COD (256 mg/L) TSS (1041 mg/L) Sulphide (15.2 mg/L) BOD ₅ (1.6 mg/L) Ammoniacal Nitrogen (50.4 mg/L)	Sulphide (10.8 mg/L)	Iron (20368 mg/L) Sulphide (4 mg/L)	Sulphide (14.4 mg/L) BOD ₅ (38 mg/L)	Iron (324.089 mg/L)

Directions under Section 5 of the Environment (Protection) Act, 1986 were issued to the above units for the construction and maintenance of stormwater drains and also to provide delay ponds before discharge. Follow up actions upon the directions are being taken by KSPCB.

4.7.4 INDUSTRIES UPSTREAM OF THE REGULATOR INSPECTED BY THE BOARD AS PER THE DIRECTIONS OF THE COMMITTEE

As per directions of the committee, the following industries were inspected by KSPCB on 18.07.2024.

1. M/s Ashan Exports
2. M/s Amcor XL Paints
3. M/s Neptune Readymix Concrete Pvt Ltd
4. M/s Kochiplast Solutions Pvt Ltd
5. M/s Southern Minerals And Chemicals
6. M/s Excel Petrochemicals
7. M/s Five Star Industries

Out of 7 industries, only 2 are effluent generating industries viz., M/s Ashan Exports and M/s. Amcor XL Paints. The Analysis results of the Effluent samples collected from industries on 18.07.2024 are given in Table 4.5.

Table 4.5 Analysis results of the Effluent Samples collected from Industries on 18.07.2024

SL NO	INDUSTRY NAME	pH	BOD (mg/L)	Oil and Grease (mg/L)	SS (mg/L)	COD (mg/L)	Action taken
1	M/s. Ashan Exports	7.65	1180	176.76	45	6784	Instructions issued on 10.10.2024
2	M/s.Amcos XL Paints	10.16	52	44.68	PDL		Instructions issued on 10.10.2024
3	M/s Neptune Ready-mix Concrete Pvt Ltd	No effluent					
4	M/s Kochiplast Schweleng Pvt Ltd	No effluent					
5	M/s Southern Minerals And Chemicals	No effluent					
6	M/s Excel Petrochemicals	The sample was not collected due to insufficient effluent					
7	M/s Five Star Industries	No effluent					

Instructions were issued to M/s. Ashan Exports and M/s. Amcos XL Paints for non-compliance with effluent standards based on the analysis reports of samples collected during inspection. The industry M/s. Ashan Exports has initiated action to comply with Boards instructions.

4.8 OBSERVATIONS OF THE COMMITTEE

Based on the inspection conducted on 24/06/2024, 25/06/2024 and 10/07/2024 by the Committee the following observations were made:

- Based on the analysis reports of the river water during the fish kill incident, it is observed that the reason for fish kill on 20th May, 2024 is the depletion of dissolved oxygen and generation of some dissolved gases due to the sewage inflow from urban sources, upstream of Puthalam regulator, and stagnation of the organic load on the upstream of the regulator.
- COD values were found in all stations in river Periyar. Further in-depth studies are needed to identify whether surface runoff due to heavy rain from the catchment area where industries are located has contributed to the COD values at all stations.
- Poor housekeeping/sanitation facilities/improper storage of raw materials resulted in the deterioration of runoff and this might have led to the contamination of stormwater drains.

- iv. Even though there are proper discharge arrangements and monitoring for trade effluents, there is no provision for delay ponds or quality monitoring arrangements for runoff management in most of the industries.
- v. There is no scientific and well established protocol for the operations of the shutters of the Pathalam regulator.
- vi. It is difficult for inspecting officials to access and check the river flowing throughout the industrial area due to the growth of grass and weeds, unstable slope and lack of any walkways. This makes surveillance operations difficult.
- vii. A few of the stormwater drains in the Edayar industrial area pass through different industries one after the other before opening into the river, which results in chances of industrial contamination of the stormwater, the identification of the exact source made difficult.
- viii. There are no delay ponds or monitoring mechanisms for common stormwater drains before joining the river Periyar.
- ix. Industries are storing the wastes or by-products in open areas during the monsoon which might be causing contaminated runoff into the river Periyar. Also, there is no garland drain provision around the waste storage areas of a few industries.
- x. There is a possibility of discharge of untreated effluents through the stormwater drains which may lead to shoot up of contaminants in the river Periyar.
- xi. There is no provision for monitoring of stormwater drain discharges into river Periyar to ascertain any industrial discharges as the stormwater drains are passing through the industry premises.
- xii. Runoff from waste stockpiles or contaminated drums lying in the industry which are closed might be causing contamination in the drains or river Periyar.
- xiii. There is no Real-Time Water Quality Monitoring mechanism on the downstream of Pathalam Bridge to find real-time water quality status and to alert all the concerned in the event of poor water quality of river Periyar.

5. EXISTING INITIATIVES

The existing initiatives for controlling pollution of river Periyar can be broadly classified into three

- A. Statutory actions of Kerala State Pollution Control Board under the provisions of various environmental legislations
- B. Interventions of Government and its agencies as well as actions based on Court / Tribunal directions

Details of the existing initiatives of KSPCB are attached in Annexure-12. In compliance with the directions of the Hon'ble National Green Tribunal (NGT) and the Hon'ble High Court of Kerala, several initiatives and actions have come for the restoration of river Periyar. A significant action in progress presently is based on the Orders of the NGT in OA No. 395/2013 (SZ), OA No. 396/2013 (SZ) and OA No. 242/2016 (SZ) before the NGT Southern Zone, Chennai. The Committee reviewed the progress of implementation by holding a meeting of all stakeholders on 25.06.2024. Interventions of the Government and its agencies as well as actions based on Court / Tribunal Directions are also attached as Annexure-13.

The action plan prepared in OA 395/2013 and OA 673/2018 contains similar action points for the restoration of River Periyar. It can be seen that even though full implementation as per initial timelines could not be achieved, many important action points have been completed which would curb a few of the earlier existing sources of pollution to the river. The completed actions are listed in Table 5.1.

Table 5.1 Completed Activities in the action plan prepared in OA 395/2013 and OA 673/2018

Sl. No	Activity	Implementing Agency	Remarks
1	Identification of industries/ establishments / commercial complexes /bars /hotels etc. discharging sewage /wastewater to the public drain /stream /river encroachments	Local bodies/KSPCB	Completed
2	a. Legacy waste management b. Solid Waste management	Munnar GramaPanchayat	a. Completed b. 4 TPD windrow plants functional
3	Installation of additional continuous online River water monitoring station	KSPCB	Completed - 2 Stations are established.
4	Installation of Night Vision Surveillance Camera at the river bank side	KSPCB	Night vision cameras installed. A total of 9 cameras were installed for surveillance.
5	Construction of Mini MCF in 20 wards (31 Nos)	Vazhakkulam GP	Completed
6	Preventing pollution of Periyar through the pipe installed near upstream of Puthalam regulator leading to Edayamuchal paddy field.	Irrigation Department	Outlet closed
7	Discharge of sewage from the township to the river through drain near Periyar Hotel shall be stopped.	Aluva municipality	Outlets are closed and fines are imposed on the violators

6	Construction of retaining wall with HDPE liner at Kalamassery dumping yard to prevent the leachate discharge from the yard to Thoombungu thodu	Kalamassery municipality	Completed

Completed activities for Solid & Liquid waste management (RRF, MCF, Haritha Karma Sena, community and institutional facilities, CSTP, FSTP etc.)		
Sl. No	Urban Local Body	Completed activities for solid & Liquid waste management (RRF, MCF, Haritha karma sena, community and institutional facilities etc.)
1	Kochi Corporation	HKS-797, MCF- 23, RRF-4 (Kaloor, Padayath, Edappally and Mattancherry). Total no. of bins in the Thumboormuzhi -32 50 TPD BSF Plant* 2 -100 TPD construction completed and 2 plants are functional from 8th March 2024. FABCO Agency Plant processing started 25 TPD Zigma Agency Processing started 12 TPD 150 TPD CBG (BPCL plant) site clearing activities going on, the draft agreement of this project was submitted by BPCL and it was given for legal vetting, the relevant consents are to be provided by the Government of Kerala through single window clearance. For clearance, a letter was sent to the Honorable Principal Secretary for necessary action. Bio mining working in progress. 2 lakh MT stockpile, approximately 99955MT waste processing completed and about 11,108.15MT RDF dispatched to cement factories. 100 KLD FSTP @ Brahmapuram (existing), 100 KLD FSTP @ Withington Island 5 MLD at Elamkulam with sewage treatment facility at Kochi, Emakulam 0.75 MLD STP owned by GCDA, International Stadium, Kaloor 0.45 MLD STP owned by GCDA, Marine Drive, Kochi
2	Thripunithura	HKS-94, Mini MCF- 5 (Functional) 7 (Non functional), MCF -1. Total no. of bins in the Thumboormuzhi -43
3	Aluva	HKS-30, MCF -1 (functional) 1 (non functional), Mini MCF- 4. Total no. of bins in the Thumboormuzhi -10
4	Kalamassery	HKS-64, MCF -2, RRF-1, Total no. of bins in the Thumboormuzhi -4, No. of Functional Community Level Biogas Plants in the LSGI- 6, In LULU Mall 3 numbers of OWC (Organic Waste Converter) are functioning, 5 Biogas plants are functioning at the CUSAT campus. Credan Bins are also functioning in Flats under ULB 10 kld STP at Kalamassery Market.

5	Elloor	HKS-23, Mini-MCF -32(Functional), MCF- 3, Total no. of bins in the Thumboomuzhi-56.
6	Angamaly	HKS-39, Mini MCF-22, MCF -1, Total no. of bins in the Thumboomuzhi -4,1 ETP Capacity 25000L/day at the market for Liquid waste management.
7	Perumbavoor	HKS-30, Mini MCF -4 (Functional) 1 (Non Functional), MCF -1, RRF-1, Total no. of bins in the Thumboomuzhi -16, No. of Functional Community Level Biogas Plants in the LSGP -1
8	North Paravoor	HKS-46, MCF -2 Mini MCF -21 (Functional)
9	Kodungalur	HKS-85, Mini MCF-40, MCF -5, RRF-2, Total no. of bins in the Thumboomuzhi -82
10	Kottappada	HKS-61, MCF -1 (Functional) 1 (Non Functional) - Total no. of bins in the Thumboomuzhi -11

Abbreviations used: HKS-Harisha Karma Sena (Govt. agency doing door-to-door collection of waste), MCF- Material Collection Facility, RRF-Resource Recovery Facility, CSTP- Common Sewage Treatment Plant, FSTP- Fecal Sludge Treatment Plant.

6. RECOMMENDATIONS TO CURB POLLUTION OF RIVER PERIYAR

The Committee hereby makes the following recommendations to curb pollution of river Periyar.

6.1 RECOMMENDATIONS TO INDUSTRIES

- a. All industries must comply strictly with all consent conditions and there should not be any unauthorised discharges.
- b. All industries, micro-small-large, shall improve housekeeping management. By this, accidental flow of pollutants through stormwater drains from the industries premises will be stopped completely.
- c. Industries particularly all major-large-red category industries shall install online continuous effluent monitoring system connected to the servers of the regulatory bodies.
- d. All the micro and small industries included shall improve their management of hazardous waste even if the quantities of hazardous waste generated are small. It shall be ensured that all the guidelines of the Central Pollution Control Board for preventing any type of pollution due to hazardous waste are complied with.
- e. The industries shall improve their effluent treatment plants and sewage treatment plants so that lesser amount of chemicals are used, systems are more energy saving and the carbon footprint of the effluent treatment techniques are minimal.
- f. Delay ponds with monitoring arrangements shall be arranged by individual industrial units for stormwater drains.
- g. Industries with permitted river discharge shall have display boards of effluent quality parameters viewable from inside of the industry as well as from the riverside.
- h. Adequate infrastructure for sewage treatment and management in all urban local bodies in the catchment of river Periyar must be ensured in a time-bound manner.
- i. The large industries and establishments drawing fresh water from the river must explore possibilities for reduction in quantities of water drawn especially during summer months so that minimum flow and self-cleansing capacity of the river could be maintained.
- j. Sewage and industrial effluent contamination of the Edamula branch of the river should also be controlled as fish kills in the lowermost stretches of the river happen after the confluence of the Eloor and Edamula branches.

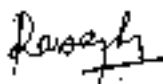
- k. The industries involved in the open storage of waste or by-products should take measures for temporary covering of the stored waste or by-products using LDPE layers, especially during monsoon or such waste may be stored under the shed. If stored in open there should be bottom lining of LDPE. Open storage areas should also be provided with garland drains all around the waste storage areas to avoid contaminated runoff into the river Periyar and the contaminated runoff should be routed through ETP for further treatment to comply with the discharge norms.
- l. Any hazardous wastes lying in the industry premises in the catchment of river Periyar should be disposed of through a Treatment Storage and Disposal Facility (TSDF) located at Ambalamedu following the manifest in accordance with the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016, as amended.

6.2 RECOMMENDATIONS TO DEPARTMENTS

- a) The Industries Department has to ensure that the common storm water drains are in a common area, not inside individual industrial premises, and amply facilitated for easy inspection; and provide delay ponds before discharge into the river.
- b) Industries Department should ensure that all industries have effective pollution control systems; they should hold periodic review of the matter with all industries in the presence of officials of Kerala State Pollution Control Board.
- c) Clear SOP shall be prepared by the Irrigation Department for the operation of regulators in the rivers in consultation with all stakeholder departments.
- d) Irrigation Department should ensure environmental flow in the Eloor branch of the river as per the Order dated 09.08.2017 of the Honorable NGT in O.A. 408/2015 which was further mandated to the Irrigation Department based on Orders of The Hon'ble NGT in OA. 395/2011 and OA. 673/2018.
- e) The Irrigation Department should carry out periodic de-sludging, de-weeding, and de-silting in the river and its banks.
- f) Irrigation Department should immediately construct dyke wall, diaphragm wall, and walkway throughout the banks of the river with the industrial area of easy surveillance by various responsible authorities, as per the action plans prepared based on the orders of Hon'ble Courts and Tribunals.

- g) All local bodies on the banks of the river and its tributaries must construct adequate no of sewage treatment plants for common sewage as well as attached to fish markets, slaughterhouses, etc. Until Common sewage treatment plants come up local bodies should ensure that scientifically designed septic tanks are provided on all residential and commercial units and there are no discharges of untreated sewage into drains or water bodies.
- h) The Irrigation Department should install a Real-Time Water Quality Monitoring System (RTWQMS) on river Periyar downstream of Parthalam Bridge to assess the real-time water quality of river Periyar.
- i) Action plans prepared for the restoration of river Periyar should be implemented in a time-bound manner by all the concerned stakeholder departments.
- j) All the stormwater outlets discharging runoff into the river Periyar are to be connected with the digital pH meter and the same should be displayed in the public domain to know the quality of discharges into river Periyar.
- k) Kerala State Pollution Control Board shall increase the effectiveness of surveillance in the river passing through the Eloor Edayar industrial area using artificial intelligence-based systems so that immediate alert in any deterioration of river water quality is obtained in the office of the Board. In such a case remote sensing techniques including the use of drones shall be used to map the quality of the river instantly.
- l) Stringent action should be taken by Kerala State Pollution Control Board against the non-complying industries including levying Environmental Compensation Charges as per guidelines issued by the Central Pollution Control Board.
- m) Kerala State Pollution Control Board should amend consent parameters for all the industries based on the stoichiometric analysis of the processes and the detailed characteristics of waste generated by the industries.
- n) Remediation of Kuzhikandam Thodu is to be initiated as per the Detailed Project Report prepared, for which, Administrative sanction shall be obtained expeditiously.

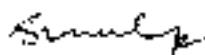
Committee members and signatures:



Dr. Rathin U. Kelkar IAS



Sri J. Chandra Babu



Sri. Surend Pameedi IFS



Smt. S. Sreelekha

ANNEXURES



- OVERVIEW OF RIVER PERIYAR Annex I (c)

ANNEXURE I

Periyar river is the longest river in the State of Kerala. The river functions as source of drinking water, water for commercial industrial purposes and irrigation as well as source of hydro electricity in addition to many other ecological functions. The Periyar is of utmost significance in the life and economy of Kerala. Pollution of river Periyar has been a grave issue faced by the State, a challenge common to almost all rivers of the country. Even though statutory and other Government agencies have been imparting coordinated efforts to alleviate the problem, effects of pollution upon local population, aquatic ecology and a few economic activities are frequently coming up as huge public outcry. Consequently several litigations are being pursued in various Courts and Tribunals in the matter of pollution of the river. WP(C) Nos 9534 of 2020, 31236 of 2023 and 996 of 2012 are under the purview of the Hon'ble High Court of Kerala, related to the issue of pollution of Periyar.

The Periyar basin spreads over an area of 5398 square kilometres (2,084 sq mi), most of it in central Kerala. A map of the river basin is given as Figure 1. Periyar, meaning big river, is the longest river in Kerala having a length of 269.90km and the second largest river basin of Kerala with a catchment area of 5398 sq km and drains part of Idukki and Ernakulam District. The Periyar river basin has a total drainage area of 5398 km² out of which 3284 km² lies in Kerala and 1114 km² lies in Tamil Nadu. Rising from the remote forest of Periyar Tiger Reserve known as Sivagiri group of hills at an elevation of +1830m, the river traversing the hilly terrains of Idukki district and at Karimnadi, Periyar crosses the district boundary and enters into Ernakulam District. From its origin, Periyar traverses through an immense cliff of rocks in a northerly direction and is joined by the Mullayar about 48 km downstream. The Mullaperiyar Dam is constructed at the confluence of the Periyar and Mullayar to create the Periyar Thekkady lake and reservoir. Below the Mullaperiyar Dam, the river flows in a winding course taking a north westerly direction. On its travel down, it is enriched by many tributaries like Katappana, Chiruthoni, Perinjunkutty, Muthirapuzha and Idanala. Lower down at Malayattoor, the river takes a meandering course and flows for about 23 km through Kalady and Chowara and reaches Aluva. At Aluva, the river bifurcates into the Vemayar and the Mangalapuzha branches. The Mangalapuzha branch joins Chalakudy River at Elenthikkamand empties into the Arabian sea at Munambam. The Vemayar branch flows southwards, again dividing into two near Kunjunnikkara- Udayannoor island. This branch joined after the island and again bifurcates at Edamula. One branch flows through Eloor - Edayar industrial belt known

Annex 1 (c2)

as the Eloor Branch. The other flows through Kalamassery and Manjummel, known as the Edamula Branch, both ultimately join and reach the Vembanad lake at Eloor Ferry. As in the case of many other inland water bodies, River Periyar is gradually undergoing eco-degradation throughout its course of flow due to various anthropogenic stresses, which include indiscriminate deforestation, domestic-agricultural-industrial water pollution, excessive exploitation of resources, sand mining and various interferences in the flow of water.



Figure 1: Map of Periyar River basin

A m x P (3)

Periyar basin is spread over Idukki and Ernakulam Districts. The length of Periyar river in Idukki district is 134.40 km and 110.50 km in Ernakulam district. The local bodies involved are Kumity, Vandiperiyar GP, Vazhathoppu GP, Munmar GP, Kanjikkuzhy GP, Bysonvally GP, Rajakkad GP, Senapathy GP, Vellathooval GP, Konnathady GP, Nedungadam GP, Karunapuram GP, Erattayar GP, Kamebiyar GP, Kattappana GP, Elapparara GP, Ayyappankovil GP, Upputhara GP, Kuttanipuzha GP, Mankulam GP, Vathykudy GP, Ayyampuzha GP, Manjappara GP, Kalady GP, Pindimana GP, Vengoor GP, Moodakkuzha GP, Koorappady GP, Mayalattoor and Neeleswaram GP, Vazhakulam GP, Royamangalam GP, Ottal GP, Keezhmad GP, Kanjoor GP, Aluva Municipality, Sreemoolanagar GP, Chengamanad GP, Kadungalloor GP, Eloor GP, Varappuzha GP, Angadikkadavu GP, Perumbavoor Municipality, Alanged GP, Kalamassery Municipality, Edathala GP, Kadamakudy GP, Cheranallor GP, Kunukara GP, Puthenvelikkara GP, Karumallur GP, Pzhiikara GP, Paravur Municipality, Chendamangalam GP, Vadaickkara GP, Vellungalloor GP, Kottuvally GP, Kodungalloor Municipality.



Annex 2 (c)

ANNEXURE 2**1. POLLUTION SOURCES:**

The Periyar river stretches are viable to pollution in many ways. Major Sources of pollution in Periyar river can be categorized as industrial effluents, Urban waste including Sewage and garbage, agricultural run-off. It is very important to find out those potential chances of pollution and adopt control measures as the river stretch is a prime important source of water for drinking and other purposes. Pilgrim centres/ tourist places, major town ships, Residential apartment buildings, commercial establishments etc. situated on the banks of river which also contribute the river pollution. Water pollution arises from a variety of sources, both natural and anthropogenic.

1.1 INDUSTRIAL POLLUTION

The significance of industrial pollution in river Periyar starts in the downstream portions specifically from Industries located on either sides of Eloor branch of river Periyar, in Edayar and Eloor industrial areas. The types of industries include fertilizers, chlor- alkali, tannery, chicken waste rendering units, fish processing, pesticides, chemicals and allied industries, modern rice mills, waste oil processing, radioactive mineral processing, rubber processing units, animal bone processing units etc. There are 32 industries in Eloor-Edayar industrial belt which are effluents generating industries. All of these industries have installed Effluent Treatment Plants for the treatment of effluent generated in the units.

Industrial belts are also functioning on the banks of the river in its upstream stretch/tributaries of river Periyar viz Kalady, Okkal, Angamali areas in the upstream areas and Kalamassery. Apart from this, modern rice mill industries are also located in the upstream areas of Periyar river. These industries are provided with Effluent treatment plants. If the effluent is not properly treated before discharge, there are chances for river water pollution. The list of industries located on the bank/tributaries of River Periyar with waste water generation are listed below (Table 1&2) Map showing the location these industries are shown below (Fig 2&3)

Annex 2 (c)

**Table 1: List of Industries Located Along The Catchment Area Of Periyar
(Ernakulam-Upstream of Eloor Edayar)**

Sl No.	River/ Tributary	Local Body	Name of Industry	Type of Industry
1	Periyar	Aluva Municipality	Always Rubex Pvt Ltd, Desom, Aluva	Manufacture Of Crepe/Crump Rubber
2	Edamula Stream	Kalamassery Municipality	Elite Foods Pvt Ltd, Edappally	Food Production
3	Edamula Stream	Kalamassery Municipality	Travancore Foods India Pvt Ltd, Kalamassery	Food And Food Processing Including Fruits And Vegetable Processing
4	Edamula Stream	Kalamassery Municipality	Indigo Paints, Ida Kalamassery	Paint Products
5	Periyar	Kalady Panchayath	Kaitons Hawaii Industries, Near Police Station, Kalady P.O, Ernakulam	Rubber
6	Manjaly thodu	Angamaly Municipality	M/s Pallickal Agro tech, Vengoor, Kidangoor P.O, Ernakulam	Rice Mill
7	Manjaly thodu	Angamaly Municipality	Peters Rice Mill, Industrial Estate Angamaly South	Rice Mill

Annex 2 (3)

8	Manjaly thodu	Angamaly Municipality	K.A.P. Modern Rice Mill, Nayathode p.o. Angamaly	Rice Mill
9	Manjaly thodu	Angamaly Municipality	Chakkirathimada Industries, Angadibada v. Angamaly 683572	Rice Mill
10	Manjaly thodu	Kalady Panchayath	Pallickal Agro Mills, Mattoor P.O, Kalady	Rice Mill
11	Manjaly thodu	Kalady Panchayath	Christy Modern Rice Mill, Mattoor P.O. Kalady	Rice Mill
12	Manjaly thodu	Kalady Panchayath	Chinnaxal Food Products, Mattoor Marottichode, Kalady	Rice Mill
13	Manjaly thodu	Kalady Panchayath	Metro Agro Mills, Mattoor, Kalady- 683574	Rice Mill
14	Manjaly thodu	Kalady Panchayath	M/S Kalady Rice Millers Consortium (P) Ltd. Mattoor, Kalady P.O	Rice Mill
15	Manjaly thodu	Kalady Panchayath	Kaveri Modern Rice Mill, Mattoor P.O, Kalady	Rice Mill
16	Manjaly thodu	Kalady Panchayath	M/S.K & T Agro Mills Pvt.Ltd, Mattoor Kalady Ennakulam	Rice Mill

Annex 2 (4)

17	Mangaly thodu	Nedumbassery Panchayath	Mother's Rice Mill, Industrial Development area, Angamaly, South P.O, Ernakulam	Rice Mill
18	manjaly thodu	Nedumbassery Panchayath	Veejay Rice Mill, Industrial Development area, Angamaly, South P.O, Ernakulam	Rice Mill
19	Periyar	Kanjoor Panchayath	St.antonys Modern Rice Mill, Sreemoolanagaram P.O Kalady	Rice Mill
20	Periyar	Kanjoor Panchayath	Parackal Agro Mills, Kanjoor P.O. Kalady	Rice Mill
21	Periyar	Kanjoor Panchayath	Pooja Modern Rice Mill, Chengal Kalady PO PIN 683574	Rice Mill
22	Periyar	Kanjoor Panchayath	Anna Agro Mills, Parappuram P.O Kanjoor Ernakulam - 683593	Rice Mill
23	Periyar	Sreemoolanagara m Grama Panchayath	Thekkakara Rice Mill, Kalady - Aluva Rd, Sreemoolanagaram, Kerala 683580	Rice mill
24	Mangaly thodu	Kalady Panchayath	Keerthi Natural Rice Industries, Madoor - Yordhanapuram Rd, Madoor, Kalady, Kerala 683574	Rice mill
25	Manjaly thodu	Kalady Panchayath	Valookaran Modern Rice Mill, Ernakulam, Kerala 683574	Rice mill

Annex 2 (5)

26	Manjaly thodu	Kalady Panchayath	Ibis Power Laundry & Dry Cleaning Co., SIDCO Industrial Park, Chempamoor	Laundry
27	Manjaly thodu	Angamaly Municipality	Perumbavoor Plywood Manufacturers Consortium Pvt. Ltd, 27/217G SIDCO Industrial Park Angamaly South Post Angamaly	Resin manufacture
28	Manjaly thodu	Kalady Panchayath	Kalpana Agro Mills, Mattoor, Kalady P.O. PIN-683574	Rice Mill
29	Manjaly thodu	Kalady Panchayath	M/S Kalady Rice Millers Consortium (P) Ltd, Mattoor, Kalady P.O	Rice Mill
30	Manjaly thodu	Kalady Panchayath	Peoples Dairy Development Project Central Society, Kuttikkara, Piranoor P.O, Kalady	Milk Processing Unit
31	Manjaly thodu	Kalady Panchayath	Aiswarya Agro Mills, Mattoor, Kalady P.O	Rice Mill
32	Manjaly thodu	Angamaly Municipality	Kancoor Ingredients Ltd, VII/138, Kanakkankadavu Road (Kancoor Road), Angamaly South	Rice Mill
33	Periyar	Kalady Panchayath	Parackal Agro Mills, Kanjoor P.O Kalady	Rice Mill
34	Chengal thodu	Kalady Panchayath	Pooja Modern Rice Mill, Chengal Kalady PO PIN 683574	Rice Mill

Annex 2 (6)

35	Periyar	Sreemoolana Garam Grama Panchayath	St. Anthony's Modern Rice Mill, Sreemoolanngaram P.O Kalady	Rice Mill
36	Manjaly thodu	Angamaly Municipality	Casino Air Caterers And Flight Services, Nayathodu, P.O. Angamaly, Emakulam. 683572	Food Caterers
37	Manjaly thodu	Angamaly Municipality	INKEL Ltd., INKEL Tower I, Behind TELK, Angamaly	Industrial Complex
38	Chengal Thodu	Nedumbassery Panchayath	Lulu Flight Kitchen (P) Ltd, Near CISF Office, VIP road, Nedumbassery	Food Caterers
39	Periyar	Okkal Panchayath	M/S E. C. Agro Mills, Okkal P.O., Okkal	Modern Rice Mill
40	Omma thodu Leading To River Periyar	Okkal Panchayath	M/S Edappana Agro Mills सत्यमेव जयते	Modern Rice Mill
41	Omma thodu Leading To River Periyar	Okkal Panchayath	M/S Edathula Modern Rice Mill, Chelamattom, Okkal P.O	Modern Rice Mill
42	Periyar	Okkal Panchayath	M/S Joseco Agro Mills, East Okkal, Okkal P.O - 683550	Modern Rice Mill
43	Periyar	Okkal Panchayath	M/S Jupiter Leys (P) Ltd, Okkal, Okkal P.O, Emakulam - 683550	Solvent Extraction Unit

Annex 7 (7)

44	Ommathodu Leading To River Periyar	Okkal Panchayath	M/S K K R Agro Mills, Chelamattom, Okkal P.O	Modern Rice Mill
45	Ommathodu Leading To River Periyar	Okkal Panchayath	M/S Kkr Agro Mills Pvt Ltd. Okkal P O,Okkal	Modern Rice Mill
46	Ommathodu Leading To River Periyar	Okkal Panchayath	M/S Kkr Agro Mills Pvt Ltd, Okkal P O,Okkal	Pickles Manufacturing Unit
47	Periyar	Okkal Panchayath	M/S Lakshmi Agro Mills, Edavoor P.O., Koovalpady	Modern Rice Mill
48	Ommathodu Leading To River Periyar	Okkal Panchayath	M/S Malha Agro Mills,Okkal P O., Okkal	Modern Rice Mill
49	Ommathodu Leading To River Periyar	Okkal Panchayath	M/S Mundeth Agro Mills,Edavoor Koovalpady	Modern Rice Mill
50	Periyar	Okkal Panchayath	M/S Portolil Agro Mills, Okkal P.O, Perumbavoor-683550	Modern Rice Mill
51	Vishakala Thodu/ Manmathodu Leading To Periyar	Okkal Panchayath	M/S Supreme Food Industries, Opp X/w 274, Chelamattom Okkal	Ice Cream Manufacturing

Annex (8)

52	Vizhakala Thodu/ Mannthodu Leading To Periyar	Okkal Panchayath	M/S Valiyaveetil Modern Rice Mill,Chelamattom Okkal P.O	Modern Rice Mill
53	Periyar	Koovappady Panchayath	M/S Manickathan Modern Rice Mill, Kunihilacond, Kodanad P.O.	Modern Rice Mill
54	Vizhakala Thodu/ Mannthodu Leading to Periyar	Koovappady Panchayath	Diamond Food Products,Koovappady P.O Perumbavoor	Modern Rice Mill
55	Periyar	Koovappady Panchayath	Nambiyattukudy Agro Industries	Modern Rice Mill
56	Periyar	Koovappady Panchayath	Nambiyattukudy Modern Rice Mill	Modern Rice Mill
57	Vizhakala Thodu/ Mannthodu Leading To Periyar	Koovappady Panchayath	Honey Industries,Koovappady P.O Perumbavoor	Modern Rice Mill
58	Periyar	Koovappady Panchayath	Nambiyattukudy Food & Spices	Modern Rice Mill
59	Periyar	Koovappady Panchayath	Geeyem Agro Mills	Modern Rice Mill
60	Thodu leading To Periyar	Vazhakkulam Panchayath	Avi Natural Products Ltd.	Solvent Extraction Unit

Annex 2 (q)

61	Periyar Neriamangalam Stretch	Keerampara Panchayath	Basil Natural Technically Specified Rubber Private Limited	Manufacture Of Crepe / Crump Rubber
62	Periyar Edamulayar Stretch	Kothamangalam Panchayath	Palappilai Specified Block Rubbers Pvt Ltd, Karukadom	Manufacture Of Crepe / Crump Rubber

**Table 2: List of Industries Located Along The Catchment Area Of Periyar
(Ernakulam-Eloor Edayar)**

Sl No.	River/ Tributary	Local Body	Name of Industry	Type of Industry
1.	Eloor Stream	Eloor Municipality	Fertilizers And Chemicals Travancore Limited (Fact)- Fertilizer Plant, Udyogamandal.	Fertilizer Unit
2.	Discharge To Edamula Stream	Eloor Municipality	Fertilizers And Chemicals Travancore Ltd (Fact), Petro-Chemical Plant, Udyogamandal	Petrochemical Unit
3.	Discharge To Kuzhikandam Thodu Finally Reach Edamula Stream	Eloor Municipality	Eludusan Insecticides Limited (Hil), Udyogamandal.	Insecticide
4.	Eloor Stream	Eloor	Indian Rare Earths	Minerals And

Anna 2. (10)

		Municipality	(Ire) Limited, Rare Earths Division. Udyogamandal	Rare Earth
5.	Eloor Stream	Eloor Municipality	Travancore Cochin Chemicals. (Tee). Udyogamandal	Chlor Alkali
6.	Eloor Stream	Kadungallor Panchayath	Sud Chemie (India) Pvt Ltd., Binanipuram, Edayar	Inorganic Chemical
7.	Edamula Stream	Eloor Municipality	Falcon Infrastructure Ltd, Puthiyaroad Jn. Eloor. Udyogamandal P.O.	Container Freight Station
8.	Eloor Stream	Kadungallor Panchayath	Essar Enterprises Ltd, Binanipuram, Edayar.	Crumb Rubber Unit
9.	Eloor Stream	Kadungallor Panchayath	Poovanthikkaran Rubbers. Edayar.	Rubber Unit
10.	Eloor Stream	Kadungallor Panchayath	TMS Leathers, Ida, Edayar.	Tannery Blue Hide
11.	Eloor Stream	Kadungallor Panchayath	Simrise TSR Factory, Industrial Development Area. Edayar	Isar 20 Crumb Rubber Unit
12.	Eloor Stream	Kadungallor Panchayath	Rubber O Malabar Products (P) Ltd, Ida. Edayar	Rubber Conveyor Belt Unit
13.	Eloor Stream	Kadungallor Panchayath	Cella Space., Ida. Edayar	Ware house
14.	Eloor Stream	Kadungallor Panchayath	Malaya Rubtech Industries. Edayar, Ida.	Isar 20 Crumb Rubber Unit

Annex (ii)

15.	Eloor Stream	Kadungallor Panchayath	Cochin Minerals And Rutile Ltd (Cmrl), Ida, Edayar.	Synthetic Rutile Unit
16.	Eloor Stream	Eloor Municipality	Hindalco Industries Ltd, Kalamassery	Aluminium Casting And Extrusion
17	Eloor Stream	Kadungallor Panchayath	Indo German Carbons Ltd (Igel), Edayar. Binanipuram	Activated Carbon
18.	Eloor Stream	Eloor Municipality	Cochin Printech Pvt. Ltd., Udyogamandal P.O., Eloor.	Printing
19	Eloor Stream	Kadungallor Panchayath	National Industries, Ida, Edayar.	Bone Meal And Allied Products
20.	Eloor Stream	Kadungallor Panchayath	Yeoman Bone & Allied Products, Ida, Edayar.	Bone Meal And Allied Products
21	Eloor Stream	Kadungallor Panchayath	Biocon Organics Pvt. Ltd., Edayar	Bone Meal And Allied Products
22	Eloor Stream	Kadungallor Panchayath	Alphamit Crumb Rubber Pvt Ltd, V/793, Ida, Edayar	Isnr 20 Crumb Rubber Unit
23	Eloor Stream	Kadungallor Panchayath	Neptune Readymix Concrete Pvt. Ltd., Edayar	Concrete Product Unit
24	Eloor Stream	Kadungallor Panchayath	Arjuna Natural Extracts Ltd., Industrial Development Area, Edayar, Muppanhadom P.O.	Oleo resins manufactures

Annex 2 (12)

25.	Eloor Stream	Kadungallor Panchayath	Cee Jee Lubricants, Industrial Development Area, Edayar, Binanipuram P.O.	Oil re-refining
26.	Eloor Stream	Kadungallor Panchayath	Organo Fertilizers (India) Pvt. Ltd., Industrial Development Area, Edayar, Mupparbadoth P.O.	poultry meal
27.	Eloor Stream	Kadungallor Panchayath	TMV Natural Oils And Extracts (P), Industrial Development Area, Edayar, Mupparbadoth P.O.	Herbal extracts
28.	Eloor Stream	Kadungallor Panchayath	Parakkal Industries, Industrial Development Area, Edayar	Poultry Meat
29.	Eloor Stream	Kadungallor Panchayath	Varkkey'S Industries, Industrial Development Area, Edayar Binanipuram P.O.	Tallow
30.	Eloor Stream	Kadungallor Panchayath	Marksmen Marine Pvt Ltd	Fish oil extraction
31.	Eloor Stream	Kadungallor Panchayath	Nellikadu Bone Industries, Industrial Development Area, Edayar, Mupparbadoth P.O.	Fish oil extraction

Annex (L) 13

32.	Eloor Stream	Kadungallor Panchayath	Alliance Marine Products, Edayar Muppathadom P.O - 683502	Fish/Chicken Oil Extraction
33.	Eloor Stream	Kadungallor Panchayath	Travancore Polymers, Industrial Development Area, Edayar, Binanipuram	UF Resin

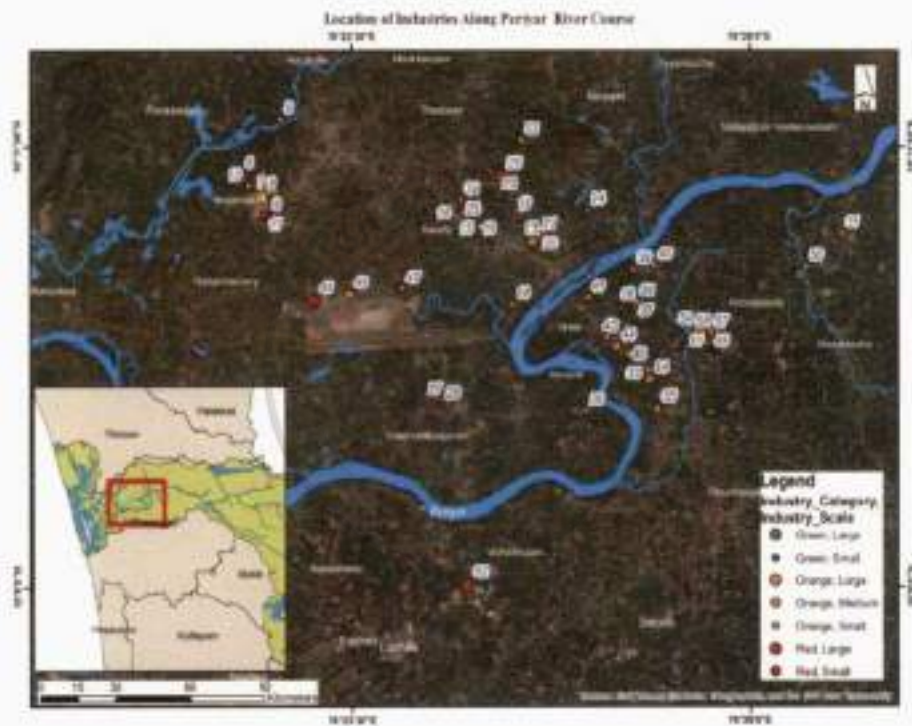


Figure 2: Location of Industries located along the Catchment area of Periyar (Ernakulam Upstream of Eloor Edayar)

Anna 2 (14)

Sl No.	Name Of Industries
4	Chakkathimoodu Industries
5	Perumbavoor Plywood Manufacturers Consortium Pvt.Ltd
6	Veejay Rice Mill (Moderns Rice Mill)
7	Peters Rice Mill
8	Inkel Ltd
9	Ibis Power Laundry And Dry Cleaning Co.
10	Kumori Industries Ltd
11	Metro Agro Mills
12	Kalady Rice Millers Consortium (P) Ltd (Refiners Unit)
13	Pooja Modern Rice Mill
14	Parackal Agro Mills
15	Peoples Dairy Development Project Central Society
16	Palakkal Agro Mills
17	K&Amp;T Agro Mills Pvt Ltd
18	Christy Modern Rice Mill
19	Kalpana Agro Mills
20	Alswarya Agro Mills
21	Rice Tech Agro Mills Pvt Ltd
22	Chirackal Food Products
23	Naisons Hawaii Industries
24	Kerenji Agro Mills (P) Ltd
25	Anna Agro Mills
26	Thebbokara Rice Mill
27	St Anny's Modern Rice Mill
28	Diamond Plywood
29	Manickathan Industries
30	Kumari Modern Rice Mill
31	Edathala Modern Rice Mill
32	Supreme Food Products
33	Kkr Agro Mills Pvt Ltd
34	Joseco Agro Mill
35	Edappalam Agro Mills
36	Panathil Agro Mills
37	Lakshmi Agro Mills
38	Mundeth Agro Mill
39	E.C Agro Mills
40	Jupiter Leys
41	Matha Agro Mills
42	Kkr Agro Mills Unit II
43	Palappitil Specified Block Runners Pvt Ltd
44	Alway's Rubber Pvt Ltd
45	K.A.P. Modern Rice Mill
46	Lulu Flight Kitchen (P) Ltd
47	Canino Air Caterers And Flight Services
48	Geeyem Agro Mills
49	Nambiarukudy Modern Rice Mill
50	Art Natural Products Ltd.
51	Vakoluram Modern Rice Mill
52	Diamond Food Products,Koonappady
53	Nambiyattukudy Agro Industries
54	Honey Industries,Koonappady
55	Nambiarukudy Food & Amp; Spices
56	Basel Natural Technically Specified Rubber Private Limited

Anna 2 (15)

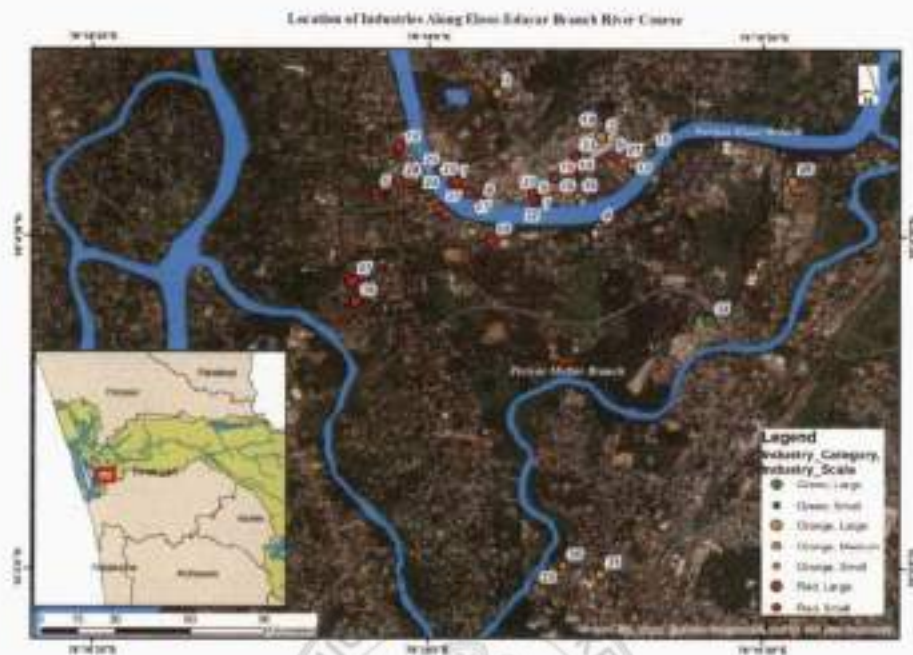


Figure 3: Location of Industries located Along The Catchment area of Periyar (Ernakulam Eloor Edayar)

Sl No.	Name of Industries
1	Indo German Carbons Ltd
2	Arjuna Natural Pvt Ltd
3	Cella Space Ltd
4	Cochin Printech Pvt, Ltd.
5	Hindustan Insecticide Limited
6	Tins Industries
7	Marksmen Marine Products
8	Lime Industry Under Eloor
9	Varkeys Industries
10	Organo Fertilizers India Pvt Ltd
11	Biocon Organics Pvt Ltd
12	Indian Rare Earths Limited
13	Malaya Rub Tech Industries
14	Nelkathir Bone Industries
15	Neptune Readymix Concrete Pvt Ltd
16	Rubber O Malabar Products Pvt Ltd
17	Sad Chemi India Pvt Ltd
18	San Rise Tsr Factory
19	Tmv Natural Oils And Extracts Pvt Ltd
20	Travancore Polymers

Annex 2 (16)

21	Alpharub Crumb Rubber Pvt Ltd
22	Parakkal Industries
23	Cee Jee Lubricants
24	Essar Enterprises
25	Yeoman Bone And Allied Products
26	Hindalco Industries Ltd
27	The Fertilizers And Chemicals Travancore Limited
28	The Fertilizers And Chemicals Travancore Ltd Fertilizers Plant
29	Travancore Cochin Chemicals Ltd
30	Elite Foods Pvt Ltd
31	Indigo Paints Pvt Ltd
32	Central Kitchen (Travancore Foods India Pvt Ltd, Subsidiary Of Carnival Foods)
33	Cochin Minerals And Rutile Ltd.
34	Falcon Infrastructure Ltd.
35	Alliance Marine Products Edayar
36	Fertilizers And Chemicals Travancore Ltd (Fact), Petro-Chemical Plant
37	Fertilizers And Chemicals Travancore Limited (Fact)- Fertilizer.

At present, five industries have been permitted to discharge treated effluent into the Periyar River; out of them, only one industry (TMS Leathers) is having discharge point at the upstream of the bund and other four industries have outlets at the downstream of bund. All other industries have to reuse the treated effluent to the maximum extent possible and balance has to be disposed through soak pits. The details of industries permitted with authorized outlets to river Periyar is given below.

Table 3: List Of Industries permitted with authorized outlets to river Periyar

Sl No	Name	Authorized Quantity
1	The Fertilizers and Chemicals Travancore Limited, (Idiyogamandal)	12000 m ³ /day (Pattalam bund downstream), 9840 m ³ /day (Edamula Branch of Periyar)
2	IREL (India), Limited	400 m ³ /day
3	Sud-chemie India Pvt. Ltd	450 m ³ /day
4	Cochin Minerals and Rutile Limited (CMRL)	659 m ³ /day
5	TMS LEATHERS	75 m ³ /day

Anna ? (17)

1.2 Agricultural Run Off

There are plantations, such as tea, cardamom, and other spices as well as rubber in the catchment area of river Periyar in its upper stretches. The use of chemical fertilizers and pesticides in these plantations can lead to runoff during rainfall, introducing harmful chemicals into the river. Agricultural activities, especially on sloped terrains, can lead to soil erosion, causing sediments to enter the river. This increases turbidity and can impact aquatic life by smothering fish eggs and reducing light penetration.

This comprises of following type of pollution

- **Pesticides and Herbicides:** Chemicals such as pesticides, insecticides, herbicides etc used in agriculture can wash into nearby water bodies during rainfall, leading to contamination.
- **Fertilizers:** Excess nutrients, particularly nitrogen and phosphorus, can cause eutrophication, which leads to algal blooms and oxygen depletion in water bodies.
- **Runoff from areas where cattle farms, pig farms, poultry farm etc are located** may also contribute significant organic load which include animal excreta.
- **1.3 Urban Waste**

Urban waste contributing to river pollution primarily consists of:

- **Stormwater Runoff :** Water from urban areas can carry pollutants such as oil, grease, heavy metals, and garbage into waterways.
- **Sewage:** Untreated or inadequately treated sewage can introduce harmful bacteria, viruses, and organic matter into water sources.
- **Household Chemicals:** Improper disposal of household chemicals like cleaning agents and paints can lead to water contamination.

The upper stretches of the Periyar River, primarily located in the Idukki District of Kerala, are generally characterized by forest areas, wildlife reserves, and less intensive human activity compared to the middle and lower stretches. Although the upper stretches are less populated,

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2 (19)

2 Types of Pollutants

Water pollutants can be classified as organic pollutants, inorganic pollutants, pathogens, suspended solids, nutrients and agriculture pollutants, thermal, radioactive, and other pollutants. Organic and inorganic pollutants are mainly discharged from industrial effluents and sewage into the water bodies.

Organic water pollutants include bacteria and other organic pollutants from sewage, fertilizers, agricultural runoffs, forestry, food processing, tree and brush debris, industrial waste, and so on. Inorganic water pollutants include inorganic salts, mineral acids, metals, trace elements, metal compounds, Ammonia, Heavy metals, Nitrates and Phosphates from sewage and agriculture, sulfates, cyanides etc. Heavy Metals such as lead, mercury, and cadmium, chromium which can come from industrial discharges. Pesticides and Herbicides are used in agriculture and can run off into waterways, affecting both wildlife and human health. Nutrients such as Nitrogen and phosphorus from fertilizers can cause eutrophication, leading to dead zones in water bodies. Plastic from urban lining can also be a pollutant present in river water.

The various sources of pollution in river Periyar including industrial, agricultural and urban can contribute to the presence of the pollutants described above.

Due to these contaminants, the river either no longer supports a certain human use, such as drinking water, or undergoes a marked shift in its ability to support its biotic communities, such as fish.

3 Environmental and Social Impacts

Pollution in rivers can have significant environmental and social impacts. It may affect aquatic life, biodiversity, human health, and local communities:

3.1 Aquatic Life

- **Habitat Degradation:** Pollutants such as sediments, chemicals, and excess nutrients can alter the physical and chemical characteristics of river habitats, making them less suitable for aquatic organisms. For example, increased sedimentation can smother spawning sites and reduce light penetration for aquatic plants.

Annex 2 (in)

- **Toxicity:** Heavy metals, pesticides, and other pollutants can be toxic to aquatic life, causing direct harm or leading to bioaccumulation in the food chain. This can result in reduced reproductive success, weakened immune systems, and high mortality rates among fish and other aquatic organisms.
- **Eutrophication:** Excessive nutrients, especially nitrogen and phosphorus, can lead to eutrophication, where rapid algal growth depletes oxygen levels in the water. This process, known as hypoxia or "dead zones," can result in the death of fish and other aquatic life due to lack of dissolved oxygen.

Data available with Pollution Control Board shows that there has been several minor and major fish-kill incidents in the river Periyar, particularly in the lower stretches of Eloor branch and Edamula branch, in recent years. The studies have shown that depletion of dissolved oxygen (DO) in water and related biochemical reactions in the river water is the cause of almost all these fish kill incidents. The latest incident of fish kill occurred during 20-03-24 and 21-03-24 downstream of Padhatam in Eloor branch and affected the river further downstream also.

3.2 Biodiversity

- **Loss of Species:** Pollution can lead to habitat destruction and changes in water quality, causing a decline in species diversity. Sensitive species may be lost or become endangered, while more pollution-tolerant species may dominate, reducing overall biodiversity.
- **Disruption of Ecosystems:** Changes in species composition and habitat quality can disrupt ecological balance, affecting predator-prey relationships, competition among species, and overall ecosystem functionality.

3.3 Human Health

- **Waterborne Diseases:** Pollution from untreated sewage and agricultural runoff can introduce pathogens like bacteria, viruses, and protozoa into the water. This can lead to waterborne diseases such as cholera, dysentery, and hepatitis, posing significant health risks to local populations.

Annex 2 (21)

- **Chemical Exposure:** Contaminants such as heavy metals and industrial chemicals can pose health risks through direct contact with polluted water or through the consumption of contaminated fish and other aquatic organisms. Long-term exposure to these pollutants can lead to serious health issues, including cancer, neurological disorders, and reproductive problems.
- **Nutrient Pollution:** Excessive nutrients in water bodies can lead to harmful algal blooms that produce toxins, which, when ingested or inhaled, can cause health problems such as respiratory issues, gastrointestinal problems, and liver damage.

3.4 Local Communities

- **Economic Impact:** Pollution can affect local economies, particularly those dependent on fishing, agriculture, and tourism. Reduced fish stocks, contaminated water sources, and degraded natural landscapes can lead to loss of livelihoods and reduced income for communities.
- **Reduced Quality of Life:** Pollution can diminish the quality of life for residents by affecting access to clean water, recreational activities, and overall environmental aesthetics. The presence of pollutants can lead to unpleasant odours, unsightly conditions, and restricted use of natural resources.
- **Social Displacement:** In some cases, severe pollution and environmental degradation can lead to the displacement of communities, particularly those living in vulnerable areas along the river. This can disrupt social structures and create additional challenges for affected populations.

Annex 3 (i)

Annexure 3- NWMP DATA OF 2022, 2023 & 2024

The observed range of water quality parameters in river Periyar (Annual Average) for the year 2022 are given in Table below

2022			PERIYAR RIVER						
River Station			pH	EC µmhos/cm	DO mg/l	BOD mg/l	TC MPN/100ml	FC MPN/100ml	CLASS*
Kadady 8918	NWMP	Max	7.8	12	8.2	1.8	6300	4000	C
		Min	6.2	14	7.0	0.6	1200	310	
		Mean	6.9	41	7.5	1.1	3300	1900	
KWA Aluva 1408	NWMP	Max	7.9	98	8.0	1.9	5000	4000	C
		Min	6.8	48	6.2	0.7	310	100	
		Mean	6.9	43	7.3	1.4	1657	1048	
SDP Aluva 1336	NWMP	Max	7.4	87	7.8	2.2	7000	5000	C
		Min	6.3	48	5.6	1.8	1700	700	
		Mean	6.7	37	6.8	1.6	4055	2457	
Mapputhadam 1331	NWMP	Max	9.6	98	7.6	1.8	7000	4100	C
		Min	6.5	19	5.5	1.8	1000	310	
		Mean	7.3	38	6.7	1.2	2475	1079	
Elur 8817	NWMP	Max	8.5	15700	7.2	2.3	7000	5000	BELOW E
		Min	6.5	85	5.1	0.9	1100	490	
		Mean	7.3	4104	5.2	1.7	4625	2600	
Puthalam 1334	NWMP	Max	8.8	10000	7.8	2.6	7000	5000	BELOW E
		Min	6.3	40	6.0	1.2	370	300	
		Mean	7.4	2878	6.9	1.6	3640	2173	
Parappikkadon 1336	NWMP	Max	8.8	14000	8.0	1.8	7000	5000	BELOW E
		Min	6.8	38	6.2	0.5	230	63	
		Mean	7.2	4334.9	7.0	1.2	1536	1047	
Kalamassery 1338	NWMP	Max	8.4	78	7.8	2.4	11000	9200	C
		Min	6.8	35	5.3	0.8	1500	470	
		Mean	7.3	99	6.3	1.7	3400	1825	
Pannakkutti 8389	NWMP	Max	7.7	110	8.4	2.7	4000	2000	C
		Min	6.5	48	7.8	1.2	41	100	
		Mean	7.0	67	7.7	1.9	2155	901	

Water Quality data- April 2022

The observed range of water quality parameters in river Periyar (Annual average) for the year 2021 are given in Table below.

River Stations		pH	EC µmhos/cm	DO mg/L	DOB mg/l	TC mg/L	PC mg/L	CLASS
Kaduna IB	NWMP	9.5	54	8.8	1.9	1962	1400	C
	4km	9.1	29	6.3	2.2	700	298	
	14km	7.7	42	7.1	1.8	1433	1204	
	24km	9.8	63	7.4	2.0	5444	1800	
NWA Adams	NWA	6.7	36	5.1	3.8	251	80	A

WATER QUALITY DATA APRIL 2023

75

Annex 3 (A)

WPTST 001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WPTST 002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WPTST 003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WPTST 004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WPTST 005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WPTST 006	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WPTST 007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WPTST 008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

**BDL: Below Detectable Limit, as set in NWMP reporting format.

RIVER PERCYAR DATA FOR THE MONTH OF JANUARY AUGUST 2024

River Segment		Percy River							Location
Station	Depth (m)	Temp (°C)	pH	DO (mg/L)	EC (µS/cm)	TSS (mg/L)	Chlorophyll (µg/L)	Ammonia (mg/L)	
Station 001	0.5	18.5	7.2	4.5	150	10	50	0.5	Station 001
	1.0	18.2	7.1	4.2	140	12	45	0.4	
	1.5	18.0	7.0	4.0	130	15	40	0.3	
	2.0	17.8	6.9	3.8	120	18	35	0.2	
Station 002	0.5	18.0	7.1	4.3	140	11	48	0.4	Station 002
	1.0	17.8	7.0	4.1	130	13	43	0.3	
	1.5	17.5	6.9	3.9	120	16	38	0.2	
	2.0	17.2	6.8	3.7	110	19	33	0.1	
Station 003	0.5	17.8	7.0	4.2	130	12	46	0.3	Station 003
	1.0	17.5	6.9	4.0	120	14	41	0.2	
	1.5	17.2	6.8	3.8	110	17	36	0.1	
	2.0	17.0	6.7	3.6	100	20	31	0.0	
Station 004	0.5	17.5	6.9	4.1	120	13	44	0.2	Station 004
	1.0	17.2	6.8	3.9	110	15	39	0.1	
	1.5	17.0	6.7	3.7	100	18	34	0.0	
	2.0	16.8	6.6	3.5	90	21	29	0.0	
Station 005	0.5	17.2	6.8	4.0	110	14	42	0.1	Station 005
	1.0	17.0	6.7	3.8	100	16	37	0.0	
	1.5	16.8	6.6	3.6	90	19	32	0.0	
	2.0	16.5	6.5	3.4	80	22	27	0.0	
Station 006	0.5	17.0	6.7	3.9	100	15	40	0.0	Station 006
	1.0	16.8	6.6	3.7	90	17	35	0.0	
	1.5	16.5	6.5	3.5	80	20	30	0.0	
	2.0	16.2	6.4	3.3	70	23	25	0.0	
Station 007	0.5	16.8	6.6	3.8	90	16	38	0.0	Station 007
	1.0	16.5	6.5	3.6	80	18	33	0.0	
	1.5	16.2	6.4	3.4	70	21	28	0.0	
	2.0	16.0	6.3	3.2	60	24	23	0.0	
Station 008	0.5	16.5	6.5	3.7	80	17	36	0.0	Station 008
	1.0	16.2	6.4	3.5	70	19	31	0.0	
	1.5	16.0	6.3	3.3	60	22	26	0.0	
	2.0	15.8	6.2	3.1	50	25	21	0.0	
Station 009	0.5	16.2	6.4	3.6	70	18	34	0.0	Station 009
	1.0	16.0	6.3	3.4	60	20	29	0.0	
	1.5	15.8	6.2	3.2	50	23	24	0.0	
	2.0	15.5	6.1	3.0	40	26	19	0.0	

Annex 3 (c)

RIVER PERIYAR DATA OF NWMP STATIONS FOR THE MONTH OF APRIL 2024

Station Name	Station ID	Station Code	Station Type	Station Category	Station Sub-Category	Station Group	Station Sub-Group	Station Sub-Sub-Group	Station Sub-Sub-Sub-Group
Periyar	01	01	01	01	01	01	01	01	01
Periyar	02	02	02	02	02	02	02	02	02
Periyar	03	03	03	03	03	03	03	03	03
Periyar	04	04	04	04	04	04	04	04	04
Periyar	05	05	05	05	05	05	05	05	05
Periyar	06	06	06	06	06	06	06	06	06
Periyar	07	07	07	07	07	07	07	07	07
Periyar	08	08	08	08	08	08	08	08	08
Periyar	09	09	09	09	09	09	09	09	09
Periyar	10	10	10	10	10	10	10	10	10
Periyar	11	11	11	11	11	11	11	11	11
Periyar	12	12	12	12	12	12	12	12	12
Periyar	13	13	13	13	13	13	13	13	13
Periyar	14	14	14	14	14	14	14	14	14
Periyar	15	15	15	15	15	15	15	15	15
Periyar	16	16	16	16	16	16	16	16	16
Periyar	17	17	17	17	17	17	17	17	17
Periyar	18	18	18	18	18	18	18	18	18
Periyar	19	19	19	19	19	19	19	19	19
Periyar	20	20	20	20	20	20	20	20	20
Periyar	21	21	21	21	21	21	21	21	21
Periyar	22	22	22	22	22	22	22	22	22
Periyar	23	23	23	23	23	23	23	23	23
Periyar	24	24	24	24	24	24	24	24	24
Periyar	25	25	25	25	25	25	25	25	25
Periyar	26	26	26	26	26	26	26	26	26
Periyar	27	27	27	27	27	27	27	27	27
Periyar	28	28	28	28	28	28	28	28	28
Periyar	29	29	29	29	29	29	29	29	29
Periyar	30	30	30	30	30	30	30	30	30
Periyar	31	31	31	31	31	31	31	31	31
Periyar	32	32	32	32	32	32	32	32	32
Periyar	33	33	33	33	33	33	33	33	33
Periyar	34	34	34	34	34	34	34	34	34
Periyar	35	35	35	35	35	35	35	35	35
Periyar	36	36	36	36	36	36	36	36	36
Periyar	37	37	37	37	37	37	37	37	37
Periyar	38	38	38	38	38	38	38	38	38
Periyar	39	39	39	39	39	39	39	39	39
Periyar	40	40	40	40	40	40	40	40	40
Periyar	41	41	41	41	41	41	41	41	41
Periyar	42	42	42	42	42	42	42	42	42
Periyar	43	43	43	43	43	43	43	43	43
Periyar	44	44	44	44	44	44	44	44	44
Periyar	45	45	45	45	45	45	45	45	45
Periyar	46	46	46	46	46	46	46	46	46
Periyar	47	47	47	47	47	47	47	47	47
Periyar	48	48	48	48	48	48	48	48	48
Periyar	49	49	49	49	49	49	49	49	49
Periyar	50	50	50	50	50	50	50	50	50
Periyar	51	51	51	51	51	51	51	51	51
Periyar	52	52	52	52	52	52	52	52	52
Periyar	53	53	53	53	53	53	53	53	53
Periyar	54	54	54	54	54	54	54	54	54
Periyar	55	55	55	55	55	55	55	55	55
Periyar	56	56	56	56	56	56	56	56	56
Periyar	57	57	57	57	57	57	57	57	57
Periyar	58	58	58	58	58	58	58	58	58
Periyar	59	59	59	59	59	59	59	59	59
Periyar	60	60	60	60	60	60	60	60	60
Periyar	61	61	61	61	61	61	61	61	61
Periyar	62	62	62	62	62	62	62	62	62
Periyar	63	63	63	63	63	63	63	63	63
Periyar	64	64	64	64	64	64	64	64	64
Periyar	65	65	65	65	65	65	65	65	65
Periyar	66	66	66	66	66	66	66	66	66
Periyar	67	67	67	67	67	67	67	67	67
Periyar	68	68	68	68	68	68	68	68	68
Periyar	69	69	69	69	69	69	69	69	69
Periyar	70	70	70	70	70	70	70	70	70
Periyar	71	71	71	71	71	71	71	71	71
Periyar	72	72	72	72	72	72	72	72	72
Periyar	73	73	73	73	73	73	73	73	73
Periyar	74	74	74	74	74	74	74	74	74
Periyar	75	75	75	75	75	75	75	75	75
Periyar	76	76	76	76	76	76	76	76	76
Periyar	77	77	77	77	77	77	77	77	77
Periyar	78	78	78	78	78	78	78	78	78
Periyar	79	79	79	79	79	79	79	79	79
Periyar	80	80	80	80	80	80	80	80	80
Periyar	81	81	81	81	81	81	81	81	81
Periyar	82	82	82	82	82	82	82	82	82
Periyar	83	83	83	83	83	83	83	83	83
Periyar	84	84	84	84	84	84	84	84	84
Periyar	85	85	85	85	85	85	85	85	85
Periyar	86	86	86	86	86	86	86	86	86
Periyar	87	87	87	87	87	87	87	87	87
Periyar	88	88	88	88	88	88	88	88	88
Periyar	89	89	89	89	89	89	89	89	89
Periyar	90	90	90	90	90	90	90	90	90
Periyar	91	91	91	91	91	91	91	91	91
Periyar	92	92	92	92	92	92	92	92	92
Periyar	93	93	93	93	93	93	93	93	93
Periyar	94	94	94	94	94	94	94	94	94
Periyar	95	95	95	95	95	95	95	95	95
Periyar	96	96	96	96	96	96	96	96	96
Periyar	97	97	97	97	97	97	97	97	97
Periyar	98	98	98	98	98	98	98	98	98
Periyar	99	99	99	99	99	99	99	99	99
Periyar	100	100	100	100	100	100	100	100	100



Annex 3 (B)

**BDL = Below Detectable Limit, as set in H&MP reporting format.



Annex 3(a)

ANNEXURE 3(a) - Report of Fisheries Director

US (BRC)
27/05/2024

Ref: DEVTMS/IT40/2024. CI

ഫിഷറീസ് ഡയറക്ടറുടെ അദ്ധ്യക്ഷതയിൽ,
തിരുവനന്തപുരം,
തീയതി 25-05-2024
ഇമെയിൽ: fisheriesdirector@gmail.com

ഫിഷറീസ് ഡയറക്ടർ,
തിരുവനന്തപുരം.

ഗവൺമെന്റ് പ്രിൻസിപ്പൽ സെക്രട്ടറി
ഫിഷറീസ് & വൈൽഡ്‌നസ് വകുപ്പ്
ഗവൺമെന്റ് സെക്രട്ടറിയറ്റ്
തിരുവനന്തപുരം



സ്വർ

വിഷയം:- ഫിഷറീസ്-2024 മേയ് മാസം 20-05-2024 തീയതി പെരിയാറിൽ നടന്ന മത്സ്യക്കുരുതി സംബന്ധിച്ച് ഫിഷറീസ് ഓഫീസറുടെ ഡയറക്ടർക്ക് അയച്ച അയക്കുന്ന റിപ്പോർട്ട് സമർപ്പിക്കുന്നത് - സംബന്ധിച്ച്.
സൂചന:- സ്വർക്കാരിൽ നിന്നുള്ള 22-05-2024 ലെ നിർദ്ദേശം.

മേൽ വിഷയത്തിലേക്കും സൂചനയിലേക്കും സ്വർക്കാരിന്റെ ശ്രദ്ധ ക്ഷണിക്കുന്നു. 2024 മേയ് മാസം 20-05-2024 തീയതി പെരിയാറിൽ നടന്ന മത്സ്യക്കുരുതിയിലേക്കു് നേരിട്ട് ഓരോന്നിച്ച് റിപ്പോർട്ട് സമർപ്പിക്കുവാൻ സ്വർക്കാരിൽ നിന്നും നിർദ്ദേശിച്ചതിന്റെ അടിസ്ഥാനത്തിൽ സ്ഥലം നേരിട്ട് സന്ദർശിച്ച് വിശദമായി പരിശോധിച്ച് അയക്കാനായി റിപ്പോർട്ട് തുടർ നടപടികൾക്കായി ഇതരവിഭാഗം ഉള്ളടക്കം ചെമ്പ് സമർപ്പിക്കുന്നു.

വിശ്വാസ്യതയുള്ളതും.

ഫിഷറീസ് ഓഫീസറുടെ ഡയറക്ടർ (ഇൻ ചാർജ്)
ഫിഷറീസ് ഡയറക്ടർക്ക് വേണ്ടി

ANNEXURE 3^a(2)

2024 ജൂൺ മാസം 20 ന് പെരിയറ്റിൽ നടന്ന അദ്ധ്യക്ഷതയിൽ സംഭവവിഷയം ഫീഡ്ബാക്ക് അഡ്മിഷണൽ ഡയറക്ടറുടെ അദ്ധ്യക്ഷതയിൽ സ്ഥലത്ത് നേരിട്ട അഭിപ്രായങ്ങൾ നടത്തിയ യോഗത്തിൽ ചർച്ച

[illegible][illegible]

ANNEXURE

3 (A) 3

ഇരുനൂറ് വെട്ടുമരയെ ഫിഷറീസ് യോയിന്റ് ഡയറക്ടർ, ഏറണാകുളം (മേഖല) ഫിഷറീസ് ഡെപ്യൂട്ടി ഡയറക്ടർ എന്നിവരുമായി ചേർന്ന സംയുക്ത സമ്മേളനം കേന്ദ്ര യൂണിറ്റുകൾ അടങ്ങുന്ന സംഘം മനരിട്ട സന്ദർശിച്ചു പല യൂണിറ്റുകളിലും വിജയവഴിക്ക് പാകമായിട്ടുള്ള മത്സ്യങ്ങൾ ചത്ത് കൊണ്ടിരിക്കുന്നുണ്ട് എന്ന് കണ്ട് അറിയപ്പെട്ടു. ചില കേന്ദ്ര യൂണിറ്റുകളിൽ ചത്ത മത്സ്യം നിക്ഷേപം ചെയ്തതായി മനസ്സിലായിട്ടുണ്ട്. ഇടത്തു പാക്കുകളിലൂടെ ചേർന്നിട്ടുള്ള നദീതട ഭാഗവും സന്ദർശിച്ചു മിക്കവാറും എല്ലാ പാക്കുകളിലും ഓട്ട് ബെറ്റുകൾ നീന്തിയിരുന്നത് ഇവക്കുണ്ടുണ്ട്. ടി പാക്കുകളിൽ നിന്നുള്ള വിഷമലിനീകൃതം തന്നെയാണ് മത്സ്യക്കുരുക്ക് കാരണം എന്ന് അറിയപ്പെട്ടിട്ടുണ്ട്. ഇടുക്കൽ കാര്യങ്ങൾ സാമ്പിൾ പരിശോധനാഫലം ഓലിച്ചതെ വ്യക്തമാക്കുകയുള്ളൂ.

ഇടത്തു മീൻ പൂമ്പാളങ്ങളിലും at preening fishes ഉൾപ്പെടെ ചത്ത് കൊണ്ടിരുന്നത് ഇടുക്കൽ ആവശ്യം തീർക്കുന്നതാണ്. സമയ സന്ദർഭം കഴിഞ്ഞ് ഈ അംഗങ്ങൾ കലോസരിൽ നിന്നും തുറന്നിട്ടു വിശദീകരിക്കുകയായി ചർച്ച നടത്തി പഠന റിപ്പോർട്ടിന്റെ തലസ്ഥാനത്തിൽ ഭാവി കാലങ്ങൾ അഭിമാനിക്കുന്നതിന് ബഹു ഫിഷറീസ് മന്ത്രിയുടെ അധ്യക്ഷതയിൽ യോഗം വിളിച്ച് ചർച്ച ചെയ്യുന്നതിന് ഉപദേശമായിരിക്കും.

ഇരുനൂറ് ഫിഷറീസ് ടി. അംഗങ്ങൾ കണ്ടായി പിടയ്ക്കൽ ഒരു ടി. ബഹുവ്യവസായ വകുപ്പ് മന്ത്രി വിളിച്ച മീറ്റിംഗിൽ പങ്കെടുത്ത് മത്സ്യകർഷകർക്കും തൊഴിലാളികൾക്കും സംഭവിച്ച നാശനഷ്ടത്തിന്റെ ആഴം അറിയപ്പെട്ടതിന് ശക്തം സംഘം പണിട്ട്. ജില്ലാ കളക്ടറും സന്ദർശിച്ച് സംഭവത്തിന്റെ തീവ്രതയിലും കർഷകർക്കും തൊഴിലാളികൾക്കും ഉണ്ടായ നാശനഷ്ടത്തെക്കുറിച്ച് വേദപുരുഷത്തി.

അതേത്തരം സംഘം ഏറണാകുളം ഫിഷറീസ് കോപ്പിസ്റ്റ് അസെസ്മെന്റ് റിപ്പോർട്ട് ചെയ്ത് 3 മാർച്ചിൽ ഇതി മൂലമുണ്ടായ നാശനഷ്ടം കർഷകർ, മത്സ്യത്തൊഴിലാളികൾ, മത്സ്യത്തൊഴിലാളി യൂണിറ്റുകൾ പ്രതിനിധികൾ എന്നിവരെ മനരിൽ കൂട്ട് കണ്ടിട്ടുവെച്ച് നടത്തി പ്രസ്തുത യോഗത്തിൽ കർഷകർ, മത്സ്യത്തൊഴിലാളികൾ, അംഗങ്ങൾ ആവശ്യങ്ങൾ അവതരിപ്പിക്കുകയും പരിഹാരപരമായ അഭിപ്രായങ്ങൾ നിന്നും കൈയെടുക്കാൻ നഷ്ടപരിഹാരം ഉൾപ്പെടെയുള്ള ശക്തമായ നടപടികൾ ഉണ്ടാകണമെന്ന് ആവശ്യപ്പെടുകയും ചെയ്തു. ഇവയെല്ലാം തന്നെ ഉപരിവശത്തിനായി മത്സ്യകർഷകർ ചെയ്യുന്ന സാധാരണക്കാരാണ്. പലരും ഈ ആവശ്യങ്ങൾക്കായി ചിലർ ഏകീകരിച്ചിട്ടുണ്ട്. ആയതിന്റെ അടിസ്ഥാനം യാതൊരു മറ്റൊരു ഇല്ലാത്ത അംഗവുമാണ്. മനോഹരകൾക്ക് മൊഴിയാട്ടാറിൽ പ്രവൃത്തിക്കുന്നതാണ് ആവശ്യം ഇങ്ങനെയി. മത്സ്യകർഷകർ പരിപാലിച്ചിരുന്നു ഇടുക്കൽ പദ്ധതി വിജയവഴിക്ക്

ANNEXURE

3(a) 4

പാകമായിത്തീരുന്നതാണെന്നും അവരുടെ മക്കളുടെ വിദ്യാഭ്യാസ ചെലവുകൾക്കായുള്ള നമ്പാറുമാണ് നഷ്ടമാണെന്ന് മത്സ്യകർഷകർ അറിയിക്കുകയുണ്ടായി. പല ഘട്ടങ്ങളിലും ഫാക്ടറി മാലിന്യം കൂടും മത്സ്യം ചത്തു മരിക്കാറുണ്ടെന്നും പുനരാൽ നാളിത്തക്കു നിത്യപരമായ പരിശ്രമനയും നടപടികളും ഉണ്ടായിട്ടില്ലെന്നും അവർ പരാതിപ്പെട്ടു. ്ലി പ്രകാരമുള്ള നൂതനസംസ്കരണ പുനര്രജീവിപ്പിക്കുന്നതിനാവശ്യമായ പ്രാത്യക പാഠക്ക് പ്രഖ്യാപിച്ച് നൽകിയിരുന്നതാണ് മത്സ്യകർഷകരുടെ നോക്കിപ്പോലീകളും എക്സൈസിൽ ആവശ്യപ്പെട്ടു.

ഫീൽഡ് മെയ് ഉത്സാഹസമർത്ഥി നിന്നും ഡോക്യുമെന്റേഷൻ പ്രദാനം ചെയ്ത കണക്കുകളുടെ അടിസ്ഥാനത്തിൽ മത്സ്യകർഷകളിലെ നാൾ നഷ്ടങ്ങൾ വിലയിരുത്തിയപ്പോൾ 7,03,66,280/- (എഴ് കോടി രൂന്ന് അക്ഷത്തി അറുപതരണ്ടായിരത്തി ഇരുനൂറ്റി എൺപത് രൂപ മാത്രം) രൂപയുടെ നഷ്ടം സംഭവിച്ചതായി കണ്ടെത്തപ്പെട്ടിട്ടുണ്ട്. പഞ്ചായത്ത് അടിസ്ഥാനത്തിൽ വർദ്ധിത മത്സ്യകർഷകർ സംഭവിച്ച നഷ്ടം പ്രാദേശികമായി വിലയിരുത്തി Annexure 2-ൽ ആയി ചേർത്തിട്ടുണ്ട്. പ്രസ്തുത പ്രദേശങ്ങളിൽ എക്സൈസ് 50 ഓരും ചീനവലകൾ പ്രവർത്തിക്കുകയും ഉപജീവനത്തിനായി ഇതിനെ ആശ്രയിക്കുകയും ചെയ്യുന്നുണ്ട്. പുഴയിലെ മത്സ്യ സമ്പത്തിന് പര്യാപ്തമായി നഷ്ടപ്പെട്ട സാഹചര്യത്തിൽ ആയത് പുനരജീവിപ്പിക്കുന്നതുവരെ മത്സ്യവത്താഴിമാളി / അനുബന്ധ മത്സ്യവത്താഴിമാളികളുടെ ഉപജീവനത്തിനായി 3 മാസത്തെ നഷ്ടം 6,51,34,000/- (ആറ് കോടി അൻപതെരുന്നായിരത്തി ഒരാലൂറ്റി നാലായിരത്തി അഞ്ഞൂറ് രൂപ മാത്രം) രൂപയായി വിലയിരുത്തി Annexure 3-ൽ ആയി വിശദമായി ചേർത്തിട്ടുണ്ട്. ആയത് ഏതൊട്ടത്തിൽ ചുവടെ ചേർത്തുന്നു.

മത്സ്യകർഷകർ നാൾ നഷ്ടം സംഭവിച്ച മത്സ്യകർഷകർക്കും ഉപജീവന അർഹ്യ നഷ്ടപ്പെട്ട മത്സ്യവത്താഴിമാളികൾക്കും നൽകേണ്ടതായ നഷ്ട പരിഹാരം

മത്സ്യകർഷകർ (ഇടുക്കി) Embarment Breeding Unit)	210 ഇടുക്കി, 5 ha കളം യൂണിറ്റ് 0.4 ha embarment)	70366280
മത്സ്യവത്താഴിമാളികൾ (ചീനവല കുറ്റിവല തൊഴിലാളികൾ ഉൾപ്പെടെ)	2249 (Registered) + 58 (Non-registered) @ 350/day for 25 days in a month for 3 months)	80532500
മത്സ്യ അനുബന്ധ തൊഴിലാളികൾ	518 @ 300/day for 25 days in a month for 3 months	4852000
Total		135560780

ANNEXURE

43(4)5

ശുപാർശകൾ

1. ETP തൊണ്ടിറ്റിപ്പിനിനായി ക്ഷേപാസ്, ഫിഷറീസ് റെക്സ് മെഡ്യൂഷൻ കൺട്രോൾ ബോർഡിലെ അംഗങ്ങളെ ഉൾപ്പെടുത്തി യിറ്റാ കലക്ടർ ചെയർമാനായ തൊണ്ടിറ്റിപ്പി കമ്മിറ്റി ബ്രഹ്മികൽത്ത് മണ്ഡലത്തും Effluent ന്റെ അളവ് റിപ്പോർട്ട് ചെയ്ത് പബ്ലിക് ചെയ്യണമെന്നും ഇത് പാലിക്കായല പക്കം ഗ്രീൻ കൺസ്യൂണലിൽ ഹരിത് കൺസ്യൂണൽ ഉൾപ്പെടെയുള്ള നടപടികൾ സ്വീകരിക്കുന്നതാണ്. കൂടാതെ ഈ മേഖലയിലെ ഫിഷറീസ് മാനേജ്മെന്റ് കൗൺസലിന്റെ പ്രാർത്ഥനയ്ക്ക് ശക്തിപ്പെടുത്തണം.
2. കുറ്റക്കാരെ കണ്ടെത്തുകയും കുറ്റക്കാരെക്കുറിച്ചെ ശ്രദ്ധയോടെ നടപടികൾ സ്വീകരിക്കുന്നതിനോടൊപ്പം കുറ്റകൃത്യം നടത്തിയവരുടെ ശിക്ഷ തന്നെ കൃത്യ ബോധിപ്പിക്കാനുള്ള നഷ്ട പരിഹാരം ഉറപ്പാക്കണം.
3. ക്ഷേപാസ്സിന്റെ ഗവേഷണ റിപ്പോർട്ടിന്റെ അടിസ്ഥാനത്തിൽ വൈകാരികവീഡ്യ സാമ്പൽ പുന്നസമാപിക്കാനായുള്ള പദ്ധതികൾ ആവിഷ്കരിക്കണം.
4. മത്സ്യവിജ്ഞാപിന്റെ പുനരുദ്ധനത്തിനായി പഞ്ചായത്ത് തലത്തിൽ മത്സ്യ പ്രജനന കേന്ദ്രങ്ങൾ തദ്ദേശ മത്സ്യത്തൊഴിലാളികളുടെയും ഫിഷറീസ് മാനേജ്മെന്റ് കൗൺസലിന്റെയും സംയുക്ത സഹകരണത്തോടെ കൂടി നടപ്പാക്കണം. കൂടാതെ ടി റൂറൽബോധിൻ കല പ്രദേശത്ത് മത്സ്യവിത്ത് നീലക്കുപ പദ്ധതി ഉൾക്കൊള്ളണം.
5. ഇപ്പോൾ നഷ്ടപ്പെട്ട മത്സ്യത്തൊഴിലാളികൾക്ക് താമസത്തിൽ 25 ഭവനം കണക്കാക്കി 350 രൂപ നിവാരണ നികുതിക്ക് 3 മാസത്തേക്കുള്ള ധനസഹായം വീക്ഷണം. ചെമ്പലമുക്ക് പരിഗണിക്കണമെന്നാണ്. അനുബന്ധ മത്സ്യത്തൊഴിലാളികൾക്ക് 300 രൂപ നികുതിക്ക് ഇത് വരുമാനമുള്ള അനുയോജ്യമായിരിക്കും. കൂടാതെ റൂറൽ ബോധിൻ കല പ്രദേശത്ത് 3 മാസത്തേക്ക് സാക്കുൻ മറയൻ അനുഭവിക്കുന്നത് പരിഗണിക്കുന്നതാണ്.
6. മനക്വയ മത്സ്യകൃഷി, PMKSRY പദ്ധതികളിൽ ഉൾപ്പെട്ട മത്സ്യകുടി-കുടിയാണ് കൂടുതലും നാശനഷ്ടം സംഭവിച്ചിരിക്കുന്നത്. ഇവയ്ക്ക് ഇൻഷുറൻസ് സബ്സിഡി നൽകി കൃഷി പുനരാരംഭിക്കുന്നതിന് പ്രത്യേക പാക്കേജ് അനുവദിക്കേണ്ടതാണ്. കൂടാതെ വിതരണ നടത്തി വരികയാണിരുന്ന ഇക്കയുടെ ഒരു മാധ്യം ധനസഹായമായി നൽകുന്നത് ഉചിതമായിരിക്കും.

ANNEXURE

F-3(A)6

7. പാലക്കാട് നഗരസഭയിലെ നഗരസഭാമേയറിലായി കർഷകർ താൽപ്പര്യപ്പെടുന്നതും, കെ. സി.സി. കൂട്ടായ്മയ്ക്ക് കാര്യമായ മുൻപന്തി വായ്പകൾക്ക് കരാറുകാരനായും പ്രവർത്തിക്കുന്നതും പരിഗണിക്കുന്നതാണ്.

8. പാലക്കാട് നഗരസഭയിലെ നഗരസഭാമേയറിലായി കർഷകർ താൽപ്പര്യപ്പെടുന്നതും, കെ. സി.സി. കൂട്ടായ്മയ്ക്ക് കാര്യമായ മുൻപന്തി വായ്പകൾക്ക് കരാറുകാരനായും പ്രവർത്തിക്കുന്നതും പരിഗണിക്കുന്നതാണ്.

സുബ്ബു കുമാർ നായർ,
ഫിഷറീസ് അഡീഷണൽ ഡയറക്ടർ (ഇൻ ചാർജ്)

സലീം ഫാദ്,
ഫിഷറീസ് അഡീഷണൽ ഡയറക്ടർ (ഇൻ ചാർജ്)

എം. താജുദ്ദീൻ,
ഫിഷറീസ് അഡീഷണൽ ഡയറക്ടർ (പ്രൊജക്ട്)

ഡോ. സോഫിയ താജുദ്ദീൻ അസം,
ഫിഷറീസ് ഡെപ്യൂട്ടി ഡയറക്ടർ (മേയറൻ)

ANNEXURE

3(8)1

Annexure-1

Sl. No.	Project Name	Name and Address of the Property Owner	Category of Land	Category of Land Utilized	Area (sq. ft.)	Present Activity	Date of Starting	At present standing structure	Investment (Lacs)	Estimated cost (Lacs)	Project Status	Time taken (Months)	Contract Number
1	Project Name	Subdivision House, Subdivision House, Subdivision House, Subdivision House	20.5	20.5	20.5	R.O.S. project, Subdivision House, Subdivision House, Subdivision House	14.07.2014	Working	24	11	10	10	10/000000
2	Project Name	Subdivision House, Subdivision House, Subdivision House, Subdivision House	15	15.00	15.00	Subdivision House, Subdivision House, Subdivision House, Subdivision House	17.01.2014	Working	21	8	30	30	210000000
3	Project Name	Subdivision House, Subdivision House, Subdivision House, Subdivision House	17.11.13	17.11.13	17.11.13	Subdivision House, Subdivision House, Subdivision House, Subdivision House	01-05-2010	Working	45.00	16	15	15	11/000000
4	Project Name	Subdivision House, Subdivision House, Subdivision House, Subdivision House	01-08-17	01-08-17	01-08-17	Subdivision House, Subdivision House, Subdivision House, Subdivision House	01-08-2016	Working	30	8	10	10	11/000000
5	Project Name	Subdivision House, Subdivision House, Subdivision House, Subdivision House	21	21.00	21.00	Subdivision House, Subdivision House, Subdivision House, Subdivision House	14/01/2014	Working	21	3	10	10	11/000000

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ANNEXURE

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ANNEXURE
K 3(a) 11

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ANNEXURE

3(6) n

Brackish water Cope Culture

Annexure-2

Sl.No	Village	Regd. Scheme		Private/Water Reg. Scheme	Operational Cost (INR/ha)	Standing crop (Value)	
		BMK	PMKSY			(standing crop/ha)	(INR/ha)
1	Kadambakudy	42	5	11	74.3	37023	187.3
2	Varappuzha	30	5	16	68.3	20707	133.6
3	Chattambalur	13	4	5	26.67	6444	21.38
4	Mulanakudi	8	1	2	3.66	435	1.35
5	Cochin Corporation	1	1	1	6.46	11487	37.3
6	Chirappuzha	8	1	0	2.98	1788	14.48
7	Muthukudam	2	11	11	2.4	552	21.2
	Total	101	37	55	179.82	88179	446.77

ANNEXURE

N 3(a), 13

Private CBQs

Annexure-1

Cage	Private Application not verified/Not Reg.REFERENCE)	Operational Cost (in lakhs)
Kadambakudy	54	66



ANNEXURE

3(6) 14

A/Annex-1

Pragathi Water Pond Culture

Sl.No	Crop	Dept. Subsector		Per Pond (M/ha) (Wet. & Dry)	Operational Cost	Standing Crop (T/ha)	Standing crop (T/ha)
		ATOK	PMWSY		(in lakhs)		
1	Karimkandi	1.2 Ha	0	18	1.44	1400	152000
2	Cheruvu	0	0.2 Ha	12	0.48	1072	108000
	Total	1.2 Ha	0.2 Ha	30	1.92	2472	260000

ANNEXURE

3(6) 117

समग्र संस्कृति अनुसूची 1

Sl. No.	Village	Dept Scheme		Project (Watershed Reg. all Leases)	Operational Cost	Standing crop (kg)	Standing crop (kg)
		Job	Project				
1	Kachanavath	1.1 Ha	"	"	1.1	140	14000
	Total	1.1 Ha	"	"	1.1		

ANNEXURE

3(A) 16

Chances list

Annexure 4

Sl.No	Locd	Registered	Not Registered (Not verified)
1	Kodamkulandy	7	133
2	Varappuzha	0	24
3	Cheranelloor	6	16
4	Mulavettan	0	10
	Total	13	183

ANNEXURE

F 3 (h) 17

Sl. No.

Lgd

Sl. No.	Lgd	Registered	Not Registered
1	Kalamakudy	0	2
2	Varappuzha	0	0
3	Cheruvilakkal	5	0
4	Mulanthod	15	3
	Total	20	7

ANNEXURE

A 3 (6) U

Electronics Factory

Annexure 3

Sl.No	Unit	Registered	No. Registered	Amount
1.	Kadambur	560	10	14962500
2	Vasappuram	1071	17	28428750
3	Chinnambur	700	31	6063750
4	Madavur	700	0	5250000
5	Cochin Corporation	100	5	2756250
6	Ezhikkara	117	0	3071250
	Total	2248	58	40532500

ANNEXURE

13(9) 14

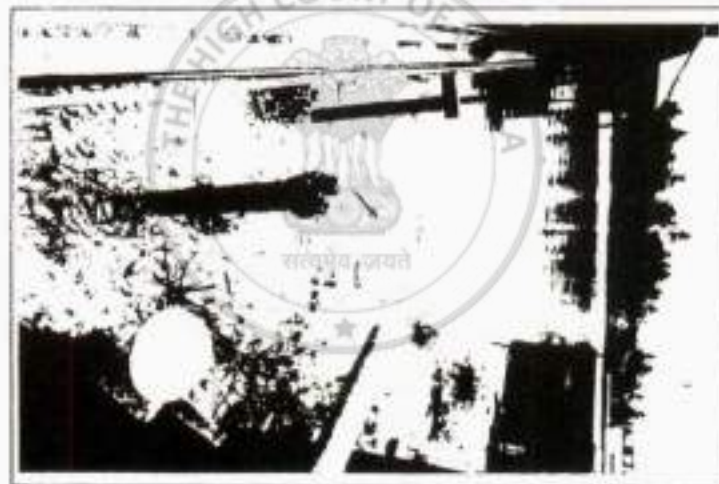
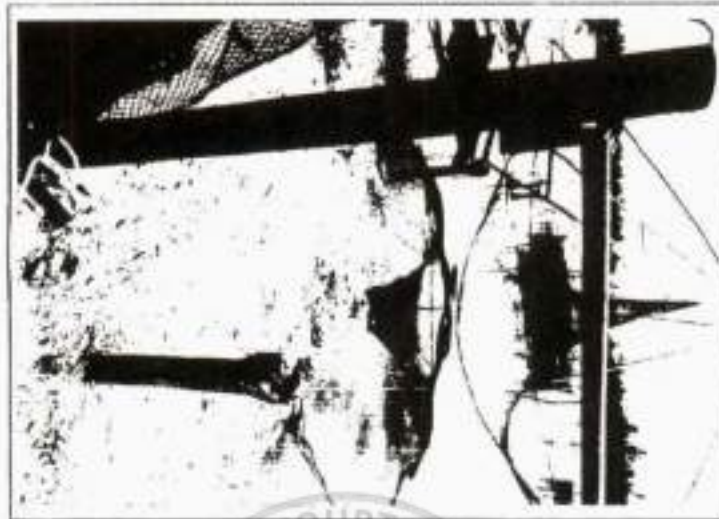
Alleged Workers

Amount in Rs.

Sl.No	Legal	Registered	Not Registered	Amount
1.	Kadambalady	140	-	1760000
2.	Varappuzha	169	-	1521000
3.	Cheramelloor	50	-	450000
4.	Muthuvukud	50	-	450000
5.	Cochin Corporation	20	-	180000
6.	Ezhalkara	89	-	891000
	Total	518	-	4662000

ANNEXURE

3 (a) 90



Photographs

99

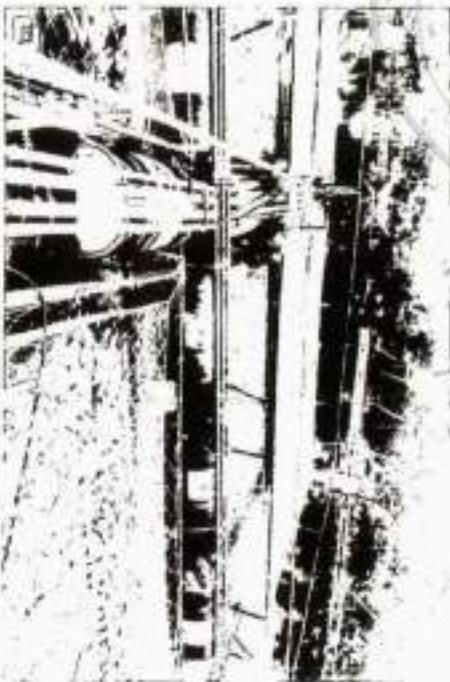
ANNEXURE

3(a)
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ANNEXURE

3(6) 22



101

101

102

ANNEXURE

ANNEXURE 4: ANALYSIS REPORT OF THE RIVER WATER SAMPLES TAKEN ON 20/05/2024 & 21/05/2024

ANALYSIS REPORT OF RIVER WATER OF PERIYAR																									
Sl. No	Source of sample	pH		BOD(mg/L)			COD(mg/L)			Lead(mg/L)(µS/cm)			Hardness(mg/L)			Chloride(mg/L)			Alkalinity(mg/L)			TDS(mg/L)			
		20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	21.05.2024 (9.30PM)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	21.05.2024 (9.30PM)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	21.05.2024 (9.30PM)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	21.05.2024 (9.30PM)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	21.05.2024 (9.30PM)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	
1	River Periyar Polla in bridge	6.87	-	7.1	0.2	-	2.5	16	-	6	301.2	-	70.29	42	-	18	48.12	-	12.33	26	-	20	174.5	-	40.68
2	River Periyar Pathala in Bund	6.75	6.58	7.18	1	0.5	2.4	24	44.8	8	268.6	354.8	61.25	40	39	20	179.4	49.75	9.79	22	26	20	205.4	155.5	75.45
3	River Periyar Pathala in Bund	6.85	6.68	6.91	1.9	0.8	2.5	32	56	18	1132.9	253.8	74.57	1400	500	16	2528.3	244.67	163.12	46	30	16	6552	1469	43.16
4	River Periyar Vennala dam	6.80	6.75	7.21	2.9	0.9	1.9	31	58.4	24	106.09	8120	206.8	1500	1100	28	2691.4	2120.5	163.12	44	42	16	6187	4700	171.8

102

461

6	River Periyar Theer Pary	6.85	7.1	-	0.5	1.7	61.4	28	-	10160	1254	1300	38	2202.1	55.46	46	14	5881	725.8
7	River Periyar Padusha mKada	6.72	7.04	2.9	-	1.8	12	8	92.63	-	71.49	16	19	-	13.86	20	24	53.61	41.38

ANALYSIS REPORT OF RIVER WATER OF PERIYAR

Sl no	Source of sample	Dissolved Oxygen(mg/L)			Nitrate Nitrogen(mg/L)			Nitrite(mg/L)			Nitrates(mg/L)			Phosphate(mg/L)			Sulphate(mg/L)			Free Chlorine(mg/L)			Subphates(mg/L)		
		(Morning)	(9.30PM)	(Evening)	(Morning)	(9.30PM)	(Evening)	(Morning)	(9.30PM)	(Evening)	(Morning)	(9.30PM)	(Evening)	(Morning)	(9.30PM)	(Evening)	(Morning)	(9.30PM)	(Evening)	(Morning)	(9.30PM)	(Evening)	(Morning)	(9.30PM)	(Evening)
1	River Periyar Padusha no Bridge	6.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	River Periyar Padusha state Road	10.3	1	-	-	-	BDL	-	-	-	-	-	0.17	-	-	-	101	-	-	-	BDL	-	BDL	-	-
3	Alipettai	2.7	2.1	-	-	-	BDL	-	-	-	-	-	0.05	-	-	-	9	-	-	-	BDL	-	BDL	-	-
4	River Periyar Padusha mKada	6.8	3.2	-	2.26	-	0.3	-	-	-	-	-	0.68	-	-	-	590	-	-	-	3.55	-	BDL	-	-

ANNEXURE 4 (2)

106

3	River Periyar Panchalam Bund downstream	-	BDL	-	-	0.17	-	-	0.015	-	BDL	-	BDL	-	BDL	-	BDL	-	-
4	River Periyar Panchalam Bund upstream	-	BDL	-	-	0.54	-	-	0.035	-	BDL	-	BDL	-	BDL	-	BDL	-	-
5	River Periyar Panchalam Bund upstream	-	BDL	-	-	0.57	-	-	BDL	-	BDL	-	BDL	-	BDL	-	BDL	-	-
6	River Periyar Panchalam Bund upstream	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

ANNEXURE

4(5)

ANALYSIS REPORT OF RIVER WATER OF PERIYAR																													
Sl no	Source of sample	Cadmium(mg/L)				Copper(mg/L)				Chromium(mg/L)				Manganese(mg/L)				Nickel(mg/L)				Barium(mg/L)				Vanadium(mg/L)			
		20.05.2024 (Morning)	20.05.2024 (Afternoon)	21.05.2024 (Morning)	21.05.2024 (Afternoon)	20.05.2024 (Morning)	20.05.2024 (Afternoon)	21.05.2024 (Morning)	21.05.2024 (Afternoon)	20.05.2024 (Morning)	20.05.2024 (Afternoon)	21.05.2024 (Morning)	21.05.2024 (Afternoon)	20.05.2024 (Morning)	20.05.2024 (Afternoon)	21.05.2024 (Morning)	21.05.2024 (Afternoon)	20.05.2024 (Morning)	20.05.2024 (Afternoon)	21.05.2024 (Morning)	21.05.2024 (Afternoon)	20.05.2024 (Morning)	20.05.2024 (Afternoon)	21.05.2024 (Morning)	21.05.2024 (Afternoon)				
1	River Periyar Panchalam Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
2	River	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			

410

107

108 ANNEXURE 4(2)

ANALYSIS REPORT OF SAMPLES COLLECTED FROM RIVER PERIYAR ON 21.05.2024 (BOAT SAMPLING)														
Source of sampling	Sampling locations	pH	COD (mg/L)	SS (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Hardness (mg/L)	Turbidity (NTU)	Colour Hazen	TDS (mg/L)	Conductivity (µmS/cm)	Sulphide (mg/L)	Oil&Grease (mg/L)
Edamulla MUTTA RBRANCH	Annudha pumping station	6.5	82.08	32.8	93	10	5.35	47	0.9	20	312.552	540	BDL	2.88
	FACT PD	6.7	112.3	31.6	907.8	12	21.87	120	0.4	20	495.279	855.7	BDL	0.64
	Kuzhikando mThodu	6.0	129.6	36.4	24.5	20	21.87	140	0.7	20	616.62	1169	BDL	0.03
	Eloorf cmv	6.8	99.36	50.8	342.5	20	26.73	160	0.8	20	983.12	1702	BDL	11.8
Pattala enFloorf dayar branch	MUTTINA KAM	6.9	108	16.4	81.6	12	9.72	30	1.4	30	252.88	436.9	BDL	3.16
	VETTUK ADAYU	6.9	95.04	2.8	32.6	8	9.72	60	1	30	73.855	127.6	BDL	0.72
	IRE	6.5	108	3.2	24.5	12	2.43	40	1.4	30	86.588	149.6	BDL	1.08
	FACT-UD	6.4	86.4	17.2	40.8	8	7.29	50	1.1	30	76.691	132.5	BDL	1.92
	BINANI ZINC LTD	6.9	108	BDL	24.5	4	2.43	20	1.1	30	65.983	114	BDL	13.96
	SUD	6.9	82.08	BDL	46.3	12	2.43	40	1.2	30	64.883	112.1	BDL	11.36
	CHEMIE CMRL	6.9	90.72	BDL	48.9	20	4.86	70	1	30	115.93	200.1	BDL	2.24
TCC	6.9	86.4	47.6	24.5	8	2.43	30	0.8	30	53.915	93.2	BDL	7.92	

109

ANNEXURE

4 (B)

Source of sample	Sampling location	Ammonia as nitrite (mg/L)	Free Ammonia (mg/L)	Sulphate (mg/L)	Phosphate (mg/L)	Fluoride (mg/L)	Phenolic Compound (mg/L)	Nitrates (mg/L)	Iron (mg/L)	Hexavalent Chromium (mg/L)	Zinc (mg/L)	Lead (mg/L)	Mercury (mg/L)
Edathala - MUTTA RBRAN CH	Aranatha Pumping station	0.25	0.09	13	0.08	0.13	0.02	4.5	0.59	BDL	0.024	BDL	BDL
	FACT PD	0.6	0.19	4	1.4	0.13	0.04	3.7	0.14	BDL	0.032	BDL	BDL
	Kuzhikan dam Thodu	0.4	0.21	128	0.09	0.13	1.23	3.8	0.22	BDL	0.014	BDL	BDL
	Elott Ferry	0.3	0.11	125	0.12	0.15	1.85	3.5	0.66	BDL	0.038	BDL	BDL
	MUTTINA KAM	0.5	0.27	BDL	0.16	0.11	1.7	3.8	0.43	BDL	0.02	BDL	BDL
Pattalam Floor Edayar branch	VEETUKA DAYU	0.1	0.05	BDL	0.12	0.09	2.7	3.9	0.32	BDL	0.226	BDL	BDL
	IRE	0.3	0.08	63	0.1	0.12	2.1	3.7	1.12	BDL	0.013	BDL	BDL
	FACT-UD	0.3	0.08	19	0.1	0.09	2.34	3.9	0.64	BDL	0.021	BDL	BDL
	BINANIZ INC LTD	0.3	0.13	6	0.1	0.09	2.8	3.5	0.84	BDL	0.013	BDL	BDL
	SUDCHE MIE	BDL	BDL	BDL	0.27	0.07	1.27	3.6	1	BDL	0.02	BDL	BDL
	CMRL	0.1	0.11	7	0.27	0.08	1.62	2.3	0.32	BDL	BDL	BDL	BDL
	TCC	0.1	0.03	BDL	0.46	0.1	1.13	2.4	0.76	BDL	BDL	BDL	BDL

110

ANNEXURE 4 (9)

Source of sampling	Sampling locations	Arsenic(mg/L)	Cadmium(mg/L)	Copper(mg/L)	Chromium(mg/L)	Manganese(mg/L)	Nickel(mg/L)
Edamala-Muttar branch	Ancutha Pumping station	BDL	BDL	BDL	BDL	0.04	BDL
	FACTPD	BDL	BDL	BDL	BDL	0.143	BDL
	Kuzhikandom Thodu	BDL	BDL	BDL	BDL	0.04	BDL
	Elooferry	BDL	BDL	BDL	BDL	0.045	BDL
Pathala mElloor Edayar branch	MUTTINAKAM	BDL	BDL	BDL	BDL	0.042	BDL
	VETTUKADAVU	BDL	BDL	BDL	BDL	0.299	BDL
	IRE	BDL	BDL	BDL	BDL	0.032	BDL
	FACT-UD	BDL	BDL	BDL	BDL	0.034	BDL
	BINANIZINC LTD	BDL	BDL	BDL	BDL	0.03	BDL
	SUDCHEMIE	BDL	BDL	BDL	BDL	0.047	BDL
	CMRL	BDL	BDL	BDL	BDL	0.029	BDL
	TCC	BDL	BDL	BDL	BDL	0.033	BDL

110

ANNEXURE 5(c)

Appendix C: List of Businesses generating waste for the European Sustainable LM EMEA										
Sl. No.	Name and Address of the party	Type of waste	Category	Waste Code	Waste Quantity (MT/Year)	Waste Description	Waste Treatment	Waste Disposal Method	Waste Disposal Facility	Waste Disposal Date
1	ABC Ltd., 123 Main Street, New York, NY 10001	General waste	General	200101	10000	General waste, including paper, plastic, metal, and other non-hazardous materials.	Landfill	Landfill	ABC Ltd.	2023-01-01
2	XYZ Corp., 456 Park Avenue, New York, NY 10022	Industrial waste	Industrial	200201	50000	Industrial waste, including metal shavings, oil, and other hazardous materials.	Incineration	Incineration	XYZ Corp.	2023-02-15
3	DEF Inc., 789 Broadway, New York, NY 10003	Construction waste	Construction	200301	20000	Construction waste, including concrete, bricks, and other building materials.	Landfill	Landfill	DEF Inc.	2023-03-10
4	GHI LLC, 101 Wall Street, New York, NY 10038	Food waste	Food	200401	15000	Food waste, including food scraps, bones, and other organic materials.	Composting	Composting	GHI LLC	2023-04-05
5	JKL Co., 202 Madison Avenue, New York, NY 10017	Textile waste	Textile	200501	8000	Textile waste, including fabric scraps, clothing, and other textile materials.	Recycling	Recycling	JKL Co.	2023-05-20
6	MNO Ltd., 303 Main Street, New York, NY 10001	Electronic waste	Electronic	200601	3000	Electronic waste, including computers, monitors, and other electronic devices.	Recycling	Recycling	MNO Ltd.	2023-06-10
7	PQR Inc., 404 Park Avenue, New York, NY 10022	Chemical waste	Chemical	200701	12000	Chemical waste, including solvents, acids, and other hazardous chemicals.	Incineration	Incineration	PQR Inc.	2023-07-01
8	STU Corp., 505 Broadway, New York, NY 10003	Medical waste	Medical	200801	6000	Medical waste, including needles, gloves, and other medical supplies.	Incineration	Incineration	STU Corp.	2023-08-15
9	VWX LLC, 606 Wall Street, New York, NY 10038	Automotive waste	Automotive	200901	4000	Automotive waste, including car parts, tires, and other automotive components.	Recycling	Recycling	VWX LLC	2023-09-05
10	YZA Co., 707 Madison Avenue, New York, NY 10017	Construction waste	Construction	201001	18000	Construction waste, including concrete, bricks, and other building materials.	Landfill	Landfill	YZA Co.	2023-10-20
11	BCD Inc., 808 Main Street, New York, NY 10001	General waste	General	201101	9000	General waste, including paper, plastic, metal, and other non-hazardous materials.	Landfill	Landfill	BCD Inc.	2023-11-10
12	EFG Ltd., 909 Park Avenue, New York, NY 10022	Industrial waste	Industrial	201201	45000	Industrial waste, including metal shavings, oil, and other hazardous materials.	Incineration	Incineration	EFG Ltd.	2023-12-01
13	HIJ Co., 1010 Broadway, New York, NY 10003	Construction waste	Construction	201301	22000	Construction waste, including concrete, bricks, and other building materials.	Landfill	Landfill	HIJ Co.	2024-01-15
14	KLM LLC, 1111 Wall Street, New York, NY 10038	Food waste	Food	201401	16000	Food waste, including food scraps, bones, and other organic materials.	Composting	Composting	KLM LLC	2024-02-05
15	NOP Inc., 1212 Madison Avenue, New York, NY 10017	Textile waste	Textile	201501	8500	Textile waste, including fabric scraps, clothing, and other textile materials.	Recycling	Recycling	NOP Inc.	2024-03-20
16	QRS Co., 1313 Main Street, New York, NY 10001	Electronic waste	Electronic	201601	3500	Electronic waste, including computers, monitors, and other electronic devices.	Recycling	Recycling	QRS Co.	2024-04-10
17	TUV Ltd., 1414 Park Avenue, New York, NY 10022	Chemical waste	Chemical	201701	13000	Chemical waste, including solvents, acids, and other hazardous chemicals.	Incineration	Incineration	TUV Ltd.	2024-05-01
18	WXY Corp., 1515 Broadway, New York, NY 10003	Medical waste	Medical	201801	6500	Medical waste, including needles, gloves, and other medical supplies.	Incineration	Incineration	WXY Corp.	2024-06-15
19	ZAB LLC, 1616 Wall Street, New York, NY 10038	Automotive waste	Automotive	201901	4500	Automotive waste, including car parts, tires, and other automotive components.	Recycling	Recycling	ZAB LLC	2024-07-05
20	ACD Inc., 1717 Madison Avenue, New York, NY 10017	Construction waste	Construction	202001	19000	Construction waste, including concrete, bricks, and other building materials.	Landfill	Landfill	ACD Inc.	2024-08-20

ANNEXURE 5 (2)

[illegible]

The seal of the High Court of Kerala is a circular emblem. It features the text "THE HIGH COURT OF KERALA" around the top inner edge. In the center is the State Emblem of India, which is a four-lion capital of an abacus. Below the emblem is the motto in Sanskrit, "सत्यमेव जयते" (Satyameva Jayate). At the bottom of the seal is a small star.

ANNEXURE 6 (1)

**ANNEXURE 6 - DETAILS OF INSPECTIONS CARRIED OUT IN THE
MONTHS OF APRIL, MAY, JUNE AND JULY, 2024, LETTERS/
NOTICES/ ORDERS/ DIRECTIONS GIVEN AND COMPLIANCE STATUS**

SL NO (Col.1)	NAME OF THE INDUSTRY (Col.2)	DATE OF VISITS	NO OF INSPECT IONS (APRIL TO JULY 2024) (Col.3)	Any non- compliance with effluent standards observed (Y/N) (Col.4)	Any non- compliance with other consent conditions observed (Y/N) (Col.5)	Letter / Notice/ Direction issued based on non- compliance as per Col.4 and Col.5 (Col.6)	Present status and details of Letter / Notice/ Direction issued based on non-compliance (Col.7)
1	M/s. FACT - PETROCHEMICAL UNIT, UDYOGAMA NDAL	25.07.2024, 30.04.2024, 25.05.2024	3	N	N	NA	NA
2	M/s. FACT - FERTILIZER UNIT, UDYOGAMA NDAL	30.04.2024, 22.05.2024, 29.06.2024, 25.07.2024	4	N	Y	Y	Direction issued (under Section 33A of the Water Act and section 31A of the Air Act), compliance

ANNEXURE 6 (2)

അനുബന്ധം 6 (2)

							reported, verified, no action pending
3	M/s TRAVANCOR F COCHIN CHEMICALS LTD.	20.04.2024, 24.05.2024, 18.06.2024, 15.06.2024, 28.06.2024, 30.07.2024	6	Y	Y	Y	Closure intention notice issued (under Section 31A of the Water Act and section 31A of the Air Act). compliance reported; verified; no action pending
4	M/s.TMS LEATHERS	30.04.2024, 23.05.2024, 28.06.2024, 30.07.2024	4	Y	Y	Y	Direction (under section 5 of The FP Act, 1986) of Committee given; compliance yet to be reported; to proceed after compliance timeline is over
5	M/s. INDIAN RARE EARTHS LTD.	20.04.2024, 14.05.2024, 30.07.2024	3	Y	Y	Y	Letter issued with direction to rectify the defects of Effluent treatment Plant; compliance reported; verification ongoing

ANNEXURE 6 (3)

6	M/s.SUD CHEMIE (INDIA) PVT. LTD.	30.04.2024, 24.05.2024, 27.06.2024, 08.06.2024, 11.07.2024	5	N	N	NA	NA
7	M/s. CMRL	20.04.2024, 24.05.2024, 28.06.2024, 30.07.2024	4	N	Y	Y	Direction (under section 5 of The EP Act, 1986 of Committee given; compliance yet to be reported; to proceed after compliance timeline is over
8	M/s. ARJUNA NATURAL EXTRACTS LTD.	20.04.2024, 09.05.2024, 30.07.2024	3	അനുവദിക്കുന്നില്ല	Y	Y	Consent revoke intention notice issued; under Section 31A of the Water Act and section 31A of the Air Act; compliance reported; verified; no action pending.

ANNEXURE 6 (4)

9	M/s. SUNRISE TSR FACTORY, EDAYAR	20.04.2024, 17.05.2024, 26.06.2024, 07.07.2024	4	N	Y	Y	Direction under section 5 of The EP Act, 1986) of Committee given. compliance yet to be reported; to proceed after compliance timeline is over
10	M/s. ACTIVE CHAR PRODUCTS		1	N	N	NA	NA
11	M/s. AMCOSXL PAINTS (INDIA) PVT. LTD.	9.05.2024, 28.06.2024	3	Y	N	Y	Letter issued with direction to rectify the defects of Effluent treatment Plant. compliance reported; verified; no action pending
12	M/s. INDO GERMAN CARBON LTD.	28.06.2024, 17.06.2024, 07.07.2024	2	N	N	NA	NA
13	M/s. KEMO GRAVURES, EDAYAR	30.05.2024, 26.06.2024,	3	N	Y	Y	Closure intention notice issued (under Section 33A of the Water Act and

ANNEXURE 6 (S)

		08.07.2024.					section 31 A of the Air Act): compliance yet to be reported; to proceed after compliance timeline is over
14	M/s. ALPHARUB CRUMB RUBBER	24.05.2024, 04.06.2024, 25.06.2024, 09.07.2024	4	N	Y	Y	Direction (under section 5 of The EP Act, 1986) of Committee given; compliance yet to be reported; to proceed after compliance timeline is over
15	M/s. MALAYA RUB TECH INDUSTRIES	17.05.2024, 23.05.2024, 14.06.2024, 10.07.2024	4	Y	Y	Y	Direction (under section 5 of The EP Act, 1986) of Committee given; compliance yet to be reported; to proceed after compliance timeline is over
16	M/s. DECCAN INDUSTRIES	26.05.2024,06.06.2024,03.07.2024	3	N	Y	Y	Consent Revoke Order issued (under Sections 25, 26 & 27 of the Water Act and Section 21 of the Air Act): compliance

ANNEXURE 6

							reported; verification ongoing
17	M/s. MARKSMEN MARINE PRODUCTS PVT. LTD.	05.04.2024, 09.05.2024, 26.06.2024, 31.07.2024	4	N	N	NA	NA
18	M/s. ORGANO FERTILIZERS	05.04.2024, 09.05.2024, 05.06.2024	1	N	Y	Y	Direction (under section 5 of The EP Act, 1986) of Committee given; compliance yet to be reported; to proceed after compliance timeline is over
19	M/s. SHINE STAR INDUSTRIES	07.07.2024	1	N	N	NA	NA
20	M/s. HIPOWER INDUSTRIES	04.06.2024, 08.07.2024	2	Y	Y	N	Consent Refusal Intention notice issued (under Sections 25, 26 & 27 of the Water Act and Section 31 of the Air Act). Further action initiated

ANNEXURE 6(7)

21	M/s. TRAVANCOR E POLYMERS	17.05.2024, 18.06.2024, 12.07.2024.	3	N	Y	Y	Notice issued, compliance reported; Verified; no action pending
22	M/s. ESSAR INDUSTRIES	12.06.2024, 06.07.2024	2	N	N	NA	NA
23	M/s. RUBBER O MALABAR	04.07.2024, 18.07.2024	2	N	Y	Y	Notice issued; compliance yet to be reported; to proceed after compliance timeline is over
24	M/s. JONAKIN CHEMICALS	17.05.2024	I	Y	N	Y	Letter issued with direction to rectify the defects of Effluent treatment Plant : compliance reported; verified; no action pending
25	M/s. BRIGHT COATS	17.05.2024, 28.06.2024	2	Y	N	Y	Consent Refusal Intention notice issued (under Sections 25, 26 & 27 of the Water Act and Section 21 of the Air Act). verification

ANNEXURE 6 (r)

							ongoing.
26	M/s. COCHIN PETROMINS PVT LTD	18.06.2024, 24.07.2024.	3	N	N	NA	NA
27	M/s. FALCON INFRASTRUCTURE	04.07.2024	1	N	N	NA	NA
28	M/s. PARAKKAL INDUSTRIES	05.04.2024, 31.07.2024	2	Y	N	Y	Letter issued with direction to rectify the defects of Effluent treatment Plant. . compliance reported; verified; no action pending
29	M/s. ALLIANCE MARINE PRODUCTS	16.04.2024	1	Y	Y	Y	Closure Order (under Section 33A of the Water Act and section 31A of the Air Act) issued.
30	M/s. CEEJEE LUBRICANTS	02.05.2024 23.05.2024 26.06.2024, 12.07.2024	4	N	Y	Y	Direction issued (under Section 31 c & Section 33A of the Water Act and section 31A of the Air Act); Nor

ANNEXURE 6 (A)

							Complied, Closure Order issued:
31	M/s.CELLA SPACE	24.05.2024, 04.06.2024	2	Y	N	Y	Letter issued with direction to rectify the defects of Effluent treatment Plant. : compliance reported; verified; no action pending
32	M/s. NEPTUNE	01.06.2024, 01.07.2024,	2	N	N	NA	NA
33	M/s. Ashon Exporters & Industries	23.05.2024, 09.06.2024, 04.07.2024	3	N	Y	Y	Show cause notice issued, compliance reported; verified; no action pending
34	M/s. Fornual Trade Links	16.04.2024	1	Y	N	Y	Letter issued with direction to rectify the defects of Effluent treatment Plant. Compliance reported; verified; no action pending
35	M/s. Excel Petrochemical	02.05.2024,	2	N	N	NA	NA

ANNEXURE 6 (10)

		17.07.2024					
36	M/s. A K Chemicals	25.05.2024. 10.06.2024. 14.06.2024	J	N	Y	Y	Closure intention notice issued Section 33A of the Water Act and section 31A of the Air Act); Compliance reported; verified; no action pending

Abbreviations Used: Y-Yes, N-No, NA- Not Applicable



ANNEXURE (6)

1

BEFORE THE HON'BLE HIGH COURT OF KERALA, ERNAKULAM

W.P.(C) No. 9534 of 2020

K.S.R. Menon	...	Petitioner
State of Kerala and others	Vs.	Respondents

**COUNTER AFFIDAVIT FILED ON BEHALF OF RESPONDENTS 3 AND 4
IN THE ABOVE CASE, AS DIRECTED BY THIS HON'BLE COURT AS
PER ORDER DATED 24-05-2024.**

I, Baburajan P.K., aged 52 years, S/o P. A. Kuttappan (Late), residing at Edapally, Ernakulam, working as Chief Environmental Engineer, Kerala State Pollution Control Board, Regional Office, Ernakulam, as directed by this Hon'ble Court as per order dated 24-05-2024.

1. I am the Chief Environmental Engineer, Kerala State Pollution Control Board, (hereinafter referred to as Board), Regional Office, Ernakulam. I am aware of the facts affirmed by me as revealed from the relevant records. I am filing this Counter Affidavit on behalf of Respondents 3 and 4 in the above Writ Petition, as duly authorized.

2. All the averments and allegations contained in the Writ Petition are hereby denied except those which are specifically admitted herein below.

3. The above Writ Petition is filed inter-alia for a direction to the respondents to take immediate steps to curb the discharge of toxic effluents by the Industries functioning in the river banks as well as from Aluva Market and also for a direction to the respondents to conduct periodical inspections to the Industries functioning at the river bank of Periyar and Aluva Market. The above counter affidavit is filed reserving



BABURAJAN P.K.
Chief Environmental Engineer

ANNEXURE 6(4)

2

the right of this respondent to file a detailed counter affidavit, if necessary.

4. It is respectfully submitted that Eloor-Edayar area in Ernakulam district is the major industrial area in Kerala where industries are located on either sides of River Periyar in its lower stretches. It is submitted that the Board takes all necessary steps to ensure safe disposal of all types of wastes from these industries and to facilitate preservation of the river and ambient air and also to redress the overall environmental issues in that area. An office of the Board (**Environmental Surveillance center**) is functioning in Eloor round the clock for continuous monitoring of the industries in the area. The Board has taken numerous steps as part of keeping surveillance over the industrial area and the river Periyar. The area of monitoring comprises of Eloor Municipality and Kadungaloor Grama Panchayath. The Eloor municipality area and Kadungaloor Grama Panchayath are situated on the two banks of the River Periyar and the smaller Edamula stream is flowing between Eloor municipality and Kalamassery Municipality.

5. The Environmental Surveillance Center has been equipped with 24 hour functioning surveillance vehicle. Patrolling of the Eloor - Edayar industrial belt is a routine job of the office and the vehicle is utilized for the complaint enquiry also. The Board has installed sufficient number of surveillance cameras (CCTV cameras) with online recording facility on either bank of River Periyar at strategic points so that any untoward physical change of river water or any illegal discharge into the river from any industries or any dumping of waste can be monitored. The live and recorded details can be viewed from the control room setup in the Environmental Surveillance Center. This has helped the Board, to carryout surveillance activities in the area more effectively. The CCTV cameras are installed at the following locations:


BABURAJAN P.K.
Chief Environmental Engineer

ANNEXURE 6(a)

3

Side of Neptune Ready-Mix Concrete Industry-upstream of river

Side of Merchem Ltd Edayar- upstream of river

Side of National Industry Edayar-upstream of river

Side of Travancore Cochin Chemicals (two cameras)

Side of FACT (two cameras)

Side of SreeShakthi Paper Mills Ltd.

Pathalam Bund

6. Periyar river water quality is being monitored daily at five stations such as Pathalam Bridge, Pathalam bund (upstream), Pathalam bund (downstream) Vettukadavu (downstream) and Puthalamkadavu. Except the Puthalamkadavu, all the other four stations are in the Eloor (or Edayar) branch of Periyar and Puthalamkadavu Station is in Edamula branch of Periyar. Board had established an online continuous water quality monitoring station in 2012, at Methanam in Periyar which is a location downstream of all major industrial activities. The station has recently developed certain malfunction which is being repaired or replaced. Another online continuous water quality monitoring station is installed by the Board at upstream of Pathalam bund, the data from this station is being transmitted continuously to the control room of our office and the same is also displayed at the display Board at FACT junction.

7. In addition to the online water quality monitoring, the following monitoring programs are regularly carried out by the Board. Monitoring under National Water Quality Monitoring Program (NWMP). Under this Program, seven stations in river Periyar are being monitored, among which 5 stations are located at the industrial stretch. Monthly sampling is done at 12 locations close to the discharge points of Industries.

8. Board has taken measures to upkeep the quality of the environment of Eloor area. All the industries are brought under the consent purview of the Board to ensure that they are operated with required pollution control facilities. The consent was issued with various

ANNEXURE (6)

4

conditions specifying the quality and quantity for the effluent discharge and emissions. Periodical inspections are conducted by Board to these industries as a part of compliance monitoring of the consent conditions. In case of any violations are noticed, actions are taken then and there on the violations noted against such industry. Notices and closure directions are also issued to the industries as and when unauthorized effluent discharge or emissions are noticed. Board also continuously monitors surveillance cameras and in case of any unauthorized discharge found or abnormality, actions were being taken against the violators.

9. It is submitted that, under the compliance monitoring, the compliance of the conditions stipulated in the consent to operate are verified in the field and if any lapses by the units are noticed during enquiry, time bound direction will be given to that particular industrial unit. Industries will be inspected on monthly/ bimonthly based on the category of industries and periodical effluent samples will be collected from the authorized outlets. Since a full-fledged laboratory also is functioning under the district office, follow-up action on the basis of analysis report also can be taken without any delay. In order to reduce the impact of industrial pollution in the river, the Board have given certain general and specific directions to the industries located on the bank of the river. The general directions are as follows:

- i. All industries making direct discharge of treated effluent to Periyar, were directed to provide delay ponds so as to contain the effluent during any upset condition in the plant or in ETP.
- ii. Industries were directed to provide light arrangements on their area near to the riverbank.
- iii. As part of bringing down the consumption of water from Periyar for industrial activity, the industries were directed to reuse the treated effluent to the maximum extent possible.
- iv. All industries discharging effluent into Periyar were directed to raise their effluent discharging outlets much above the water level of the river.

ANNEXURE 4(6)

5

- v. Industries were directed to provide energy meters exclusively for the effluent treatment plants, so as to monitor the working status of the ETP.
- vi. The Industries which were discharging their treated effluent upstream of the bund were directed to shift the location to the downstream of the bund.

As directed by the Board, most of the Industries shifted their outlet location to downstream of the bund. At present only one industry (TMS Leather) is having discharge point at the upstream of the bund.

10. The actions taken during the period (January - April 2024) are summarized below:

No of large scale red category industries	11
Frequency of inspection & sample collection	Monthly sample collected from all the large scale red category industries. From other industries, samples are collected once in two months/ three months. Also samples are collected and analysed in case of any complaints received/ any discharge noticed during surveillance inspection by the Board
No. of show cause notices issued based on exceedance of effluent parameters/ non compliance of consent conditions	18
No. of Consent Refusal intention notices issued	7
No. of consent refusal orders issued	3
No. of consent revoke intention notices issued	4
No. of consent revoke orders issued	1
No of closure intention notices issued	2
No of closure orders issued	2

From January 2021 to May 2024, the office of the Surveillance Centre, Eloor has received 276 public complaints either through telephone or

ANNEXURE

6(6)

6

written. All these complaints have been enquired and necessary actions have been taken then and there.

11. It is submitted that complaints were received from the Eloor ferry area regarding fish death in the Periyar River on 20.05.2024, at around 9 PM. Pollution Control Board's surveillance team inspected the site and observed fish, including varieties like carp, Pearl spot, Tilapia floating in the river struggling to breathe. By dawn, on 21/05/2024, fish were found dead in various locations, including Vettukadav, Eloor Ferry, Cheranalloor, Varapuzha, Kadamakudy, and Kothadu. Samples of water and dead fish were collected from the area where dead fish were found. The dissolved oxygen (DO) level of the water sample found to be lower than that required for the survival of the fish. Analysis report of the river water samples is as follows:

KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE, ELOOR ANALYSIS REPORT OF RIVER WATER			
Station Name	Puthalam Bridge		
Source of Sample	River Periyar		
Parameters	Unit	20.05.2024 (Morning)	21.05.2024 (Morning)
pH		6.87	7.1
BOD	mg/L	0.2	2.5
COB	mg/L	16	6
Conductivity	µS/cm	301.2	70.29
Hardness	mg/L	42	18
Chloride	mg/L	48.12	12.13
Sulphate	mg/L	26	20
TDS	mg/L	174.33	40.48
Dissolved Oxygen	mg/L	0.7	5.3

Station Name	Puthalam Quad Unstated			
Source of Sample	River Periyar			
Parameters	Unit	20.05.2024 (Morning)	20.05.2024 (9.30 Am)	21.05.2024 (Morning)
pH		6.75	6.58	7.18
BOD	mg/L	1	0.5	2.4
COB	mg/L	24	44.8	8
Conductivity	µS/cm	366.6	354.8	51.75

RAMURAJAN BK.
Chief Environmental Engineer

ANNEXURE
6(a)7

Hardness	mg/L	40	39	20
Chloride	mg/L	49.75	179.4	9.79
Alkalinity	mg/L	32	26	20
TDS	mg/L	155.47	205.16	35.45
Dissolved Oxygen	mg/L	1.3	1	4.3
Nitrite	mg/L	-	BDL	-
Nitrate	mg/L	-	1.6	1
Phosphate	mg/L	-	0.17	-
Sulphate	mg/L	-	101	-
Free Chlorine	mg/L	-	BDL	-
Sulphide	mg/L	-	BDL	-
Free Ammonia	mg/L	-	BDL	-
Total Kjeldahl Nitrogen	mg/L	-	2.24	-
Ammoniacal Nitrogen	mg/L	-	BDL	-
Phenolic Compounds	mg/L	-	0.04	-
Sodium	mg/L	-	85.1	-
Potassium	mg/L	-	5.45	-
SAR (Sodium absorption ratio)	mg/L	-	4.5	-
Hexavalent Chromium	mg/L	-	BDL	-
Cyanide	mg/L	-	BDL	-
Fluorides	mg/L	-	0.12	-
Zinc	mg/L	-	0.062	-
Lead	mg/L	-	BDL	-
Mercury	mg/L	-	BDL	-
Arsenic	mg/L	-	BDL	-
Cadmium	mg/L	-	BDL	-
Copper	mg/L	-	0.011	-
Chromium	mg/L	-	0.022	-
Manganese	mg/L	-	0.055	-
Nickel	mg/L	-	BDL	-
Boron	mg/L	-	0.03	-
Vanadium	mg/L	-	BDL	-

Station Name	Pambam Kund Downstream			
Source of Sample	River Pambam			
Parameters	Unit	20.05.2024 (Morning)	20.05.2024 (9.30 PM)	21.05.2024 (Morning)
pH		6.85	6.69	6.91
BOD	mg/L	1.9	0.8	2.5
COD	mg/L	32	56	18
Conductivity	µS/cm	11320	2538	7457
Hardness	mg/L	1400	700	16
Chloride	mg/L	2528.3	244.67	163.12

RAMUJAN R.K.
Chief Executive Engineer

ANNEXURE 6(a) &

8

Alkalinity	mg/L	96	34	16
TDS	mg/L	6552.03	1468.39	43.16
Dissolved Oxygen	mg/l	2.7	2.1	4.6
Nitrite	mg/l	-	BDL	-
Nitrate	mg/L	-	1.3	-
Phosphate	mg/L	-	0.05	-
Sulphate	mg/L	-	9	-
Free Chlorine	mg/l	-	BDL	-
Sulphide	mg/l	-	BDL	-
Free Ammonia	mg/l	-	0.003	-
Total Kjeldahl Nitrogen	mg/L	-	1.26	-
Ammoniacal Nitrogen	mg/L	-	0.56	-
Phenolic Compounds	mg/l	-	0.00	-
Sodium	mg/L	-	26.0	-
Potassium	mg/L	-	5.5	-
Sodium Absorption Ratio	mg/L	-	4.6	-
Hexavalent Chromium	mg/l	-	BDL	-
Cyanide	mg/l	-	BDL	-
Fluorides	mg/l	-	0.17	-
Zinc	mg/l	-	0.015	-
Lead	mg/L	-	BDL	-
Mercury	mg/l	-	BDL	-
Arsenic	mg/l	-	BDL	-
Cadmium	mg/l	-	BDL	-
Copper	mg/l	-	BDL	-
Chromium	mg/l	-	BDL	-
Manganese	mg/l	-	0.042	-
Nickel	mg/L	-	BDL	-
Boron	mg/L	-	0.02	-
Vanadium	mg/L	-	BDL	-

Station Name	Vettukadavu			
Source of Sample	River Parthar			
Parameters	Unit	20.05.2024 (Morning)	20.05.2024 (9.30 PM)	21.05.2024 (Morning)
pH		6.89	5.75	7.21
BOD	mg/L	3.9	0.9	1.9
COD	mg/L	34	50.4	24
Conductivity	µs/cm	10690	8120	2968
Hardness	mg/L	1500	1100	30
Chloride	mg/L	2691.43	2120.5	163.12
Alkalinity	mg/L	94	42	16
TDS	mg/L	6187.37	4699.80	171.79
Dissolved Oxygen	mg/L	6.6	3.2	4

ANNEXURE

6(6)

9

Nitrate Nitrogen	mg/l	-	2.26	-
Fluorides	mg/l	-	0.54	-
Nitrites	mg/l	-	0.2	-
Nitrates	mg/l	-	10	-
Phosphate	mg/l	-	0.66	-
Sulphate	mg/l	-	590	-
Free Chlorine	mg/l	-	2.55	-
Sulphide	mg/l	-	BDL	-
Free Ammonia	mg/l	-	BDL	-
Total Kjeldahl Nitrogen	mg/l	-	2.24	-
Ammoniacal Nitrogen	mg/l	-	BDL	-
Phenolic compounds	mg/l	-	0.62	-
Hexavalent Chromium	mg/l	-	BDL	-
Cyanide	mg/l	-	BDL	-
Sodium	mg/l	-	112	-
Potassium	mg/l	-	2.64	-
SAR (Sodium Adsorption Ratio)	mg/l	-	1.1	-
Zinc	mg/l	-	0.035	-
Lead	mg/l	-	BDL	-
Mercury	mg/l	-	BDL	-
Arsenic	mg/l	-	BDL	-
Cadmium	mg/l	-	0.02	-
Copper	mg/l	-	0.072	-
Chromium	mg/l	-	BDL	-
Manganese	mg/l	-	0.043	-
Nickel	mg/l	-	0.064	-
Boron	mg/l	-	0.509	-
Vanadium	mg/l	-	BDL	-

Station Name	Clear Ferry		
Source of Sample	River Periyar		
Parameters	Unit	20.05.2024 (9.30 PM)	21.05.2024 (Morning)
pH		6.85	7.1
BOD	mg/l	6.5	1.7
COD	mg/l	61.4	78
Conductivity	µS/cm	10160	1254
Hardness	mg/l	1390	28
Chloride	mg/l	2262.07	55.46
Alkalinity	mg/l	46	14
TDS	mg/l	3980.01	742.34
Dissolved Oxygen	mg/L	7.1	5.4

19

ANNEXURE 6(6)₁₀

Nitrate	mg/L	BDL	-
Nitrate	mg/L	16	-
Phosphate	mg/L	1.08	-
Sulphate	mg/L	340	-
Sulphide	mg/L	BDL	-
Free Ammonia	mg/L	BDL	-
Total Kjeldahl Nitrogen	mg/L	1.12	-
Ammoniacal Nitrogen	mg/L	BDL	-
Residual Chlorine	mg/L	7.09	-
Phenolic compounds	mg/L	0.008	-
Fluoride	mg/L	0.52	-
Sodium	mg/l	148.2	-
Potassium	mg/L	8.2	-
SAAR (Sodium Absorption Ratio)	mg/l	6	-
Hexavalent Chromium	mg/L	BDL	-
Cyanide	mg/L	BDL	-
Zinc	mg/L	BDL	-
Lead	mg/L	BDL	-
Mercury	mg/L	BDL	-
Asenic	mg/L	BDL	-
Cadmium	mg/L	BDL	-
Copper	mg/L	BDL	-
Chromium	mg/L	BDL	-
Manganese	mg/L	0.041	-
Nickel	mg/L	BDL	-
Boron	mg/L	0.02	-
Vanadium	mg/L	BDL	-

Station Name	Pythapurakadav		
Source of Sample	River Periyar		
Parameters	Unit	20.05.2024 (Morning)	21.05.2024 (Morning)
pH	-	6.22	7.04
BOD	mg/L	2.9	1.8
COD	mg/L	12	8
Conductivity	µS/cm	92.63	71.49
Hardness	mg/L	16	19
Chloride	mg/L	17.94	13.06
Alkalinity	mg/L	20	24
TDS	mg/L	53.61	41.38
Dissolved Oxygen	mg/L	4.2	3.5

133

RAJURAJAN P.K.
Chief Environmental Engineer

11

ANNEXURE
6(a),ii

The fish sample was sent to the Kerala University of Fisheries and Ocean Studies (KUFOS) for analysis and the results are awaited.

12. The above analysis reports reveal that the pH of the river water is well within the standards prescribed by the CPCB for the surface water quality. Since there is tidal effect upto the Pathalam Bund, fluctuation in the river water quality is common in the parameters like TDS, electrical conductivity, Hardness, Chloride etc. Also presence of certain metals like Zinc, Manganese, Nickel, Boron, Copper etc are detected in negligible concentration in the river water. The Periyar River downstream of the Pathalam Regulator bund is classified as Class E as per the best designated usage, which is Irrigation, Industrial Cooling, Controlled Waste disposal. The upstream of Pathalam Bund is classified as Class C as per the best designated usage, which is drinking water source after conventional treatment and disinfection. The classification table is given as below:-

Designated Best Use	Class of Water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	• Total Coliforms Organism MPN/100ml shall be 50 or less • pH between 6.5 and 8.5 • Dissolved Oxygen 6mg/l or more • Biochemical Oxygen Demand 5 days 20C 2mg/l or less
Outdoor bathing (Organised)	B	• Total Coliforms Organism MPN/100ml shall be 500 or less • pH between 6.5 and 8.5 • Dissolved Oxygen 5mg/l or more • Biochemical Oxygen Demand 5 days 20C 3mg/l or less
Drinking water source	C	• Total Coliforms Organism

12

ANNEXURE 6(A)

after conventional treatment and disinfection		MPN/100ml shall be 5000 or less • pH between 6 to 9 • Dissolved Oxygen 4mg/l or more • Biochemical Oxygen Demand 5 days 20C 3mg/l or less
Propagation of Wild life and Fisheries	b	• pH between 6.5 to 8.5 • Dissolved Oxygen 4mg/l or more • Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	c	• pH between 6.0 to 8.5 • Electrical Conductivity at 25C micro mhos/cm Max.2250 • Sodium absorption Ratio Max. 26 • Boron Max. 2mg/l

13. In this regard it is respectfully submitted that, on 20/05/2024, at 3 PM, three shutters at the Pathalam regulator-cum-bridge were opened by Irrigation Department. It was observed that the water with high organic load and very low Dissolved Oxygen (DO) levels, along with the settled sludge, with biological waste settled at the bottom of the bund causing anaerobic condition upstream of bund, gushed out through the 3 shutters and mixed up with the saline water at the downstream side of the bund. The situation had become vulnerable because of high-tide condition in the downstream side within hours since the shutter has opened. The DO measurements taken on the morning and night on 20.05.2024 are given below.

Dissolved Oxygen Levels:

Location	20.02.2024, 7.30	20.05.2024, 9.30

135


SARFARAZ KHAN
 Chief Environmental Engineer

ANNEXURE 6(A)
13

13

	am(mg/L)	pm(mg/L)
Pathalam Bund Upstream	1.3	1.0
Pathalam Bund Downstream	2.7	2.1
Vettukadavu	6.8	3.2
Eloor Ferry	-	2.1

14. It is submitted that the opening of the Pathalam bund's shutter with discharge of high organic load seems to have lead to a decline in dissolved oxygen (D.O.) levels in the downstream areas. On 20.05.2024, at Vettukadav, the D.O. concentration dropped from 6.8 mg/L in the morning to 3.2 mg/L at night, within hours since the shutters got opened. It is presumed that this change in DO level is the result of the shutter opening. The reports of the Pollution Control Board in the last few years regarding the water quality changes related to the Pathalam regulator were also examined. It has been observed that during the summer months when the bund is closed for a long time, organic wastes reach the river from several residential/commercial areas ultimately deposited at the river bed of the upstream side of the bund. As per preliminary investigations, this fish death is due to the sudden, continuous and strong flow of DO depleted water along with deposited sludge of high organic load that occurred when the bund was opened, which caused the drop of DO in the downstream of the bund. It has been observed that the prolonged closure of the shutters in the Pathalam bund for several days results in the accumulation of organic load which subsequently cause drop-down of dissolved oxygen (DO) levels in the upstream water of the bund. Therefore, in order to maintain the minimum flow in the river, instructions have been given to the Irrigation Department since 2018 to maintain the minimum flow in the river based on the order of the Honorable NGT's O A 408/2015 dated 09.08.2017. In this context it is submitted that instructions were issued to the Irrigation Department on 10-01-2024 to maintain minimum flow in the river. True copy of the letter dated 10-01-2024 issued by the Board is produced

ANNEXURE

14

6(6)19

herewith marked as Exhibit R-3 (a). However, the Irrigation Department has not taken any action to maintain the minimum flow or to intimate the Board or other relevant departments regarding the opening of the shutters.

15. The scientific reason behind the phenomena of DO depletion, which causes fish kill is briefly explained below. The settled biological sludge at the bottom of the river scoured along with the water during the opening of the shutters at the bund. On the course of its movement downwards the sludge causes further depletion of DO of water as per oxygen sag curve and finally causes critical oxygen depletion in water which may lead to fish kill kilometers downstream of the river. In addition, the following factors may affect in fish kill:

- Fluctuation in climate and change in temperature
- Disturbance in the ecosystem of aquatic life
- The fishes used for the cage fish culture are of saline breeds. The abrupt change in the concentration of salinity may also affect the fishes.

16. At present, five industries have been permitted to discharge treated effluent into the Periyar River. During the inspection on 21.05.2024, illegal or untreated waste water discharge from these industries was not noticed. Unauthorized discharges were not detected from the surveillance camera footages also. The details of industries permitted with authorize outlets to river Periyar is given below.

Sl No	Name	Authorized Quantity
1	The Fertilizers and Chemicals Travancore Limited, Udugamandal	12000 m ³ /day (Pothalam bund downstream), 9840 m ³ /day(Edamula Branch of Periyar)
2	IREL (India), Limited	400 m ³ /day
3	Sud-chemie India Pvt Ltd	450 m ³ /day
4	Cochin Minerals and Rutile Limited (CMRL)	659 m ³ /day

SASURAJAN PK
Chief Environmental Engineer

ANNEXURE 4015

15

S	TMS LEATHERS	75 m ³ /day

At present only one industry (TMS Leather) is having discharge point at the upstream of the bund. However, traces of effluent discharge were observed from a chicken waste rendering unit namely "Alliance Marine Products" to the river. As the unit was also observed with odour nuisance problems, a closure order was issued to the company on 22.05.2024. True copy of the order dated 22.05.2024 Issued by the Board to the Unit is produced herewith marked as **Exhibit R-3(b)**.

17. In the context of the fish kill incident on 21.05.2024, Industries in the Eloor-Edayar area having waste water generation were inspected and samples were collected for analysis. All the large scale red category industries were inspected under the above inspection. Notices were issued to three Industries, namely, (1) M/s. Arjuna Natural Extracts (2) M/s. The Fertilisers and Chemicals Travancore Limited (FACT), Udyogamandal Complex (3) AK Chemicals based on the violations observed during the inspections on the subsequent days. True copies of the Orders dated 27.05.2024, 28.05.2024 and 27.05.2024 Issued by the Board to the above three Industries are produced herewith and marked as **Exhibits R-3(c), R-3(d) and R-3(e)** respectively.

18. Findings of previous studies conducted in River Periyar:

A) Study Conducted By the Board in Muttar River (Edamula Stream) in the Year 2016.

Board conducted a detailed study of pollution causing in Muttar River in the year 2016. The study report includes the causes of pollution and also recommendations to improve the water quality. The suggestions of the study are as follows:

1. The discharge of untreated/partially treated sewages from open municipal drains, lodge and residential area into river is a key issue.
2. Centralised treatment facility for municipal wastes in the area is required.


BABURAJAN P.K.
 Chief Environmental Engineer

ANNEXURE 6A (16)

16

Leachate from Kalamassery dumping yard also affecting water quality.

3. Facility for treatment of human waste in residential building to be ensured.
4. Continuous monitoring and surveillance in the Kalamassery Industrial Area required as pollution from industrial area also observed.
5. Decayed vegetations from paddy fields in Muttam yard area and Pallilamkara contributes high level of BOD to the Thumbungathodu during starting of rainy season. Reuse of this land as paddy field again can prevent water stagnation and formation of high BOD oxygen less water.
6. Natural streams in this area to be conserved.

B) Study Conducted By the 'Supervised Committee' constituted by the Hon'ble NGT In O.A No. 560/2018 Dated 21.01.2019:

A detailed study was also conducted by the five members "Supervised Committee" constituted by the Hon'ble NGT as per direction contained in the order passed in O.A No. 560/2018 dt 21/01/2019. The committee consists of Officials from Central Pollution Control Board (CPCB), Kerala State Pollution Control Board (KSPCB), National Environmental Engineering & Research Institute (NEERI), State Environmental Impact Assessment Authority (SEIAA) and representative of District Magistrate. The Committee had conducted detailed studies of river water and sediments on 18.05.2019 and 30.08.2019 in-order to find contaminated stretch if any in River. Water and sediment samples from following stations were collected and analyzed. Sampling locations are given in Table below

SAMPLING LOCATIONS
Uliyannur bridge
Pathalam bridge
U/s of pathalam regulator bridge
Kalamassery bridge
PuthalamKadavu
U/s of manjummei regulator
Muttar bridge

139

SABURAJAN KK
Chief Environmental Engineer

ANNEXURE (C) 17

17

U/s of unthithode second point	-	-	-
U/s of unthithode first point	-	-	-
Confluence point of unthithode	-	-	-
D/s of unthithode first point	-	-	-
D/s of unthithode second point	-	-	-
Eloor ferry- eloor&edamula stream	-	-	-
Eloor ferry- varapuzha bridge	-	-	-
Methanam bridge	-	-	-
Vettukadavu	-	-	-
D/s of IREL discharge point	-	-	-

Findings of the Study:

- i. The committee observed that except iron, no other heavy metals and Organo Chlorine Pesticides (OCPs) /Chlorinated Organic Compounds (COCs) were reported in the water samples taken from the Periyar River in the second monitoring. However, in the first monitoring, the concentration of heavy metals was found slightly higher than the prescribed standards in few locations. The reduction in the concentration of heavy metals in the event of second monitoring is most likely due to the ongoing monsoon.
- ii. It is observed that no significant pollution has occurred in Periyar river with respect to heavy metals and Organo Chlorine Pesticides (OCPs)/Chlorinated Organic Compounds (COCs). However, the committee felt that need of regular monitoring of these locations (as per the observed locations of first monitoring) with respect to heavy metals and identification of sources causing the traces of heavy metal in sediments. The regular monitoring may be carried out by KSPCB to keep close eye on illegal discharges from industries.

C) Study Conducted By Board, CWRDM And Kerala University on 22.04.2020:

Board received various complaints on black discoloration of river

ANNEXURE 6018

18

Periyar on 30.03.2020 and 18.04.2020. It is noted that during the opening of the bund, black colored water containing sediments is flushed off to the downstream. The shutter is operated by irrigation department. Even after Board's repeated directions to maintain minimum flow and operate the regulator regularly, irrigation department failed to comply the Board's direction. As per the provisions of Disaster Management Act, District Collector had issued order entrusting the Chief Environmental Engineer, Regional Office, Ernakulam for a detailed enquiry on the causes of dis-colouration of river Periyar. Board had conducted a detailed enquiry in Industries and also samples collected from Periyar for analysis. A team of experts viz. Dr. Sabu Joseph, Professor, Environmental Studies, Kerala University and Smt Reshmi, Hydrologist, CWRDM, Calicut under the leadership of Chairman, Pollution Control Board had conducted an inspection and independent monitoring of the area on 22.04.2020.

The conclusion drawn from the study was that the dissolved oxygen levels of the bottom water samples showed the presence of organic matter turning it into anoxic in the inspected stretch of Periyar River.

D) KUFOS Report on fish kill incident of 2023:

Even in the last year, on 09.06.2023, when the Puthalam bund was opened for the first time after summer, there was fish death. A report furnished by KUFOS (Kerala University of Fisheries and Ocean Studies) in 2023 based on examination of fish samples from the incident stated that, from the available information on plankton diversity and having analyzed the dead fishes, it could be inferred that the fish kill should have occurred either due to a sudden decrease in the dissolved oxygen (DO) level, or increase in ammonia levels; it is also a possibility that a sudden influx of the water with lower DO level from the upper part due to excessive load of organic matter entering the lower reaches could also have caused an hypoxic conditions.


BABURAJAN R.K.
 Chief Environmental Engineer

141

19. Important Findings of Board based on the above studies:

The study reports reveal that the heavy metals levels in river water and sediments are well within the limit. Variations are noted with respect to general parameters such as Chloride, TDS, Conductivity etc. which is mainly due to saline intrusion caused by tidal effect. High BOD is due to the organic load contributing from different sources of sewage discharges and also due to dumping of septage, solid wastes etc. in River. COD level in river is caused due to discharge from various drains of town ships and also effect of the industrial discharges. The standards for COD specified in treated effluent for river discharge is 250mg/lit. The treated effluent discharge from industries is permitted in class "E" river considering the stream flow and conditions. The stretch of Periyar downstream of Pathalam bund is classified as "E". The treated effluent conforming to the standards prescribed the Board is allowed to discharge the river considering the classification and stream flow as its effect will be nullified with abundant dilution attaining with the riverflow. During summer, at the time of closing of bund, there will be no enough dilution of treated effluent discharged due to stagnation of river. This may cause accumulation of organic load in the upstream. Hence, it is very mandatory to maintain Environment flow in river during lean period especially at the stretch where controlled waste disposal is permitted for industries.

20. It is humbly submitted that the present conclusion is arrived based on the preliminary investigation and laboratory results. A few more analysis reports are awaited. A final conclusion can be made only after obtaining the analysis reports and report of analysis of fish samples from M/s KUFOS. Based on the studies/investigations made as above the Board is of the opinion that the following measures are to be adopted by the stake holders for mitigating the recurring incidents of pollution in river Periyar.


BABURAJAN RK.
Chief Environmental Engineer

20

ANNEXURE 6(a) 70

1. A committee needs to be constituted consisting of Irrigation Department, Kerala State Pollution Control Board and Eloor Municipality as members. A protocol shall be made for operating the Regulatory-cum-bridge at Pathalam. The Irrigation department shall coordinate necessary action in this regard.
2. Expedite the action of irrigation department regarding the Construction of walkway, dyke wall at the Periyar River bank at industrial belt so as to have better surveillance and effective control on Industrial discharges.
3. Industries department shall provide proper drainage system for storm water discharge and maintain internal roads inside the industrial area.
4. Constituting of a joint committee including the heads of various departments associated with River such as Revenue, Fisheries, Irrigation, PCB, LSGD, Industries etc. to specifically address the issue of recurring phenomena of Periyar River pollution and to prepare a comprehensive action plan.

21. The averments contained in the Writ Petition, to the effect that the 4th respondent cannot effectively prevent the discharge of effluents from the Industries functioning in the Periyar river banks is not correct and hence denied. As stated supra, the Board has field a comprehensive mechanism of surveillance of the Industries working at Periyar river banks. All the Industries are got under the consent purview and the Board ensures that these Units are operated by following the consent conditions, scrupulously. Whenever violations are noticed, stringent actions are being taken to curb any kind of pollution from such Industries.

22. For the reasons stated above it is submitted that there is no merit in the contentions taken in the Writ Petition and the Writ Petition is liable to be dismissed with costs to respondents 3 and 4.


BASURAJAN PK
Chief Enforcement Engineer

21

ANNEXURE
6(a) & 1

23. All the facts stated above are true to the best of my knowledge, information and belief. What is stated in the above paragraphs are true to my knowledge and what is stated in those paragraphs are on information and belief derived from records and I believe the same to be true.

Dated this the 31st day of May, 2024.


BABURAJAN P.K.
Chief Environmental Engineer

DEPONENT

Solemnly affirmed and signed before me by the deponent on this the 31st day of May, 2024 in my Office at Ernakulam.

ADVOCATE





ANNEXURE 6(a) 12
Exhibit R-3 (a)

**KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE**

FACT-01, No. 5-4, CHYRUGATTANAD P.O., KULAKKAL, PIN-477302.

Phone: 0496 2545078, E-mail: escc@kspcb.kerala.gov.in

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്റ്റ് ക്വട്ടേഷൻ നമ്പർ 5-4, ചെറുഗട്ടത്തറ പി.ഒ., കുലാക്കൽ താലൂക്ക്.

ഫോൺ-0496 2545078



"മിഷൻ 2025 - മലിനീകരണം"

പിസിബി/ഇഎസ്.സി/സിഎം-33/08

തീയതി: 10.01.2024

ഭവനം

എൻവയോൺമെന്റൽ എഞ്ചിനീയർ,
എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ,
കൂട്ടം

സർവ്വകലാശാല

എക്സിക്യൂട്ടീവ് എഞ്ചിനീയർ,
ഇറിഗേഷൻ ഡിവിഷൻ,
സിവിൽ സപ്ലൈസ് 2nd ഫ്ലോർ,
കാക്കനാട്.

വിഷയം- പെരിയാർ നദിയിലെ ഇടമുട്ട കൈവഴിയിലെ 07.01.2024 ലെ മത്സ്യക്കുരുതി
- സംബന്ധിച്ച്.

സർ,

പെരിയാർ നദിയുടെ കളമശ്ശേരി മണ്ണുരുത്തി വഴി ഒഴുകുന്ന ഇടമുട്ട കൈവഴിയിൽ കഴിഞ്ഞ ദിവസങ്ങളിൽ പൂഴയിലെ ഓക്സിജന്റെ അളവ് കുറയുകയും പൂഴയിലെ വെള്ളത്തിന് നിറവ്യത്യാസം കാണുകയും ചെയ്തിരുന്നു. മണ്ണുരുത്തിൽ 07.01.2024 തീയതിയിൽ മത്സ്യക്കുരുതിയുണ്ടായി. ഇത്തരം സാഹചര്യങ്ങൾ ഒഴിവാക്കുന്നതിന് പാകാളം, മണ്ണുരുത്തി റെഗുലേറ്ററുകൾ വേലിയേറ്റം, വേലിയിറക്കം അനുസരിച്ച് കൃത്യമായി പ്രവർത്തിപ്പിക്കേണ്ടതും സ്ഥിരമായ റിംഗ് നിലവിലെ ചെയ്യുന്നതിനുള്ള നടപടികൾ സ്വീകരിക്കേണ്ടതുമാണ്.

വിശ്വസ്തതയോടെ,

എൻവയോൺമെന്റൽ എഞ്ചിനീയർ
(പ്രിൻ്റഡ് അധികൃതർ)

പകർപ്പ്- ചീഫ് എൻവയോൺമെന്റൽ എഞ്ചിനീയർ,
മേഖല കാർപ്പറലയം,
കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്,
എറണാകുളം.



Exhibit R-3 (b)

KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Ge.No.5-5, EDYOGAMANDAL P.O., ERNAKULAM-682001.

Phone: 40842543678, E-mail: escc@kspcb.kerala.gov.in

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ട് കോർപ്പറേഷൻ നമ്പർ 5-5, ഇടയോഗമണ്ഡലം പി.ഒ.

എറണാകുളം-682 001



ANNEXURE 6(6)2;

PCB/ESC/UTE-11/2019

REGD WITH AD

Date: 22.05.2024

- Ref: 1. Consent No. KSPCB/ESC/CO/10022341-2023 issued on 07.09.2023, valid up to 31.07.2028
2. Inspection conducted by Board officials on 20.05.2024, 21.05.2024 and 22.05.2024
3. This office letter dated 21.05.2024.

CLOSURE ORDER

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of Environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environmental (Protection) Act 1986 in the state,

WHEREAS M/s. Alliance Marine Products, Industrial Development Area, Edayar, Muppakkulam P.O., Ennakulam hereinafter referred to as the unit comes under the purview of the Water (Prevention and Control of Pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981, and Environment (Protection) Act 1986;

WHEREAS you were bound to comply with the conditions of the consent issued by the Board as per Section 21 of Air (Prevention and Control of Pollution) Act 1981 and Section 25 of Water (Prevention and Control of Pollution) Act 1974;

WHEREAS as per reference (1) above, Board had issued consent to operate for operating a chicken waste rendering unit in Industrial Development Area Edayar;

WHEREAS a massive fish kill incident occurred in the river Periyar on 20.05.2024 and 21.05.2024.

WHEREAS inspection was conducted by Board officials in the area, your industry was also inspected on 21.05.2024 and 22.05.2024;

ANNEXURE 6(h) 24

WHEREAS during inspection conducted on 20.05.2024 huge quantity of cooked product was seen dumped inside the processing area, front shutter was damaged, odour control system was not functioning and it causes intense foul smell in the nearby area;

WHEREAS during the inspection on 21.05.2024 traces of discharge of effluent was verified close to your storm water outlet pipe and it proves an unauthorized discharge of raw effluent through the storm water drain into the river periyar;

WHEREAS the discharge of effluent into the streams is a serious offence;

NOW THEREFORE Board intends to close down your unit as per Section 33A of Water (Prevention and Control of Pollution) Act, 1974 and as per the Section 31A of the Air (Prevention and Control of Pollution) Act, 1981. You are directed to close down the unit with immediate effect and report the action taken to this office at the earliest

Dated this the 22nd day of May, 2024



For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD

ENVIRONMENTAL ENGINEER

ENVIRONMENTAL ENGINEER
KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
ERNAKULAM REGIONAL OFFICE - 685 001

To

M/s. Alliance Marine Products,
Industrial Development Area,
Edayar, Muppallilom P.O.,
Ernakulam

Copy to: The Chief Environmental Engineer
KSPCB, Regional Office, Ernakulam

ANNEXURE
6 A(45)

KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Office, 5, GOVINDA MENON Rd., P.O. FINESTRA LANE-682001
Phone: 04712515578, E-mail: escc@kspcb.org.in

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയറോണമെന്റൽ സർവിലൻസ് സെന്റർ

ഫാക്റ്റ് ഓഫീസ് നമ്പർ 5-4, ഗോവിന്ദമേനോൻ റോഡ്, ഫിനേസ്ത്രാ ലെയ്ൻ-682001
ഫോൺ: 04712515578, ഇമെയിൽ: escc@kspcb.org.in



Exhibit R-3(c)

PCB/ESC/CO-08/06

Date: 27.05.2024

- Ref: 1. Consent to Operate KSPCB/ERRO/CO/10029394/2023 dated 08/08/2023
valid up to 30/06/2028
2. Inspection conducted on 25/05/2024

CONSENT REVOKE INTENTION NOTICE

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of Environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environmental (Protection) Act 1986 in the state;

WHEREAS M/s. Arjuna Natural Extracts, Industrial Development Area, Edappur, Binaniguzam come under the purview of the Water (Prevention & Control of Pollution) Act 1974, Air (Prevention & Control of Pollution) Act 1981 and Environmental (Protection) Act 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS The Board has issued the Consent to Operate to the unit as per reference 1.

WHEREAS inspection was conducted by Board officials in your unit on 25.05.2024;

WHEREAS during inspection conducted on 25.05.2024, blackish coloured discharge was seen through the stormwater drain inside the unit;

WHEREAS legal sample was collected and forwarded for analysis;

WHEREAS under section 24 of the Water Act, no person shall knowingly cause or permit to enter any poisonous, toxic or polluting matter whether directly or indirectly, in to any stream or well or river or on land;

ANNEXURE

6(A) 26

NOW THEREFORE the Board intends to revoke the Consent to operate issued vide reference cited I above due to the above reasons. You are hereby directed to show cause if any within 7 days of receipt of this notice as to why the Consent to Operate shall not be revoked.

Dated this the 27th day of May 2024.



For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD

ENVIRONMENTAL ENGINEER

ENVIRONMENTAL ENGINEER,
KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
ELLOOR, UTHIRAKALAMUDA - 686 001

To

M/s. Arjuna Natural Extracts,
Industrial Development Area,
Edayur.

Copy to: The Chief Environmental Engineer,
Kerala State Pollution Control Board,
Regional Office,
Ernakulam.





Exhibit R-3(d)

KERALA STATE POLLUTION CONTROL BOARD ENVIRONMENTAL SURVEILLANCE CENTRE

FACT-Of.No.5-S, UDYOGAMANDAL P.O., ERNAKULAM 683501,
Phone: 0112326479, E-mail: keralaesp@rediffmail.com

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയോൺമെന്റൽ സർവിലയൻസ് കെന്റർ

ഫാക്റ്റ് ഓഫീസ് നമ്പർ 5-എ, ഉദ്യോഗമണ്ഡൽ പി.ഒ.,
എറണാകുളം-683 501



PCB/ESC/CO-31/07

Date : 28.05.2024

Sub:- Direction issued under section 33A of Water (Prevention & Control of Pollution) Act, 1974 in the matter of Pollution caused by M/s. FACT, Udyogamandal complex, Udyogamandal P.O., Eloor, Ernakulam.

Ref: Consent No: PCB/HO/EKM-3/ICO-R/05/2023 dated 26.05.2023 and valid upto 30.06.2028.

DIRECTION

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974.

WHEREAS the Board is the enforcing authority of Environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act in the state:

WHEREAS M/s. The Fertilisers And Chemicals Travancore Limited (FACT), Udyogamandal Complex- Fertilizer Plants, Udyogamandal, Eloor, Kerala 683501(here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts:

WHEREAS during heavy rain fall on 28.05.2024, overflow of storm water was noticed from the sulphur unloading area of your unit in the river bank.

WHEREAS inspection was conducted by Board officials in the said area and found that storm water mixed with sulphur was seen flowing into the river from the unit premises.

WHEREAS you have not taken measures to contain the water from that area which will lead to river pollution;

ANNEXURE 6(6) 28

NOW THEREFORE on the basis of the above violations, in exercise the power conferred under section 33A of Water Act, 1974 it is hereby directed that.

1. The unloading of sulphur from the barges shall be made through any mechanical ways ensuring zero spillages in the factory premises and into the river.
2. The transportation of sulphur into the unit shall be done through trucks to the maximum extent possible and its unloading shall be done inside enclosed storage area.
3. Proposal for compliance of above direction shall be submitted to this office within 15 days of the receipt of this direction failing which Board will be forced to insist a ban on transportation of sulphur through barges into the unit.

Also you are hereby directed to offer your explanation on the above said matter

Dated this the 28th day of May 2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD

SENIOR ENVIRONMENTAL ENGINEER
SENIOR ENVIRONMENTAL ENGINEER
KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
FOR TRANSDIVISIONAL SP-01

To

M/s. Fertilizers and Chemicals Travancore Ltd.,
Udyogamandal Complex (Fertilizer Plant),
Emakulam – 683 501.

- Copy to:-
1. The Chairperson,
Kerala State Pollution Control Board,
Head Office,
Thiruvananthapuram.
 2. The Member Secretary,
Kerala State Pollution Control Board,
Head Office,
Thiruvananthapuram.
 3. The Chief Environmental Engineer,
Kerala State Pollution Control Board,
Regional Office, Emakulam.



Exhibit R-3 (e)

ANNEXURE 6(4) 29
KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE

FACTORY No 3-5, CHITTOORAMANDAP P.O., ERNAKULAM-683501,
 Phone: 04842545678, E-mail: espcc@vsnl.com

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ

ഫാക്ടറി കിരീടപ്പള്ളി തമ്പുരട്ടി-5, ഉത്തരവിലക്കടവൽ പി.ഒ.,
 എറണാകുളം-683 501



PCB/ESC/CO-188/07

Date:27.05.2024

CLOSURE INTENTION NOTICE

- Ref:- 1. Consent No. PCB/ESC/COIC-52/R3/19 issued dated 20.11.2019 and valid upto 30.06.2020
 2. Application for ICO renewal dated 20.11.2023
 3. Inspection conducted by Board officials on 25.05.2023
 4. Show cause notice No. PCB/ESC/CO-188/07 dated 07.11.20223

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (herein after referred as the Board) as per section 4 of the Water (Prevention & Control of pollution) Act, 1974;

WHEREAS the Board is the enforcing authority of Environmental legislations, in the Water (Prevention &Control of Pollution) Act, 1974, the Air (Prevention & Control of pollution) Act, 1981 and the Environmental (Protection) Act, 1986 in the state;

WHEREAS M/s. AK CHEMICALS, V/587 A, Industrial Development Area, Udayar, Dinaipuram P.O., comes under the purview of Water (Prevention &Control of Pollution) Act, 1974, and Air (Prevention & Control of pollution) Act, 1981 and is bound to comply with the statutory requirements and standards laid there under;

WHEREAS Board had issued consent to operate to you with specific conditions for control of Air and Water Pollution, but the validity of the consent was expired on 30.06.2020 and the application for consent to operate renewal was refused as per reference cited (2) above due to violations noticed;

WHEREAS during the inspection conducted on 25.05.2024 as per reference cited (3), sulphur powder spilled in your compound found mixed up with storm water, it discharged through the storm water drain and it ultimately reaches the river Periyar;

WHEREAS you have not given any reply to the letter referred (4) till date and not reported the compliance of instructions given by the Board;

ANNEXURE 6(a) 30

WHEREAS operating the unit without consent of the Board since 2020 and other violations mentioned above are serious offences under the relevant sections of environment legislations;

NOW THEREFORE Board intends to close down your unit as per Section 13A of Water (Prevention & Control of Pollution) Act, 1974, and as per the Section 31A of the Air (Prevention & Control of Pollution) Act, 1981. You may file objection, if any, within 7 days of receipt of this notice as to why the above mentioned directions shall not be issued.

Dated this the 27th day of May 2024



For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD

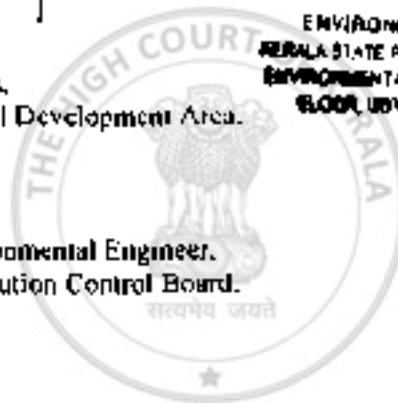
ENVIRONMENTAL ENGINEER

ENVIRONMENTAL ENGINEER
KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
BLOOR, UDYOGRAMANDAL - 683 001

To

M/s. AK Chemicals,
VI/587 A, Industrial Development Area,
Binanipuram P.O.,
Edayar.

Copy to: The Chief Environmental Engineer,
Kerala State Pollution Control Board,
Regional Office,
Ernakulam.



ANNEXURE 6(b),

Annexure 6 (b)**Minutes of the meeting conducted by the Committee constituted by Hon'ble High Court of Kerala in WP(C) Nos. 9534 of 2020, 996 of 2012 and 31236 of 2023****Date : 24.06.2024****Time: 11AM****Venue: Conference Hall, Eloor Municipality, Eloor.**

The meeting commenced at 11:00 am. The members of the Committee constituted as per the G.O.(Rt) No.43/2024/ENVT dated 20.06.2024 based on the Order of the Hon'ble High Court dated 10.06.2024 in W.P.(C) Nos. 9534/2020, 996/2012 & 31236/2023 consisting of the Secretary to Government, Environment Department, Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore, Director, Environment and Climate Change and the Chairperson, Kerala State Pollution Control Board chaired. Sub-collector, Kochi participated in the meeting. The petitioner in the WP(C) No. 31236 of 2023, representatives of petitioners in WP(C) Nos. 9534 of 2020 and 996 of 2012, the Amicus Curiae appointed by Hon'ble High Court of Kerala in WP(C) No. 31236 of 2023, Officers of Kerala State Pollution Control Board and Revenue Department were also present in the afore-said meeting. The list of attendees is attached.

The Secretary, Environment Department, Government of Kerala introduced the purpose of today's meeting and informed that the visit was in compliance with the Hon'ble High Court of Kerala order dated 10.06.2024 in the three WP(C)s. Further, he stated that the Committee constituted by the Hon'ble Court shall meet the petitioners in the writ petitions mentioned above as well as Amicus Curiae. The Hon'ble Court had also ordered the Committee to visit the sites already visited by the Amicus Curiae. Accordingly, this meeting was being held and the Committee members would hear the petitioners' grievances. The Secretary also informed all present that a report will be submitted to the Hon'ble High Court based on the meeting and site visits. Thereafter, The Secretary invited the petitioners to present their grievances.

Sri.Sudheer Panicker, representing Sri.K.S.R. Menon, the petitioner in WP(C) No. 9534 of 2020 stated that the River Periyar is the primary source of drinking water for the whole of Kochi and many other municipalities and other

ANNEXURE 6(b) 1

local bodies including Aluva. But this river is getting polluted by waste water discharges from the industries located along its banks, specifically in the Eloor-Edayar industrial area. Many studies and reports have already been made and submitted to various Courts, Tribunals and other forums. But the implementation of the recommendations in the reports is lacking. He alleged that the official mechanism is oblivious to the gross industrial pollution caused and is not taking any legal actions against polluters of the river Periyar.

Mr. Shabeer, representing Mr. Purushan Eloor, petitioners in the WP(C) No 996 of 2012 stated that the DPR prepared for remediation for Kuzhikandam Thodu is not yet implemented. The claim of official departments including Kerala State Pollution Control Board that the floods of 2018 and 2019 had washed away the pollutants from Kuzhikandam Thodu is wrong. Instead of the remediation as per DPR, the Irrigation Department had recently excavated and dumped a part of the contaminated soils and sediments from the Kuzhikandam Thodu on the bank of the Thodu itself which was a highly irresponsible activity. He added that, in the recent report by KUFOS and other agencies, regarding analysis of the water and other samples collected subsequent to the fish kill incident of May, 2024, there is an indication of chemical contamination. He also informed that the various action plans prepared for Periyar rejuvenation with short-term and long-term measures have not been implemented completely. In the past, in compliance with Hon'ble Court directions, CPCB as well as KSPCB have conducted studies from the upstream of river Periyar to its confluence to the Vembanad estuary. But the suggestions from the study reports have not been implemented till now. He said that the walkway for conducting inspections to be constructed all along the bank of the river, especially along the industrial area, as a part of the action plan, has not been implemented even after all these years by the Irrigation Department. He was of the view that the statutory sampling cannot be performed properly by the Kerala State Pollution Control Board without dyke wall and walkway. He also pointed out that the M/s Cochin Minerals and Rutile Limited (CMRL), an industry in the Eloor-Edayar industrial area, has a large pond of "Cemox Clay" which is a waste material generated in this industry. He alleged that this industrial wastes was earlier considered as hazardous waste but later agencies including Kerala State Pollution Control Board declared it as non-hazardous without any scientific basis. Large dumps of Cemox clay in the industrial premises cause water pollution due to

ANNEXURE 6(b) 3

the leachate coming from the dumped area, including during monsoon season. Also the Kerala State Pollution Control Board is not insisting on construction of a dyke-wall around the dumped premises to prevent flow of leachate from the area into the river. He alleged that Kerala SPCB is not insisting on implementation of the conditions of consent given to the industry. He also raised a complaint against M/s TMS Leathers, a tannery unit located in the Edayar industrial area on its side of Pathalam regulator. Some earlier inspections have shown that there are malpractices done by the TMS leathers in the treatment and discharge of trade effluents. Apart from the above, he also raised the issue of many storm-water outlets in the industries opening near the river but which were not authorized by the Pollution Control Board. He alleged that the waste water as well as storm water with contaminants through these storm water outlets is being discharged into the river Periyar. He specifically pointed out the issue of illegal stormwater discharge from M/s Indian Rare Earths Limited and several complaints have often been reported to the Pollution Control Board. Sri. Shabeer also alleged that in the consent to operate granted to M/s. CMRL by Kerala PCB, stipulates only five parameters for discharge of treated effluent, but earlier twelve parameters for discharge of trade effluents were prescribed. Thereafter, he informed that several storm water drains constructed by District Industries Centre are passing through the industrial area and causing discharge effluent into the river. But there are no delay ponds in any of the storm water drains, so any presence of pollutants in the storm water cannot be detected, monitored and controlled from causing pollution.

Sri.Shibu Manual, the petitioner in WP(C) No. 31236 of 2023, started his arguments by saying that he has been pursuing a number of litigation since the last 30 years for preventing chemical contamination in river Periyar in Eloor-Edayar industrial area. In one of his petitions, the Hon'ble High Court had ordered elaborate testing of samples of the river, industrial effluents and sediments, as per the petitioner's request. Later matters before the Hon'ble High Court were transferred to the Hon'ble NGT. He also added that the industries which came up here to utilize the large water resource of river Periyar has been polluting the river without adhering to the effluent standards prescribed by the Kerala PCB. In both the Eloor branch and Muttar branch, chemical industrial effluent as well as domestic effluents are discharged into the river Periyar. The pollution is not from the industries alone but also from towns located all along the river like Aluva,

ANNEXURE 6(b)4

Kalamassery etc. He requested the Kerala State Pollution Control Board that consent to operate shall not be issued to industries in Eloor-Edayar area and Kalamassery area which do not have adequate effluent treatment plants and the Local Government Bodies have to develop adequate infrastructure to ensure treatment of generated sewage before discharge of treated water into river. He also added that he himself is a victim in the fish kill incident and he has lost fish-wealth of about 1.5 tons in the fish kill. He further said that the claim of PCB that depletion of Dissolved Oxygen alone is the cause of the fish kill is not correct. He is of the view that various action plans have also suggested adoption of zero liquid discharge by the industries in the Eloor-Edayar industrial area and those industries which cannot achieve zero liquid discharge have to be closed permanently. He also pointed out that there are certain establishments which transport chemicals to wash off their tankers in river Periyar thus causing pollution of the river. He further alleged that illegal discharges from M/s Travancore Cochin Chemicals, an industry on the Eloor bank of the river, also causing river pollution.

Mr. Sakhir Hussain, who accompanied the representative of petitioner in OA.No. 996 of 2012, said that many study reports and action plans are being made, but none of them are completely implemented. Even the free drinking water supply provided in Eloor is facing problems due to the inaction of the Pollution Control Board. The Board is not regularly collecting the shares of the industries to pay the bills to the Kerala Water Authority. Mr. Sakhir Hussain also emphasized the need for a dyke wall and inspection road on either bank of the Periyar throughout the industrial area for better control of the industries.

Adv. Ananthakrishnan A Kartha, the Amicus Curiae, informed the Committee that he had elaborated his findings in the report which he had submitted before the Hon'ble Court. He listed the various sites which Amicus Curiae had visited earlier along with the Central and Kerala State PCB representatives.

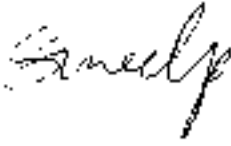
The Committee after hearing the petitioners and the Amicus Curiae informed that the committee would undertake the site visits and the concerned parties were requested to accompany the committee.

The meeting concluded at 1.00 pm

ANNEXURE 6(b) 5

Name and DesignationSignature

1. Dr. Rathan U.Kelkar IAS
Secretary to Government, Environment Department,
Government of Kerala.
Sd/-
(Approved by email)
2. Sri. J. Chandra Babu,
Regional Director, Regional Directorate
Central Pollution Control Board,
Bengaluru, Karnataka.

3. Sri. Suneel Pamidi IFS,
Director, Environment & Climate Change

4. Smt. S. Sreekala,
Chairperson,
Kerala State Pollution Control Board
Thiruvananthapuram, Kerala.




ANNEXURE 6(b)

**Attendance list of the hearing by the committee constituted as per the
Hon'ble High Court : dated 10/06/2024 in W.P.(C) Nos.9534/2020,
996/2012 and 31236/2023**

Date : 24.06.2024

Place and Time: Elloor Municipality Conference hall,11am

Sl. no	Name and designation
1	Dr.Rathan.U.Kelkhar IAS Secretary , Directorate of Environment and climate change, Government of Kerala
2	Smt.K.Meera IAS Fort Kochi Sub collector
3	Sri.Suneel Pamini IFS Director, Directorate of Environment and climate change
4	Sri.J.Chandra Babu Regional Director CPCB
5	Smt.S.Sreekala, Chairperson, KSPCB.
6	Adv.Ananthakrishnan.A.Kartha Amicus Curiae
7	Sri.Shebeen O.V. Periyar Malineekarana Virudha Samithi.
8	Sri.Sudheer Panicker C/o Sri.KSA Menon
9	Sri.Shibu Manual
10	Sri.Abbas V.C District Collector , Ernakulam
11	Sri.Sakeer Husam M.M Periyar Malineekarana Virudha samidhi, Ernakulam
12	Smt.Geetha .P Chief Environmental Scientist, KSPCB.

ANNEXURE (b) 7

13	Dr. Isamen Environmental Scientist, KSPCB
14	Sri. Baburajan P.K Chief Environmental Engineer KSPCB, RO, Ernakulam
15	Smt. Bindhu Radhakrishnan, Chief Environmental Engineer, KSPCB, HO
16	Smt. Sreelakshmy, EE, KSPCB, DO-1 Ernakulam
17	Sri. Krishnan M N Senior Environment Engineer, KSPCB TVM
18	Sri. Sajeesh Joy, EE, Legal Cell, RO, KSPCB Ernakulam
19	Smt. Pravinha P.K AEE, KSPCB, HO, Thiruvananthapuram
20	Sri. Shiju M.A, SEE, KSPCB ESC, Eloor
21	Smt. Ramaena V V AEE, KSPCB ESC, Eloor
22	Sri. Aith Babu C.R AE, ESC, Eloor
23	Sri. Sayooj K Ullas GIS-Specialist, KSPCB, HO Thiruvananthapuram.
24	Smt. Raji Lakshmanan Selection Grade C.A KSPCB-RO, Ernakulam.
25	Sri. Arjun Chandran K AE, ESC, Eloor

ANNEXURE 6(c)**Annexure 6(c)****Minutes of the meeting chaired by Environment Secretary held on 25.06.2024 with Committee members and stakeholder departments at the chamber of the District collector, Ernakulam**

Meeting commenced at 11 am with the Environment Secretary presiding. The members of the committee constituted as per the G.O.(Rt) No 43/2024/CNYT dated 20.06.2024 based on the Order of the Hon'ble High Court dated 10.06.2024 in W.P.(C) Nos. 9534/2020, 996/2012 & 31236/2023 consisting of the Secretary to Government, Environment Department; Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore, Director, Environment and Climate Change and the Chairman, Kerala State Pollution Control Board, District Collector, Ernakulam and representatives of stakeholder departments were present in the meeting. Attendance list is attached.

The Environment Secretary explained that the agenda of the meeting is to evaluate the current status of implementation of action plan projects for rejuvenation of river Periyar. Secretary urged the need for coordination between various departments in the implementation of committed short term and long term measures in the action plan. Further, added that, the Secretaries of Municipalities, Grama Panchayats may also need to evaluate its implementation and hurdles encountered should be reported.

The Secretary explained that Hon'ble High Court will closely monitor the progress and any deviations would be viewed seriously, and asked to update the current status and timeline of implementation of action points and requested the Chairperson, KSPCB to readout the action plan items. The Chairperson gave a brief introduction about the action plan submitted to NGT for restoration of Periyar in OA 673/2018 regarding polluted river stretches (Stretch of Periyar : Alwaye-Elloor to Kalamassery in Priority-V) and OA 395/2013. The detailed discussion based on action plan items was carried out as follows.

ANNEXURE 6(0)2.

No.	Activity	Timeline as per action plan	Status reported in meeting	Implementing Agency
1	Augmentation and Revamping of existing STP at near Adwantha Ashramam and to increase the capacity of STP so as to treat more sewage generated in the municipality.	Dec 2019	Chairperson, KSPCB, enquired about the current status on the work. The Secretary, Aluva Municipality reported that civil works are under progress and retendering for mechanical works being done. The Environmental Secretary advised the matter to be taken up at HOD level, expressing displeasure that the project is held up from 2019.	LSGD-Aluva Municipality
2	Augmentation and Revamping of existing STP at Aluva Market and to increase the capacity of STP so as to treat more sewage generated in the municipality.	2021	Chairperson, KSPCB enquired about the status of implementation action point. Secretary, Aluva Municipality explained that new projects are coming in the same area and it's been discussed whether to include this project with upcoming ones. Environmental secretary instructed to report exact timeline of the project in the next review meeting and requested District collector to conduct review meetings and to monitor the progress.	LSGD-Aluva Municipality. DC, Ernakulam
3	Discharge of sewage from township to the River through drain near Periyar Hotel shall be stopped.	2010	Secretary, Aluva Municipality reported that outlets are closed and fine imposed on the violators. She added that even though such outlets are closed, incidents are reported on the disposal through these outlets since no treatment facilities are available in small units.	Aluva Municipality.

ANNEXURE 6003 ANNEXURE

4	Identification of the establishments/commercial complexes/flats/houses/hut etc who is discharging the sewage to the public drain and to collect line based on polluter pay principle	2020	Secretary, Aluva Municipality reported that inspections are conducted and fines are imposed to the outlets coming from canals and Periyar River.	Aluva Municipality.
5	Installation of modern abattoirs	March 2021	Secretary, Aluva Municipality reported that it is to be set up near the market premises along with a new sanctioned project of Rs. 50 Crores.	Aluva Municipality
6	Procurement of sewer cleaning machines and equipment maintenance	March 2020	Secretary, Aluva Municipality reported that drainage cleaning activities are done regularly. JCBs are also used for carrying out the waste. Sewer machines are not purchased.	Aluva Municipality
7	Installation of cameras at the waste dumping spots	2020	Secretary, Aluva Municipality reported that for monitoring the dump sites CCTV cameras have been installed.	Aluva Municipality
8	Construction of retaining wall with HDPE liner at Kalamassery dumping yard in order to prevent the leachate discharge from the yard to Thoombungal Theedu	Sept 2019	Secretary, Kalamassery Municipality reported that Bidding is at tendering stage. KSWMP needs 6 months for completion and applied for consent of PCB. The EE,DCI, Ernakulam reported that Site inspection is complete and details requested for are to be submitted for further processing of consent application.	Kalamassery Municipality
9	Installation of plastic shredding unit	June 2019	Proposed Land is where biominig is being done	Kalamassery Municipality

ANNEXURE 6(4)

10	Constitution of squads for night surveillance for finding the unauthorized dumping of sewage in NAD wetlands Kalamassery	2020	Secretary, Kalamassery reported the night squad is functioning properly with regular inspections and the squad includes Health Inspector and Police officials. Fines imposed and collected from violators by the squad.	Kalamassery Municipality
11	Installation of common STP for Kalamassery Municipality and ETP at Municipal Market	December 2019	Secretary, Kalamassery Municipality reported that a comprehensive proposal for renovating the market is submitted and awaiting allocation of funds. EE,DCI,Ernakulam pointed out that there is direct discharge from Kalamassery market and Township. Secretary, Kalamassery municipality replied that there are some outlets into Mular and action is being taken.	Kalamassery Municipality
12	Installation of modern abattoirs including poultry and meat rendering plants	2021	It is reported the project is held up due to land issues	Kalamassery Municipality, Industries Department (for land allotment)
13	Identification of the establishments/commercial complexes/flats/houses/shops etc who is discharging the sewage in the public drain	2020	It is reported that 6 outlets are closed and STP is functional	Kalamassery Municipality
14	Installation of cameras at the waste dumping spots	2020	It is reported that the project is ongoing. It is also informed that it is linked to Police control rooms.	Kalamassery Municipality

ANNEXURE 6(क) 5-

15	Identification of sources of sewage discharged to drain near Pathalam bridge and action to stop the discharge which reach river Periyar from hotels, labor camps etc. In case the quantity of sewage generated is assessed to be more STP need to be installed.	2020	DC reported that land of FACT is available for FSTP, Eloor and the Ministry of Fertilizers is to accept the proposal. Possibility of sharing the facility for Kalamassery also to be explored.	Eloor Municipality, Suchitwa mission KSPCB (for monitoring)
16	Installation of cameras at the waste dumping spots	2020	It is reported that 84 cameras are installed.	Eloor Municipality
17	Inventory of sources of pollution through a rapid study/Study for identification of pollution sources at Edupatty thodu	3 months	It is reported that discharge points are closed and activity completed. Chairperson KSPCB requested to provide details for PCB to initiate verification of same.	Kochi Municipal Corporation
18	Issuing notice to the defaulters	4 months	It is reported that the activity is completed.	Kochi Municipal Corporation
19	Identification of natural drains/thodu reaching river Periyar and cleaning of weeds, grasses etc.	2 years	Chairperson pointed out the issue of water hyacinth growth in some portions of the river. EE, Irrigation department replied that action will be taken on the issue. Regional Director, CPCB enquired about the number of stormwater effluent discharge drains and domestic drains to the river Periyar. Irrigation reported that such a study is not done and LSGI are custodian of small drains. EE agrees to conduct a detailed study and to submit report.	Irrigation department
20	Clearing of weeds, grasses at the river bank in order to ensure the smooth flow of water	3 years	It is reported that work has already been completed near Pathalam and currently normal flow is maintained.	Irrigation department

ANNEXURE (C) 6

2)	Maintaining Minimum flow in river during lean period and periodical operation of Regulators at River in-order to maintain minimum flow.	3 years	Chairperson, KSPCB pointed out that since the river is perennial, e-flow should be maintained and industrial intake also to be regulated, if necessary. EE, Irrigation explained that there are 3 KWA pumping stations and it is essential to maintain optimum head for intake of the water level in the bund. Also added that drinking water supply is the top priority. Regional Director, CPCB, Bengaluru enquired Irrigation Department with regard to the contingency plan in the event of fish kill due to any effluent discharges in the river Peniyar. Irrigation Department representative informed that there is no such Disaster Management Plan. Secretary Environment department enquired whether there is any SOP for regulator operation. The EE replied that no such SOP is currently available and a draft protocol for opening of the regulator has been prepared. Secretary, Environment department asked to share the SOP to all stakeholder departments. Regional Director, CPCB opined that alerts should be in public media on regulator opening. District Collector, Emakulam suggested to provide prior information of opening of regulators to local bodies so that cage fish farmers can act accordingly. The Environment Secretary urged the need to have clear clarity on protocol and suggested the matter to be taken up at WRD Secretary level.	Irrigation department

ANNEXURE 6(2) 7

22	Construction of internal roads and proper drainage in Edayar industrial estate		It was reported that drainage work is progressing	Industries department
23	Installation of common discharge pipe line at downstream of Parthasar Regulator Bridge	3 years	It was reported that they have suggested constructing a walkway parallel to the surveillance service road AEE. ESC,PCB suggested to consider the activity with top priority so that PCB can have access to the river banks and surveillance can be conducted.	Industries department, Irrigation department
24	Monitoring of quality of water at various intake point	2020	It is reported by KWA official that it is being done.	Kerala Water Authority
25	Installation of cameras at the waste dumping spots	2020	At Onjithodu 8 cameras were already installed and 2 nos near MCE at Padinjare Kadungallur. 33 cameras being installed and work orders have already been issued and will be completed within 3 months	Kadungallur Panchayath
26	Identification of the establishments/commercial complexes/flats/houses/hotels etc who are discharging the sewage to the public drain.	2020	The Junior Superintendent, Choomikkara Panchayath informed that no direct discharge from industry or others in the area	Choomikkara Panchayath
27	Installation of cameras at the waste dumping spots (Choomikkara Panchayath)	2020	13 cameras installed.	Choomikkara Panchayath

ANNEXURE 6(C) 8

LONG TERM MEASURES

No.	Activity	Timeline as per action plan	Status reported in meeting	ACTION
1	Construction of walkway, ring roads etc. at the Periyar River bank of industrial belt	4 years	Chairperson, KSPCB pointed out the importance of having a walkway on the downstream side also. The Secretary Envt Dept informed that the same is also to be discussed in the next CS meeting scheduled on 02.06.2024.	Irrigation department
2	Fencing of the river banks along the stretches of waste disposal (Edamula stretch)	1-2 years	Reported that 85% work is completed	Cochin Municipal Corporation
3	Beautification of the river stretches (Edamula stretch)	1-2 years	Work is in progress.	Cochin Municipal Corporation

Further discussions

Perumbavoor and Kothamangalam municipalities have reported that no CSTP or FSTP are installed and they were requested to submit details of solid and liquid waste management facilities provided and proposed. Fisheries Dept. reported that recommendation was given to have a committee including DC to monitor fish farming in cage units, pond units. RD, CPCB enquired about the loss incurred by the last massive fish kill incident. Fisheries dept. representative replied that direct loss of about 6 crores in aquaculture, indirect loss of about 7.55 crores (Total 13.55 crores) estimated approximately.

KUFOS Registrar said that a comprehensive plan is needed for rejuvenation of river Periyar. The recommendations have been forwarded, which would approximately take 3 years for implementation. He emphasized the need to have a real time water quality monitoring system. He added that KUFOS has a plan for black soldier fly plant, which can take care of organic waste. RD, CPCB enquired about the reason identified for the fish kill based on the studies of KUFOS. He replied that it could be due to anoxia and presence of ammonia and Hydrogen sulfide. He added that the presence of pesticides detected in river water. RD, CPCB stated that ammonia and hydrogen sulfide can evolve due to the degradation of organic waste accumulated at the upstream of the bend. The Chairperson asked about the test result of fish samples handed over by the Board and he agreed

ANNEXURE 6(C) g

to submit the results soon. Agriculture Department was instructed to submit the details of action taken for controlling the excessive use of pesticides for farming as per the action plan submitted to Hon'ble NGT.

Chairperson KSPCB informed that regular inspections are being carried out by the Board in the industries and other establishments which are under the consent purview of the Board and actions are also taken in case of violations.

After reviewing the status of implementation of action plans in case of river Periyar, Committee is of the view that the implementation is not upto the expectations and there is a need to speed up implementation of plans in a time bound manner.

Decisions taken in the meeting

1. The timeline for implementation of action points needs to be reported by stakeholder departments/agencies regularly
2. Local Govt. Departments have to take action for development of requisite infrastructure for sewage and fecal sludge management all along the river Periyar
3. The protocols/SOP for operation of band shutters needs to be shared with all stakeholders. The public media alerts and information to local authorities should be provided on opening of shutters of regulators in Periyar river.
4. The projects that are held up need to be taken up and discussed at HOD levels in LSGD, Water resources and Irrigation Dept.
5. All the stakeholder departments are requested to give top priority for implementation of the action plan as there is much delay already in implementation. Many assurances were made but no progress happened in the field. Legacy waste is a big issue. District collector, Ernakulam is to review the project implementation regularly

1. Dr.Rathan U.Kelkar IAS
Secretary to Government, Environment Department,
Government of Kerala

Sd/-

(Approved by mail)

2. Er J Chandra Babu,
Regional Director, Regional Directorate
Central Pollution Control Board,
Bengaluru, Karnataka.

3. Sri. Sumedh Pamidi IFS,
Director, Environment & Climate Change.

4. Ex. S Sreekala,
Chairperson,
Kerala State Pollution Control Board
Thiruvananthapuram, Kerala.

ANNEXURE 7(a)**Kuzhikandam Thodu Water Sample (General)**

Date of sampling-24.06.2024,25.06.2024,26.06.2024

Sl. No	Source of sample	DOS (mg/L)	TDS (mg/L)	CHLORIDE (mg/L)	CYANIDE (mg/L)	FLUORIDE (mg/L)	NITRATE (NO ₃) (mg/L)	PHOSPHORUS (PO ₄) (mg/L)	SULPHATE (SO ₄) (mg/L)	CALCIUM (mg/L)	MAGNESIUM (mg/L)	SODIUM (mg/L)	POTASSIUM (mg/L)	IRON (mg/L)	COBALT (mg/L)	SULPHATE (mg/L)
1	Kuzhikandam rethodu (Near HIL discharge)	622	29	65.5	0.07	0.93	6.1	3.03	172	12.02	38.88	69.09	BODL	4.64	12	BODL
2	Panachikulodu	353	11	381.9	0.04	0.2	3.4	0.15	23.5	11.22	149.97	178.15	BODL	3.04	16	BODL
3	Kuzhikandam Thodu 50m before from confluence point	578	23	73.5	0.05	0.81	11.8	0.04	112	24.01	21.36	65.92	9.72	3.23	12	
4	Panachikulodu 50m before from confluence point	642	17	190.5	0.05	0.34	5.4	0.18	25.3	25.65	7.70	124.85	6.76	2.55	12	14
5	Uthulakodu 50m from confluence point	716	17	243.2	0.04	0.36	3.3	0.17	52.5	20.04	140.09	108.8	6.68	3.17	12	14
6	Uthulakodu 50m from Panayam river	531	18	134	0.04	0.34	7.2	0.12	29	16.83	10.21	88.65	5.77	1.34	12	BODL

Kuzhikandam Thodu Water Sample (Heavy metals)

Date of sampling: 30.06.2024, 25.06.2024, 26.06.2024

SL. No	Source of sample	ARSENIC (mg/L)	CADMIUM (mg/L)	COPPER (mg/L)	LEAD (mg/L)	MANGANESE (mg/L)	MERCURY (mg/L)	ZINC (mg/L)	TOTAL CHROMIUM (mg/L)	HEXA CHROMIUM (mg/L)
1	Kuzhikandam Thodu 50m behind from confluence point	BDL	BDL	BDL	BDL	0.45	BDL	0.1	BDL	BDL
2	Parakkithodu 50m behind from confluence point	BDL	BDL	BDL	BDL	0.17	BDL	0.05	BDL	BDL
3	Unnikithodu 50m from confluence point	BDL	BDL	BDL	BDL	0.14	BDL	0.03	BDL	BDL
4	Unnikithodu 50m from Periyar river	BDL	BDL	BDL	BDL	0.05	BDL	0.03	BDL	BDL
5	Kuzhikandam Thodu (NEAR JAIL Discharge)	BDL	BDL	BDL	BDL	0.73	BDL	0.21	BDL	BDL
6	Parakkithodu	BDL	BDL	BDL	BDL	0.18	BDL	0.03	BDL	BDL

ANNEXURE 3(d) 2

Kuzhikandam Thodu Water Sample (pesticides)

Date of sampling: 24.06.2024, 25.06.2024, 26.06.2024

SL. No.	Source of sample	o,p'-DDT (mg/L)	p,p'-DDT (mg/L)	o,p'-DDE (mg/L)	p,p'-DDE (mg/L)	o,p'-DDD (mg/L)	p,p'-DDD (mg/L)	alpha-BHC (mg/L)	beta-BHC (mg/L)	gamma-BHC (mg/L)	Endosulfan-alpha (mg/L)	Endosulfan-beta (mg/L)	Endosulfan-sulphate (mg/L)	Sum of DDDs DDE/ DDT (mg/L)	1,2 DCA (mg/L)	1,2 TCE (mg/L)	1,1,2 TCA (mg/L)	1,1,2 TeC A (mg/L)
1	Kuzhikandam Thodu (Near HST discharge)	0.0074	0.0061	BDL	BDL	0.0004	0.0006	0.0071	0.0047	0.0213	0.0064	0.0045	0.204	0.0152	0.032	0.012	0.014	0.043
2	Parachuthodu	0.0004	0.0002	BDL	BDL	0.0002	0.0002	0.0006	BDL	0.000	0.0017	BDL	0.0005	0.0013	BDL	BDL	BDL	BDL
3	Kuzhikandam Thodu 50m behind from confluence point	0.0005	0.0009	BDL	BDL	0.0002	0.0009	0.0044	0.0005	0.0017	0.0144	0.004	0.0176	0.0073	BDL	BDL	BDL	BDL
4	Parachuthodu 50m behind from confluence point	0.0004	0.0003	BDL	BDL	0.0004	0.0004	BDL	BDL	BDL	0.0007	BDL	0.0004	0.0045	BDL	BDL	BDL	BDL
5	Uthathodu 50m from confluence point	0.0042	0.0003	BDL	BDL	0.0006	0.0003	0.0006	0.0003	0.0004	0.0035	BDL	0.0003	0.00021	BDL	BDL	BDL	BDL
6	Uthathodu 50m from Periyar river	0.0004	BDL	BDL	BDL	BDL	BDL	0.0002	0.0004	0.0004	0.0070	0.0003	0.0022	0.0004	BDL	BDL	BDL	BDL

ANNEXURE 1: Kuzhikandam Thodu Water Sample (pesticides)

Kuzhikandam Thodu Sediment Sample (general)

Date of sampling: 24.06.2024, 25.06.2024, 26.06.2024

Sl no	Source of sample	Chloride (mg/Kg)	Sulphate (mg/Kg)	Ammonical Nitrogen (mg/Kg)	pH	Cyanide (mg/Kg)	Nitrite (mg/Kg)	Fluoride (mg/Kg)
1	Kuzhikandam Thodu (Near HLL discharge)	1070.66	478.38	84.6	6.39	0.68	BDL	36.67
2	Parasethi Thodu	7500	4717	198.2	7	3.3	4.727	19.386
3	Kuzhikandam Thodu 50m behind from confluence point	1281.97	378.37	71.7	7.2	0.17	BDL	13.84
4	Parasethi Thodu 50m behind from confluence point	600.888	815.48	85.6	7.6	0.44	BDL	12.87
5	Unthirithodu 50m from confluence point	1631.7	1190.7	210	7.13	1.32	BDL	93.58
6	Unthirithodu 50m from Periyar river	557.96	472.32	113.1	4.13	0.40	4.6	15.09

ANNEXURE
7 (a) 7
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Kuzhikandam Thodu Sediment Sample (Heavy metals)**Date of sampling-24.06.2024,25.06.2024,26.06.2024**

Sl		Mercury (mg/Kg)	Copper (mg/Kg)	Zinc (mg/Kg)	Arsenic (mg/Kg)	Cadmium (mg/Kg)	Lead (mg/Kg)	Iron (mg/Kg)	Manganese (mg/Kg)	Revised Chromium (mg/Kg)	Total Chromium (mg/Kg)
No	Source of sample										
1	Kuzhikandam Thodu (Near HIL discharge)	BDL	48.64	191.23	BDL	BDL	76.66	23914	74.67	BDL	47.76
2	Pamachithodu	BDL	35.97	233.3	BDL	BDL	28.31	47819	103.85	BDL	66.3
3	Kuzhikandam Thodu 50m behind from confluence point	BDL	14.48	123.78	BDL	BDL	20.02	19579	38.46	BDL	33.39
4	Pamachithodu 50m behind from confluence point	BDL	7.34	47.16	BDL	BDL	10.68	18144	35.6	BDL	32.44
5	Unchithodu 50m from confluence point	BDL	162.83	793	BDL	BDL	165	53343	172.5	BDL	261.5
6	Unchithodu 50m from Periyar river	BDL	15.39	133.92	BDL	BDL	12.82	10997	25.52	BDL	73.9

ANNEXURE

7/6/24

Kozhikodam Thodu Sediment Sample (Pesticides)

Date of sampling: 24.06.2024, 25.06.2024, 26.06.2024

Sl. no.	Source of sample	OP DDT (mg/Kg)	DP DDT (mg/Kg)	OP DDE (mg/Kg)	DP DDE (mg/Kg)	OP DDB (mg/Kg)	DP DDB (mg/Kg)	Sum of OP/DDT (mg/Kg)	Alpha BHC (mg/Kg)	Beta BHC (mg/Kg)	Gamma BHC (mg/Kg)	Endosulphan Alpha (mg/Kg)	Endosulphan Beta (mg/Kg)	Endosulphan (mg/Kg)	1,2 DCA (mg/Kg)	TCE (mg/Kg)	1,1,1 TCA (mg/Kg)	1,1,1,2 TeCA (mg/Kg)
1	Kozhikodam Thodu (Near HM discharge)	53.626	41.673	39.378	29.253	36.451	34.575	210.4.8	13.756	4.961	24.317	57.966	34.734	2.666	0.501	0.711	0.411	0.391
2	Parachikudi	0.519	2.015	0.187	0.44	2.017	2.143	7.321	BDL	BDL	BDL	0.63	BDL	0.016	0.12	0.099	0.131	0.121
3	Kozhikodam Thodu 50m behind from confluence point	15.625	22.81	2.933	5.163	22.827	24.23	93.828	0.506	0.069	0.166	4.28	0.218	0.231	0.212	0.244	0.181	0.190
4	Parachikudi 50m behind from confluence point	0.038	0.519	0.519	0.414	0.49	0.517	2.497	0.053	0.016	BDL	0.228	BDL	BDL	0.02	0.031	0.021	0.029
5	Uthupuzha 50m from confluence point	0.913	6.909	1.18	2.184	7.002	3.299	35.787	0.099	0.032	0.114	1.247	0.112	0.064	0.102	BDL	0.104	0.105
6	Uthupuzha 50m from Periyar river	4.697	2.791	0.616	0.737	7.844	8.296	29.964	0.027	BDL	0.019	0.225	BDL	0.023	BDL	0.125	0.164	BDL

ANNEXURE 7A (1)

ANNEXURE 7(b)**River Water Sample (Heavy Metals) Eloor Stretch****Date of Sampling-29.06.2024, 02.07.2024, 03.07.2024, 27.07.2024, 19.08.2024 (15 parameters)****River Water Sample (General Parameters) Eloor Stretch****Date of Sampling-29.06.2024, 02.07.2024, 03.07.2024, 27.07.2024, 19.08.2024 (15 parameters)**

Sl. No.	Source of sample	Iron (mg/L)	Total Dissolved Solids (mg/L)	Sulphate (mg/L)	Ammoniacal Nitrogen (mg/L)	Free Ammonia (mg/L)	Phosphate (mg/L)	Total Hardness (mg/L)	Electrical Conductivity (µS/cm)	Oil & Grease (mg/L)	Calcium (°Cl)	Turbidity (NTU)	Phosphorus (mg/L)	Faecal Coliforms (CFU/100ml)	Phocul Strepococci (CFU/100ml)	Total Coliforms (CFU/100ml)
1	River Periyar near combined Storm water outlet between Halaya Rubberbelt Alupparam Chumb Rubber.	0.34	1	BDL	BDL	BDL	BDL	20	742	BDL	3.1	11.8	0.7	400	160	2960
2	River Periyar near TMS Levee authorized outlet	0.35	1	BDL	1.4	BDL	BDL	12	48.1	BDL	24	14.0	0.1	300	14	2642
3	River Periyar near storm water outlet at CHRL Shree Shakti boundary	0.37	1	1.4	BDL	BDL	0.44	10	53	BDL	31.5	9.7	0.5	160	31	2731
4	River Periyar near Storm water outlet at CHRL & National Industries boundary	0.34	1	1	1.12	BDL	BDL	18	49	BDL	24.9	6.9	0.1	400	520	1920

ANNEXURE 7(b)

5	River Periyar Padakkal near Bund upstream	0.5	1	1.4	BDL	BDL	BDL	BDL	1	16.7	BDL	27	1.4	11	140	20	1360
6	River Periyar near Tamil authorized outlet	0.13	1	BDL	BDL	BDL	BDL	BDL	16	70.9	BDL	22.7	11.5	11	140	40	2800
7	River Periyar near SudChemie	0.5	1	BDL	BDL	+16	+994	BDL	22	44.7	BDL	11.4	11.5	11	330	349	1440
8	River Periyar near TCC Storm water drain at TCC- FACT boundary	0.5	5	1.4	BDL	BDL	BDL	BDL	34	419	BDL	20.5	12.2	13	0	0	0
9	River Periyar near FACT-40 drain storm water outlet	0.42	4	1	BDL	0.16	0.004	BDL	18	44	BDL	1	10.5	17	0	0	360
10	River Periyar near FACT storm water outlet	0.45	2	BDL	BDL	4.65	BDL	BDL	22	140.2	BDL	9.21	12.2	38	0	0	1260
11	River Periyar near storm water drain of IREL at IREL- FACT Boundary	0.41	2	4.5	BDL	BDL	BDL	BDL	16	87.1	BDL	7.4	10.5	12	0	26	120
12	River Periyar near IREL Outlet	BDL	1	BDL	BDL	BDL	BDL	BDL	32	137.1	BDL	13.5	10.5	12	0	30	160
13	River Periyar near Erumazhi storm water outlet	0.62	1	0.96	BDL	BDL	BDL	BDL	20	68.4	BDL	12.4	10.5	11	0	140	520

ANNEXURE 7(b) 2

SL No	Source of sample	ARSENIC (mg/L)	CADMIUM (mg/L)	COPPER (mg/L)	LEAD (mg/L)	MANGANESE (mg/L)	MERCURY (mg/L)	ZINC (mg/L)	TOTAL CHROMIUM (mg/L)	STEMA CHROMIUM (mg/L)
1	River Periyar near combined Storm water outlet between Malaya Mukkuchal Alipparamb Church Rubble.	ND	NDL	NDL	NDL	NDL	NDL	NDL	NDL	NDL
2	River Periyar near TMS Leather authorized outlet	NDL	NDL	NDL	NDL	NDL	NDL	NDL	NDL	NDL
3	River Periyar near storm water outlet of CMRL- Shree Shakti boundary	NDL	NDL	NDL	NDL	NDL	NDL	NDL	NDL	NDL
4	River Periyar near Storm water outlet of CMRL & National Industries boundary	NDL	NDL	NDL	NDL	NDL	NDL	NDL	NDL	NDL
4	River Periyar Puthan Road upstream	NDL	NDL	NDL	NDL	NDL	NDL	NDL	NDL	NDL
6	River Periyar near CMRL authorized outlet	NDL	NDL	NDL	NDL	NDL	NDL	NDL	NDL	NDL
7	River Periyar near Sudhanu	NDL	NDL	NDL	NDL	NDL	NDL	0.14	NDL	NDL
8	River Periyar near TOC Storm water drain at TOC-FACT boundary	NDL	NDL	NDL	NDL	NDL	NDL	0.16	NDL	NDL
9	River Periyar near FACT-D drain storm water outlet	0.01	NDL	NDL	NDL	NDL	NDL	0.06	NDL	NDL
10	River Periyar near FACT storm water outlet	NDL	NDL	0.07	NDL	NDL	NDL	0.15	NDL	NDL
11	River Periyar near storm water drain of CMRL at IREL-FACT Boundary	NDL	NDL	NDL	NDL	NDL	NDL	0.14	NDL	NDL
12	River Periyar near IREL Outlet	NDL	NDL	NDL	NDL	NDL	NDL	0.19	NDL	NDL
13	River Periyar near Bhopal zinc storm water outlet	NDL	NDL	NDL	NDL	NDL	NDL	0.3	NDL	NDL

ANNEXURE 7(b)

River Water Sample (Pesticides) Elam Stretch

Date of Sampling: 29.06.2024, 03.07.2024, 27.07.2024.

Sl No	PESTICIDES	o,p'-DDT (mg/L)	p,p'-DDT (mg/L)	o,p'-DDE (mg/L)	p,p'-DDE (mg/L)	o,p'-DDD (mg/L)	p,p'-DDD (mg/L)	alpha-BHC (mg/L)	beta-BHC (mg/L)	gamma-BHC (mg/L)	Endosulfin-sulpho (mg/L)	Endosulfin-beta (mg/L)	Endosulfin-sulphate (mg/L)	Sum of DDTs (mg/L)	LC DCA (mg/L)	TCF (mg/L)	LC DCA (mg/L)	LC TCC (mg/L)
1	River Periyar near Santhi upstream	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	River Periyar near Chell. authorized outlet	0.0002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.0002	BDL	BDL	BDL	BDL
3	River Periyar near Swell. dam	0.0006	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.0006	BDL	BDL	BDL	BDL
4	River Periyar near JCU Storm water drain at TCC-FACT boundary	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	River Periyar near FACT-D dam storm water outlet	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	River Periyar near FACT storm water outlet	0.0006	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.0003	BDL	0.0001	0.0006	BDL	BDL	BDL	BDL
7	River Periyar near storm water drain of BEL at BEL-FMT	0.0004	0.0006	0.0006	0.0004	0.0004	0.0006	BDL	BDL	BDL	0.0006	BDL	BDL	0.0007	BDL	BDL	BDL	BDL

ANNEXURE 7(b) 4

Sl. No.	Location	pH	DO (mg/L)	BOD (mg/L)	TDS (mg/L)	TSS (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Nitrate (mg/L)	Phosphate (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Iron (mg/L)
1	River Parjya near NEIL Outlet	8.10005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	River Parjya near Bhatia Zinc mine water outlet	8.10049	4.10013	BDL	9.30003	0.0001	0.00013	BDL	BDL	BDL	BDL	BDL	BDL	BDL

River Water Sample (General Parameters) Ladakula Stretch

Date of Sampling-29.06.2024, 02.07.2024, 19.08.2024 (15 parameters)

Sl. No.	Source of sample	pH	DO (mg/L)	BOD (mg/L)	TDS (mg/L)	TSS (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Nitrate (NO3-) (mg/L)	Phosphate (PO43-) (mg/L)	Sulfate (SO42-) (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)		
1	River Parjya near Fast autonomous guard pond outlet	7.07	16	5.1	1.6	58	BDL	16.9	BDL	0.08	2.9	0.02	4.3	2.8	0.97	7.37	1.66
2	River Parjya near Fast PD authorized outlet	7.06	16	5.2	0.9	27	15.6	25.3	BDL	0.29	32.4	0.01	43	3.4	13.36	12.14	22
3	River Parjya at Chagdikolabe river confluence point	7	12	5.3	1	65	BDL	16.3	BDL	0.09	3.6	0.02	9.8	2.8	0.73	9.98	1.78
4	River Parjya at Eleon Ferry junction	6.9	24	5.4	1.3	65	BDL	17.9	BDL	3.5	0.03	2	2.4	1.22	19.63	1.75	

River Water Sample (General Parameters) Edamanki Stretch

Date of Sampling-29/06/2024, 02/07/2024, 19/08/2024 (15 parameters)

SL No	Source of sample	Iron (mg/L)	Total Organic Carbon (mg/L)	Sulphate (mg/L)	Sulphide (mg/L)	Ammoniacal Nitrogen (mg/L)	Free Ammonia (mg/L)	Phenolic compound (mg/L)	Total Hardness (mg/L)	Electrical Conductivity (µS/cm)	Oil & Grease (mg/L)	Colour (CU)	Turbidity (NTU)	Phosphates (mg/L)	Faecal Coliforms (CFU/100ml)	Faecal Streptococci (CFU/100ml)	Total Coliforms (CFU/100ml)
1	River Periyar near Fact ammonia guard pond outlet	0.61	1	BDL	BDL	1.94	0.02	BDL	20	194.9	BDL	24.4	11.5	2.2	520	240	2160
2	River Periyar near Fact PD and house outlet	0.24	1	BDL	BDL	BDL	BDL	BDL	22	24.1	BDL	18.3	10.7	0.1	720	80	2560
3	River Periyar at Ougithadai eriyam confluence point	0.45	1	BDL	BDL	BDL	BDL	BDL	14	79	BDL	37.3	11.1	0.2	160	80	2480
4	River Periyar at Eloor Periy junction	0.38	1	BDL	BDL	BDL	BDL	BDL	16	73.5	BDL	17.7	10.6	0.2	20	180	2400

ANNEXURE - 7b(6)

River Water Sample (Heavy Metal) Edamula Stretch

Date of Sampling-29.06.2024, 02.07.2024

SL No	Source of sample	ARSENIC (mg/L)	CADMIUM (mg/L)	COPPER (mg/L)	LEAD (mg/L)	MANGANESE (mg/L)	MERCURY (mg/L)	ZINC (mg/L)	TOTAL CHROMIUM (mg/L)	HEXA CHROMIUM (mg/L)
1	River Periyar near Fact ammonia guard pond outlet	BDL	BDL	BDL	BDL	BDL	BDL	0.02	BDL	BDL
2	River Periyar near Fact PO authorized outlet	BDL	BDL	BDL	BDL	0.09	BDL	0.06	BDL	BDL
3	River Periyar at Uthatholath Periyar confluence point	BDL	BDL	BDL	BDL	0.06	BDL	0.02	BDL	BDL
4	River Periyar at Floor Ferry junction	BDL	BDL	BDL	BDL	BDL	BDL	0.03	BDL	BDL

ANNEXURE 7b(7)

River Water Sample (Pesticides) Edumula Stretch

of Sampling: 29.06.2024, 02.07.2024

Sl no	Pesticides	pp'-DDT (mg/L)	pp'-DDE (mg/L)	pp'-DDD (mg/L)	pp'-DDE (mg/L)	pp'-DDD (mg/L)	pp'-DD (mg/L)	alpha-BHC (mg/L)	Beta-BHC (mg/L)	gamma-BHC (mg/L)	Endosulfan-alpha (mg/L)	Endosulfan-beta (mg/L)	Endosulfan-sulphate (mg/L)	Sum of DDE/DDT (mg/L)	1,2-DCP (mg/L)	TCE (mg/L)	1,1,2-TCA (mg/L)	1,1,2,2-TeC A (mg/L)
1	River Periyar near Fast ammonia guard pond outlet	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	River Periyar near Fast PD authorized outlet	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	River Periyar at Chengalodu Periyar confluence point	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	River Periyar at Elloor Ferry junction	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

ANNEXURE 7(b) of
MEMORANDUM

ANNEXURE 7(c)**Sediment sample-(General, Heavy metals)-Eloor Stretch**

Date of Sampling-29.06.2024,02.07.2024,09.07.2024, 27.07.2024

Sl. No.	Source of sample	Heavy metals										General							
		Mercury (mg/Kg)	Copper (mg/Kg)	Zinc (mg/Kg)	Arsenic (mg/Kg)	Cadmium (mg/Kg)	Lead (mg/Kg)	Iron (mg/Kg)	Manganese (mg/Kg)	Chromium (mg/Kg)	Total Chromium (mg/Kg)	Chloride (mg/Kg)	Sulphate (mg/Kg)	Ammoniacal Nitrogen (mg/Kg)	pH	Cyanide (mg/Kg)	Nitrate (mg/Kg)	Fluoride (mg/Kg)	
1	River Periyar near combined Storm water outlet between Malappuram District/Apalahalli Canal) Bhabha.	BDL	157.86	112.08	BDL	BDL	34.1	46079	111.73	BDL	756.6	292	119	2647	7.15	BDL	BDL	BDL	
2	River Periyar near TMS Leather authorized outlet	BDL	236.79	125.01	BDL	BDL	29.12	14613	137.76	BDL	5008	8.9	4	82.25	6.93	BDL	BDL	BDL	
3	River Periyar near storm water outlet of CSOIL-Shree Shakti boundary	BDL	11.02	23.67	BDL	BDL	29.32	14943	232.62	BDL	4589	67.3	72	526.5	6.8	0.12	BDL	BDL	
4	River Periyar near Sarni water outlet at C.M.I.L. Chemical Industries boundary	BDL	24327	136.68	BDL	BDL	47.84	38194	675.64	BDL	5642	298	113	145	7.12	BDL	BDL	4.43	

ANNEXURE 7(c)

5	River Periyar Palakkad Band upstream	BDL	4.17	3.7	BDL	BDL	BDL	3261.9	4.65	BDL	1.51	2.9	1	37.1	6.64	BDL	BDL	BDL
6	River Periyar near Chel polluted water	BDL	10.27	36.42	BDL	BDL	5.1	15948	200.22	BDL	87.25	35.33	91	388.9	7.12	BDL	BDL	0.06
7	River Periyar near TCC Sion water drain at TCC-FACT Boundary	BDL	22.31	170.1	BDL	BDL	13.98	14962	154.81	BDL	35.22	53.6	549	332.7	8.37	0.02	BDL	1.26
8	River Periyar near FMT-40 water drain water under	BDL	20.88	138.71	BDL	BDL	14.41	27149	164.1	BDL	54.1	32.32	144	239.6	6.72	BDL	BDL	0.87
9	River Periyar near FMT water under water	BDL	44.21	73.93	BDL	BDL	31.33	17505	46.72	BDL	84.14	11.9	177	171.2	4.31	BDL	BDL	1.49
10	River Periyar near water water drain of IREL at REL FACT Boundary	BDL	44.43	206.6	BDL	1.9	411	7730	406.5	BDL	171.54	190.6	370	106.06	7.66	BDL	BDL	1.29
11	River Periyar near IREL water	BDL	14.18	645.63	BDL	2.19	8.81	12429	32	BDL	27.34	180.45	355	225.4	4.04	BDL	BDL	4.11
12	River Periyar near Biscuit unit water	BDL	28.08	144.22	BDL	10.34	42.12	18292	373.64	BDL	68.39	107.1	542	175.2	4.27	BDL	BDL	4.43
13	River Periyar at Elloor Depot	BDL	10.55	123.66	BDL	BDL	5.67	15783	239.27	BDL	31.12	41.7	270	225.3	4.06	BDL	BDL	1.07

Sediment Samples (Pesticides)- Elloor Stretch

Date of Sampling-29.06.2024, 02.07.2024, 03.07.2024, 11.07.2024

Sl. No	Source of sample	pp DDT (µg/L)	op DDT (µg/L)	op DDE (µg/L)	pp DDE (µg/L)	op DDD (µg/L)	pp DDD (µg/L)	Sum of DDT/DDT DE/DDT T (µg/L)	Alpha BHC (µg/L)	Beta BHC (µg/L)	Gamma BHC (µg/L)	Endrin Alfa (µg/L)	Endrin Beta (µg/L)	Endrin gamma (µg/L)	1,2 DCA (µg/L)	TOC (µg/L)	1,1,2 TCA (µg/L)	1,1,1,2 TeCA (µg/L)
1	River Periyar near combined Storm water outlet between Mahya Rattechedu Aluphar and Crumb Rubber.	0.173	0.704	0.043	0.12	0.714	0.342	2.496	BDL	BDL	BDL	0.02	BDL	BDL	0.101	BDL	BDL	0.114
2	River Periyar near TMS Leathel authorized outlet	0.017	0.66	BDL	BDL	0.063	0.064	0.204	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	River Periyar near storm water outlet of CMRL- Shree Shakti boundary	0.014	0.64	BDL	BDL	0.043	0.043	0.136	BDL	BDL	BDL	BDL	BDL	0.063	BDL	BDL	BDL	BDL
4	River Periyar near Storm water outlet at CMRL & National Industries boundary	0.14	0.563	0.025	0.067	0.57	0.59	1.935	BDL	BDL	BDL	BDL	BDL	BDL	0.144	BDL	0.167	0.56
5	River PeriyarPalkalam Bend upstream	0.014	0.024	BDL	BDL	0.023	0.025	0.038	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	River Periyar near CMRL	0.069	0.641	0.064	0.154	0.642	0.681	2.251	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.102	0.113	BDL

	authorized outlet																		
7	River Periyar near TDC Storm water drain at TDC-FACT boundary	0.116	0.626	0.663	0.087	0.635	0.66	2.187	BDL	BDL	BDL	BDL	BDL	BDL	0.144	0.177	0.201	0.214	
8	River Periyar near FACT-D drain storm water outlet	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
9	River Periyar near FACT storm water outlet	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
10	River Periyar near storm water drain of IREL an IREL-FACT Boundary	0.054	0.234	BDL	0.037	0.228	0.244	0.846	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
11	River Periyar near IREL Outlet	0.104	0.54	0.863	0.137	0.537	0.576	1.901	BDL	BDL	BDL	0.041	BDL	BDL	0.019	BDL	BDL	0.018	
12	River Periyar near Buntur zinc storm water outlet	0.012	0.047	BDL	BDL	0.048	0.049	0.156	0.079	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
13	River Periyar at Eloor Depot	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	

Sediment Sample (General, Heavy metals) Edamada Stretch

Date of Sampling: 29.06.2024, 02:37:24024

Sl. No	Source of sample	HEAVY METALS										GENERAL PARAMETERS							
		Mercury (mg/Kg)	Copper (mg/Kg)	Zinc (mg/Kg)	Arsenic (mg/Kg)	Cadmium (mg/Kg)	Lead (mg/Kg)	Iron (mg/Kg)	Manganese (mg/Kg)	Heavy metal Chromium (mg/Kg)	Total Chromium (mg/Kg)	Chloride (mg/Kg)	Sulphate (mg/Kg)	Ammoniacal Nitrogen (mg/Kg)	pH	Cyanide (mg/L)	Nitrite (mg/L)	Fluoride (mg/L)	
1	River Periyar near FACT Armonia Canal pond outlet	BDL	17.14	524.57	BDL	BDL	5.77	1035	4	46.52	BDL	15.01	25.1	520	270.5	6.92	BDL	BDL	BDL
2	River Periyar near FACT ED Authorized outlet	BDL	52.49	329.25	BDL	BDL	12.23	1431	9	44.84	BDL	31.12	21.1	162	130	6.80	BDL	BDL	0.37
3	River Periyar at Unchikodu Periyar confluence point	BDL	40.41	1149.01	BDL	BDL	26.71	1484	4	40.83	BDL	49.16	131.2	230	133.4	7.37	0.02	BDL	0.63
4	River Periyar at Eloor Ferry Junction	BDL	6.38	135.99	BDL	BDL	3.78	1258	6	50.68	BDL	26.31	61.5	156	27.6	7.22	BDL	BDL	0.26

ANNEXURE 7C

Sediment Samples (Pesticides)- Edamunda Stretch

Date of Sampling-29.06.2024, 02.07.2024

Sl No	Source of samples	p,p' DDT (mg/Kg)	p,p' DDT (mg/Kg)	p,p' DDE (mg/Kg)	p,p' DDE (mg/Kg)	p,p' DDD (mg/Kg)	p,p' DDD (mg/Kg)	Sum of DDD/DDT (mg/Kg)	Alpha BHC (mg/Kg)	Beta BHC (mg/Kg)	Gamma BHC (mg/Kg)	Endosulfan Alpha (mg/Kg)	Endosulfan Beta (mg/Kg)	Endosulfan Sulphate (mg/Kg)	1,2 DCA (mg/Kg)	TCE (mg/Kg)	1,2,3 TCA (mg/Kg)	1,1,1,2 TeC A (mg/Kg)
1	River Periyar near FACT	0.021	0.159	0.012	0.106	0.158	0.166	0.622	BDL	BDL	BDL	BDL	0.047	0.157	BDL	BDL	BDL	BDL
2	Antimonia Grand pond outlet River Periyar near FACT PO	0.039	0.225	0.019	0.037	0.023	0.244	0.587	BDL	BDL	BDL	0.037	BDL	BDL	BDL	BDL	BDL	BDL
3	Authorized Outlet River Periyar Orugallad Periyar confluence pond	1.005	3.566	1.492	1.153	3.618	3.894	14.68	0.079	0.034	0.103	1.795	0.057	0.044	0.281	0.114	0.271	0.45
4	River Periyar Elloor Paddy junction	0.741	3.548	0.163	0.379	3.624	3.774	12.228	0.613	BDL	BDL	0.146	BDL	0.014	0.325	0.281	0.331	0.91

ANNEXURE 7(C) 6

ANNEXURE 7(d)**Storm Water Sample (General Parameters)**

Date of Sampling: 29.06.2024, 03.07.2024, 27.07.2024, 19.08.2024 (5 parameters)

Sl. No	Source of sample	pH	COD (mg/L)	DO (mg/L)	BOD (mg/L)	TDS (mg/L)	TSS (mg/L)	Chloride (mg/L)	Cyanide (mg/L)	Fluoride (mg/L)	Nitrate (NO ₃ -) (mg/L)	Phosphorus (PO ₄ -) (mg/L)	Sulphate (SO ₄ -) (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)
1	Storm water outlet between Malaya Subtechit Alpanth Comh Rubber.	7.25	56.56	12	23.52	430	19	148.5	BDL	0.13	5	0.45	49	40	27.95	50.18	31.32
2	IREL Storm water outlet (North side of the unit)	7.79	44	6.4	3.1	1156	66	6849	BDL	0.63	40	0.95	108	43	27.95	4839	6.87
3	IREL Storm water outlet (South side of the unit)	10.62	48	5.7	3.5	8122	615	248	3.03	2.77	740	0.36	3600	BDL	BDL	2502	9.1
4	Fact storm water drain near Ammonia storage building	6.72	36	7.3	6.6	665	BDL	223.1	BDL	0.26	24.4	0.74	50.5	4.8	23.33	130.1	5.99

ANNEXURE 7(d)

Storm Water Sample (General Parameters)

Date of Sampling: 24.06.2024, 03.07.2024, 17.07.2024, 19.08.2024 (15 parameters)

SL. No.	Source of sample	Iron (mg/L)	Total Organic Carbon (mg/L)	Sulphate (mg/L)	Sulphide (mg/L)	Ammoniacal Nitrogen (mg/L)	Free Ammonia (mg/L)	Phenolic compound (mg/L)	Total Hardness (mg/L)	Electrical Conductivity (µS/cm)	Oil & Grease (mg/L)	Colour (CU)	Turbidity (NTU)	Phosphate (mg/L)	Faecal Coliforms (CFU/100mL)	Faecal Streptococci (CFU/100mL)	Total Coliforms (CFU/100mL)
1	Storm water outlet between Malaya Rubber & Alpha and Gamma Rubber.		5	1.92	1.92	10.85	BDL	BDL	180	785	BDL	141	23.9	9.2	1060	5800	2720
2	IREL Storm water outlet (Northern side of the unit)	0.03	1	1	BDL	4.45	0.17	BDL	18	4430	BDL	6.3	11.5	0.2	0	0	120
3	IREL Storm water outlet (Southern side of the unit)	0.09	15	BDL	BDL	7.75	8.44	BDL	15	20.9	BDL	30	22.5	0.4	0	20	0
4	Fast storm water drain near Annamalai barge loading	0.29	2	1.92	BDL	8.53	0.05	BDL	100	895	BDL	7.8	7.6	5	260	4400	4180

ANNEXURE 7 (d) 2.

ANNEXURE 7(e)**Annexure 7 (e) - Directions issued to Industries under Section 5 of EP Act**

☎. Gaxnd: 4471- 2312940, 2318133, 2318154, 2318155 Chairnan 2311159 Member Secretary: 2314151
 e-mail: chh.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: www.kspcb.kerala.gov.in
KERALA STATE POLLUTION CONTROL BOARD
 കരള സ്റ്റാറ്റു പോളുഷൻ കൺട്രോൾ ബോർഡ്
 Pattom P.O., Thiruvananthapuram - 695 004
 പാറ്റം പി.ഒ., തിരുവനന്തപുരം - 695 004

KSPCB/1372/2024-SEE-1**Date: 23.10.2024****To****Reg. with A/D**

**M/s Fertilizers and Chemicals Travancore Ltd.,
 Udyogamandal Complex (Fertilizer Plant),
 Umapulam -- 683501.**

Sub:- Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974.

WHEREAS the Board is the authority for enforcing environmental legislations in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board

ANNEXURE 7(2)

WHEREAS during the inspection of the Committee and subsequent sampling of river Periyar and storm water drains from industrial premises, on 25.06.2024, 29.06.2024, 02.07.2024 and 03.07.2024, it was observed that there are chances of contamination of the river due to surface run off from storm water drains.

Based on the observations of the Committee, in exercise of the powers conferred under Section 5 of the Environment (Protection) Act, 1986, you are hereby directed to comply with the following.

- Provide delay ponds in storm water drains flowing through your premises to the outlets to river and ensure that no contaminants are discharged through the drains.

NOW THEREFORE, you are hereby directed to submit action taken report to the Board within thirty days of receipt of this Direction, failing which further action would be initiated under The Environment (Protection) Act, 1986.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to:

- 1) The Chief Environmental Engineer,
KSPCB Regional Office,
Ennakulam.
- 2) The Senior Environmental Engineer,
KSPCB, ESC Eloor.

ANNEXURE 7(c4)

WHEREAS during the inspection of the Committee and subsequent sampling of river Periyar and storm water drains from industrial premises, on 25.06.2024, 29.06.2024, 02.07.2024 and 03.07.2024, it was observed that there are chances of contamination of the river due to surface run off from storm water drains.

Based on the observations of the Committee, in exercise of the powers conferred under Section 5 of the Environment (Protection) Act, 1986, you are hereby directed to comply with the following.

- Provide delay ponds in storm water drains flowing through your premises to the outlets to river and ensure that no contaminants are discharged through the drains.

NOW THEREFORE, you are hereby directed to submit action taken report to the Board within thirty days of receipt of this Direction, failing which further action would be initiated under The Environment (Protection) Act, 1986.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to:

- 1) The Chief Environmental Engineer,
KSPCB Regional Office,
Emakulam.
- 2) The Senior Environmental Engineer,
KSPCB, ESC Eloor.

ANNEXURE 7(c) 5

☎: General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: chairman@kspcb.org, ms@kspcb.org, info@kspcb.org FAX: 2318152 web: www.kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്



Pollution P.O., Thiruvananthapuram - 695 004

പൊ മ.പ.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1372/2024-SEE-I

Date: 23.10.2024

To

Reg. with A/D

The Travancore Cochin Chemicals Ltd.,
Udyogamandal P.O.,
Kochi - 683 501.

Sub:- Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Pariyar, a Committee was constituted with the following members

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board

ANNEXURE 7(1)(b)

WHEREAS during the inspection of the Committee and subsequent sampling of river Periyar and storm water drains from industrial premises, on 25.06.2024, 29.06.2024, 02.07.2024 and 03.07.2024, it was observed that there are chances of contamination of the river due to surface run off from storm water drains.

Based on the observations of the Committee, in exercise of the powers conferred under Section 5 of the Environment (Protection) Act, 1986, you are hereby directed to comply with the following.

- Provide delay ponds in storm water drains flowing through your premises to the outlets to river and ensure that no contaminants are discharged through the drains.

NOW THEREFORE, you are hereby directed to submit action taken report to the Board within thirty days of receipt of this Direction, failing which further action would be initiated under The Environment (Protection) Act, 1986.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to:

- 1) The Chief Environmental Engineer,
KSPCB Regional Office,
Emakulam.
- 2) The Senior Environmental Engineer,
KSPCB, ESC Elnor.

ANNEXURE 7(e) 7

Tel: General: 0471- 2312910, 2318153, 2318154, 2318155; Chairman: 2318150 Member Secretary: 2318157
e-mail: chm.kspcb@gov.in; ms.kspcb@gov.in; FAX: 2318152 web: www.kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള മലിനീകരണ നിയന്ത്രണ ബോർഡ്



Paloni P.O., Thiruvananthapuram - 695 004

പാലോ പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1372/2024-SEE-I

Date: 23.10.2024

To

Reg. with A/D

M/s. Sud Chemie India Pvt Ltd.,
Edayar Industrial Development Area,
Bananipuram P.O.,
Cochin-683502.

Sub:- Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board

ANNEXURE 7e(8)

WHEREAS during the inspection of the Committee and subsequent sampling of river Periyar and storm water drains from industrial premises, on 25.06.2024, 29.06.2024, 02.07.2024 and 03.07.2024, it was observed that there are chances of contamination of the river due to surface run off from storm water drains.

Based on the observations of the Committee, in exercise of the powers conferred under Section 5 of the Environment (Protection) Act, 1986, you are hereby directed to comply with the following.

- Provide delay ponds in storm water drains flowing through your premises to the outlets to river and ensure that no contaminants are discharged through the drains.

NOW THEREFORE, you are hereby directed to submit action taken report to the Board within thirty days of receipt of this Direction, failing which further action would be initiated under The Environment (Protection) Act, 1986

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to.

- 1) The Chief Environmental Engineer,
KSPCB Regional Office,
Ernakulam
- 2) The Senior Environmental Engineer,
KSPCB, BSC Eloor.

ANNEXURE 7(e) 9

☎: General: 0471-2312914, 2314153, 2314154, 2318155 Chulissa, 2318158 Member Secretary: 2318157
e-mail: clg.kspcb@gmail.in; mskspcb@gmail.in FAX: 2318152 - web: www.kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram - 695 004

പട്ടം ഓഫീസ്, തിരുവനന്തപുരം - 695 004



KSPCB/1372/2024-SEE-I

Date: 23.10.2024

To

Reg. with A/D

M/s. The Fertilisers And Chemicals Travancore Limited (FACT),
Udyogamandal Complex- Petrochemical Plants,
P.B No.17, Udyogamandal,
Ernakulam - 683501.

Suh:- Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974:

WHEREAS the Board is the authority for enforcing environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act, 1986 in the Kerala State.

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos- 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board

ANNEXURE 7(e) to

WHEREAS during the inspection of the Committee and subsequent sampling of river Periyar and storm water drains from industrial premises, on 25.06.2024, 29.06.2024, 02.07.2024 and 03.07.2024, it was observed that there are chances of contamination of the river due to surface run off from storm water drains.

Based on the observations of the Committee, in exercise of the powers conferred under Section 5 of the Environment (Protection) Act, 1986, you are hereby directed to comply with the following.

- Provide delay ponds in storm water drains flowing through your premises to the outlets to river and ensure that no contaminants are discharged through the drains.

NOW THEREFORE, you are hereby directed to submit action taken report to the Board within thirty days of receipt of this Direction, failing which further action would be initiated under The Environment (Protection) Act, 1986.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to:

- 1) The Chief Environmental Engineer,
KSPCB Regional Office,
Ernakulam.
- 2) The Senior Environmental Engineer,
KSPCB, ESC Floor.

ANNEXURE 3(a)

■ General: 0471-2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: chm.kspcb@gov.in, ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1078/2024-SEE-1

Date: 29/07/2024

Reg with A/D

Ref: Consent No :PCB/ESC/IC-681/R4/2023 dated 02.03.2023

SHOW CAUSE NOTICE

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of The Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in The Water (Prevention & Control of Pollution) Act 1974, The Air (Prevention & Control of Pollution) Act 1981 and The Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS M/s Alpharub Crumb Rubber (P) Ltd, Industrial Development Area , Edayar, Aluva, 683110 (here after will be referred as unit) comes under the purview of the Water(Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts,

WHEREAS your unit were bound to comply with the conditions of the Consent referred (I) issued by the Board as per Section 21 of Air (Prevention and Control of Pollution) Act, 1981 and Section 25 of Water (Prevention and Control of Pollution) Act, 1974;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change,
Government of Kerala
2. Director, Directorate of Environment & Climate Change

ANNEXURE 2(a)

3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board.

WHEREAS an inspection was conducted by the said Committee to the ETP Area and effluent discharge area of your unit on 10.07.2024 and observed the following violations and non-compliance of compliance conditions:

- i) ETP unit operation levels are just at the ground level and may lead to submergence of ETP during the monsoon period.
- ii) An unauthorised discharge provision and untreated effluent discharge from industry premises to storm water drain was observed which raises suspicion of an unauthorised discharge of effluent from your unit.
- iii) Wastes or sledges are stored in open area adjacent to the ETP
- iv) Very Poor housekeeping in the ETP and the surrounding areas

Now THEREFORE, you are directed to SHOW CAUSE why action under relevant clauses of The Water(Prevention and Control of Pollution) Act,1974 shall not be taken against you for the above mentioned reason

Dated this the 29th day of July, 2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

To

✓ M/s Alpharub Crumb Rubber PLtd,
V/793, Industrial Development Area,
Edayar, Aluva, 683110

Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office, Ernakulam

2) The Senior Environmental Engineer
KSPCB, ESE Floor

ANNEXURE 8(b),

☎ General-0474-2312910, 2318453, 2318454, 2318153 Chairman, 2318140 Member Secretary- 2318151
e-mail: cha.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 [web: kspcb.kerala.gov.in](http://web.kspcb.kerala.gov.in)

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram - 695 004



KSPCB/1078/2024-SEE-1

Date: 29/07/2024

To

Reg with AD

M/s. Malaya Rub Tech Industries,
Industrial Development Area, Edayar,
Muppalthadam P. O., Aluva, Kerala

Sub :-Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of The Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in The Water (Prevention & Control of Pollution) Act 1974, The Air (Prevention & Control of Pollution) Act 1981 and The Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change,
Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional
Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board.

WHEREAS the Committee inspected your unit (i.e., ETP area) on 10.07.2024. Based on the inspection findings of the Committee and in exercise of the powers conferred under Section 5 of The Environment (Protection) Act, 1986, you are hereby directed to ensure the following and submit a compliance report:

ANNEXURE (b),

1. Construct and maintain proper drains to direct entire the storm waters into a common drain and fix the stormwater outlet point to river Periyar complying to the discharge norms as per granted Consents/ common drain of DIC whichever possible with clear visibility and easy access. Provide a delay pond before the discharge point.
2. A pH meter is also connected to the discharging water at the discharge outlets and the pH values are displayed for public notice and records maintained.
3. Flowmeters are also fitted at the outlet discharge point (s) to know the total volume of water being discharged into the riverine system/drain and records maintained.
4. Prepare and submit a latest lay out plan (PDF document) of your industry showing all the buildings, machineries, individual ETP tanks, raw material/products/ by products / hazardous waste storage area, storm water drains with its outlet point marked etc. All the above shall be clearly indicated and labelled in the above drawing.
5. Submit average monthly production details with quantity for the last one year.
6. Submit water balance data based on actual water consumption/ effluent generation/ reuse for the last six months.
7. Performance evaluation of the existing ETP be carried out through an institute of repute and modification/ rectification / latest technology adaptation as per requirement shall be carried out if required and submit the performance evaluation report to Board.
8. Prepare a flow chart of ETP showing all unit operations including tank capacities, retention time etc. and the same shall be displayed at the ETP area.
9. Maintain log book in which the flow meter readings are regularly entered. Ensure that flow meter provided are functioning properly.
10. Maintain stock register for chemicals used in the ETP if chemical addition is

ANNEXURE 8(b) 3

provided.

11. Provide 360° rotating night vision camera in the back yard of the unit and at the ETP area and share the live visuals with the Board.
12. Ensure adequate lighting in the ETP area upto river side of your unit.
13. Keep the industry premises always hygienic and ensure that adequate sanitation facilities are provided to the workers. Facilities shall be provided for the collection and disposal of solid waste including garbage/food waste.)
14. Ensure that the domestic effluent is discharged through properly designed septic tank- soakpit facility of adequate capacity.

NOW THEREFORE, you are hereby directed to submit compliance report to the Board on the above within fifteen days of receipt of this directions, failing which further action would be initiated under The Environment (Protection) Act, 1986



For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

- Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office
Ernakulam
- 2) The Senior Environmental Engineer
KSPCB, ESC E1006

ANNEXURE 810,

☎ General: 0471-2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: chn.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1078/2024-SEE-1

Date: 29/07/2024

To

Reg- with A/D

M/s Cochin Minerals and Rutile Limited,
Industrial Development Area, Edayar,
Munpathadam P O,
Ernakulam - 680110, Kerala

Sub :-Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of The Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in The Water (Prevention & Control of Pollution) Act 1974, The Air (Prevention & Control of Pollution) Act 1981 and The Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board.

WHEREAS the Committee inspected your unit (i.e., ETP and CEMOX storage area) on 10.07.2024. Based on the inspection findings of the Committee and in exercise of the powers conferred under Section 5 of The Environment (Protection) Act, 1986, you are hereby directed to ensure the following and submit a compliance report:

ANNEXURE 8 (Ca)

1. A separate and designated area shall be earmarked for proper storage or stacking of raw material i.e., Ilmenite and CEMOX with adequate lining and leachate collection facilities. Ilmenite and CEMOX storage areas are well maintained and shall be covered during the monsoon period to avoid rainwater coming in contact with the Ilmenite and CEMOX.
2. Submit the utilization details of CEMOX in the last five years.
3. The underground pipe provided at the stormwater drain leading to river Periyar, at the boundary of the Industry shall be removed urgently and the open drain shall be extended up to river Periyar by providing a delay pond before discharging into the river Periyar. Also, provide a delay pond to all the other stormwater drains before being discharged.
4. Properly designed garland drain all around the CEMOX storage area and the industry shall be constructed to direct the entire storm water into a common drain and fix the stormwater outlet point to the river with clear visibility and easy access. Provide a delay pond before the discharge point and the storm water free from pollutants only should be discharged into the river periyar.
5. A pH meter is also connected to the discharging water at the discharge outlets and the pH values are displayed for public notice and records maintained.
6. Flowmeters are also fitted at the outlet discharge point (s) to know the total volume of water being discharged into the riverine system and records maintained.
7. Prepare and submit a latest layout plan (PDF document) of your industry showing all the buildings, machineries, individual ETP tanks, raw material/ products/ by products/ hazardous waste storage area, storm water drains with its outlet point marked etc. All the above shall be clearly indicated and labelled in the above drawing.
8. Submit average monthly production details with quantity for the last one year, provide a modified mass balance.

ANNEXURE 8 (3)

9. Submit water balance data based on actual water consumption/ effluent generation/ reuse for the last six months.
10. Performance evaluation of the existing ETP be carried out through an institute of repute and modification/ rectification / latest technology adaptation as per requirement shall be carried out if required and submit the performance evaluation report to Board. Ensure that a pH meter provided at ETP (final collection pond of treatment plant) shall be calibrated periodically and functioning properly at all times. Also, a camera focussing towards sensors immersed in a treated water tank shall be arranged and connected to the server of Board.
11. Prepare a flow chart of ETP showing all unit operations including tank capacities, retention time etc. and the same shall be displayed at the ETP area.
12. Log book in which the flow meter readings are regularly entered and records maintained. Ensure that flow meters provided at the ETP outlet are functioning properly.
13. Maintain a stock register for chemicals used in the ETP and made available during the visits of officials of the Board.
14. Provide 360° rotating night vision cameras in the backyard of the unit and at the ETP area and share the live visuals with the server of Board.
15. Ensure adequate lighting in the ETP area up to the river side of the unit.
16. The bushes and trees at the riverside boundary inside the premises of the company shall be cleared urgently.
17. Keep the industry premises always hygienic and ensure that good housekeeping is maintained all the time.
18. Adequate Sanitation facilities are provided to the workers.
19. Facilities shall be provided for the collection and disposal of solid waste including garbage/food waste.

ANNEXURE 8 (1) 4

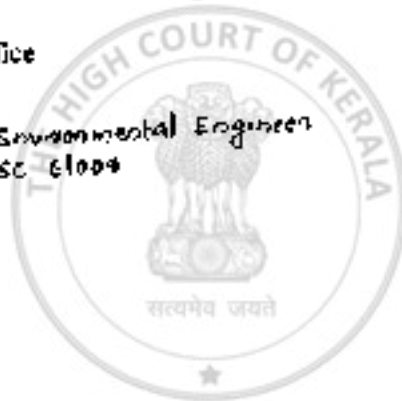
NOW THEREFORE, you are hereby directed to submit compliance report to the Board on the above within fifteen days of receipt of this directions, failing which further action would be initiated under The Environment (Protection) Act, 1986.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office
Ernakulam

2) The Senior Environmental Engineer
KSPCB, ESC, Ernakulam



ANNEXURE 8(d),

☎ General: 0471- 2312913, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: chn.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pollution P.O., Thiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004

**KSPCB/1078/2024-SEE-1****Date: 29/07/2024****To****Reg with A/D**

M/s .Organo Fertilizers (India) Pvt.Ltd.
Industrial Development Area,Edayar,
Muppathadam.P.O.,Aluva

Sub :-Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of The Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in The Water (Prevention & Control of Pollution) Act 1974, The Air (Prevention & Control of Pollution) Act 1981 and The Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change,
Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional
Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board.

WHEREAS the Committee inspected your unit (i.e., FTP area) on 10.07.2024. Based on the inspection findings of the Committee and in exercise of the powers conferred under Section 5 of The Environment (Protection) Act, 1986, you are hereby directed to ensure the following and submit a compliance report":

ANNEXURE (d)

1. Construct and maintain proper drains to direct entire the storm waters into a common drain and fix the stormwater outlet point to river Periyar complying to the discharge norms as per granted Consents/ common drain of DIC whichever possible with clear visibility and easy access. Provide a delay pond before the discharge point.
2. A pH meter is also connected to the discharging water at the discharge outlets and the pH values are displayed for public notice and records maintained.
3. Flowmeters are also fitted at the outlet discharge point (s) to know the total volume of water being discharged into the riverine system/drain and records maintained.
4. Prepare and submit a latest lay out plan (PDF document) of your industry showing all the buildings, machineries, individual ETP tanks, raw material/products/ by products / hazardous waste storage area, storm water drains with its outlet point marked etc. All the above shall be clearly indicated and labelled in the above drawing.
5. Submit average monthly production details with quantity for the last one year.
6. Submit water balance data based on actual water consumption/ effluent generation/ reuse for the last six months.
7. Performance evaluation of the existing ETP be carried out through an institute of repute and modification/ rectification / latest technology adaptation as per requirement shall be carried out if required and submit the performance evaluation report to Board.
8. Prepare a flow chart of ETP showing all unit operations including tank capacities, retention time etc. and the same shall be displayed at the ETP area.
9. Maintain log book in which the flow meter readings are regularly entered. Ensure that flow meter provided are functioning properly.
10. Maintain stock register for chemicals used in the ETP if chemical addition is

ANNEXURE 8(d)₃

provided.

11. Provide 360° rotating night vision camera in the back yard of the unit and at the ETP area and share the live visuals with the Board.
12. Ensure adequate lighting in the ETP area upto river side of your unit.
13. Keep the industry premises always hygienic and ensure that adequate sanitation facilities are provided to the workers. Facilities shall be provided for the collection and disposal of solid waste including garbage/food waste.
14. Ensure that the domestic effluent is discharged through properly designed septic tank- soakpit facility of adequate capacity.

NOW THEREFORE, you are hereby directed to submit compliance report to the Board on the above within fifteen days of receipt of this directions, failing which further action would be initiated under The Environment (Protection) Act, 1986

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office
Ernakulam

2) The Senior Environmental Engineer
KSPCB, ESC 61001

ANNEXURE 8(c)

General: 0471-2312913, 2318153, 2318154, 2318155 Chairman: 2318153 Member Secretary: 2318151
e-mail: cha.kspcb@gov.in ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Palton P.O., Thiruvananthapuram - 695 004

പാറ്റം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1078/2024-SEE-1

Date: 29/07/2024

Reg. with A/P

Ref: 1. Consent No : PCB/ESC/CO/EC-690/R1/23 dated 01/09/2023 valid up to 30/06/2028.

2. Letter PCB/ESC/CO/95/07 dated 18.06.2024 issued to you.

CLOSURE INTENTION NOTICE

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Environment (Protection) Act, 1986 in the state;

WHEREAS M/s TMS Leathers, I.D.A., Edayar, Muppathadam, Emakulam - 683110 (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & The Air (Prevention & Control of Pollution) Act, 1981 and The Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS you were bound to comply with the conditions of the Consent referred (1) issued by the Board as per Section 21 of The Air (Prevention and Control of Pollution) Act, 1981 and Section 25 of The Water (Prevention and Control of Pollution) Act, 1974;

WHEREAS directions were issued to you vide letter cited 2nd above based on the inspection conducted by Board officials on 27.05.2024;

ANNEXURE 8(e) 2

WHEREAS an inspection to ETP Area and effluent discharge outlet of M/s TMS Leathers, I.D.A., Edayar, Muppathadom, Ernakulam - 683110 was conducted on 10.07.2024 by the Committee constituted as per the Hon'ble High Court of Kerala order dated 10.06.2024 in WPC No. 9534/2020, 996/2012, 31236/2023 and during the visit to the ETP Area located within your industry premises, the Committee observed the following violations and/or non-compliance of conditions.

1. The probes provided in the Online Continuous Effluent monitoring system (OCEMS) was found kept in a bucket containing water which raises suspicion of manipulation in the actual reading.
2. A camera focussing towards the sensors (OCEMS) immersed in the treated effluent not been provided.
3. Storm water was flooded in the entire industry premises since there was no proper storm water drains or delay pond.
4. No action initiated to comply with the directions issued vide Board's letter cited 3rd;
5. There was no easy and safe access to ETP area up to river bank where an your industry authorized effluent discharge outlet is provided.
6. Very Poor housekeeping in the ETP and the surrounding areas and approach to ETP area was not proper.
5. No provision/ access is provided to take sample from the authorized out let pipe immediately before reaching the river and also treated effluent pipe line to river was provided through underground which is not permitted.

ANNEXURE 3

NOW THEREFORE you are hereby directed to show cause, if any, within 15 days of receipt of this notice, as to why, under Section 33 A of the Water (Prevention and Control of Pollution) Act, 1974, direction for closure shall not be issued to the unit for the violations noticed.

Dated this the 29th day of July, 2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

To

M/s TMS Leathers
I.D.A., Edayar
Muppathadam
Ernakulam - 683110

Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office
Ernakulam
2) The Senior Environmental Engineer
KSPCB, ESC Floor



ANNEXURE 8(2)

☎ General: 0474- 2312910, 2318153, 2343154, 2318145 Chairman: 2318150 Member Secretary: 2318151
e-mail: chm.kspcb@gov.in, ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD



കേരള സംസ്ഥാനതല മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pallam P.O., Thiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1078/2024-SEE-1

Date: 29/07/2024

To

Reg. with AID

M/s Sunrise TSR Factory,
Industrial Development Area,
P.O. Edayar, Kerala

Sub :- Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of The Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in The Water (Prevention & Control of Pollution) Act 1974, The Air (Prevention & Control of Pollution) Act 1981 and The Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board.

WHEREAS the Committee inspected your unit (i.e., ETP area) on 10.07.2024. Based on the inspection findings of the Committee and in exercise of the powers conferred under Section 5 of The Environment (Protection) Act, 1986, you are hereby directed to ensure the following and submit a compliance report:

1. Construct and maintain proper drains to direct the entire storm water into a common drain and fix the storm water outlet points to river/ common drain

ANNEXURE 8(f)

and fix the stormwater outlet point to river Penyar complying to the discharge norms as per granted Consents/ common drain of DIC whichever possible with clear visibility and easy access. Provide a delay pond before the discharge point.

2. A pH meter is also connected to the discharging water at the discharge outlets and the pH values are displayed for public notice and records maintained.
3. Flowmeters are also fitted at the outlet discharge point (s) to know the total volume of water being discharged into the riverine system/drain and records maintained.
4. Prepare and submit a latest lay out plan (PDF document) of your industry showing all the buildings, machineries, individual ETPanks, raw material/ products/ by products / hazardous waste storage area, storm water drains with its outlet point marked etc. All the above shall be clearly indicated and labelled in the above mentioned drawing.
5. Submit average monthly production details with quantity for the last one year.
6. Submit water balance data based on actual water consumption/ effluent generation/ reuse for last six months.
7. Performance evaluation of the existing ETP be carried out through an institute of repute and modification/ rectification / latest technology adaptation as per requirement shall be carried out if required and submit the performance evaluation report to Board.
8. Prepare a flow chart of ETP showing all unit operations including tank capacities, retention time etc. and the same shall be displayed at the ETP area.
9. Maintain log book in which the flow meter readings are regularly entered. Ensure that flow meter provided are functioning properly.
10. Maintain stock register for chemicals used in the ETP if chemical addition is provided.

ANNEXURE 8(P)

11. Provide 360° rotating night vision camera in the back yard of the unit and at the ETP area and share the live visuals with the Board.
12. Ensure adequate lighting in the ETP area upto river side of your unit.
13. Keep the industry premises always hygienic and ensure that adequate sanitation facilities are provided to the workers. Facilities shall be provided for the collection and disposal of solid waste including garbage/food waste.
14. Ensure that the domestic effluent is discharged through properly designed septic tank- soakpit facility of adequate capacity.

NOW THEREFORE, you are hereby directed to submit compliance report to the Board on the above within fifteen days of receipt of this directions, failing which further action would be initiated under The Environment (Protection) Act, 1986



For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office
Ernakulam

2) The Senior Environmental Engineer
KSPCB, ESC Floor

ANNEXURE 8(2)

☎ General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: chn.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Chiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004

**KSPCB/1078/2024-SEE-1****Date: 29.07.2024**

To

Reg. with A/D

The Executive Engineer,
Irrigation Division,
Ernakulam

Sub :-Directions under Section 5 of the Environment (Protection) Act, 1986

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of The Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in The Water (Prevention & Control of Pollution) Act: 1974, The Air (Prevention & Control of Pollution) Act 1981 and The Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board.

WHEREAS Committee conducted inspection in the Eloor Edayar industrial area on 24.06.2024, 25.06.2024 & 10.07.2024. Based on the inspection findings of the Committee and in exercise of the powers conferred under Section 5 of The Environment (Protection) Act, 1986, you are hereby directed to ensure the following and submit a compliance report:

ANNEXURE 8(g)

1. The Irrigation Department shall regularly operate the shutters of Regulator Cum Bridge (RCB) of Pathalam and Manjummal so as to maintain minimum flow in all the seasons i.e., 15% to 20% of the average lean season flow of river Periyar (Order of the Hon'ble NGT dated 09.08.2017 passed in OA No. 498/2015 may please be referred).
2. Protocol for Operation of Regulator cum bridge(s) covering relevant aspects including alerts to the local public, informing Pollution Control Board about opening of shutters, Emergency Response in consultation with the State Disaster Management Authority and the authorities responsible for taking necessary remedial measures in the event of any disaster shall be prepared and implemented on priority.
3. Expedite the feasibility of construction of walkway, dyke wall etc.in the Periyar River bank at the Edayar industrial belt so as to have better surveillance in the area.
4. Clear the bushes, weeds and grasses at the river banks (in the Eloor Edayar industrial belt) periodically to ensure the smooth flow in the riverine system and to obtain a clear vision through surveillance cameras.
5. Periodic desilting, desludging and de-weeding at the upstream and downstream regions of Pathalam bund using suitable machineries be carried out
6. Storm water drains and the drains through which the effluents are allowed to be discharged by the Industries shall be identified on priority and their locations are mapped on priority. Also, provision of measurement of flow in all the drains joining river Periyar shall be made and the flow as well as the quality of water being discharged in these drains shall be measured at least on a monthly basis and records maintained.

ANNEXURE 3

7. Real Time Water Quality Monitoring Station (RTWQMS) shall be installed at suitable locations on the d/s of Eloor-Edayar industrial area on river Periyar and measurement of flow and relevant water quality parameters such as DO, TSS, EC, BOD, COD etc., and the monitored data shall be shared in the server of Board.

NOW THEREFORE, you are hereby directed to submit compliance report to the Board on the above within fifteen days of receipt of this directions, failing which further action would be initiated under The Environment (Protection) Act, 1986.



For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

- Copy to: 1) The Chief Environmental Engineer
KSPCB
Regional Office
Ernakulam
- 2) The Senior Environmental Engineer
KSPCB, ESC Eloor

ANNEXURE 2(A)

General: 0471-2312916, 2318153, 2318154, 2318155 Chairman, 2318150 Member Secretary: 2318151
e-mail: chm.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാനതല മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram - 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1078 /2024-SEE-1

Date: 29.07.2024

To

Reg. with A/D

**The General Manager
District Industries Centre (DIC)
Kakkanad, Ernakulam**

Sub :- Directions under section 5 of the Environment (Protection) Act, 1986

Ref: This office letter dated 05.07.2024

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of The Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the authority for enforcing Environmental legislations, in The Water (Prevention & Control of Pollution) Act 1974, The Air (Prevention & Control of Pollution) Act 1981 and The Environment (Protection) Act, 1986 in the Kerala State;

WHEREAS as per the order dated 10.06.2024 of Hon'ble High Court of Kerala, in W.P. (C) Nos. 9534/2020, 996/2012 and 31236/2023 related to pollution of river Periyar, a Committee was constituted with the following members.

1. The Secretary, Directorate of Environment and Climate Change, Government of Kerala
2. Director, Directorate of Environment & Climate Change
3. The Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore
4. The Chairperson, Kerala State Pollution Control Board.

WHEREAS Committee conducted inspection in the Eloor Edayar industrial area on 24.06.2024, 25.06.2024 & 10.07.2024.. Based on the inspection findings of the Committee and in exercise of the powers conferred under Section 5 of The Environment (Protection) Act, 1986, you are hereby directed to ensure the following and submit a compliance report":

ANNEXURE 8(h) 2

1. It is observed that the drains in industries carrying storm water through the industrial area are all completely closed with concrete slabs. Thereby, it was not possible to check whether there are any illegal/unauthorised industrial effluent discharges into these drains. Hence it is directed that at all such junctions where industrial storm water outlets meet the common storm water drain, a suitable provision (a manhole or grilled cover) for clear visibility inside the drain must be provided.
2. Any illegal industrial effluent discharges outlets into the storm water drains in the industrial area shall be closed with immediate effect, and only storm water from industries should be allowed to discharge.
3. The storm water drain work progressing near Sunrise TSR Industry shall be completed at the earliest.
4. All the storm water drains in the Edayar industrial area shall have a delay pond and the storm water from the storm water drains free from pollutants and the storm water conforming to the discharge norms only shall be discharged into the riverine system.
5. All the common storm water drains which pass through individual industry premises shall be realigned outside the premises of the industry and within a common property of the DIC, wherever feasible.
6. It shall be ensured that adequate sanitary facilities and sewage management facilities are provided for labour working in the industries while granting permission to the industries by DIC

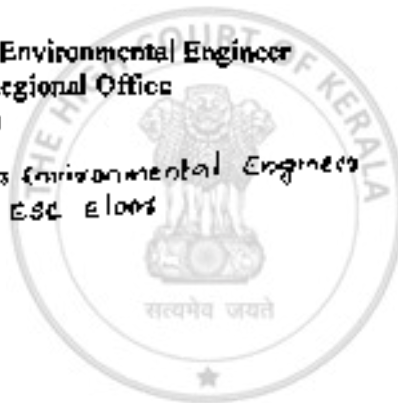
ANNEXURE 8 (A)

NOW THEREFORE, you are hereby directed to submit compliance report to the Board on the above within fifteen days of receipt of this directions, failing which further action would be intiated under The Environment (Protection) Act, 1986.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD


CHAIRPERSON

Copy to: 1) The Chief Environmental Engineer
KSPCB, Regional Office
Eranakulam
2) The Senior Environmental Engineer
KSPCB, ESC Elangudi



Annexure-9

TABLE-I-INDUSTRY SAMPLES

Date of sampling-10.07.2024

Sl No	Parameter	Alpharadi (Crack) Rubber		Saurat TSE Factory		TMS Leathers		Majra Rubber Tech Industries		Organic Fertilizers		Coccol Nitrates And Buzil Lal	
		Value	Limit	Value	Limit	Value	Limit	Value	Limit	Value	Limit	Value	Limit
1	pH(25°C)	7.47	6.4-8.4	7.32	6.4-8.5	6.45	6.4	7.47	6.4-8.5	8.1	6.5-8.5	6.40	6.4-8.5
2	TSS (mg/L)	156	100	12	100	NDL	50	11	100	NDL	100	121	100
3	Oil & Grease	NDL	10	11	15	NDL	10	NDL	10	NDL	10	NDL	10
4	CaO (mg/L)	154	250	196	250	12	250	140	250	150	250	NA	NA
5	MgO (mg/L)	534	50	718	50	19	50	428	50	143	50	NA	NA
6	Total Kjeldahl Nitrogen (mg/L)	14.34	50	21.34	50	NA	NA	81.5	50	NA	NA	NA	NA
7	Sulfate (mg/L)	152	2	152	2	8	2	152	2	152	2	NA	NA
8	Ammonical Nitrogen (mg/L)	28	25	44.24	25	NA	NA	30.50	25	112.96	50	NA	NA
9	TDS (mg/L)	NA	NA	NA	NA	1796	2100	NA	NA	NA	NA	NA	NA
10	Hexavalent Chromium (mg/L)	NA	NA	NA	NA	NDL	0.1	NA	NA	NA	NA	NDL	1
11	Total Chromium (mg/L)	NA	NA	NA	NA	NDL	2	NA	NA	NA	NA	NDL	2

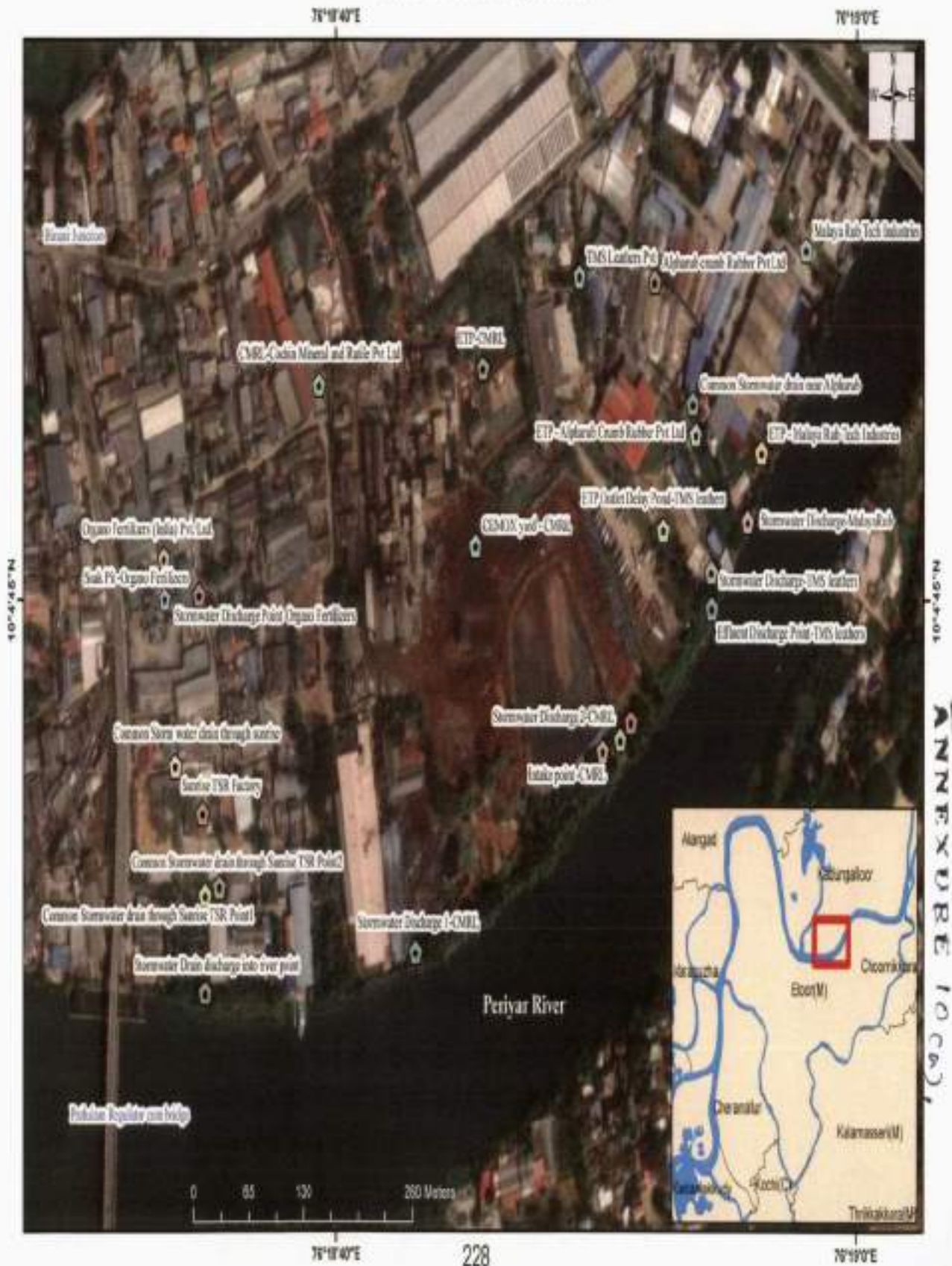
ANNEXURE 9 (C)

TABLE 2 - INDUSTRY SAMPLES - STORMWATER

Date of sampling: 10.12.2024

S. No.	Source of sample	Sample point	pH (SFC)	COD (mg/L)	BOD (mg/L)	Chloride (mg/L)	Magnesium (mg/L)	TSS (mg/L)	Colour (mg/L)	Electrical Conductivity (mg/L)	Cadmium (mg/L)	Total Hardness (mg/L)	Sulphate (mg/L)	Iron (mg/L)	Ammonical Nitrogen (mg/L)	Phosphate (mg/L)	BOD (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Soluble (mg/L)	TSS (mg/L)	Hexavalent Chromium (mg/L)	Total Chromium (mg/L)
1	Highland Urinal Building	Stormwater drain of Highland Urinal roller	6.8	48	BOD	134	48.1	11	16.1	662	112	146	41	0.044	3.92	82	5.7	8.94	15.2			
2	Sample TSS Factory 1	Canter stationer drain of Sample TSS Factory 1	7.72	254	BOD	1052	92	1441	36.1	1150	25	106	306	2.63	50.4	44	31.6	50.14	11.2			
3	Sample TSS Factory 2	Sample stationer drain of Sample TSS Factory 2	7.96	48	BOD	2304	38.38	65	99.2	1300	16	180	114	0.546	14.81	47	15	43.4	11.3			
4	TMS Lenders	Stormwater drain of TMS Lenders	7.74	34	BOD	1234	412.3	BOD	4	3416	136	1300	12	25.362	3.92	41	12		1	221	BOD	BOD
5	Organic Fertilizer	Stormwater drain of Organic Fertilizer	7.81	46	BOD	1152	34	36	572	633	35.6	123	34	0.067	27.4	47	38		14.4			
6	Crude Oil Repairs	Stormwater drain of Crude Oil Repairs	7.71	72	BOD	250.1	BOD	54	10.4	1304	BOD	BOD	24	324.08	2.34	42				BOD	BOD	
7	Crude Oil Refinery	Stormwater drain of Crude Oil Refinery	7.06	56	BOD	1485	42.2	74	32.1	995	25.6	218	148	2.31	15.07	24				BOD	BOD	

Field Visit Location Map 10/07/2024



ANNEXURE 10 (c)

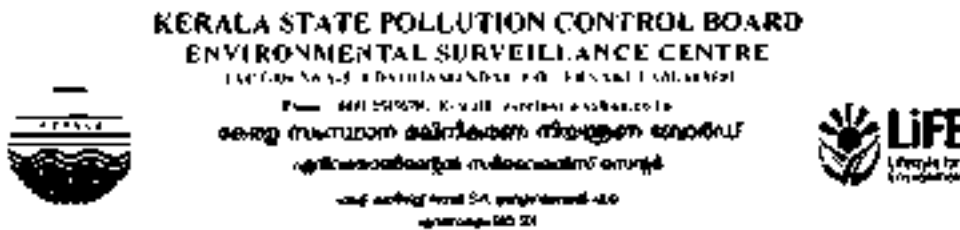
Field Visit Location Map 18/07/2024





memo/2024

ANNEXURE II



22-10-2024

PCB/HO/EKM/ICO/468/2011

Ref: 1) Consent No : PCB/HO/EKM-3/ICO-R/01/2023 valid up to 30.06.2028
 2) Analysis report No PCB/CL/539/2024-25 dated 22/08/2024
 (Enclosed herewith)

CONSENT REVOKE INTENTION NOTICE

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of environmental legislations, the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981 and the Environment (Protection) Act, 1986 in the state;

WHEREAS M/s Cochin Minerals and Rutile Limited, Industrial Development Area, Edayar, Muppathadam P O, Ernakulam - 683110 (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS you were bound to comply with the conditions of the Consent referred (1) issued by the Board as per Section 21 of Air (Prevention and Control of Pollution) Act, 1981 and Section 25 of Water (Prevention and Control of Pollution) Act, 1974;



HISTORICAL

ANNEXURE 11(a)

WHEREAS unit was inspected on 10.07.2024 by Committee constituted as per the order dated 10/06/2024 of Hon'ble High court of Kerala in W.P.(C) Nos 9534/2024, 996/2012 and 31236/2023 related to pollution of river Periyar and samples were collected from ETP outlet;

WHEREAS As per the analysis report cited above, the following parameter in the effluent sample taken from your unit on 10.07.2024 was found to be high

Parameter	Value	Permissible Limit
Total Suspended Solids	121 mg/L	100 mg/L

WHEREAS the above consented parameter are not meeting the prescribed limits, violating the consent condition;

WHEREAS the exceedance of the above parameter indicates the inefficiency in the operation of ETP/ inadequacy of the ETP;

NOW THEREFORE in exercise of the powers conferred under section 27 of Water (Prevention and Control of Pollution) Act, 1974 Board intends to revoke the Consent issued due to the above reasons. You are hereby directed to show cause if any within 15 days of receipt of this notice as to why the Consent to Operate given shall not be revoked.

Dated this the 21.10.2024,

For and on behalf of the

KERALA STATE POLLUTION CONTROL BOARD

Signed by

Shiju M A

Date: 22-10-2024 14:29:05

SENIOR ENVIRONMENTAL ENGINEER

To

M/s Cochin Minerals and Rutile Limited,
Industrial Development Area, Edayar,
Muppathadam P O, Ernakulam – 683110

Copy to: The Chief Environmental Engineer.

GATEWAY TO KERALA

P. 15/10/2024

ANNEXURE 11/3)

KSPCB, Regional Office, Ernakulam



ANNEXURE 11(4)


**KERALA STATE POLLUTION CONTROL BOARD
CENTRAL LABORATORY**

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

കേന്ദ്ര പരീക്ഷണശാല

An Environmental Laboratory recognised under E(P)A 1986

TC 8325

**TEST REPORT**

Analysis Report No.	PCB/CL/339/2024-25	Date	22.08.2024	Format No.	PCB/CL/CH/F-7
Ref. No.	PCB/ESC/CO-19/08 Dated 11.07.2024	Date of Collection	10.07.2024		
Received From	Environmental Surveillance Centre, Eloor	Date of Receipt	11.07.2024		
No. of Sample	02	Period of Analysis	12.07.2024 - 20.08.2024		
Source	ETP outlet of CMRL (Effluent)	Scientist-in-charge	Dr. Josemin		
Sample Condition	Fit for analysis	Sample Type	Water Samples		
Sample collected by	The Senior Environmental Engineer, Environmental Surveillance Centre, Eloor.	Sample volume & container type	Plastic Can		
Sample preservation	As per APHA/IS:2025 (Part-1)	Type of Test	Chemical		

SAMPLE ID: CMRL-ETP

Sl. No	Parameters	Unit	Value	Test Method	Lowest Detection Limit
1	pH	---	6.93	APHA, 4500-H+B, 24 th Ed., 2023	1
2	Total Suspended Solids	mg/L	121	APHA, 2540-D, 24 th Ed., 2023	10 mg/L
3	Oil & Grease	mg/L	BDL	APHA, 5520-B, 24 th Ed., 2023	10 mg/L

SAMPLE ID: CMRL-ETP-HM

Sl. No	Parameters	Unit	Value	Test Method	Lowest Detection Limit
1	Hexavalent Chromium	mg/L	BDL	APHA, 3500-Cr-B, 24 th Ed., 2023	0.01 mg/L
2	Total Chromium	mg/L	BDL	APHA, 3120-B, 24 th Ed., 2023	0.03 mg/L

--End of Report--

Checked By

Sowmya T M
Assistant Scientist

Authorised By

Dr. JOSEMIN

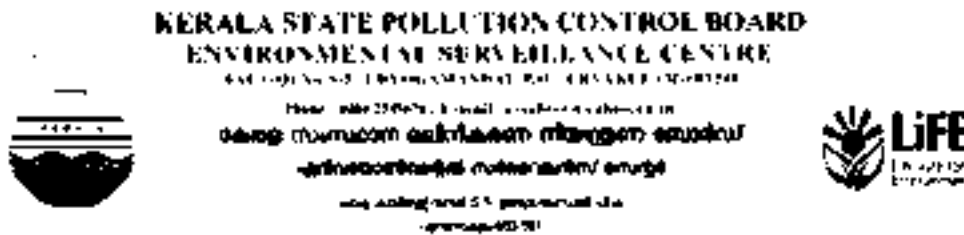
Note: The test results relate only to the sample submitted for analysis and it shouldn't be reproduced except in full without the written permission of the authorized signatory of the lab.

GANDHI NAGAR, KOCHI - 682 020 (phoneline), 0471 - 492 020
Ph: 0474 220 7781, EPA BX: 0474 220 7743 - 86, Fax: 0474 - 220 7781, Mob: 9447975781
E Mail: kspcbstkun@gmail.com, kspcbenvtp@gmail.com Web: www.keralapcb.kn-fo
Certified for OHSMIS (ISO 45001:2018)



0008

ANNEXURE 11(5)



21-10-2024

PCB/ESC/CO-472/14

Ref: 1) Inspection conducted by the Board officials on 10/07/2024
 2) Analysis report No - PCB/CL/540/2024-25 dated 22/08/2024
 (Enclosed herewith)

SHOW CAUSE NOTICE

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of environmental legislations, the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981 and the Environment (Protection) Act, 1986 in the state;

WHEREAS M/s Organo Fertilizers (India) Pvt Ltd. Industrial Development Area, Edayar, Muppathadam P.O., Aluva, Pin: 683110 (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS you were bound to comply with the conditions of the Board as per Section 21 of Air (Prevention and Control of Pollution) Act, 1981 and Section 23 of Water (Prevention and Control of Pollution) Act, 1974;

WHEREAS unit was inspected on 10.07.2024 by Committee constituted as per the order dated 10/06/2024 of Hon'ble High court of Kerala in W.P.(C) Nos 9534/2024, 996/2012 and 31236/2023 related to pollution of river

ANNEXURE 11(6)

Periyar and samples were collected from ETP outlet:

WHEREAS As per the analysis report cited above, the following parameter in the effluent sample taken from your unit on 10.07.2024 was found to be high.

Parameter	Value	Permissible Limit
Ammoniacal Nitrogen	1139.6mg/L	50 mg/L
Sulphide	15.2 mg/L	2 mg/L

WHEREAS the above consented parameters are not meeting the prescribed limits, violating the consent condition;

WHEREAS the exceedance of the above parameters indicates the inefficiency in the operation of ETP; inadequacy of the ETP;

NOW THEREFORE you are directed to show cause within 15 days why further actions shall not be initiated for non-compliance with condition of Consent.

Dated this the 21.10.2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD



SENIOR ENVIRONMENTAL ENGINEER

SENIOR ENVIRONMENTAL ENGINEER
KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
GLOOR, LIPYOGANADAL - 695 001

To

M/s Organo Fertilizers (India) Pvt Ltd,
Industrial Development Area, Edayar,
Muppathadam .P.O., Aluva . Pin: 683110

Copy to: The Chief Environmental Engineer,
KSPCB . Regional Office , Ernakulam



ANNEXURE
KERALA STATE POLLUTION CONTROL BOARD
CENTRAL LABORATORY
കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
കേന്ദ്ര പരീക്ഷണശാല
 An Environmental Laboratory recognised under E(P)A 1986



TC 8515

TEST REPORT

Analysis Report No.	PCB/CL/540/2024-25	Date	23.08.2024	Format No.	PCB/CL.CH.F.1
Ref. No.	PCB/ESC/CO-472 Dated 11.07.2024	Date of Collection	10.07.2024		
Received From	Environmental Surveillance Centre, Elour	Date of Receipt	11.07.2024		
No. of Sample	01	Period of Analysis	12.07.2024 - 20.08.2024		
Source	Filter outlet of Organic Fertilizers (EFFluent)	Scientist-in-charge	Dr. Josemm		
Sample Condition	Fit for analysis	Sample Type	Water Samples		
Sample collected by	The Senior Environmental Engineer, Environmental Surveillance Centre, Elour.	Sample volume & container type	Plastic Can		
Sample preservation	As per APHA/IS:2025 (Part-1)	Type of Test	Chemical		

SAMPLE ID: ORG-ETP

Sl. No	Parameters	Unit	Value	Test Method	Lowest Detection Limit
1	pH	---	8.4	APHA, 4500-FO D, 24 th Ed., 2023	1
2	Total Suspended Solids	mg/L	BDL	APHA, 2540-F, 24 th Ed., 2023	10 mg/L
3	Oil & Grease	mg/L	BDL	APHA, 5520-B, 24 th Ed., 2023	10 mg/L
4	BOD	mg/L	30.3	IS 2025 Part-4A, 1993	2 mg/L
5	COD	mg/L	136	APHA, 5520-B, 24 th Ed., 2023	4 mg/L
6	Ammoniacal Nitrogen	mg/L	1139.6	APHA-4500 NH3-C, 24 th Ed., 2023	0.02 mg/L
7	Sulphide	mg/L	15.2	APHA, 4500 S, 24 th Ed., 2023	1 mg/L

--End of Report--

Checked By

Sowmya T M
Assistant Scientist

Authorised By

Note: The test results relate only to the sample submitted for analysis and it shouldn't be reproduced except in full without the written permission of the authorised signatory of the lab.

GANDHI NAGAR, KOCHI - 682 020 നമ്പൂനാട്, കൊച്ചി - 682 020
 Ph: 6484 220 7781, EPABX: 0484 220 7783 - 86, Fax: 0484 - 220 7781, Mob: 9447975741
 E-Mail: kspcb@kspcb.org, kspcbnwp@gmail.com Web: www.keralapcb.org
 Certified for OHSMS (ISO 45001:2018)



ANNEXURE 11(8)

**KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE**

കേരള സംസ്ഥാന പരിസ്ഥിതി മലിനീകരണ നിയന്ത്രണ ബോർഡ്
പരിസ്ഥിതി നിരീക്ഷണ കേന്ദ്രം

മലയാളം മലയാളം മലയാളം മലയാളം മലയാളം

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21-10-2024

PCB/ESC/CO-CO-176/2012

Ref: 1) Consent No: PCB/ESC/CO/IC-133/R4/2022 valid up to 31.12.2026
2) Analysis report No PCB/CL/518/2024-25 dated 22/08/2024
(Enclosed herewith)

CONSENT REVOKE INTENTION NOTICE

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of environmental legislations, the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981 and the Environment (Protection) Act, 1986 in the state;

WHEREAS M/s Malaya Rub Tech Industries, IDA, Edayar, Muppathadam P. O., Aluva, Muppathadam, P.O. Pin 683110 (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS you were bound to comply with the conditions of the Consent referred (1) issued by the Board as per Section 21 of Air (Prevention and Control of Pollution) Act, 1981 and Section 25 of Water (Prevention and Control of Pollution) Act, 1974;

WHEREAS unit was inspected on 10.07.2024 by Committee constituted as

ANNEXURE 11/91

per the order dated 10/06/2024 of Hon'ble High court of Kerala in W.P.(C) Nos 9534/2024, 996/2012 and 31236/2023 related to pollution of river Periyar and samples were collected from ETP outlet;

WHEREAS As per the analysis report cited above, the following parameter in the effluent sample taken from your unit on 10.07.2024 was found to be high.

Parameter	Value	Permissible Limit
BOD	62.8mg/L	30 mg/L
COD	400 mg/L	250 mg/L
Sulphide	15.2 mg/L	2 mg/L
Ammoniacal Nitrogen	56.56 mg/L	25 mg/L
Total Kjeldhal Nitrogen	81.76 mg/L	50 mg/L

WHEREAS the above consented parameters are not meeting the prescribed limits, violating the consent condition;

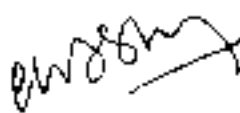
WHEREAS the exceedance of the above parameters indicates the inefficiency in the operation of ETP/ inadequacy of the ETP;

NOW THEREFORE in exercise of the powers conferred under section 27 of Water (Prevention and Control of Pollution) Act, 1974 Board intends to revoke the Consent issued due to the above reasons. You are hereby directed to show cause if any within 15 days of receipt of this notice as to why the Consent to Operate given shall not be revoked.

Dated this the 21.10.2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD




SENIOR ENVIRONMENTAL ENGINEER

To
M/s. Malaya Rub Tech Industries.

SENIOR ENVIRONMENTAL ENGINEER
KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
GROUND FLOOR, UDOOGA MANNAAL - 683 901

ANNEXURE 1(10)

IDA. Edayar, Muppathadam P. O.,
Aluva, Muppathadam, P.O.
Pin 683110

Copy to: The Chief Environmental Engineer,
KSPCB . Regional Office . Ernakulam





ANNEXURE II (A) **KERALA STATE POLLUTION CONTROL BOARD** **CENTRAL LABORATORY**

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
കേന്ദ്ര പരിഷ്ക്കരണശാല

An Environmental Laboratory recognised under EPA/IA 1986

TC 8535

TEST REPORT

Analysis Report No.	PCB/CL/538/2024-25	Date	22.08.2024	Form No. PCB/CL, CH/17-1
Ref. No.	PCB/ESC/CC-176/12 Dated 11.07.2024	Date of Collection	10.07.2024	
Received From	Environmental Surveillance Centre, Eloor	Date of Receipt	11.07.2024	
No. of Sample	01	Period of Analysis	12.07.2024 - 20.08.2024	
Source	Filter outlet of Malaya Rub Tech Industries (Effluent)	Scientist-in-charge	Dr. Josemin	
Sample Condition	Fit for analysis	Sample Type	Water Samples	
Sample collected by	The Senior Environmental Engineer, Environmental Surveillance Centre, Eloor.	Sample volume & container type	Plastic Can	
Sample preservation	As per APHA/IS:3025 (Part-1)	Type of Test	Chemical	

SAMPLE ID: MAL-ETP

Sl. No	Parameters	Unit	Value	Test Method	Lowest Detection Limit
1	pH	...	7.67	APHA, 4500-H+B, 24 th Ed., 2023	1
2	Total Suspended Solids	mg/L	81	APHA, 2540 D, 24 th Ed., 2023	10 mg/L
3	Oil & Grease	mg/L	NDL	APHA, 5520-B, 24 th Ed., 2023	10 mg/L
4	BOD	mg/L	62.8	IS 3025 Part 441, 1993	2 mg/L
5	COD	mg/L	400	APHA, 5220-B, 24 th Ed., 2023	4 mg/L
6	Total Kjeldahl Nitrogen	mg/L	81.76	APHA, 4500-N org H, 24 th Ed., 2023	0.2 mg/L
7	Sulphide	mg/L	13.2	APHA, 4500 S2 F, 24 th Ed., 2023	1 mg/L
8	Ammoniacal Nitrogen	mg/L	56.56	APHA-4500 NH3-C, 24 th Ed., 2023	0.02 mg/L

--End of Report--

Checked By

Sowmya T M
Assistant Scientist

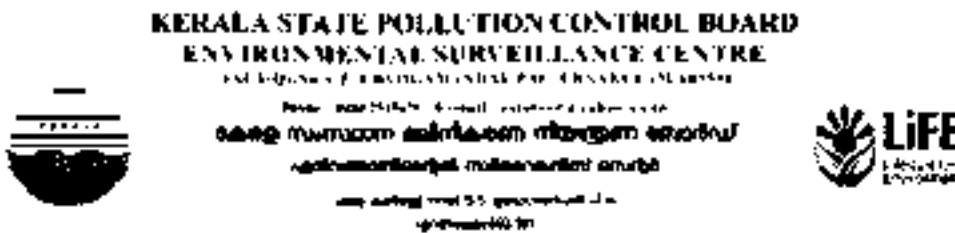
Authorised By

Note: The test results relate only to the sample submitted for analysis and it should not be reproduced except in full without the written permission of the authorised signatory of the lab.

GANDHI NAGAR, KOCHI - 682 020 ഞാമ്പിനാർ, കൊച്ചി - 682 020
Ph: 0484 220 7781, FAX: 0484 220 7783 - 86, Fax: 0484 - 220 7782, Mob: 9447975781
E Mail: kspcbclerk@gmail.com, kspcbnwmp@gmail.com Web: www.keratapcb.in
Certified for QMSMS (ISO 45001:2018)



ANNEXURE 1(1/2)



21-10-2024

PCB/ESC/CO-95/07

Ref: 1) Consent No: PCB/ESC/CO/IC-490/R1/23 valid up to 30.06.2028
 2) Analysis report No- PCB/CL/537/2024-25 Dated 20.08.2024
 (Enclosed herewith)

CONSENT REVOKE INTENTION NOTICE

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of environmental legislations, the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981 and the Environment (Protection) Act, 1986 in the state;

WHEREAS M/s. TMS Leathers, I.D.A., Edayar, Muppathadom, Ernakulam-683110, (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS you were bound to comply with the conditions of the Consent referred (1) issued by the Board as per Section 21 of Air (Prevention and Control of Pollution) Act, 1981 and Section 25 of Water (Prevention and Control of Pollution) Act, 1974:

WHEREAS unit was inspected on 10.07.2024 by Committee constituted as per the order dated 10/06/2024 of Hon'ble High court of Kerala in W.P.(C) Nos 9534/2024, 996/2012 and 31236/2023 related to pollution of river

ANNEXURE 11 (13)

Periyar and samples were collected from ETP outlet;

WHEREAS As per the analysis report cited above, the following parameter in the effluent sample taken from your unit on 10.07.2024 was found to be high.

Parameter	Value	Permissible Limit
Sulphide	8 mg/L	2 mg/L

WHEREAS the above consented parameters are not meeting the prescribed limits, violating the consent condition;

WHEREAS the exceedance of the above parameters indicates the inefficiency in the operation of ETP/ inadequacy of the ETP;

NOW THEREFORE in exercise of the powers conferred under section 27 of Water (Prevention and Control of Pollution) Act, 1974 Board intends to revoke the Consent issued due to the above reasons. You are hereby directed to show cause if any within 15 days of receipt of this notice as to why the Consent to Operate given shall not be revoked.

Dated this the 21.10.2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD




SENIOR ENVIRONMENTAL ENGINEER

To

M/s. TMS Leathers,
I.D.A., Edayar, Muppathadam,
Ernakulam-683110.

SENIOR ENVIRONMENTAL ENGINEER
KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
FLOOR, UTHOGAMANGAL-683 911

Copy to: The Chief Environmental Engineer,
KSPCB, Regional Office, Ernakulam

ANNEXURE 11/14

KERALA STATE POLLUTION CONTROL BOARD
CENTRAL LABORATORYകേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
കേന്ദ്ര പരിരक्षणശാല

An Environmental Laboratory recognised under EPA 1986

TC 8525

TEST REPORT

Analysis Report No.	PCB/CL/537/2024-25	Date	20.08.2024	Format No.	PCB/CL/CH/1-7
Ref. No.	PCB/SC/CO-48/07 Dated 11.07.2024	Date of Collection	10.07.2024		
Received From	Environmental Surveillance Centre, Floor	Date of Receipt	11.07.2024		
No. of Sample	02	Period of Analysis	12.07.2024 - 20.08.2024		
Source	ETP outlet of TMS Leather effluent.	Scientist-in-charge	Dr. Josephil		
Sample Condition	Fat for analysis	Sample Type	Water Samples		
Sample collected by	The Senior Environmental Engineer, Environmental Surveillance Centre, Floor.	Sample volume & container type	Plastic Can		
Sample preservation	As per APHA 15:3025 (Part-1)	Type of Test	Chemical		

SAMPLE ID: TMS-ETP

Sl. No	Parameters	Unit	Value	Test Method	Lowest Detection Limit
1	pH		8.05	APHA, 4500-H-19.24 th Ed., 2023	1
2	Total Suspended Solids	mg/L	BDL	APHA, 2540-D, 24 th Ed., 2023	10 mg/l
3	Oil & Grease	mg/l	BDL	APHA, 5520-D, 24 th Ed., 2023	10 mg/l
4	Sulphide	mg/l	8	APHA, 4500-S2 E, 24 th Ed., 2023	1 mg/l
5	Total Dissolved Solids	mg/l	1796	APHA, 2540-C, 24 th Ed., 2023	10 mg/l
6	COD	mg/L	12	APHA, 5220-B, 24 th Ed., 2023	4 mg/l
7	BOD	mg/L	5.9	IS 3025 Part (4): 1993	2 mg/l

SAMPLE ID: TMS-ETP-HM

Sl. No	Parameters	Unit	Value	Test Method	Lowest Detection Limit
1	Hexavalent Chromium	mg/l	BDL	APHA, 3500-Cr-18, 24 th Ed., 2023	0.05 mg/l
2	Total Chromium	mg/l	BDL	APHA, 3120 Cr, 24 th Ed., 2023	0.02 mg/l

-End of Report-

KANITHI NAGAR, KCR Hill - 682 020 (Kottayam), Kerala
 Ph: 0484 220 7781, Fax: 0484 220 7783 - 80, Fax: 0484 - 220 7781, Mob: 9847975241
 E Mail: kspc@kspcmail.com, kspc@kspcmail.com With: www.kspc.kerala.gov.in
 Certified to ISO 15189 (2013) 05001:2019



ANNEXURE 11(15)

Checked By
Sowmya T M
Assistant Scientist

Authorized By

Note: The test results relate only to the sample submitted for analysis and it shouldn't be reproduced except in full without the written permission of the authorised signatory of the lab.



ANNEXURE 11(16)



21-10-2024

PCB/ESC/CO-40/07

Ref: 1) Consent No : PCB/ESC/IC-681/R4/2023 valid up to 31.01.2028
 2) Analysis report No. PCB/CL/542/2024-25 Dated 22/08/2024
 (Enclosed herewith)

CONSENT REVOKE INTENTION NOTICE

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974;

WHEREAS the Board is the enforcing authority of environmental legislations, the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981 and the Environment (Protection) Act, 1986 in the state;

WHEREAS M/s Alphanub Crumb Rubber P Ltd, V/793, 1DA, Edayar, Aluva, Pin -683110 (here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS you were bound to comply with the conditions of the Consent referred (1) issued by the Board as per Section 21 of Air (Prevention and Control of Pollution) Act, 1981 and Section 25 of Water (Prevention and Control of Pollution) Act, 1974;

WHEREAS unit was inspected on 10.07.2024 by Committee constituted as per the order dated 10/06/2024 of Hon'ble High court of Kerala in W.P.(C)

ANNEXURE 11(17)

Nos 9534/2024, 996/2012 and 31236/2023 related to pollution of river Periyar and samples were collected from ETP outlet;

WHEREAS As per the analysis report cited above, the following parameter in the effluent sample taken from your unit on 10.07.2024 was found to be high.

Parameter	Value	Permissible Limit
BOD	59.6 mg/L	30 mg/L
Sulphide	15.2 mg/L	2 mg/L
Total Suspended Solids	106 mg/L	100 mg/L

WHEREAS the above consented parameters are not meeting the prescribed limits, violating the consent condition;

WHEREAS the exceedance of the above parameters indicates the inefficiency in the operation of ETP/ inadequacy of the ETP;

NOW THEREFORE in exercise of the powers conferred under section 27 of Water (Prevention and Control of Pollution) Act, 1974 Board intends to revoke the Consent issued due to the above reasons. You are hereby directed to show cause if any within 15 days of receipt of this notice as to why the Consent to Operate given shall not be revoked.

Dated this the 21.10.2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD



SENIOR ENVIRONMENTAL ENGINEER

SENIOR ENVIRONMENTAL ENGINEER
KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL COMPLIANCE CENTRE
ELLOOR, CHYOGAMANDAL - 683 301

To

M/s Alpharub Chumb Rubber P Ltd,
V 793, IDA, Edayar, Alovera,
Pin -683110

Copy to: The Chief Environmental Engineer,

ANNEXURE 11 (b)

KSPCB, Regional Office, Ernakulam





ANNEXURE

KERALA STATE POLLUTION CONTROL BOARD CENTRAL LABORATORY

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
കേന്ദ്ര പരിക്ഷണശാല

An Environmental Laboratory recognised under EPA 1986

TC 8525

TEST REPORT

Analysis Report No.	PCB/CL/542/2024-25	Date	22.08.2024	Format No.	PCB/CL/CHE-7
Ref. No.	PCB/CL/SC/CO-40/07 Dated 11.07.2024	Date of Collection	10.07.2024		
Received From	Environmental Surveillance Centre, Floor	Date of Receipt	11.07.2024		
No. of Sample	01	Period of Analysis	12.07.2024 - 30.08.2024		
Source	Final treatment tank of Alpharub Crumb Rubber (Effluent)	Scientist-in-charge	Dr. Josephi		
Sample Condition	Fit for analysis	Sample Type	Water Samples		
Sample collected by	The Senior Environmental Engineer, Environmental Surveillance Centre, Floor	Sample volume & container type	Plastic Can		
Sample preservation	As per APHA/IS:3025 (Part-1)	Type of Test	Chemical		

SAMPLE ID: ALP-ETP

Sl No	Parameters	Unit	Value	Test Method	Lowest Detection Limit
1	pH	---	7.47	APHA, 4500-H+ B, 24 th Ed., 2023	1
2	Total Suspended Solids	mg/L	106	APHA, 2540-D, 24 th Ed., 2023	10 mg/L
3	Oil & Grease	mg/L	NDL	APHA, 5520-B, 24 th Ed., 2023	10 mg/L
4	COD	mg/L	18-	APHA, 5220-B, 24 th Ed., 2023	4 mg/L
5	BOD	mg/L	39.6	IS:3025 Part 44, 1993	2 mg/L
6	Total Kjeldahl Nitrogen	mg/L	14.56	APHA, 4500-N org B, 24 th Ed., 2023	0.2 mg/L
7	Sulphide	mg/L	13.2	APHA, 4500-S2 F, 24 th Ed., 2023	1 mg/L
8	Ammoniacal Nitrogen	mg/L	2.8	APHA-4500-NH3-A, 24 th Ed., 2023	0.02 mg/L

End of Report

Checked By
Sowmya P
Assistant Engineer

Authorised By

Note: The test results relate only to the sample submitted for analysis and it shouldn't be reproduced except in full without the written permission of the authorized signatory of the lab

GANDHI NAGAR, KOCHI - 682 020 (0484) 220 7781 - 86, Fax: 0484 - 220 7781, Mob: 944795741
E Mail: kspcb@kerala.gov.in, kspcbnwp@gmail.com Web: www.keralapcb.nic.in
Certified for OHSMS (ISO 45001:2018)



ANNEXURE 11(29)



21-10-2024

PCB/ESC/CO-55/2010

- Ref: 1) Consent No : PCB/ESC/CO/IC-74/R3/2022 valid up to 30.11.2024.
 2) Inspection conducted by the Board officials on 10/07/2024
 3) Analysis report No.PCB/CL/541/2024-25 dated 22.08.2024(Enclosed herewith)

CONSENT REVOKE INTENTION NOTICE

WHEREAS the Government of Kerala have constituted the Kerala State Pollution Control Board (hereinafter referred as the Board) as per Section 4 of the Water (Prevention & Control of Pollution) Act 1974:

WHEREAS the Board is the enforcing authority of environmental legislations, the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981 and the Environment (Protection) Act, 1986 in the state:

WHEREAS M/s. Sun Rise TSR Factory, Edayar, IDA, Muppathadam P.O, PIN 683110(here after will be referred as unit) comes under the purview of the Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 and is bound to comply with the provisions of the said Acts;

WHEREAS you were bound to comply with the conditions of the Consent referred (1) issued by the Board as per Section 21 of Air (Prevention and Control of Pollution) Act, 1981 and Section 25 of Water (Prevention and Control of Pollution) Act, 1974;

ANNEXURE II (iv)

WHEREAS unit was inspected on 10.07.2024 by Committee constituted as per the order dated 10/06/2024 of Hon'ble High court of Kerala in W.P.(C) Nos. 9534/2024, 996/2012 and 31236/2023 related to pollution of river Periyar and samples were collected from ETP outlet;

WHEREAS As per the analysis report cited above, the following parameter in the effluent sample taken from your unit on 10.07.2024 was found to be high.

Parameter	Value	Permissible Limit
Oil and Grease	14 mg/L	10 mg/L
Total Kjeldahl Nitrogen	53.76 mg/L	50 mg/L
Sulphide	15.2 mg/L	2 mg/L
Ammoniacal Nitrogen	44.24 mg/L	25 mg/L

WHEREAS the above consented parameters are not meeting the prescribed limits violating the consent condition;

WHEREAS the exceedance of the above parameters indicates the inefficiency in the operation of ETP / inadequacy of the ETP;

NOW THEREFORE in exercise of the powers conferred under section 27 of Water (Prevention and Control of Pollution) Act, 1974 Board intends to revoke the Consent issued due to the above reasons. You are hereby directed to show cause if any within 15 days of receipt of this notice as to why the Consent to Operate given shall not be revoked.

Dated this the 21.10.2024.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD



SENIOR ENVIRONMENTAL ENGINEER

SENIOR ENVIRONMENTAL ENGINEER
KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
ELAHOOR, UTTAMANGALAM - 686 001

11/2/24

To

M/s. Sun Rise TSK Factory,
Edayar, IDA, Muppathadam P.O.,
PIN-683110

Copy to: The Chief Environmental Engineer,
KSPCB, Regional Office, Ernakulam





ANNEXURE 11 (33)
KERALA STATE POLLUTION CONTROL BOARD
CENTRAL LABORATORY

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
 കേന്ദ്ര പരീക്ഷണശാല

An Environmental Laboratory recognised under E(P)A 1986



TC 8525

TEST REPORT

Analysis Report No.	PCB/CL/541/2024-25	Date	22.08.2024	Format No. PCB/CL/CH/I
Ref. No.	PCB/ESC/CO-55/10 Dated 11.07.2024	Date of Collection	10.07.2024	
Received From	Environmental Surveillance Centre, Eloor	Date of Receipt	11.07.2024	
No. of Sample	01	Period of Analysis	12.07.2024 – 20.08.2024	
Source	Filter outlet tank of Sunrise TSR Factory (Effluent)	Scientist-in-charge	Dr. Josemin	
Sample Condition	Fit for analysis	Sample Type	Water Samples	
Sample collected by	The Senior Environmental Engineer, Environmental Surveillance Centre, Eloor.	Sample volume & container type	Plastic Can	
Sample preservation	As per APHA/IS:3025 (Part-1)	Type of Test	Chemical	

SAMPLE ID: SUN-ETP

Sl. No	Parameters	Unit	Value	Test Method	Lowest Detection Limit
1	pH	-	7.42	APHA, 4500-H ⁺ B, 24 th Ed., 2023	1
2	Total Suspended Solids	mg/L	12	APHA, 2540-D, 24 th Ed., 2023	10 mg/L
3	Oil & Grease	mg/L	14	APHA, 5520-B, 24 th Ed., 2023	10 mg/L
4	Sulphide	mg/L	15.2	APHA, 4500 S ₂ F, 24 th Ed., 2023	1 mg/L
5	Ammoniacal Nitrogen	mg/L	44.24	APHA-4500 NH ₃ -C, 24 th Ed., 2023	0.02 mg/L
6	COD	mg/L	156	APHA, 5220-B, 24 th Ed., 2023	4 mg/L
7	BOD	mg/L	27.8	IS 3025 Part(44): 1993	2 mg/L
8	Total Kjeldahl Nitrogen	mg/L	53.76	APHA, 4500-N org B, 24 th Ed. 2023	0.2 mg/L

--End of Report--

Checked By

Sowmya T M
 Assistant Scientist

Authorised By

Dr. JOSEMIN
 Environmental Scientist

Note: The test results relate only to the sample submitted for analysis and it shouldn't be reproduced except in full without the written permission of the authorised signatory of the lab.

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ANNEXURE 12/1)

ANNEXURE-12 ACTIONS BY KERALA STATE POLLUTION CONTROL BOARD UNDER THE PROVISIONS OF VARIOUS ENVIRONMENTAL LEGISLATIONS

Eloor-Edayar area in Ernakulam district is the major industrial area in Kerala where industries are located on either sides of River Periyar in its lower stretches. The Board takes all necessary steps to ensure safe disposal of all types of wastes from these industries and to facilitate preservation of the river and ambience and also to redress the overall environmental issues in that area. An office of the Board namely Environmental Surveillance center is functioning in Eloor round the clock for continuous monitoring of the industries in Eloor area.

1. The Environmental Surveillance Center has been provided with surveillance vehicle mainly for patrolling of the Eloor - Edayar industrial belt and is done regularly. The vehicle is also utilized for the complaint enquiry.
2. The Board has installed sufficient number of surveillance cameras (CCTV cameras) with online recording facility on either bank of River Periyar at strategic points so that any untoward physical change of river water or any illegal discharge into the river from any industries or any dumping of waste can be monitored. The live and recorded details can be viewed from the control room setup in the Environmental Surveillance Center.
3. Periyar river water quality is being monitored daily at five stations such as Pathalam Bridge, Pathalam bend (upstream), Pathalam bend (downstream), Vethukodavu (downstream) and Pathalamkudavu. Board had established an online continuous water quality monitoring station in 2012, at Methanam in Periyar which is a location downstream of all major industrial activities.
4. In addition to the online water quality monitoring, the following monitoring programs are regularly carried out by the Board. Monitoring under the National Water Quality Monitoring Program (NWMP). Under this Program, seven stations in River Periyar are being monitored, among which 5 stations are located at the industrial stretch.

ANNEXURE 2(a)

5. Monthly sampling is done at 12 locations close to the discharge points of industries. All the industries are brought under the consent purview of the Board to ensure that they are operated with required pollution control facilities. The consent was issued with various conditions specifying the quality and quantity for the effluent discharge and emissions.
6. Periodical inspections are conducted by the Board to these industries as a part of compliance monitoring of the consent conditions. In case any violations are noticed, actions are taken then and there on the violations noted against such industry.
7. Notices and closure directions are also issued to the industries as and when unauthorized effluent discharge or emissions are noticed. Board also continuously monitors surveillance cameras and in case of any unauthorized discharge found or abnormally, actions are being taken against the violators.
8. Industries will be inspected on monthly/bimonthly based on the category of industries and periodical effluent samples will be collected from the authorized outlets. Since a full-fledged laboratory also is functioning under the district office, follow-up action on the basis of analysis report also can be taken without any delay.

Under the compliance monitoring, the compliance of the conditions stipulated in the consent to operate are verified in the field and if any non-compliance are noticed during enquiry, time bound direction will be given to that particular industrial unit to rectify the defect. Industries will be inspected on monthly/bimonthly based on the category of industries and periodical effluent samples will be collected from the authorized outlets. Since a full-fledged laboratory also is functioning under the district office, follow-up action on the basis of analysis report also can be taken without any delay. In order to reduce the impact of industrial pollution in the river, the Board have given certain general and specific directions to the industries located on the bank of the river. The general directions are as follows:

- i. All industries making direct discharge of treated effluent to Periyar, were directed to provide delay ponds so as to contain the effluent during any upset condition in the plant or in ETP.

ANNEXURE 12(3)

- ii. Industries were directed to provide lighting arrangements in their area near the riverbank.
- iii. As part of bringing down the consumption of water from Periyar for industrial activity, the industries were directed to reuse the treated effluent to the maximum extent possible.
- iv. All industries discharging effluent into Periyar were directed to raise their effluent discharging outlets much above the water level of the river, so that it can be clearly visible.
- v. Industries were directed to provide energy meters exclusively for the effluent treatment plants, so as to monitor the working status of the ETP.
- vi. There is a permanent bund at Pathalam area in Eloor to prevent salinity intrusion. The industries which were discharging their treated effluent upstream of the bund were directed to shift the location to the downstream of the bund and as directed by the Board, most of the industries shifted their outlet location to downstream of the bund. At present only one industry (TMS Leather) is having discharge point at the upstream of the bund.



ANNEXURE-13

ANNEXURE-13 INTERVENTIONS OF GOVERNMENT AND ITS AGENCIES AS WELL AS ACTIONS BASED ON COURT / TRIBUNAL DIRECTIONS

1. Action plan based on OA No. 395/2013 (SZ), OA No. 396/2013 (SZ) and OA No. 242/2016 (SZ) and its present status :

The Hon'ble National Green Tribunal has disposed of OA No. 395/2013 (SZ), OA No. 396/2013 (SZ) & OA No. 242/2016 (SZ) which are related to pollution issues of River Periyar with specific directions as per order dated 27.05.2022, as, Chief Secretary, Kerala to forthwith constitute a monitoring committee comprising four Additional Chief Secretaries of concerned Departments - Environment, Local Self Government, Irrigation/Water Resource and Finance. The Additional Chief Secretary, Environment will be the Coordinator. The Committee may associate Chairman of the State PCB and District Magistrates of the three concerned districts and any other experts/individual/organization. Constitution of Committee is required for coordinated action. The Committee may consider core steps required to restore the water quality of the river so as to protect the environment and public health. The Committee may also ensure that all concerned industries in the catchment area of the Periyar River in the stretch in question adopt Zero Liquid Discharge (ZLD) and are in compliance with the norms. The Committee may also ensure remedial action by the State PCB in exercise of statutory powers under the Water (Prevention and Control of Pollution) Act, 1974 against the erring industries/individuals/local bodies.

A monitoring committee comprising Secretaries of Environment, Local Self Government, Water Resources, Finance and Revenue Departments was formed vide G.O.(R) No. 52/2022/Envr dated 13.07.2022 with ACS Environment as the coordinator to review the progress of implementation of the action plan which includes short term and long term action points. Order of Hon'ble NGT dated 27.05.2022 reiterates the action plan with 83 short-term and 12 long-term measures for rejuvenation of the Periyar River as per the report of the Additional Chief Secretary dated 16.08.2021. Meetings were held by the said committee on 19.07.2022, 26.10.2022, 04.03.2023, 05.04.2023, 18.05.2023, 22.07.2023, 11.10.2023 and 05.01.2024. Review meetings by the Chief Secretary were held on 28.10.2022, 10.08.2023 and 25.03.2024. Minutes of the meetings are attached.

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It was pointed out in the meeting held on 4.3.2023 that though the action plan consists of a large number of action points, many are repetitions of the same action points which are to be implemented in different Municipalities/GPs/Corporations. Hence it is decided to combine similar activities so as to make the review easier. Accordingly the actual number of action plans condensed to 30 points in the short term action plan and 8 in the long term action plan respectively. Progress of implementation of action points were reviewed accordingly in further meetings. Then as decided in the meetings chaired by the Secretary, Environment on 11.10.2023, the action plan submitted were divided into 3 components such as 1. Non problematic/completed, 2. progressing and 3. Problematic. The problematic activities were then reviewed in detail.

The progress of implementation of the action plan was reviewed in the meeting chaired by the Environment Secretary on 25.06.2024 at the chamber of District Collector, Ernakulam. The members of the committee constituted as per the Order of the Hon'ble High Court dated 10.06.2024 in W.P.(C) Nos. 9534/2020, 996/2013 & 31236/2023 namely the Secretary, Directorate of Environment and Climate Change, Government of Kerala, the Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore and the Chairman, Kerala State Pollution Control Board and representatives of stakeholder departments have attended the meeting. Minutes of the meeting is attached.

2. Action plan based on the Order of Hon'ble NGT PB in OA 673/2018 and its present status

As per the Order of Hon'ble NGT in OA 673/2018, based on the study by the Central Pollution Control Board, 21 river stretches in Kerala were included among the 351 polluted river stretches in India identified in 2018. Stretch of Periyar river (Along Aluva-Eloor-Kolamassery) was included in Priority V. Criteria for identification of polluted river stretch is given below:

CRITERIA

Priority	BOD Values
I	>30 mg/l
II	20-30 mg/l
III	10-20 mg/l
IV	6-10 mg/l
V	3-6 mg/l

ANNEXURE (3/3)

All States and Union Territories were directed to prepare action plans for bringing all the polluted river stretches to be fit at least for bathing purposes (i.e. BOD not greater than 3 mg/L and FC not greater than 500 MPN/100 ml).

As per the order G.O.(MS)No.12/2019/WRD dated 30.04.2019, District level Technical Committee (DLTC) with representatives from Irrigation Department (Chairperson), KSPCB (Convener), LSGD, representative of District Collector etc. has been formed and meetings and field visits were conducted. As part of OA No. 673/2018 as per the Hon'ble NGT order dated 20.09.2018 Action plan was prepared by concerned departments and is being implemented. The progress of implementation is being reviewed by DLTC and River Rejuvenation Committee (RRC) constituted vide G.O. (R) No. 135/2018/Envr dated 12.12.2018 under overall supervision and co-ordination of Additional Chief Secretary, Environment Department and also by Chief Secretary. RRC meetings convened on 23.02.2022, 01.04.2022, 15.07.2022, 13.10.2022, 20/12/2022, 08.02.2023, 13.04.2023, 20.05.2023, 11.08.2023, 11.10.2023, 27.12.2023, 17.02.2024, 23.03.2024, 12.06.2024, 01.08.2024. Review meetings were convened by Chief Secretary on 31.03.2022, 19.04.2022, 26.5.2022, 21.6.2022, 15.07.2022, 23.08.2022, 18/10/2022, 21.12.2022, 09.02.2023, 31/07/2023, 06.11.2023, 25.01.2024, 08.07.2024. Quarterly reviews are being carried out by the Central Monitoring Committee based on the progress report submitted by the Board on a Monthly basis.

The Action plan prepared for Rejuvenation of Stretch of Periyar River(Aluva-Eloor-Kalamassery) contains 36 short term action plan and 3 long term actions to be implemented by Irrigation, LSGI namely Kochi Corporation, Aluva municipality, Kalamassery Municipality, Eloor Municipality, Kadungalloor GP, Choomakkara GP, KWA, KSPCB, Industries Department and Police Department and 4 actions to be implemented by Ground water Department.

The action plan prepared in OA 395/2013 and OA 673/2018 contains similar action points for restoration of River Periyar. It can be seen that even though full implementation as per initial timelines could not be achieved, many important action points have been completed which would curb a few of the earlier existing sources of pollution to the river. The actions are listed below.

ANNEXURE 13/4)

A. COMPLETED ACTIVITIES

Sl No	Activity	Implementing agency	Remarks
1	Identification of industries/ establishments / commercial complexes / flats /hotels etc. discharging sewage /wastewater to the public drain /stream/river/etc/attachment	Local bodies/KSPCB	Completed
2	a. Legacy waste management b. Solid Waste management	Munjar Grama Panchayat	a. Completed b. 4 TPD windrow plant functional
3	Installation of additional continuous online River water monitoring station	KSPCB	Completed - 2 Stations are established
4	Installation of Night Vision Surveillance Camera at the river bank side	KSPCB	7 night vision cameras installed. Total 9 cameras installed for surveillance.
5	Construction of Mini MCF in 20 wards (51 Nos)	Vandakulam GP	Completed
6	Preventing pollution of Periyar through the pipe installed near upstream of Pothalam regulator leading to Edayattuckal paddy field.	Irrigation Department	Outlet closed.
7	Discharge of sewage from township to the River through drain near Periyar Hotel shall be stopped.	Aluva Municipality	Outlets are closed and fine imposed on the violators

ANNEXURE 13/5)

2	Conservation of retaining wall with HDPE liner at Kalamaesery dumping yard in order to prevent the leachate discharge from the yard to Thonimbungal Thodu.	Kalamaesery Municipality	Completed

Completed activities for Solid & Liquid waste management (RRF, MCF, Harithukarnasa Sena, community and institutional facilities, CSTP, FSTP etc.)			
Sl. No.	Urban Local Body	Completed activities for solid & Liquid waste management (RRF, MCF, Harithukarnasa Sena, community and institutional facilities etc.)	
1	Kochi Corporation	HKS-797, MCF- 23, RRF-4 (Kaloor, Padiyath, Edappally and Mattancherry). Total no. of bins in the Thumboomuzhi -32 50 TPD BSF Plant* 2 +100 TPD construction completed and 2 plants are functional from 8th March 2024. FABCO Agency Plant processing started 25 TPD Zigma Agency Processing started 12 TPD 150 TPD CBG (BPCL plant) site clearing activities going on, the draft agreement of this project was submitted by BPCL and it was given for legal vetting, the relevant consents are to be provided by the Government of Kerala through single window clearance. For clearance, letter sent to the Honourable Principal Secretary for necessary action. Bio-mining working in progress: 2 lakh MT stabilised, approximately 99965MT waste processing completed and about 11,103.15MT RDF dispatched to cement factories. 100 KLD FSTP @ Brahmapuram (existing), 100 KLD FSTP @ Willington Island. 5 MLD at Elankulam with septage treatment facility at Kochi, Ernakulam 0.75 MLD STP owned by UCDA, International Stadium, Kaloor 0.45 MLD STP owned by UCDA, Marine drive, Kochi	
2	Thripunithura	HKS-94, Mini MCF- 5 (Functional) 7(Non functional), MCF -1. Total no. of bins in the Thumboomuzhi -13	
3	Ahva	HKS-30, MCF -1 (functional) 1(non functional), Mini MCF- 4 , Total no. of bins in the Thumboomuzhi -10	

ANNEXURE 13(6)

4	Kalamassery	HKS-64, MCF-2, RRF-1, Total no. of bins in the Thumboormuzhi - 4, No. of Functional Community Level Biogas Plants in the LSGI- 6, In LULU Mall 3 numbers of OWC (Organic Waste Converter) are functioning, 5 Bio gas plants are functioning at CUSAT campus. Credit Bins are also functioning in Flats under ULB. 10 kld STP at Kalamassery Market.
5	Eloor	HKS-28, MINI-MCF -32(Functional), MCF- 3, Total no. of bins in the Thumboormuzhi -56.
6	Angamali	HKS-39, Mini MCF-22, MCF -1, Total no. of bins in the Thumboormuzhi -9,1 ETP Capacity 25000l/day at market for liquid waste management.
7	Perumbavoor	HKS-39, Mini MCF -4 (Functional) 1 (Non Functional), MCF -1, RRF-1, Total no. of bins in the Thumboormuzhi -16, No. of Functional Community Level Biogas Plants in the LSGI-1.
8	North Perumbavoor	HKS-46, MCF-2, Mini MCF - 2' (Functional)
9	Kodungallur	HKS-83, Mini MCF-40, MCF -3, RRF-2, Total no. of bins in the Thumboormuzhi -82
10	Kattappana	HKS-61, MCF -1 (Functional) 1 (Non Functional) , Total no. of bins in the Thumboormuzhi -11

ANNEXURE (B)

B. PROGRESSING/ REGULAR ACTIVITY

No.(as per Action Plan)	Activity	ACTION	Timeline as per action plan	Status reported in meeting held on 25.06.2024
I	ALUVA MUNICIPALITY			
1	Augmentation and Revamping of existing STP at near Advaita Ashramam and to increase the capacity of STP so as to treat more sewage generated in the municipality.	LSGD- Aluva, Municipality	Dec 2019	The Secretary, Aluva Municipality reported that civil works are under progress and retendering for mechanical works being done.
2	Augmentation and Revamping of existing STP at Aluva Market and to increase the capacity of STP so as to treat more sewage generated in the municipality.	LSGD- Aluva, Municipality	2021	Secretary, Aluva Municipality explained that new projects are coming in the same area and it's been discussed whether to include this project with upcoming ones.
3	Installation of modern abattoirs	Aluva Municipality	March 2021	Secretary, Aluva Municipality reported that it is to be set up near the market premises along with a new sanctioned project of Rs. 50 Crores.

ANNEXURE 3(8)

4	Procurement of sewer cleaning machines and equipment maintenance	Aluva Municipality	March 2020	Secretary, Aluva Municipality reported that drainage cleaning activities are done regularly. JCBs are also used for carrying out the waste. Sewer machines are not purchased.
2	KALAMASSERY MUNICIPALITY			
a	Installation of plastic shredding unit	Kalamassery Municipality	June 2019	Proposed Land is where Biomining is being done. Secretary, Kalamassery Municipality reported that Biomining is at tendering stage. KSWMP needs 6 months for completion and applied for consent of PCB.
b	Constitution of squads for night surveillance for finding the unauthorized dumping of sewage at NAD wet lands Kalamassery.	Kalamassery Municipality	2020	Secretary, Kalamassery report night squad is functioning properly with regular inspections and squad includes Health Inspector and Police Officials. Fines imposed and collected from violators by the squad.
c	Installation of common STP for Kalamassery Municipality and ETP at Municipal Market	Kalamassery Municipality	December 2019	Secretary, Kalamassery Municipality reported that comprehensive proposal for renovating the market is submitted and awaiting allocation of fund.

ANNEXURE 13(9)

d	Installation of modern abattoirs including poultry and meat rendering plants.	Kalamassery Municipality, Industries Department (for land allotment)	2021	It is reported the project is held up due to land issue
3	ELLOOR MUNICIPALITY			
e	Installation of Sewage/ Septage treatment Plant.	Elloor Municipality,	2020	DC, Ernakulam reported that land of FACT is available for FSTP, Elloor and Ministry of Fertilizers is to accept the proposal. Possibility of phasing the facility for Kalamassery also to be explored.
4	IRRIGATION DEPARTMENT			
f	Identification of natural drains/thodu reaching elloor Periyar and cleaning of weeds, grasses etc	Irrigation department	2 years	Irrigation department reported that action is being taken regularly on the issue of water hyacinth growth in the river and detailed study on drains will be carried out.

ANNEXURE 13/10

b	Clearing of weeds, grasses at the river bank in order to ensure the smooth flow of water	Irrigation department	3 years	It is reported that work already completed near Puthalam and currently normal flow established.
c	Maintaining of Minimum flow in river during lean period and periodical operation of Regulators at River in-order to maintain minimum flow.	Irrigation department	3 years	EE, Irrigation explained that there are 3 KVA pumping stations and it is essential to maintain optimum head for intake of the water level in the bund. Protocol for operation of regulator is being finalized



ANNEXURE (3/11)

5	Installation of cameras at the waste dumping spots - CCTV installation			- Aluva Municipality reported that for monitoring the dump sites, CCTV cameras have been installed. - Elur Municipality have installed 84 cameras. - In Kodungallur Panchayath, at Orinjikodu 8 cameras were already installed and 2 more near MCF at Padinjare Kodungallur. 33 cameras are being installed and work orders have already been issued. - At Choomdikam Panchayat, 13 cameras are installed.
6	Construction of internal roads and proper drainage in Edryar industrial estate.	Industries Department		Completed 13 nos internal road and 1 nos of drainage. It was reported that drainage work is progressing. Fund released to PWD for maintenance and repair of internal roads and drainage work. Tender procedure is in progress.

ANNEXURE 13(12)

7	Construction of walkway, Ring roads etc at the Periyar river bank.	Irrigation Department, LSGI	4 years	Investigation works except the survey activities for the construction of surveillance road and dyke wall on the side of the industrial area has been completed. It is reported that it is suggested to construct walk way parallel to the surveillance service road
8	Monitoring of quality of water at various intake points	Kerala Water Authority	2020	It is reported by KWA officials that it is being done regularly
9	Installation of modern abattoirs including poultry and meat rendering plants	District Panchayat Ernakulam Adakkal Thirissur private entrepreneurs	3 Y	TS have been issued for a Slaughter house at Thirissur through KPFBS Thodupuzha Municipality has taken up a proposal and further proceedings are under progress
10	Controlling the excessive use of pesticides for farming	LSGI, District Administration, Agriculture	-	LSGI/Agn Dept. may be requested for updation during the meeting

ANNEXURE 13(13)

11	Install trash trap across all tributaries and check dams to collect whatever floating debris coming through it	LSGL Tourism, District administration in association with Irrigation	-	Irrigation Department informed that there are no such check dams functioning across the branches of Periyar. The provision of trash trap is not needed for RCBs. Providing trash trap across the thoda before discharge into the river is not feasible due to technical as well as environmental reasons.
12	Identification of the scientific reason for the colour change in the downstream of Pathalam bund	KSPCB	-	PCB conducted a meeting with Irrigation Department, Kalady university on 01.11.2023 and 6-3-2024. It is decided to conduct a Sanitation survey in Kalamassery, Aluva, Perumbavoor, Kalady. Action is being taken on proposal for Sanitation Survey from Sree Sankaracharya University, Kalady.

ANNEXURE (3/14)

13	Installation of FSTPs for septage treatment at least in Block level	District Panchayat Emmakulam Idukki/ Thirissur/ private entrepreneur	3 Y	Existing FSTPs CSTP with co-treatment 1) 5 MLD STP at Elankulam with Co-treatment facility 2) 0.1 MLD FSTP at Wellington Island 3) 0.1 MLD FSTP at Beekunapuram 4) 1 MLD at Guruvayoor with co treatment facility 5) 10 KLD FSTP at Manampuram, Madakkuthara, Thirissur Thirissur District Panchayat DPR preparation of Project for installation of FSTP at Chelakkara State seed farm (Pazhayannur Block) is in progress. • DPR for ETP (5 KLD) proposed is in final stage Idukki • 30 kld FSTP at Munnar - Work delayed due to Court case. Stay vacated by Hon High Court and Land to be reassigned. Revenue Dept to take decisions.

13/15}

14	Remediation of contaminated sites along the stretch of Periyar river and its tributaries, especially for those areas for which DPR has been made	KSPCB, Industries & Revenue Department is	In the meeting held on 03.01.2024, it was reported by the company that productions and processing at HIL Unit at Udyogamandal had been stopped and the facilities are shut down. In that scenario, it is decided to explore the possibility to utilize the existing ETP of M/s.HIL. for the remediation project or transfer the 75 cents of lands identified for setting up a new ETP. In this regard, action is being taken by the Environment Department for obtaining necessary sanction from the Department of Chemical and Petro Chemicals, Ministry of Chemicals & Fertilizers.

ANNEXURE 13/16

15	Beautification of the river stretches (Edamulla stretch)	Cochin Corporation	1-2 yrs	Works in progress • Retaining wall - Construction of Retaining wall for TP canal for about 10.30 km length, excluding 800m have been completed • Side wall R.R. 80M completed • Along the side of toddy shop opposite to Thevara market road pile and slab work is going on, about 110m completed
16	Fencing of the river banks along the stretches of the waste disposal	Cochin Corporation	4 years	Reported that 85% of work is completed.
17	Converting the service stations in the watershed area to zero liquid discharge unit for preventing oil pollution and ensuring water conservation	KSPCB/ISGI		Regular Activity. Consent of the Board is being issued with suitable conditions.
18	Ensuring rain water harvesting and ground water recharge by industries, commercial establishments and residences	KSPCB, Industries & WRD & District Administration		Regular Activity. Consent of the Board is being issued with suitable conditions.

ANNEXURE, 13(11)

19	Communicating and publishing monthly water quality data between the department and also for the information of public	KSPCB, WRD		KSPCB-Water Quality data is being published on the Board's website regularly. Annual data is being published as a Directory every year.
20	Collection and disposal of domestic hazardous waste	Local bodies/PPP /KSPCB		LSGD: Managed by A4 Mercantiles Pvt. Ltd. through Akai app and Aravind Associate Pvt Ltd.
21	Collection and safe disposal of Electronic waste	LSGIs/ PPP/ KSPCB		Regular activity E-waste being collected through HarithakarmaSewa in calendar basis and then transfer to M/s Clean Kerala Company Ltd.
22	Organizing awareness programs, webinars, river walk, boating for students and public to increase the public support for river conservation .	KSPCB, WRD and District Administration		Awareness programs are being arranged regularly by various departments..
23	Encouraging water sports and Establishing tourism spots across the river so that both the local and tourist people will feel ownership of river.	LSGI, Irrigation, Tourism, District Administration		Action is being taken by LSGIs and District Administration

15/15

3. Regulatory Inspection

Regulatory inspections are being conducted by the Board and local bodies concerned to ensure proper waste management systems in the banks of River Periyar. Regulatory measures such as issuance of notices, imposing of fine and other rectification measures are also being to done in case of observance of violations of law and to ensure that waste is not being disposed to river. Consolidated details of such inspections conducted by Board and local bodies under the Local Self Government Department (LSGD) in all the districts covering the catchment of the river - Emakulam, Thrissur and Idukki- are given below.

Regulatory Inspections by Board (January 2023-June 2024)

Sl. No.	Activity	No. of inspections	No. of notices issued
	DO 1 Emakulam	265	119
2	DO 2 Emakulam	268	53
3	ESC Eloor	5437	77
4	DO, Idukki	187	29
5	DO Thrissur	198	34

DO- District Office, ESC- Environmental Surveillance Centre

Regulatory Inspections & Fine Collected - All types of local bodies (April 2023- June 2024)

Illegal outlet closing		Illegal dumping		Single use plastic ban
No. of inspections	Fine collected	No. of inspections	Fine collected	Fine collected
1463	Rs.1875320/-	3860	Rs.18750807/-	Rs. 1834395/-

ANNEXURE 13(19)

4. Condition Assessment and Management Plan for the Periyar River Basin

Govt. of India, has sanctioned a project for performing studies on Condition Assessment & Management Plan (CAMP) for six river basins in the country, including the Periyar River Basin in Kerala. The objective of the studies and management plan shall be to restore and maintain wholesomeness of the river ecosystem, improvement of ecological health, enabling rivers to perform its functions and to make the rivers Sarva supported on 5 pillars. - Unpolluted River Flow (NirmalDhara), Continuous River Flow (AviralDhara), River Conservation Synchronized Development, Connecting People and River Science & Management. Earlier, in the case of Ganga river basin, Ganga River Basin Management Plan (GRBMP) was prepared by the consortium of 7 IITs with IIT Kanpur as the lead partner. The centre for Ganga River Basin Management and studies (eGanga) has been established at IIT Kanpur to advise and provide continual scientific support to the Government for implementation and dynamic evolution of the Plan. The Consortium Institutes for studies on the Periyar River are NIT Calicut and IIT Palakkad. The scope of the project is very broad and encompasses various aspects related to the river basin including demography, stream and drainage network, waterbodies, landuse/ landcover, agricultural profile including cropping pattern, irrigation, crop yield, nutrient and sediment load etc, biological profile, climate and meteorology, hydrology (including streamflow and groundwater), lithology, geological profile, hydraulic structures, sediments, water quality (surface water and groundwater), water demand and supply (including domestic, agricultural, industrial etc), industries, wastewaters, solid waste, treatment of liquid and solid wastes, mining, disasters etc. Stakeholder Advisory (SAC) committee of the project CAMP for six river basins was convened by MoJS on 31.05.2024.