BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL

SOUTHERN BENCH, CHENNAI

Original Application No.184 of 2024 (SZ) &

I.A No. 84 of 2024 (SZ)

WITH

Original Application No.233 of 2024 (SZ)

WITH

Original Application No.234 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 & 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)

REPORT FILED BY THE CHIEF ENVIRONMENTAL ENGINEER FOR AND ON BEHALF OF THE KERALA STATE POLLUTION CONTROL BOARD

Standing counsel for the 5th, 1st and 2nd Respondents in O.A 184 of 2024, O.A 233 of 2024 and O.A 234 of 2024 respectively.

Rema Smrithi. V. K., Advocate
Additional Standing Counsel, National
Green Tribunal, (SZ), CHENNAI

BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL

SOUTHERN BENCH, CHENNAI

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And

MoEF&CC, Through Regional Office, Bangalore and Ors. : Respondent(s)

VOLUME– I

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Dated this the 24th day of March, 2025.

Rema Smrithi. V. K., Advocate

Standing Counsel for the 5th, 1st and 2nd Respondents in O.A 184 of 2024, O.A 233 of 2024 and O.A 234 of 2024 respectively.

BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL

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And

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And

MoEF&CC, Through Regional Office, Bangalore and Ors. : Respondent(s)

VOLUME– II

INDEX

Dated this the 24th day of March, 2025.

Rema Smrithi. V. K., Advocate

Standing Counsel for the 5th, 1st and 2nd Respondents in O.A 184 of 2024, O.A 233 of 2024 and O.A 234 of 2024 respectively.

BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL

SOUTHERN BENCH, CHENNAI

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The Principal Secretary to Govt. of Kerala, Environment Department, Thiruvananthapuram & Ors. : Respondent(s)

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And

Kerala State Pollution Control Board, Through its Member Secretary, Kerala and Ors. : Respondent(s)

WITH

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"Fish Kill spotlights pangs of Periyar".

And

MoEF&CC, Through Regional Office, Bangalore and Ors. : Respondent(s)

REPORT FILED BY THE CHIEF ENVIRONMENTAL ENGINEER FOR AND ON BEHALF OF THE KERALA STATE POLLUTION CONTROL BOARD

I, Baburajan P K, aged 53 years, working as Chief Environmental Engineer, Regional Office, Kerala State Pollution Control Board, Ernakulam. I am competent to and duly authorized to represent the 4th Respondent in the above application. I know the facts and circumstances of the case. The factual submissions made here under are true and correct to the best of my knowledge, information and belief. In these circumstances, it is just and necessary that this Hon'ble Tribunal may be pleased to accept the accompanying information on file and it is so humbly prayed in the interests of justice in this case.

1. It is respectfully submitted that the Hon'ble High Court of Kerala passed an 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 order dated 10.06.2024 is produced and marked as **Annexure 1**. The Committee was directed to visit all 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 (i) Secretary to Government, Environment Department, (ii) Regional Director, Central Pollution Control Board, Regional Directorate, Bangalore (iii) Director, Environment and Climate Change and (iv) Chairperson, Kerala State Pollution Control Board.
2. It is respectfully submitted that the Committee has submitted the Report in WP(C) Nos 9534 of 2020, 31236 of 2023 and 996 of 2012 to the Hon'ble High Court. Copy of the

BABURAJAN P.K.
Chief Environmental Engineer

report is produced and marked as **Annexure 2**. The case is still pending in the Hon'ble High Court of Kerala.

All the facts stated above are true to the best of my knowledge, information and belief.

Dated this the 24th day of March, 2025.

BABURAJAN P.K.
Chief Environmental Engineer

Baburajan P.K.
Chief Environmental Engineer

IN THE HIGH COURT OF KERALA AT ERNAKULAM

PRESENT

THE HONOURABLE THE CHIEF JUSTICE MR. A.J.DESAI

&

THE HONOURABLE MR.JUSTICE V.G.ARUN

Monday, the 10th day of June 2024 / 20th Jyaishta, 1946

WP(C) NO. 31236 OF 2023(S)

PETITIONER:

ASSOCIATION OF GREEN ACTION FORCE,

REPRESENTED BY ITS SECRETARY,

SHIBU MANUEL,THAIPARAMBIL DOOR NO. 393,

WARD 17, UDYOGAMANDAL, ELOOR SOUTH,

ERNAKULAM - 683 501.

RESPONDENTS:

1. **UNION OF INDIA, REPRESENTED BY THE SECRETARY, MINISTRY OF ENVIRONMENT FOREST, CENTRAL SECRETARIAT, NEW DELHI - 110 001.**
2. **STATE OF KERALA, REPRESENTED BY CHIEF SECRETARY, SECRETARIAT, THIRUVANANTHAPURAM - 695 001.**
3. **THE SECRETARY, KERALA POLLUTION CONTROL BOARD, PATTOM PALACE P.O., THIRUVANANTHAPURAM - 695 004.**
4. **THE MEMBER SECRETARY, CENTRAL POLLUTION CONTROL BOARD, PARVESH BHAWAN, EAST ARJUN NAGAR,NEW DELHI - 110 032.**
5. **HINDUSTAN INSECTICIDES LTD., UDYOGAMANDAL , ELOOR, REPRESENTED BY ITS CHAIRMAN, UDYOGAMANDAL P.O., ERNAKULAM - 683 501.**
6. **FERTILIZERS AND CHEMICALS TRAVANCORE LTD., UDYOGAMANDAL DIVISION, REPRESENTED BY ITS CHIEF MANAGING DIRECTOR, UDYOGAMANDAL P.O., ERNAKULAM - 683 501.**
7. **M/S COCHIN MINERALS AND ROUTILES LTD., EDAYAR, ALUVA, KERALA, REPRESENTED BY ITS MANAGING DIRECTOR, EDAYAR P.O., ERNAKULAM - 683 502.**
8. **THE DISTRICT COLLECTOR, CIVIL STATION, KAKKANAD, ERNAKULAM - 682 030.**
9. **THE SUPERINTENDING ENGINEER, IRRIGATION DEPARTMENT, ADDL. IRRIGATION SUB DIVISION OFFICE, TOWN HALL ROAD, PWD QUARTERS, PERIYAR NAGAR, ALUVA - 683 101.**

ADDL.R 10 IMPLEADED SUO-MOTU

10. **ELOOR MUNICIPALITY, REPRESENTED BY ITS SECRETARY,**

ELOOR FERRY ROAD, UDYOGAMANDAL,ELOOR, PIN – 683 501

ADDL.R 10 IMPLEADED SUO-MOTU AS PER ORDER DATED 30.11.2023 IN WP(C)

P.T.O.

Writ petition (civil) praying inter alia that in the circumstances stated in the affidavit filed along with the WP(C) the High Court be pleased to

i) Stay the excavation work of 9th respondent in Kuzhikandom creek, till the disposal of the above Writ Petition (C).

ii) Call for action taken report from the 2nd respondent pursuant to Exhibit P6 order, for the ends of justice.

This petition again coming on for orders upon perusing the petition and the affidavit filed in support of WP(C), this Court's order dated 18/01/2024 and upon hearing the arguments of M/S. A.X.VARGHESE, A.V.JOJO, B.M.JEEVAN RAJ, & HARISANKAR S, Advocates for the petitioner, SRI.T.NAVEEN, Standing Counsel for R3, SRI.M.AJAY, Advocate for R4, SRI.GOPIKRISHNAN NAMBIAR, SENIOR ADVOCATE along with M/S. K.JOHN MATHAI, JOSON MANAVALAN, KURYAN THOMAS, PAULOSE C. ABRAHAM, RAJA KANNAN, Advocates for R5 & R6, SNEHA RAJIV, Advocate for R7, SRI.K.S.ARUN KUMAR, Advocate for R10 and of ADV.ANANTHAKRISHNAN A.KARTHA, AMICUS CURIAE, the court passed the following:

P.T.O.

A. J. DESAI, C. J. & V. G. ARUN, J.

==========

W. P. (C) Nos. 9534 of 2020, 996 of 2012 & 31236 of 2023

==========

Dated this the 10th day of June, 2024

O R D E R

A. J. Desai, C. J.

We have heard the learned counsel appearing for the respective parties. We have also gone through the report submitted by the learned Amicus Curiae and the counter affidavits filed by the parties to the proceedings.

2. Prima facie, we are of the opinion that the Committee constituted pursuant to the order passed by the National Green Tribunal way back in the year 2020 or the Central Pollution Control Board or the Kerala State Pollution Control Board have not taken appropriate steps to curb the pollution in and around Periyar river. The photographs produced by the learned Amicus Curiae along with the report speaks itself as to the extent to which the river is polluted by industrial effluents, which are hazardous to human beings as well the flora and fauna. Therefore, at this stage,

we pass the following order:-

(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.

The Executive Engineer, Irrigation Division, Kakkanad P.O., Ernakulam, is suo motu impleaded as additional 6th respondent in W. P. (C) No. 9534 of 2020.

Copy of the order shall be supplied to all concerned.

Post on 03.07.2024.

Sd/-
A. J. DESAI
CHIEF JUSTICE

Sd/-
V. G. ARUN
JUDGE

Eb

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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. Rathan 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.**

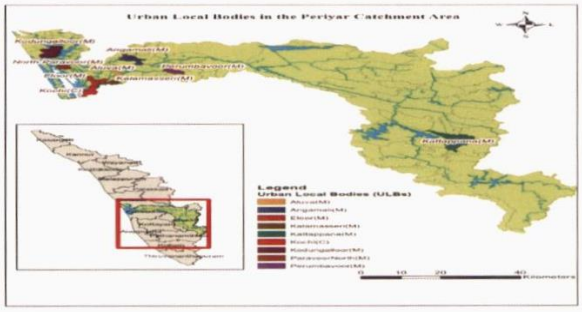

Fig 1.1 Map showing locations of urban local bodies in the catchment of Periyar

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, Varapuzha, Kadamakudy, 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 (Stncode: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 Panamkutty Bridge (Stn code: 5209). A map showing the NWMP sampling stations on river Periyar in Kerala is given in **Fig 2.1.**

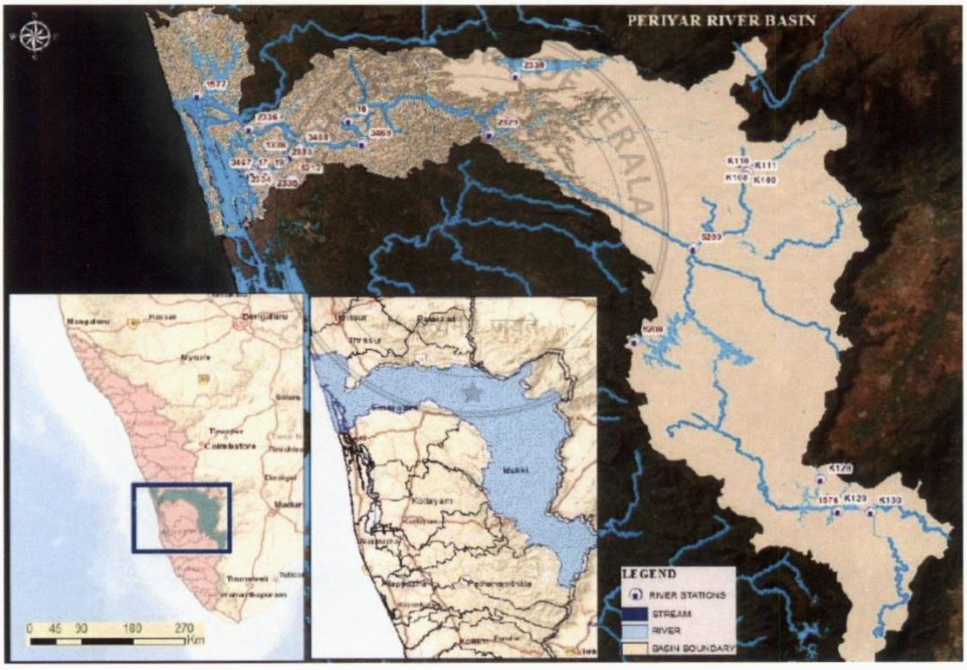

Fig 2.1 NWMP Stations in river Periyar in Kerala State

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, Muppathadam, Eloor, Pathalam, Purappalikadavu, Kalamassery, Panamkutty 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 Purappalikadavu 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, Purappalikadavu 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 Panamkutty bridge and the BOD value exceeds the limit of 3 mg/L at Pathalam, Eloor and Panamkutty 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 Kalamssery 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, Panamkutty bridge and exceeding the maximum permissible limit of 2500 MPN/100ml at Sewage discharge point Kalady, Sewage discharge point Aluva, Eloor, Pathalam, Purappalikkadavu, Panamkutty 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 Purappalikadavu (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, Purappalikadavu 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 Ammoniacal Nitrogen and corresponding pH values at 9 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 Purappillikadavu.
- 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,

Muppathadam, Eloor, Pathalam, Purappalikkadavu, Kalamassery, Panamkutty 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 organized 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 70-1900MPN/100 ml. At KWA Intake Aluva, SDP Aluva, Eloor, Kalamassery, Pathalam and Panamkutty 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 (for bathing, contact water sports and commercial fishing)
- Similar to the values of 2022 and 2023 at Eloor, Purappalikadavu 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 Ammoniacal 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 2022, 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 Kothadu. 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**.

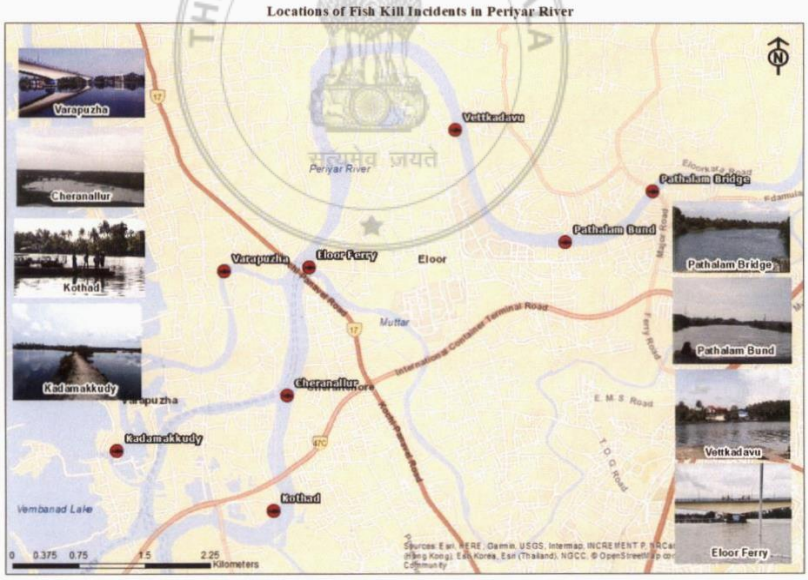

Fig 3.1 Map showing the locations of fish kill incidents and sampling stations

On 20/05/2024, at 3 p.m., three shutters at the Pathalam 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- Pathalam bridge, Pathalam bund upstream, Pathalam 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 Pathalam bund upstream, Pathalam bund downstream, Vettukadavu, Eloor Ferry

Location	Dissolved Oxygen Levels in mg/L*	
	20.05.2024, 7.30 am	20.05.2024,9.30 pm
Pathalam Bund Upstream	1.3	1.0
Pathalam 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 Pathalam bund's shutter with the discharge of high organic load has led to depletion in dissolved oxygen (D.O.) levels in the downstream areas. 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 shutters. 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 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.

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	15.04.24	
DO Value (mg/L)	5.9	6.3	3.5	6.0	5.3	5.2	5.8	4.5	4.7	4.7	4.3	4.9	NA*	7.6	2.3	
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	30.04.24	
DO Value (mg/L)	3.6	3.2	2.8	3.3	2.0	1.6	3.0	3.0	3.1	3.5	5.3	4.7	5.2	4.6	5.4	
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	15.05.24	
DO Value (mg/L)	4.5	3.8	0.9	3.0	2.6	2.8	2.9	4.0	2.6	4.0	3.2	1.2	1.3	3.4	1.3	
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	30.05.24	31.05.24
DO Value (mg/L)	2.8	4.0	2.0	2.6	1.3	4.4	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	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	14.04.24	15.04.24	
DO Value (mg/L)	1.4	1.7	4.1	2.5	2.1	1.2	2.8	0.4	2.4	0.0	1.1	1.0	0.0	6.0	1.5	
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	30.04.24	
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	3.4	2.2	
DATE	01.05.24	02.05.24	03.05.24	04.05.24	05.05.24	06.05.24	07.05.24	08.05.4	09.05.24	10.05.24	11.05.24	12.05.24	13.05.24	14.05.24	15.05.24	
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	2.0	0.0	
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	30.05.24	31.05.24
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	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 ie, 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-C1 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 Pathalam 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 Pathalam 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 3.2 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 Thoombungal 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	14.04.24	15.04.24	
DO Value (mg/L)	4.4	4.3	4.1	5.0	1.8	5.0	2.3	2.5	2.9	4.2	3.7	1.2	3.5	5.2	3.4	
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	30.04.24	
DO Value (mg/L)	3.9	2.4	2.7	3.6	3.2	3.0	3.4	4.0	3.7	4.0	3.8	3.7	4.9	5.1	4.7	
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	15.05.24	
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	4.1	4.2	4.1	4.6	
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	30.05.24	31.05.24
DO Value (mg/L)	4.6	4.5	4.3	3.5	4.2	3.9	3.0	4.4	3.0	3.0	2.5	2.0	1.1	3.1	0.5	2.4

- 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, Varapuzha, Kadamakudy and Kothadu 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 Pathalam 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, 0.015 mg/L at Pathalam Bund downstream, 0.035 mg/L at Vettukadavu,

(ii) Manganese-0.056 mg/L at PathalamBund upstream,0.042 mg/L at Pathalam Bund downstream,0.043 mg/Lat Vettukadavu, 0.041 mg/L at Eloor Ferry,

(iii) Nickel-0.64 mg/Lat Vettukadavu,

(iv) Boron-0.04 mg/L at Pathalam Bund upstream,0.02 mg/Lat Pathalam Bund downstream,0.509 mg/Lat Vettukadavu, 0.02 mg/Lat Eloor Ferry,

(v) Copper-0.012 mg/Lat Pathalam Bund upstream,0.072 mg/Lat Vettukadavu

- In addition to the routine daily sampling and sampling based on the fish kill incident conducted at Pathalam bridge, Pathalam bund, Vettukadavu, Eloor Ferry and Puthalamkadavu, 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
Amrutha pumping station	Muttinakam
FACT PD	Vettukadavu
KuzhikandomThodu	IREL
EloorFerry	FACT-UD
	BINANIZINC LTD
	SUDCHEMIE
	CMRL
	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 342.5 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 Pathalam bund. The other four industries have outlets downstream of Pathalam 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 Outlets 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 Pathalam bund), 9840 m^3/day(Edamula 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)	659 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 SPCB from 22/05/2024 to 25/05/2024

Industry	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		M/s. Travancore 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	6.67	6.5-8.5	6.8	6.5-8	7.85	5.5-9	7.5	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	**62.4**	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	-	-	-	-	24.4	250	-	-
BOD (mg/L)	-	-	12	30	-	-	-	-	**24**	20	-	-
TDS (mg/L)	-	-	-	-	-	-	-	-	1220.1	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 Compounds	-	-	0.1	1	-	-	-	-	-	-	-	-
Zinc (mg/L)	-	-	-	-	-	-	BDL	5	-	-	-	-
Copper (mg/L)	-	-	-	-	-	-	BDL	3				
Nickel (mg/L)	-	-	-	-			BDL	3	-	-	-	-
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 Cochin 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 those 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 no.s of Industries. (viz., M/S. Amcosxl Paints (India) Pvt. Ltd., M/S. Jonarin 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 no.s 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. Rubbero 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 no.s of industries (viz., M/S. Fact – Fertilizer Unit, Udyogamandal, M/S.Travancore Cochin Chemicals Ltd., M/S.TMS Leathers, M/S. Indian Rare Earths Ltd., M/S. Malaya Rub Tech , M/S. Hipower 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 33Aof 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 Coats) 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. Amcosxl Paints (India) Pvt. Ltd., M/S. Jonarin 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 20-05-2024 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. SudheerPanicker, representing Sri. K.S.R. Menon, petitioner in WP (C) No.9534/2020
3. Sri. Shebeer O.V. representing Sri. PurushanEloor, 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. 395/2013 such as local bodies, District Industries Centre, Irrigation Department, Agriculture Department and Kerala Water Authority. The Fisheries Department and KUFOS 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 OUTON 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 Periyarand 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.**

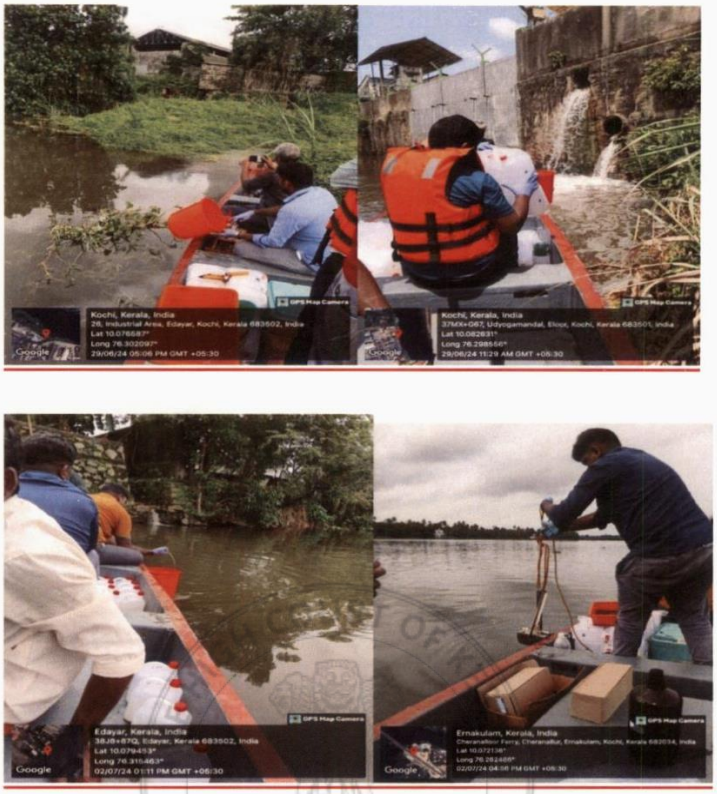

Fig 4.4 Sampling carried out on 29.06.2024, 02.07.2024, 03.07.2024, 27.07.2024, 19.08.2024 by Kerala SPCB

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 post on 01.11.2024".

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(h).**

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 (Pathalam regulator cum bridge) on 18/07/2024, detailed below:

1. M/s.Neptune Readymix Concrete Pvt. Ltd., IDA, Edayar,
2. M/s.Kochiplast Solutions Pvt Ltd, IDA, Edayar,.
3. M/s.Southern Minerals & Chemicals, IDA, Edayar,
4. M/s.AmcosXl 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 (s)
	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 Cella Space close to the boundary of M/s Cochin Minerals and Rutile Ltd, Edayar	Inspections only, no sampling
25.06.2024	Boat survey by the Committee in the river downstream of Pathalam 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, 02.07.2024, 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 Pathalam regulator by the Committee	Effluent and stormwater discharges sampled by KSPCB officials in the presence of Committee Members and the Petitioner (s)
18.07.2024	Inspection of 7 industries upstream of Pathalam 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 Panachithodu – 753mg/L, Unthithodu 50m from confluence point-716mg/L
- Concentrations of Chloride observed at Panachithodu- 287.9 mg/L, Unthithodu 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, Panachithodu 50m behind from confluence point- 0.05mg/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 – 0.1mg/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- 4717mg/Kg and Unthithodu 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) – 47.76 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^{O}C)	DO (mg/L)	BOD (mg/L)
		500 MPN/100 mL(desirable), 2500 MPN/100 mL(Maximum Permissible)	100 MPN/100 mL(desirable), 500 MPN/100 mL(Maximum Permissible)	Between6.5-8.5	5 mg/L or more	3 mg/L or less
1	River Periyar near combined Stormwater outlet between Malaya Rubtech & Alpharub Crumb Rubber.	480	160	6.94	5.9	0.5
2	River Periyar near TMS Leather authorized outlet	200	80	6.8	7.2	1.2
3	River Periyar near the stormwater outlet of CMRL-Shree Shakthi boundary	160	20	6.82	6.2	0.2
4	River Periyar near Stormwater outlet at CMRL & National Industries boundary	400	520	7.14	6.9	1.4
5	River PeriyarPathalam Bund upstream	140	20	6.64	6.2	1.1
6	River Periyar near CMRL authorized outlet	140	40	7.00	6.9	2.1
7	River Periyar near SudChemie	200	300	7.62	6.6	0.5
8	River Periyar near TCC Storm water drain at TCC-FACT boundary	Nil	Nil	6.98	6.6	0.5
9	River Periyar near FACT-D drain storm water outlet	Nil	Nil	7.78	6.2	0.1
10	River Periyar near FACT stormwater outlet	Nil	Nil	4.95	5.8	0.2
11	River Periyar near storm water drain of IREL at IREL-FACT Boundary	Nil	20	6.90	6.6	2.1
12	River Periyar near IREL Outlet	Nil	20	6.96	6.9	0.5
13	River Periyar near Binani Zinc stormwater outlet	Nil	140	7.04	7.0	2.1
14	River Periyar near Fact ammonia guard pond outlet (Edamula Branch)	520	240	7.07	5.1	1.6
15	River Periyar near Fact PD authorized outlet (Edamula	720	80	7.01	5.2	0.9

	Branch)					
16	River Periyar at OngithoduPeriyar confluence point (Edamula Branch)	160	80	7.0	5.3	1.0
17	River Periyar at Eloor Ferry junction (Edamula Branch)	20	180	6.9	5.4	1.3

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 guard 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. Alpharub Crumb Rubber (96.96 mg/L) and sampling location near stormwater outlet of M/s. CMRL-Shree Shakthi 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 Pathalam 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 Pathalam regulator near FACT stormwater outlet.

- Sulphide concentration is observed in 2 river water sampling locations upstream of Pathalam 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 & Alpharub Crumb Rubber nd Mangenese - 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. Binani 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. Alpharub Crumb Rubber.
- Heavy metals like mercury, arsenic, hexavalent chromium were 'not detected'.

STORM WATER DRAIN SAMPLES COLLECTED ON 29.06.2024, 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 (11556 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 10.07.2024DURING 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. Alpharub Crumb Rubber	M/s. Sunrise TSR Factory	M/s. TMS Leathers	M/s. Malaya Rub Tech Industries	M/s. Organo Fertilizers	M/s. Cochin Minerals And Rutile Ltd
Non complying parameters	TSS(106 mg/L) BOD(59.6 mg/L) Sulphide (15.2mg/L)	Oil & Grease (14 mg/L) TKN (53.76mg/L) Sulphide(15.2 mg/L) Ammoniacal Nitogen(44.24 mg/L)	Sulphide (8 mg/L)	COD(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(1139.6 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 11.**

STORMWATER SAMPLES COLLECTED ON 10.07.2024 DURING THE VISIT OF THE COMMITTEE

Storm water drains flowing through the premises of M/s Alpharub 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 Alpharub Crumb Rubber	M/s Sunrise TSR Factory -1	M/s Sunrise TSR Factory -2	M/s TMS Leathers	M/s Organo Fertilizers	M/s Cochin Minerals And Rutile Ltd (near Cella Space ltd)
Significant contaminants	Sulphide (15.2 mg/L)	COD (256 mg/L) TSS(1041 mg/L) Sulphide (15.2 mg/L) BOD(51.6 mg/L)) Ammoniacal Nitrogen (50.4 mg/L)	Sulphide (14.8 mg/L)	Iron (23.368 mg/L) Sulphide (4 mg/L)	Sulphide (14.4 mg/L) BOD (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 Amcos 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. Amcos 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	55	6784	Instructions issued on 10.10.2024
2	M/s Amcos XL Paints	10.16	52	44.68	BDL		Instructions issued on 10.10.2024
3	M/s Neptune Readymix Concrete Pvt Ltd	No effluent					
4	M/s Kochiplast Solutions 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:

i. 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 Pathalam regulator, and stagnation of the organic load on the upstream of the regulator.

ii. 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.

iii. 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 effluent, 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 /flats /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 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. A total of 9 cameras were installed for surveillance.
5	Construction of Mini MCF in 20 wards (31 Nos)	Vazhakulam GP	Completed
6	Preventing pollution of Periyar through the pipe installed near upstream of Pathalam regulator leading to Edayattuchal 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

8	Construction of retaining wall with HDPE liner at Kalamassery dumping yard to prevent the leachate discharge from the yard to Thoombungal thodu.	Kalamasery 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, Padiyath, 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. FABBCO 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 Honourable Principal Secretary for necessary action. Bio-mining working in progress: 2 lakh MT stabilised, approximately 99965MT waste processing completed and about 11,108.15MT RDF dispatched to cement factories. 100 KLD FSTP @ Brahmapuram (existing),100 KLD FSTP @ Willington Island. 5 MLD at Elamkulam with septage treatment facility at Kochi, Ernakulam 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. Credai 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	Angamaly	HKS-39, Mini MCF-22, MCF -1, Total no. of bins in the Thumboormuzhi -9,1 ETP Capacity 25000L/day at the 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 Paravoor	HKS-46, MCF -2, Mini MCF - 21 (Functional)
9	Kodungallur	HKS-85, Mini MCF-40, MCF -5, 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

Abbreviations used: HKS-Haritha 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 395/2013 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 Pathalam 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. Rathan U Kelkar IAS

Sri. J Chandra Babu

Sri. Suneel Pameedi IFS

Smt. S Sreekala

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ANNEXURES

- OVERVIEW OF RIVER PERIYAR Annx 1(1)

ANNEXURE 1

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 to 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 5,398 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 km^2 out of which 5284 km^2 lies in Kerala and 114 km^2 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 Karimanal, Periyar crosses the district boundary and enters into Eranakulam 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 PeriyarThekkadylake 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 Kattappana, Cheruthoni, Perinjamkutty, Muthirapuzha andIdamala. Lower downof Malayatoor, 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 Vattayar and the Mangalapuzha branches. The Mangalapuzha branch joins Chalakudy Riverat Elenthikkaraand empties into the Arabian sea at Munambam. The Vattayar branch flows southwards, again dividing into two near Kunjunnikkara- Uliayannoor island. This branch joined after the island and again bifurcates at Edamula. One branch flow through Eloor - Edayar industrial belt known

Annexure 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.

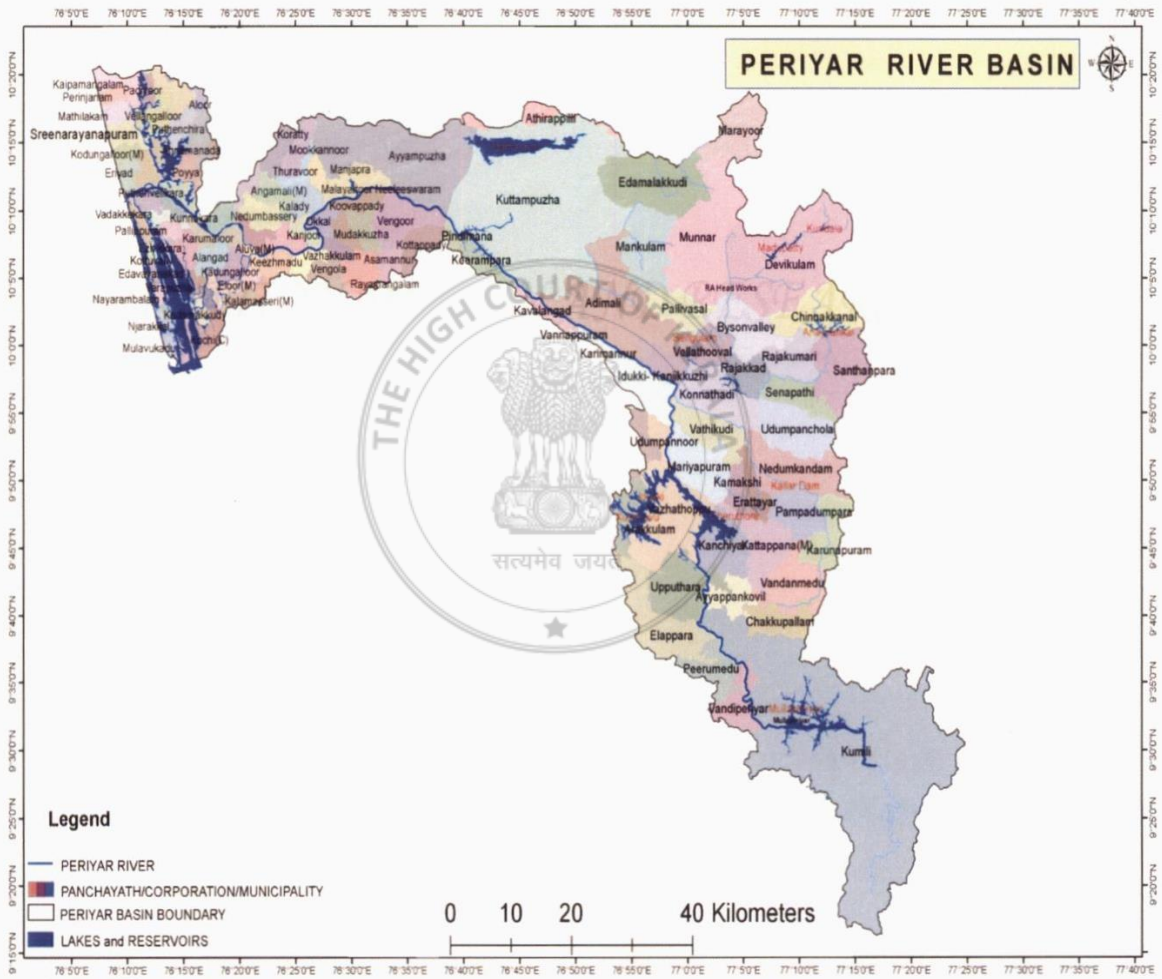

Figure 1: Map of Periyar River basin

Annx P (3)

Periyar basin is spread over Idukki and Ernakulam Districts. The length of Periyarriver in Idukki district is 154.40 km and 110.50 km in Ernakulamdistrict.The local bodies involved are Kumily, Vandiperiyar GP, Vazhathoppu GP, Munnar GP, Kanjikkuzhy GP, Bysonvally GP, Rajakkad GP, Senapathy GP, Vellathooval GP, Konnathady GP, Nedungadam GP, Karunapuram GP, ErattayarGP, Kanchiyar GP, Kattappana GP, Elapparara GP, AyyappankovilGP, Upputhara GP, Kuttampuzha GP, Mankulam GP, Vathykudy GP, Ayyampuzha GP, Manjappara GP, Kalady GP, Pindimana GP, Vengoor GP, Moodakkuzha GP, Koovappady GP, Mayalattoor and Neeleswaram GP, Vazhakulam GP, Rayamangalam GP, Okkal GP, Keezhmad GP, Kanjoor GP, Aluva Municipality, Sreemoolanagaram GP, Chengamanad GP, Kadungalloor GP, Eloor GP, Varappuzha GP, Angadikkadavu GP, Perumbavoor Municipality , Alangad GP, Kalamassery Municipality, Edathala GP, Kadamakudy GP, Cheranallor GP, Kunnukara GP, Puthenvelikkara GP, Karumalloor GP, Ezhikkara GP, Paravur Municipality, Chendamangalam GP, Vadakkekara GP, Vellangalloor GP, Kottuvally GP, Kodungalloor Municiplaity.

Annx 2 (1)

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)

Annx 2 (2)

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	Alwaye 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	Kaisons Hawai 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

Annx 2 (3)

8	Manjaly thodu	Angamaly Municipality	K.A.P. Modern Rice Mill, Nayathode p.o. Angamaly	Rice Mill
9	Manjaly thodu	Angamaly Municipality	Chakkiathmooda Industries, Angadikadav,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	Chirackal 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 Ernakulam.	Rice Mill

Anna 2 (4)

17	Manjaly 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, Parapuram P.O Kanjoor Ernakulam - 683593	Rice Mill
23	Periyar	Sreemoolanagaram Grama Panchayath	Thekkekara Rice Mill, Kalady - Aluva Rd, Sreemoolanagaram, Kerala 683580	Rice mill
24	Manjaly thodu	Kalady Panchayath	Keerthi Nirmal Rice Industries, Mattoor - Yordhanapuram Rd, Mattoor, Kalady, Kerala 683574	Rice mill
25	Manjaly thodu	Kalady Panchayath	Valookaran Modern Rice Mill, Ernakulam, Kerala 683574	Rice mill

Annx 7 (5)

26	Manjaly thodu	Kalady Panchayath	Ibis Power Laundry & Dry Cleaning Co., SIDCO Industrial Park, Chempanoor	Laundry
27	Manjaly thodu	Angamaly Municipality	Perumbavoor Plywood Manufacturers Consortium Pvt. Ltd., 23/217G 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, Kuttilakkara, Piraroor 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	Kancor Ingredients Ltd, VII/138, Kanakkankadavu Road (Kancor Road), Angamaly South	Rice Mill
33	Periyar	Kalady Panchayath	Parackal Agro Mills, Kanjoor P.O. Kalady	Rice Mill
34	Chenjal thodu	Kalady Panchayath	Pooja Modern Rice Mill,Chengal Kalady PO PIN 683574	Rice Mill

Anna 2 (6)

35	Periyar	Sreemoolana GaramGrama Panchayath	St.antonys Modern Rice Mill, Sreemoolanagaram P.O Kalady	Rice Mill
36	Manjaly thodu	Angamaly Municipality	Casino Air Caterers And Flight Services, Nayathodu.P.O. Angamaly. Ernakulam. 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	Modern Rice Mill
41	Omma thodu Leading To River Periyar	Okkal Panchayath	M/S Edathala 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, Ernakulam - 683550	Solvent Extraction Unit

Anna 2 (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., Koovappady	Modern Rice Mill
48	Ommathodu Leading To River Periyar	Okkal Panchayath	M/S Matha Agro Mills,Okkal P.O., Okkal	Modern Rice Mill
49	Ommathodu Leading To River Periyar	Okkal Panchayath	M/S Mundeth Agro Mills,Edavoor Koovappady	Modern Rice Mill
50	Periyar	Okkal Panchayath	M/S Pottolil Agro Mills, Okkal P.O, Perumbavoor-683550	Modern Rice Mill
51	Vizhakala Thodu/ Mannthodu Leading To Periyar	Okkal Panchayath	M/S Supreme Food Industries, Op/Xv/274, Chelamattom Okkal	Ice Cream Manufacturing

Anna 2 (8)

52	Vizhakala Thodu/ Mannthodu Leading To Periyar	Okkal Panchayath	M/S Valiyaveettil Modern Rice Mill,Chelamattom Okkal P.O	Modern Rice Mill
53	Periyar	Koovappady Panchayath	M/S Manickathan Modern Rice Mill, Kurichilacode, 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	Nambiattukudy 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	Nambiattukudy Food & Spices	Modern Rice Mill
59	Periyar	Koovappady Panchayath	Geeyem Agro Mills	Modern Rice Mill
60	Thodu leading To Periyar	Vazhakkulam Panchayath	Avt Natural Products Ltd.	Solvent Extraction Unit

Annx 2 (9)

61	Periyar Neriamanagalm Stretch	Keerampara Panchayath	Basil Natural Technically Specified Rubber Private Limited	Manufacture Of Crepe / Crump Rubber
62	Periyar Edamalayar Stretch	Kothamangala m Panchayath	Palappillil 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	Hindustan 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. (Tcc), 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	Poovanthukkaran Rubbers, Edayar.	Rubber Unit
10.	Eloor Stream	Kadungallor Panchayath	TMS Leathers, Ida, Edayar.	Tannery Blue Hide
11.	Eloor Stream	Kadungallor Panchayath	Sunrise TSR Factory, Industrial Development Area, Edayar	Isnr 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.	Isnr 20 Crumb Rubber Unit

Anna 2 (11)

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 (Igcl), 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	Alpharub 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 Extra cts Ltd., Industrial Development Area, Edayar,Muppathadom P.O.	Oleo resins manufactures

Anna 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, Muppathadom P.O.	poultry meal
27.	Eloor Stream	Kadungallor Panchayath	TMV Natural Oils And Extracts (P), Industrial Develop mentArea,Edayar, Muppathadom P.O.	Herbal extracts
28.	Eloor Stream	Kadungallor Panchayath	Parakkal Industries, Industrial Develop ment Area, Edayar	Poultry Meal
29.	Eloor Stream	Kadungallor Panchayath	Varkey'S Industries, Industrial Develop ment Area, Edayar Binanipuram P.O.	Tallow
30.	Eloor Stream	Kadungallor Panchayath	Marksmen Marine Pvt Ltd	Fish oil extraction
31.	Eloor Stream	Kadungallor Panchayath	Nelkadir Bone Industries, Industrial Development Area, Edayar, Muppathadom P.O.	Fish oil extraction

Annx (2) 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

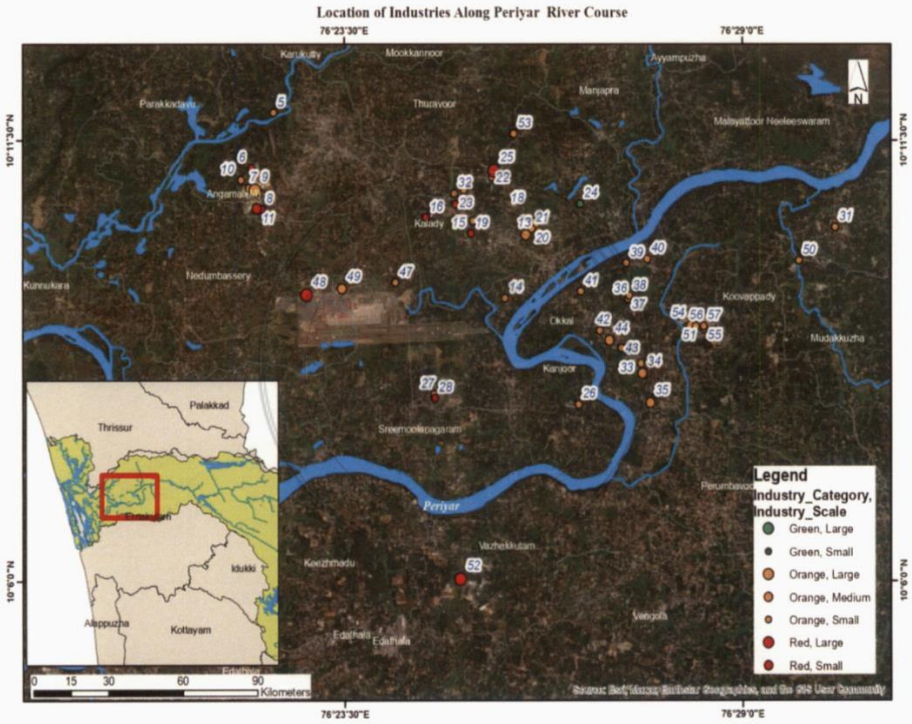

Figure 2: Location of Industries located along the Catchment area of Periyar (Ernakulam Upstream of Eloor Edayar)

Anna 2 (14)

Sl No.	Name Of Industries
4	Chakkiathmooda Industries
5	Perumbavoor Plywood Manufacturers Consortium Pvt.Ltd
6	Veejay Rice Mill (Mothers Rice Mill)
7	Peters Rice Mill
8	Inkel Ltd
9	Ibis Power Laundry And Dry Cleaning Co.
10	Kancor Ingredients Ltd
11	Metro Agro Mills
12	Kalady Rice Millers Consortium (P) Ltd [Refinery Unit]
13	Pooja Modern Rice Mill
14	Parackal Agro Mills
15	Peoples Dairy Development Project Central Society
16	Pallickal Agro Mills
17	K&Amp;T Agro Mills Pvt Ltd
18	Christy Modern Rice Mill
19	Kalpana Agro Mills
20	Aiswarya Agro Mills
21	Rice Tech Agro Mills Pvt Ltd
22	Chirackal Food Products
23	Kaisons Hawai Industries
24	Keerthi Agro Mills (P) Ltd
25	Anna Agro Mills
26	Thekkekara Rice Mill
27	St Antonys Modern Rice Mill
29	Diamond Plywoods
30	Manickathan Industries
31	Kaveri Modern Rice Mill
32	Edathala Modetn Rice Mill
33	Supreme Food Products
34	Kkr Agro Mills Pvt Ltd
35	Joseco Agro Mill
36	Edappana Agro Mills
37	Pottolil Agro Mills
38	Lakshmi Agro Mills
39	Mundeth Agro Mill
40	E.C Agro Mills
41	Jupiter Leys
42	Matha Agro Mills
43	Kkr Agro Mills Unit Ii
44	Palappillil Specified Block Rubberspvt Ltd
45	Alwaye Rubex Pvt Ltd
46	K.A.P. Modern Rice Mill
47	Lulu Flight Kitchen (P) Ltd
48	Casino Air Caterers And Flight Services
49	Geeyem Agro Mills
50	Nambiattukudy Modern Rice Mill
51	Avt Natural Products Ltd.
52	Valookaran Modern Rice Mill
53	Diamond Food Products,Koovappady
54	Nambiyattukudy Agro Industries
55	Honey Industries,Koovappady
56	Nambiattukudy Food &Amp; Spices
57	Basil Natural Technically Specified Rubber Private Limited

Anna 2 (15)

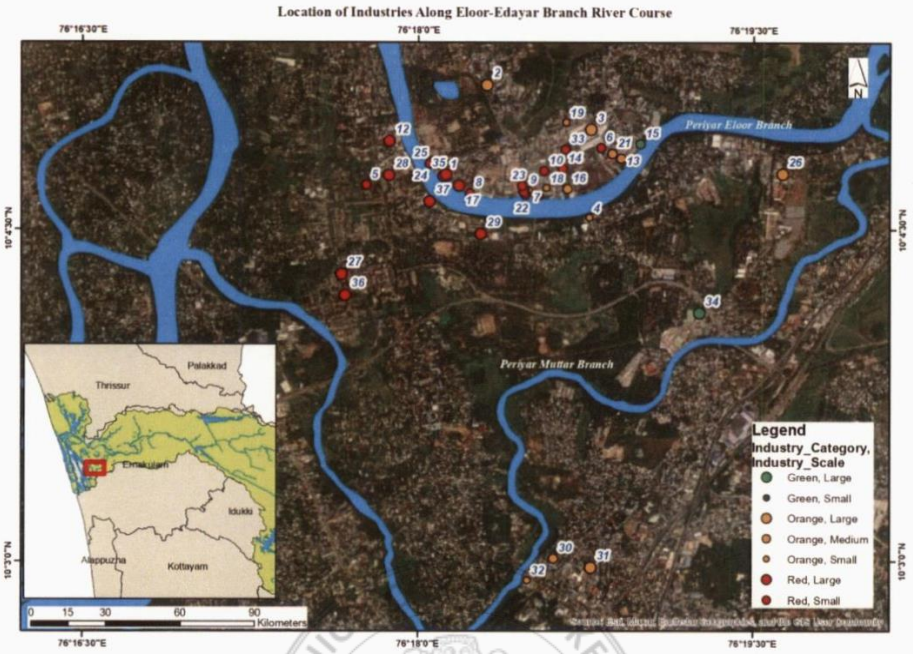

Figure 3: Location of Industries located Along The Catchment area of Periyar (Ernakulam Eloor Edayar)

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	Tms 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	Sud Chemi India Pvt Ltd
18	Sun Rise Tsr Factory
19	Tmv Natural Oils And Extracts Pvt Ltd
20	Travancore Polymers

Annx 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 Fertlizers 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, Udyogamandal	12000 m^3/day (Pathalam 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 2 (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,

Annx 2 (18)

small towns, villages, and tourist resorts still generate domestic sewage and waste. If not properly treated, these wastes can find their way into the river, introducing organic matter, nutrients, and pathogens in the following manner.

- Tourism and Recreational Activities also contributes to pollution in the river. The Periyar Wildlife Sanctuary and surrounding areas are popular tourist destinations. Inadequate waste management and disposal practices may lead to littering of plastics and other non-biodegradable materials, which can pollute the river.

- Boating and Water Activities: Recreational activities, such as boating in the Periyar Lake, can contribute to water pollution through oil spills, waste disposal, and disturbances to aquatic habitats.

Urban local bodies located along the banks of the river in its middle stretches as well as its tributaries and Municipalitieslike Aluva and Kalamassery located in the lower stretches contribute significant urban pollution. A map of the urban local bodies in the Periyar basin is shown below (fig 4). The severity of urban pollution of the river increases in the summer season if environmental flow is not maintained in the river.

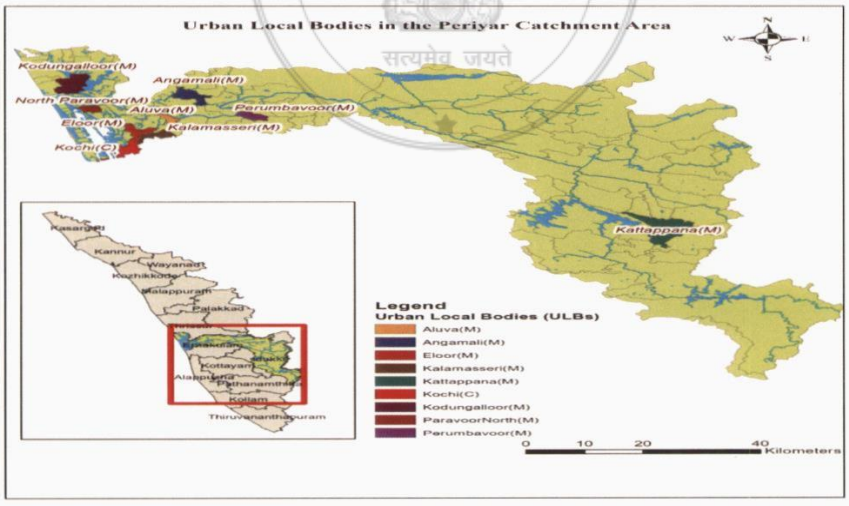

Figure 4 Map of the urban local bodies in the Periyar basin

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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 littering 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 affects 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.

Anna 2 (20)

- 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 20-05-24 and 21-05-24 downstream of Pathalam 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.

Annx 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.

Annr 3 (1)

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 Stations			pH	EC µmhos/cm	DO mg/l	BOD mg/l	TC MPN/100ml	FC MPN/100ml	CLASS*
Kalady 0018	NWMP	Max	7.8	52	8.2	1.8	6300	4800	C
		Min	6.2	34	7.0	0.6	1200	310	
		Mean	6.9	41	7.5	1.1	3308	1908	
KWA Aluva 3468	NWMP	Max	7.9	90	8.0	1.9	5800	4000	C
		Min	6.5	40	6.2	0.7	310	100	
		Mean	6.9	53	7.3	1.0	1617	1048	
SDP Aluva 1338	NWMP	Max	7.4	87	7.8	2.2	7900	5800	C
		Min	6.3	45	5.6	1.0	1700	790	
		Mean	6.7	57	6.8	1.6	4055	2457	
Muppathadam 2333	NWMP	Max	9.6	90	7.6	1.9	7900	4100	C
		Min	6.5	39	5.5	1.0	1000	310	
		Mean	7.3	55	6.7	1.2	2475	1079	
Eloor 0017	NWMP	Max	8.5	15700	7.2	2.3	7900	7000	BELOW E
		Min	6.5	85	3.1	0.9	1100	490	
		Mean	7.3	4109	5.2	1.7	4625	2608	
Pathalam 2334	NWMP	Max	9.8	20000	7.8	2.6	7900	7000	BELOW E
		Min	6.3	40	5.9	1.2	270	200	
		Mean	7.4	2870	6.9	1.6	3648	2173	
Purappillikadavu 2336	NWMP	Max	8.8	24000	8.0	1.5	7000	5800	BELOW E
		Min	6.0	35	6.2	0.5	220	63	
		Mean	7.2	4134.9	7.0	1.2	1536	1047	
Kalamassery 2335	NWMP	Max	9.4	78	7.9	2.4	11000	9200	C
		Min	6.0	45	5.3	0.8	1500	470	
		Mean	7.3	59	6.3	1.7	3408	1925	
Panamkutty Bridge 5209	NWMP	Max	7.7	116	8.4	2.7	4600	2600	C
		Min	6.5	48	7.0	1.2	41	100	
		Mean	7.0	67	7.7	1.9	2153	981	

Anna 3 (2)

Water Quality data- April 2022

Periyar

Name of River stations Station Code Parameters	SDP Aluva 338	Muppath adam 2333	Pathala m 2334	Kalamass ery 2335	Purappalli kka davu 2336	Eloor 0017	Kalady 0018	KWA Intake Aluva 3468
Temperature ^{O}C	29	30	29	29	29	30	30	30
DO mg/L	6	7.3	6.2	5.8	7.3	4.2	7.2	7.1
pH	6.9	7.3	7.3	7.2	7	7.9	6.9	6.7
Conductivity µS/cm	50	70	2882	49	6870	3120	34	40
BOD mg/L	1.2	1.3	1.8	2.2	1.0	2.0	0.8	1.1
Nitrate N mg/L	0.09	0.11	3.28	0.1	0.16	0.13	0.11	0.15
TC MPN/100ml	4100	2100	4100	3100	630	3200	2700	2200
FC MPN/100ml	2700	920	2100	470	220	2700	1500	1300
FS MPN/100ml	200	100	210	120	100	270	410	280
Turbidity NTU	2.7	1.1	1.7	0.9	2.5	3.4	2.8	2.8
Phenoph: Alkalinity	BDL	BDL	0	0	0	BDL	BDL	BDL
Total Alkalinity	15	24	28	17	50	23	10	15
Chlorides mg/L	4.4	5.8	1000	4	2065	765	5.6	3
COD mg/L	4	7.2	12	4.0	6.4	8	1.6	3.2
TKN mg/L	0.14	0.15	4.3	0.10	BDL	0.20	BDL	0.23
Amm- N mg/L	0.04	BDL	1.05	0.00	0.03	0.06	BDL	0.08
Hardness mg/L	16	26	700	18	990	190	10	10
Calcium as $CaCO_3$ mg/L	11	5	300	8	300	60	5	5
Magnesium as CaCO3mg/L	5	21	400	10	90	130	5	5
Sulphate mg/L	0.31	1.73	52.90	0.93	255	284.22	BDL	0.1
Sodium mg/L	2.5	3.0	516.4	2.20	3068	395	2.90	1.57
TDS mg/L	28	40	1854	28	3995	1710	20	22
TFS mg/L	22	30	1483	22	3600	1365	14	17
TSS mg/L	18	19	28	24	25	28	12	20
Phosphate mg/L	0.02	0.03	0.80	0.11	0.05	0.03	0.01	0.03
Boron mg/L	BDL	BDL	0.22	0.00	0.76	0.05	0	0
Potassium mg/L	1.29	2.94	13.6	1.80	54.20	26.5	1.42	1.18
Flouride mg/L	0.04	0.04	0.16	0.03	0.14	0.10	0.03	0.03
Cadmium mg/L	0.00042 (BDL)**	0.00042 (BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)
Copper mg/L	0.00035(BDL)	0.00035 (BDL)	0.00035(BDL)	0.00035(BDL)	0.00035(BDL)	0.00035(BDL)	0.00035(BDL)	0.00035(BDL)
Lead mg/L	0.00031 (BDL)	0.00031 (BDL)	0.00031(BDL)	0.00031(BDL)	0.00031(BDL)	0.00031(BDL)	0.00031(BDL)	0.00031(BDL)
Chromium mg/L	0.00056 (BDL)	0.00056 BDL)	0.00056(BDL)	0.00056(BDL)	0.00056(BDL)	0.00056(BDL)	0.00056(BDL)	0.00056(BDL)
Nickel mg/L	0.00054 (BDL)	0.00054 (BDL)	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)
Zinc mg/L	0.004	0.00059 (BDL)	0.319	0.01	0.00059(BDL)	0.026	0.00059(BDL	0.00059(BDL)
Iron mg/L	0.00043 (BDL)	0.00043(BDL)	0.293	0.023	0.00043(BDL)	0.02	0.004	0.00043(BDL)
Alpha BHC µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Gamma BHC µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
OP DDT µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
PP DDT µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Alpha Endosulfan µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Beta Endosulfan µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Aldrin µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Dieldrin µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)

**BDL- Below Detectable Limit, as set in NWMP reporting format

The observed range of water quality parameters in river Periyar (Annual average) for the year 2023 are given in Table below

2023 **PERIYAR RIVER**

River Stations			pH	EC µmhos /cm	DO mg/l	BOD mg/l	TC MPN/ 100ml	FC MPN/ 100ml	CLASS
Kalady 18	NWMP	Max	9.5	58	8.0	1.9	7900	3400	C
		Min	6.1	28	6.5	0.2	700	210	
		Mean	7.7	42	7.3	1.3	3433	1209	
KWA Aluva		Max	9.8	65	7.6	2.0	5800	2000	C
		Min	6.5	36	5.4	0.8	250	10	

Anna 3 (3)

3468	NWMP	Mean	7.5	49	6.9	1.4	2796	958	
Sewage discharge point, Aluva 1338	NWMP	Max	9.5	90	6.9	2.2	31000	3900	D
		Min	6.5	45	5.5	0.6	2200	40	
		Mean	7.3	59	6.3	1.6	6925	1945	
Muppathadam 2333	NWMP	Max	9.0	82	7.4	2.1	4300	1500	C
		Min	6.5	43	5.4	0.3	1000	270	
		Mean	7.4	56	6.2	1.2	2517	706	
Eloor 17	NWMP	Max	7.7	12270	7.0	3.2	43000	7000	BELOW E
		Min	6.5	104	3.0	0.7	1700	790	
		Mean	7.0	3365	5.0	1.9	7667	2182	
Pathalam 2334	NWMP	Max	9.6	16380	7.6	3.9	7900	7000	BELOW E
		Min	6.6	105	4.0	0.5	840	200	
		Mean	7.6	4524	6.6	2.4	4537	2477	
Purappillikadavu 2336	NWMP	Max	8.1	23950	7.6	2.9	7900	7000	BELOW E
		Min	6.6	48	5.5	0.7	700	150	
		Mean	7.3	5650	6.7	2.1	2799	1130	
Kalamassery 2335	NWMP	Max	9.0	151	6.8	2.9	7000	2000	C
		Min	6.4	48	4.2	0.6	340	110	
		Mean	7.3	68	5.6	1.5	3714	1079	
Panamkutty bridge 5209	NWMP	Max	7.7	116	8.4	5.4	4600	2600	C
		Min	6.5	48	7.0	1.2	41	100	
		Mean	7.0	67	7.7	2.1	2153	981	

WATER QUALITY DATA APRIL 2023

Name of River stations	Periyar							
Station Code	SDP Aluva 1338	Muppathadam 2333	Pathalam 2334	Kalamassery 2335	Purappallikkadavu 2336	Eloor 0017	Kalady 0018	KWA Intake Aluva 3468
Temperature OC	27	28	29	29	29	28	28	27
DO mg/L	6.4	5.8	6.8	4.3	5	4	6.6	6.4
pH	8.5	9	9.6	8	7.3	7.7	9	8.5
Conductivity µS/cm	49	82	16380	151	4921	12270	56	54
BOD mg/L	2.4	3.8	2.8	2.5	2.1	2.3	1(BDL)**	1.2
Nitrate N mg/L	0.3(BDL)	0.3(BDL)	0.3(BDL)	0.3(BDL)	0.3(BDL)	0.3(BDL)	0.3(BDL)	0.3(BDL)
TC MPN/100ml	2500	1000	840	340	7900	4300	4800	5800
FC MPN/100ml	1000	320	200	110	7000	1700	3100	1500
FS MPN/100ml	48	40	220	70	32	140	220	250
Turbidity NTU	2.8	1(BDL)	1(BDL)	1.2	1(BDL)	1.8	2.7	3
Phenoph: Alkalinity	5(BDL)	5(BDL)	20	5(BDL)	5(BDL)	5(BDL)	5(BDL)	5(BDL)
Total Alkalinity	20(BDL)	20(BDL)	45	22	22	40	20(BDL)	20(BDL)
Chlorides mg/L	5(BDL)	15	4600	35	1300	4000	5(BDL)	7
COD mg/L	5.6	5(BDL)	8.8	7.2	5.6	6.4	5(BDL)	5(BDL)
TKN mg/L	1.5(BDL)	1.5(BDL)	1.5(BDL)	1.5(BDL)	1.5(BDL)	1.5(BDL)	1.5(BDL)	1.5(BDL)
Amm- N mg/L	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Hardness mg/L	18	16	2000	25	464	1200	10(BDL)	17
Calcium as CaCO3 mg/L	16	12	660	18	98	1100	6	13
Magnesium as CaCO3 mg/L	4(BDL)	4(BDL)	1400	7	366	100	4(BDL)	4(BDL)
Sulphate mg/L	5(BDL)	5(BDL)	690	5(BDL)	127.5	500	5(BDL)	5(BDL)
Sodium mg/L	5(BDL)	8.43	2850	19.6	721.15	2205	5(BDL)	5(BDL)
TDS mg/L	28	45	9540	86	2710	7510	20	30
TFS mg/L	20	33	7500	60	2062	5200	15	22
TSS mg/L	12	10(BDL)	29	16	18	24	10(BDL)	10(BDL)
Phosphate mg/L	0.2(BDL)	0.2(BDL)	0.47	0.2(BDL)	0.2(BDL)	0.2(BDL)	0.2(BDL)	0.2(BDL)
Boron mg/L	0.5(BDL)	0.5(BDL)	0.5(BDL)	0.5(BDL)	0.5(BDL)	0.5(BDL)	0.5(BDL)	0.5(BDL)
Potassium mg/L	1.5	1.36	126	2.11	19.1	20	1.15	1(BDL)
Fluoride mg/L	0.4	0.3	0.2(BDL)	0.2(BDL)	0.4	0.6	0.4	0.4
Arsenic, mg/L	0.00049(BDL)	0.00049(BDL)	0.00049(BDL)	0.00049(BDL)	0.00049(BDL)	0.00049(BDL)	0.00049(BDL)	0.00049(BDL)
Cadmium mg/L	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)
Copper mg/L	0.00035(BDL)	0.00035(BDL)	0.00035(BDL)	0.00035(BDL)	0.00035(BDL)	0.00035(BDL)	0.00035(BDL)	0.00035(BDL)
Lead mg/L	0.00031(BDL)	0.00031(BDL)	0.00031(BDL)	0.00031(BDL)	0.00031(BDL)	0.00031(BDL)	0.00031(BDL)	0.00031(BDL)
Chromium mg/L	0.00056(BDL)	0.00056(BDL)	0.00056(BDL)	0.00056(BDL)	0.00056(BDL)	0.00056(BDL)	0.00056(BDL)	0.00056(BDL)
Nickel mg/L	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)
Zinc mg/L	0.00059(BDL)	0.00059(BDL)	0.031	0.119	0.065	0.079	0.00059(BDL)	0.034
Iron mg/L	0.13	0.107	0.117	0.123	0.095	0.197	0.056	0.00067(BDL)

Annx 3 (4)

OP DDT µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
PP DDT µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Alpha Endosulfan µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Beta Endosulfan µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Aldrin µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Dieldrin µg/L	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)

**BDL- Below Detectable Limit, as set in NWMP reporting format

RIVER PERIYAR DATA FOR THE MONTH OF JANUARY AUGUST 2024

PERIYAR RIVER									
River Stations			pH	EC umos/cm	DO mg/l	BOD mg/l	TC MPN/100ml	FC MPN/100ml	CLASS*
Kalady 0018	NWMP	Max	8.5	52	8.2	4.3	2700	940	C
		Min	6.1	30	6.1	1.0	350	70	
		Mean	7.4	39	6.9	1.6	1746	566	
		Std Dev	0.8	7	0.7	1.1	1080	386	
KWA Aluva 3458	NWMP	Max	8.2	56	7.0	2.6	3400	1900	C
		Min	6.3	39	5.1	1.0	920	370	
		Mean	7.2	48	6.0	1.5	2230	1326	
		Std Dev	0.7	6	0.7	0.6	737	474	
SDP Aluva 1338	NWMP	Max	7.8	75	6.6	2.7	8400	2700	C
		Min	6.1	40	4.5	1.0	1700	700	
		Mean	7.0	53	5.6	1.4	4138	1475	
		Std Dev.	0.5	11	0.7	0.6	1985	563	
Muppathadam 2333	NWMP	Max	8.2	86	7.4	2.1	3500	700	C
		Min	6.4	40	4.1	1.0	540	110	
		Mean	7.2	57	5.7	1.4	1225	320	
		Std Dev	0.6	17	1.0	0.5	984	212	
Eloor 0017	NWMP	Max	8.7	22780	7.4	2.5	4600	2800	Below E
		Min	6.3	41	4.3	1.0	1100	200	
		Mean	7.5	5633	5.4	3.7	2050	1093	
		Std Dev.	1.0	8201	1.0	0.6	1101	803	
Pathalam 2334	NWMP	Max	8.4	39350	8.0	3.5	2400	1300	Below E
		Min	7.0	86	5.5	1.0	410	170	
		Mean	7.9	11939	6.9	2.3	1701	769	
		Std Dev.	0.5	13196	0.8	0.9	675	407	
Purappillikadavu 2336	NWMP	Max	8.1	7085	7.1	4.2	4900	1400	C
		Min	6.2	43	5.2	1.1	400	150	
		Mean	7.4	2127	6.3	2.0	1440	350	
		Std Dev.	0.8	2884	0.7	1.0	1531	432	
Kalamassery 2335	NWMP	Max	8.3	84	6.1	3.0	3100	1700	C
		Min	6.4	44	3.8	1.0	630	270	
		Mean	7.2	61	5.2	1.7	1981	1004	
		Std Dev	0.6	16	0.9	0.8	943	456	
Panamkutty Bridge 5209	NWMP	Max	7.4	64	8.3	2.1	2000	630	C
		Min	6.5	46	7.0	1.6	110	2	
		Mean	7.0	55	7.6	1.9	1038	346	
		Std Dev.	0.3	6	0.6	0.2	603	245	

Anna 3 (5)

RIVER PERIYAR DATA OF NWMP STATIONS FOR THE MONTH OF APRIL 2024

Name Of River Stations & Station Code	Kalady 0018	KWA Intake, Aluva 3468	SDP ,Aluva 1338	Muppathadam 2333	Eloor 0017	Pathalam2334	Purappallikadavu 2336	Kalamassery 2335	Panamkutty Bridge, Idukki
Temperature	30	28	28	30	28	30	30	30	25
DO (mg/L)	6.1	6	5.7	5.3	4.4	6.8	6.3	4.6	7.4
pH	7.6	8.1	7.3	7.7	8.7	8.4	8.1	7.4	7.4
Conductivity (µmho cm)	40	52	56	77	11240	18550	5199	60	59
BOD (mg/L)	1.6	2	1.7	1.4	2.3	2.3	2.8	3	2.1
Nitrate N (mg/L)	0.3(BDL)	0.3(BDL)	0.3(BDL)	0.3(BDL)	0.3(BDL)	0.62	0.3(BDL)	0.3(BDL)	0.44
Total Coliform (MPN/100ml)	350	2200	4100	710	1600	1100	4900	2600	700
Fecal Coliform (MPN/100ml)	70	1900	1400	350	920	580	170	1200	540
Fecal Streptococci (MPN/100ml)	33	110	410	170	170	340	120	92	210
Carbonate (CO3-) (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turbidity (mg/L)	2.7	2.4	3.4	2.4	2.4	3.6	1(BDL)	2.5	1.1
Phenolphthalein Alkalinity (mg/L)	5(BDL)	5(BDL)	5(BDL)	5(BDL)	6	5(BDL)	5(BDL)	5(BDL)	5(BDL)
Total Alkalinity (mg/L)	20(BDL)	20(BDL)	20(BDL)	20(BDL)	23	60	23	20(BDL)	20(BDL)
Chlorides (mg/L)	5(BDL)	6.9	8	10.5	3498.56	6500	1823	9.86	7.91
COD (mg/L)	5(BDL)	5(BDL)	5(BDL)	5(BDL)	5(BDL)	5(BDL)	6.4	8	13.6
Total Kjeldahl Nitrogen (mg/L)	1.5(BDL)	1.5(BDL)	1.5(BDL)	1.5(BDL)	1.5(BDL)	1.5(BDL)	1.5(BDL)	1.5(BDL)	1.5(BDL)
Ammonical-N (mg/L)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Total Hardness (mg/L)	12	12	13	10(BDL)	1280	2700	800	20	12
Ca as CaCo3 (mg/L)	8	8	8	5(BDL)	680	1500	700	14	8
Mg as CaCo3 (mg/L)	4(BDL)	4(BDL)	5	4(BDL)	600	1200	100	6	4(BDL)
Sulphate (mg/L)	5(BDL)	5(BDL)	5(BDL)	5(BDL)	50	250	5(BDL)	5(BDL)	5(BDL)
Sodium (mg/L)	25	5(BDL)	5.45	10.5	2100	3800	1000	5.2	5(BDL)
Total Dissolved Solids (mg/L)	23	30	35	43	6200	11609	3703	35	32
Total Fixed Solids (mg/L)	18	24	28	34	4960	9270	2800	28	35.04
Total Suspended Solids (mg/L)	10(BDL)**	12	26	10(BDL)	122.2	122.2	15	19.2	10(BDL)
Phosphate (mg/L)	0.2(BDL)	0.2(BDL)	0.2(BDL)	0.2(BDL)	0.2(BDL)	0.31	0.2(BDL)	0.2(BDL)	0.2(BDL)
Boron (mg/L)	0.5(BDL)	0.5(BDL)	0.5(BDL)	0.5(BDL)	1.56	1.46	0.57	0.5(BDL)	0.5(BDL)
Potassium (mg/L)	1(BDL)	1(BDL)	1.5	1(BDL)	21	126	14	1(BDL)	1.6
Fluoride (mg/L)	0.2(BDL)	0.2(BDL)	0.2(BDL)	0.2(BDL)	0.2(BDL)	0.29	0.2(BDL)	0.2(BDL)	0.2(BDL)
Sodium Percentage	30.3	43.3	44.3	69.9	77.8	74.3	72.7	33.2	38.9
Alpha HCH (µg/L)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Gamma HCH (Lindane) (µg/L)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Arsenic (mg/L)	0.00049(BDL)	0.00049(BDL)	0.001	0.00049(BDL)	0.00049(BDL)	0.006	0.00049(BDL)	0.001	0.00049(BDL)
Cadmium (mg/L)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)	0.00042(BDL)
Copper (mg/L)	0.031	0.031	0.033	0.013	0.021	0.015	0.025	0.022	0.00035(BDL)
Lead (mg/L)	0.004	0.00031(BDL)	0.002	0.024	0.029	0.004	0.02	0.005	0.00031(BDL)
Chromium Total (mg/L)	0.005	0.016	0.002	0.001	0.005	0.001	0.003	0.002	0.00056(BDL)
Nickel (mg/L)	0.00054(BDL)	0.00054(BDL)	0.001	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)	0.00054(BDL)
Zinc (mg/L)	0.036	0.2	0.204	0.024	0.029	0.01	0.031	0.029	0.00059(BDL)
Iron (mg/L)	0.113	0.115	0.13	0.06	0.13	0.041	0.083	0.089	0.341
o,p' DDT (µg/L)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
p,p' - DDT (µg/L)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Manganese (mg/L)	0.056	0.029	0.038	0.036	0.173	0.068	0.08	0.044	0.007
Alpha Endosulphan (µg/L)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Beta Endosulphan (µg/L)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Aldrin (µg/L)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)
Dieldrin (µg/L)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)	0.05(BDL)

Annx 3 (6)

**BDL- Below Detectable Limit, as set in NWMP reporting format.

No. DFTVM/1740/2024-CI

Office of the Director of Fisheries
Thiruvananthapuram
Date: 25-05-2024
Email:fisheriesdirector@gmail.com

Fisheries Director,

Thiruvananthapuram

Government Principal Secretary
Fisheries and Ports Department
Government Secretariat
Thiruvananthapuram

Sir,

Subject: Fisheries - Submission of the investigation report led by the Additional Director of Fisheries regarding the fish killing incident in Periyar on 20th May 2024- regarding

Reference: Government directive dated 22.05.2024

Your attention is drawn to the aforesaid subject and reference. Based on the government's instructions to directly investigate and submit a report on the fish-killing event that occurred in Periyar on May 20, 2024, the report prepared after visiting the location in person and thoroughly inspecting it is presented herewith for further action.

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Yours faithfully

Fisheries Additional Director (In-charge)

For the Director of Fisheries

Report prepared after conducting an on-site investigation under the leadership of the Additional Director of Fisheries regarding the fish kill incident that occurred on May 20, 2024

As per the instructions of the Director of Fisheries, a team comprising of Joint Director (Inland), Joint Director (Marine), Joint Director (Central Region), Deputy Director (Regional) Ernakulam, and Deputy Director (Marine) under the leadership of Additional Director from Fisheries Directorate visited the disaster-affected areas on 23.05.2024 at 10.30 am to investigate the fish kill in the Periyar River in Ernakulam district and assess the situation.

Starting from the Eloor-Edayar section, the fish in the Periyar stretch of Kadamakudy Varappuzha, Cheranelloor, Kadangalloor, Chittattukara, Vadakkekkara, Ezhikkara, and Mulavukad panchayats and in the areas of Pachalam, Vaduthala, and Thanthonithuruth in the Cochin Corporation started dying on the night of May 20, 2024, and completely died on the afternoon of May 21. Fish death happened in 155 cage fish farms which cultivates fish species such as Chempalli, Kalanchi, Vatta, and Karimeen, fish farming in 4 ponds, embankments which cultivates Carp and the unique fish resources of the river were completely killed. After assessing the situation with the farmers and fishermen in the area, it was learnt that on May 20, 2024, colour of water in the water body turned milky and smelt of chemicals. The investigation team was able to understand in its initial assessment that the excessive presence of chemical pollution was the cause of this tragedy. Although it is clear that around 29 companies, including FACT, CMRL, SUD Chemie India, IRE, and TCC of the Eloor Municipality are operating in this area of Periyar, unfortunately, the concerned people have not yet been able to find out which chemical and which company caused this tragic incident. The fishermen also informed us that most of the fish kept in various farming units had grown to the ripe stage for harvesting. The majority of fish farmers were preparing to harvest and sell all the fish during the trawl ban. The loss of the unique fish wealth in the river will also have a very adverse effect on the livelihood of inland fish workers. The Deputy Director of Fisheries, Ernakulam, informed us that a blockade was organised in front of the office of the Deputy Director of Fisheries, Ernakulam (Region), on May 21, 2024, at 11 am under the leadership of various organizations. When visiting the places where the fish farming took place, it was realised that this has mainly affected the fish farming of the beneficiaries of the schemes directly run by the department, including Janakiya Pisciculture

and PMMSY. It has been confirmed that all the fish that were ready for harvesting within two to three months had been completely perished. The fish farmers who are cultivating fish by taking bank loans have suffered losses worth lakhs of rupees. The surveillance team from KUFOS Panangad has visited the spot and collected water and fish samples and had taken adequate taken steps to conduct tests. Accordingly, the preliminary test shows that the main reason for the fish death is the reduced oxygen content of the water (<5 PPM) and high level of turbidity which was induced by the presence of chemical pollutants, (Table 1). It is suspected that chemical pollutants emitted from the companies in this area may have mixed with the water. KUFOS officials have informed us that a report on the presence of pollutants and heavy metals in the water will be available within 3 days.

*Table :1 - Preliminary water test results

Water quality parameters	PLACE		
	Kothad Region	Moolampilly Region	Varapuzha Region
pH	6.72	6.60	7.21
DO surface (ppm)	2.12	0.3	3.81
DO below surface (ppm)	1.14	1.3	3.08
Turbidity (NTU)	6.25	6.84	6.94

*(Sample collected and estimated by KUFOS)

The investigation team then visited the cage units at the scene along with the Central Region Fisheries Joint Director and the Ernakulam (Regional) Fisheries Deputy Director. They saw in person and got convinced that fish cultivated in most of the units which were ready for harvest had died. It is understood that dead fish have been removed from some cage units. The river section adjacent to the factories was also visited. Outlets in almost all the factories open into the river. It is believed that the cause of the fish death is the toxic waste from the factories. More details will be clarified only after the sample test results are received.

The death of air-breathing fishes in many areas is also a matter of great concern. After the site visit, the team members held discussions with the expert committee formed by KUFOS. It would be appropriate to convene a meeting under the presidency of the Hon. Minister of Fisheries to decide on future matters based on the study report.

Then the fisheries team members split into two, and one team attended a meeting called by the Hon. Minister of Industries and apprised the fishermen and workers of the impact of the damage caused. The same team later visited the district collector and informed the true nature of the incident and the damage caused to the farmers and workers.

The second team met with the disaster-affected fish farmers, fish workers, and fish workers union representatives at the Ernakulam Fisheries Complex Awareness Hall at around 3 pm and collected evidence. In the meeting, the farmers and fish workers presented their grievances and demanded strong measures, including compensation, to get them out of the deplorable situation. All of them are ordinary people who do fish farming for a living. Many have taken loans for this purpose. There is no way to repay them. There was a proposal to declare a moratorium on loans. The fish farmers informed that many of the cages maintained by the fish farmers were ready for harvest and that they had lost their savings for their children's education expenses. They complained that fish had happened in many stages, but till date there has been no legal inspection and action. The fish farmers and workers unanimously demanded that a special package be announced and implemented to revive the ecosystem of the area.

Based on the preliminary estimates collected from the field-level officials, the estimated loss in fish farming is Rs. 7,03,66,280/- (Rupees Seven Crores Three Lakhs Sixty Six Thousand Two Hundred Eighty Only). The preliminary assessment of the loss to various fish farming on a panchayat basis has been attached as Annexure 2-5. Approximately 150 Chinese nets are operating in the said areas, and they depend on it for their livelihood. In the event of a complete loss of fish wealth in the river, the loss for the livelihood of the fishermen/associated fishermen for 3 months till its revival has been assessed at Rs. 6,51,94,500/- (Rupees six crore fifty one lakh ninety four thousand five hundred only) and has been attached in detail as Annexure (6-9). The details are given below at a glance.

Compensation to be paid to fish farmers who have suffered losses in fish farming and fish workers who have lost their livelihoods

Fish farmers (fish farming) Embankment Breeding Unit	210 nesting sites, 4 Ha pond unit, 0.4 Ha embankment	70366280
Fishermen (including Chinese net and kuttivala	2248 (Registered) + 58 (Non-Registered) @ 350/day for 25	60532500

workers)	days in a month for 3 months	
Fishery related workers	518 @ 300/day for 25 days in a month for 3 months	4662000
Total		**135560780**

Recommendations:

1. A monitoring committee chaired by District Collector shall be formed including members of KUFOS, Fisheries Department and Pollution Control Board for ETP monitoring and the committee should report and publish the amount of effluent every month. If this is not followed, further steps can be taken including filing a petition in the Green Tribunal. In addition, the activities of the Fisheries Management Council in this area should be strengthened.

2. Along with identifying the culprits and taking strong action against them, compensation should be ensured for the affected people from those who committed the crime.

3. Plans should be formulated to restore biodiversity based on the research report of KUFOS.

4. Fish breeding centers should be implemented at the panchayat level for the revival of fish resources with the joint cooperation of local fish workers and the Fisheries Management Council. In addition, the fish seed investment project should be intensified in the disaster-affected water area.

5. It should be considered to distribute financial assistance at the rate of Rs. 350 per day for 3 months, taking into account 25 days in a month, to the fish workers who have lost their livelihood. It would also be appropriate to provide this at the rate of Rs. 300 to the associated fish workers. In addition, free ration for 3 months can be considered to be provided to the disaster-affected people.

6. Fishermen involved in the Janakeeya fish farming and PMMSY schemes have suffered the most damage. A special package should be allocated to them to restart farming by providing input subsidy. It would also be appropriate to provide a part of the amount that should have been received by selling it as financial assistance.

7. A moratorium can be considered for loans taken by farmers through bank loans and KCC credit cards for damaged fish farming.

8. Since fish farmers are included in the package, it shall be made sure that a person can only be allowed to avail the benefits of only any one package.

Seetha R Nair

Fisheries Additional Director (In-charge)

Salim H

Fisheries Joint Director (Inland)

M Thajjudheen

Fisheries Joint Director (Project)

Dr. Sophia Margaret Joseph

Fisheries Deputy Director (Marine)

ANNEXURE

Annexure-1

SL NO	UNIT NAME	NAME AND ADDRESS OF THE PRESENT OCCUPANT	EXTENT OF LAND	EXTENT OF LAND UTILISED	WHETHER PATTA LAND OR NOT	PRESENT ACTIVITY	DATE OF STARTING	IF ALREADY STARTED PRESENT STATUS	INVESTMENT (LAKHS)	EMPLOYMENT (NOS)	EXPORT	TURN OVER (LAKHS)	CONTACT NUMBER	
1	PHILISUSA INDUSTRIES	MODISSERIL HOUSE, CHANGAMPUZHA NAGAR POST, EDAPPALLY	28.5	28.50		R.G.S powder, Sulphur Bentonete, Sulphur powder	04-12-2010	Working	25	11		50	9388607849	yes
2	TRAVANCORE POLYMERS	Shahul Hameed C A, Chirackakudy House, Kandanthara, Aliapra	15	15.00		U F Resin	17-11-2014	Working	27	6		50	7736088417	yes
3	Southern Minerals and Chemicals	MODISSERIL HOUSE, CHANGAMPUZHA NAGAR P.O. COCHIN -682033	27.223	27.22		Sulphur, N.e.c	01-09-2000	Working	46.00	16		45	9388607849	yes
4	MARKSMEN MARINE PRODUCTS PVT LTD	503, BAITHU AMMAN, KANIMANGALAM.P.O	97.087	97.09		Sterilized fish meal and oil	04/09/2015	Working	30	8	YES	105	8129270000	yes
5	PARAKKAL INDUSTRIES	P V ELDHO S/O P I VARKEY PARAKKAL HOUSE THURITHISSERY MAIKAD P.O. PIN 683590	23	23.00		Organic Fertilizer/manures, N.e.c	15/07/2011	Working	25	7		80	9895804040	yes

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6	Varkey's Industries	P V ELDHO S/O P I VARKEY PARAKKAL HOUSE THURITHISSERY MAIKAD P.O. PIN 683590	7	7.00		Mucosa from Animal guts	10-04-2008	working	45	9		80	9895804040	yes
7	Biocon Organics Pvt Ltd	GEORGE EPHRIAM,AmbookenHouse,ChurchView,poyya,thrissur	85	85.00		Bone Crushed/ Powder	05/11/2004	Working	100	12		600	9387880801	yes
8	SOUTHERN COMPOSITES PVT LTD	NADUVILE PARAMBIL FRANKLIN GARDENS KUTTIKKATTUKARA	50	50.00		Polymers & Chemicals	29-12-2000	Working	55	15		60	9446592655	yes
9	SUD CHEMIE INDIA PVT LTD	24 , Aradhana Enclave ,Ground Floor, Ramakrishnapura, New Delhi 110066	2152	2152.00		Catalyst, Chemical	01/07/1969	Working	800	157		2000	9447007867	yes
10	Super Arc Electrodes	Lakshmi prabha 31)2287 A Kuthapadi Temple Road Thammanam 682032	10	10.00		Electrodes, Graphite Rods	13/10/2015	Working	32	2		5	4846572501	yes
11	YEOMAN BONE AND ALLIED PRODUCTS	Kudiyiruppil House Malady .P.O.Mattannoor	55.5	55.50		Crushed Bone	02-06-2003	Working	100	18		800	9847322337	yes
12	Alliance Marine Products	ABDHUL LATHEEF,Kulangara Thottathil House South VellarappillySreemoolanagaram	180	180.00		Fish Meal	03-04-2020	WORKING	900	20		400	9447130157 884889819	yes

ANNEXURE

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13	INDO GERMAN carbons limited	M M ABDHUL BASHEER,57/3 old mosque road Edayarbinanipura m.p.o.	273	273.00	PATTA	Activated carbon	22-06-1998	Working	150.00	91		1500	9847286900	yes
14	Southern Carbons Pvt.Ltd	Kavalakatt house 29 Changampuzha Nagar P O	118	118.00		processing of fish(high pro feeds)	01-01-1999	Working	25	6		50	9995821114	yes
15	SUNRISE TSR FACTORY	Thenamakkal House Kanjirappilly P.O.K ottayam	250	250.00		Crumb rubber	07-04-2010	Working	100	9		400	9447159300	yes
16	Kochi Plast Solutions Pvt Ltd	Sreeshanthiphavan Pournami Lane ThaikkattukaraAluv a	100	100.00		Covers, Plastic	01/03/2017	Working	150	5		100	9447032535	yes
17	Marysadan Infra Projects Pvt Ltd(Mercum)	Adampayil house South KALAMASSERY 682033	164	164.00		Tar Mixing, Concrete Ready Mix, Concrete Produvts, Waybridge	23-11-2021	Working	75	8		1500	9447076141	yes
18	RUBBER O MALABAR PRODUCTS PVT LTD	MATTUMMAL HOUSE POST OFFICE ROAD,SHORANUR. PO,PALAKKAD,PIN 679121	200	200.00		Belt, Conveyor / Trasmission, Rubber	16-05-2011	Working	450	129		2000	9349055006	yes
19	Neptune Ready Mix Concrete Pvt Ltd	Plot No VI/58&59, Industrial Devt Area, Edayar , Muppathadam P O, Kochi 683110	100	100.00		Concrete Products, N.e.c	20/05/2002	Working	100	49		800	9388689402	yes
20	G K GASES AND CHEMICALS	PRETHISH KOVOOR,KOVOOR HOUSE LF LINE ALUVA	100	100.00		Ammonium hydroxide and anhydorus ammonia	22-09-2000	Working	30	15		75	9846053394	yes

ANNEXURE

21	TMS LEATHERS	THOPPIL HOUSE,MANNAM P.O,NORTH PARAVOOR ERNAKULAM-683520	352	352.00		Leather, N e c	26/11/2004	Working	50	41		100	9446570548	yes
22	Alpharub Crumb Rubber Pvt Ltd	RAJIVE JOSEPH THARIAN,HNo.XII/S 97 Urumbath House High Range BangalowAluva	200	200.00		Natural rubber field - coagulum to CR/BR/ISNR	01/04/2013	Working	209	15		500	9539007922	yes
23	MALAYA RUB TECH INDUSTRIES	MALAYA RAINBOW CASTLEE IN STADIUM ROAD PALARIVATTOM PIN:682025	375	375.00		R.m.natural Rubber	21-08-2008	Working	39	19		200	9447056780	yes
24	JBS INTERMIX AND RUBBER PRODUCTS PVT.LTD	THAMARACHALIL HOUSE,,SIYAD MANZIL,14,KALAM ASSERY,COCHIN,KERALA-682022	125	125.00		Tread rubber, Precured rubber, vulcunisation solution & gum	08/08/2010	Working	100	29		800	9846040120	yes
25	Cochin Minerals and Rutiles Ltd(CMRL)	SASIDHARAN KARTHA,P B NO.73,VIII/224,ALUVA	2560.75	2560.75		Synthetic Rutile. Ferric chloride, ferrous chloride,CEMOX	03/08/1989	Working	300	160		1500	9847081153	yes
26	CELLA SPACE LTD	VINOD,SREE KAILAS,57/2993,PALIYAM ROAD,ERNAKULAM	956	956.00	PATTA	Warehousing Services	24/05/2019	Working	100	85		700	9447796918	yes
27	ValethHightech Composited(P)Ltd	414, Saganka No.94, Satyadev Avenue, MRC Nagar, Santhome, Chennai-600028	89.5	89.50		Fibre Glass Boat	10-01-2013	working	50	15		100	9249580605	yes

ANNEXURE
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28	ESSAR ENTERPRISES	SAJI MON T S,Thenamakkal House kanjirappallyKottayam	40	40.00		Resin	02/05/2003	Working	50	6		75	9447159300
29	JinneesEnvioChem	DA Edayar	177	177.00		Bar, Rods And Rounds, Iron /steel	05/07/2000	Working	75	10		55	9745120080

ANNEXURE

Brackish water Cage Culture

Annexure-2

Sl.No	Lsgd	Dept.Scheme		Private (Without Reg.&Licence)	Operational Cost (in lakhs)	Standing crop(Kg)	Standing crop (Value) (in lakhs)
		JMK	PMMSY				
1.	Kadamakudy	42	5	21	74.7	37023	167.7
2.	Varappuzha	30	5	16	61.5	30207	133.6
3.	Cheranelloor	13	4	5	26.64	6444	21.28
4.	Mulavukad	0	1	2	3.66	435	1.35
5.	Cochin Corporation	5	1	1	8.46	11987	57.2
6.	Chittatukara	1	1	0	2.46	1731	14.44
7.	Vadakekkara	2	0	0	2.4	552	51.2
	Total	**93**	**17**	**45**	**179.82**	**88379**	**446.77**

ANNEXURE

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Private Cages

Annexure-3

Cage	Private (Application not verified/Without Reg.&Licence)	Operational Cost (in lakhs)
Kadamakudy	55	66

ANNEXURE

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Annexure-4

Brackish water Pond Culture

Sl.No	Lsgd	Dept.Scheme		Private (Without Reg.&Licence)	Operational Cost	Standing crop(Kg)	Standing crop(Value)
		JMK	PMMSY		(in lakhs)		
1.	Kadamakudy	1.2 Ha	0	1.8	1.44	2400	253960
2	Cheranelloor	0	0.8 Ha	1.2	4.4048	1022	108840
	Total	**1.2 Ha**	**0.8 Ha**	**3 Ha**	**5.8448**	**3422**	**362800**

ANNEXURE

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Annexure-5

Embankment Culture

Sl.No	Lsgd	Dept.Scheme		Private (Without Reg.&Licence)	Operational Cost	Standing crop(Kg)	Standing crop(Value)
		JMK	PMMSY		(in lakhs)		
1.	Kadamakudy	0.4 Ha	0	0	1.44	160	16000
	Total	0.4 Ha	0	0	1.44		

ANNEXURE E

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Chinese Net

Annexure-6

Sl.No	Lsgd	Registered	Not Registered (Not verified)
1.	Kadamakudy	0	135
2.	Varappuzha	0	24
3.	Cheranelloor	0	16
4.	Mulavukad	0	10
	Total	**0**	**185**

ANNEXURE

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Stake Net

Annexure-7

Sl.No	Lsgd	Registered	Not Registered
1.	Kadamakudy	0	2
2.	Varappuzha	0	0
3.	Cheranelloor	5	0
4.	Mulavukad	15	5
	Total	**20**	**7**

ANNEXURE

Annexure-8

Fishermen Family

Sl.No	Lsgd	Registered	Not Registered	Amount
1.	Kadamakudy	560	10	14962500
2.	Varappuzha	1071	12	28428750
3.	Cheranelloor	200	31	6063750
4.	Mulavukad	200	0	5250000
5.	Cochin Corporation	100	5	2756250
6	Ezhikkara	117	0	3071250
	Total	**2248**	**58**	**60532500**

ANNEXURE 4

A 3(a) 19

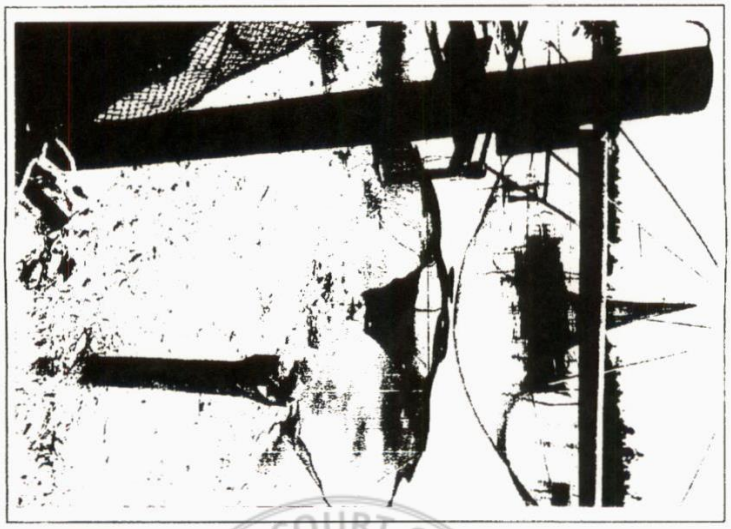
Allied Workers

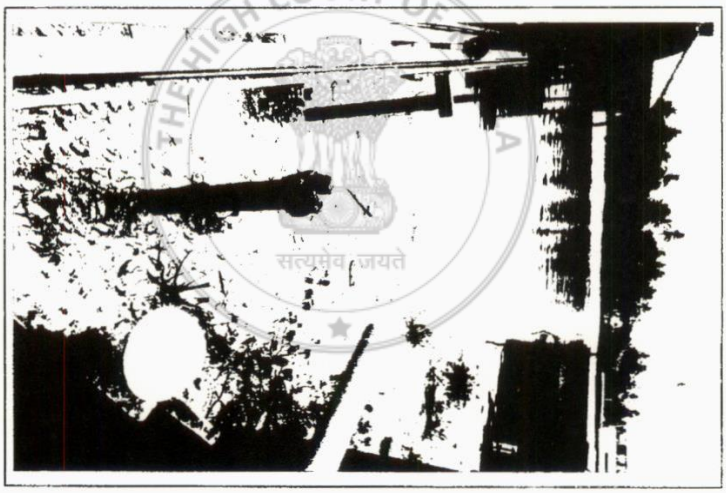
Annexure-9

Sl.No	Lsgd	Registered	Not Registered	Amount
1.	Kadamakudy	140	-	1260000
2.	Varappuzha	169	-	1521000
3.	Cheranelloor	50	-	450000
4.	Mulavukad	50	-	450000
5.	Cochin Corporation	20	-	180000
6.	Ezhikkara	89	-	801000
	Total	**518**		**4662000**

ANNEXURE

3(5) 20





Photographs

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ANNEXURE

R3(a)21

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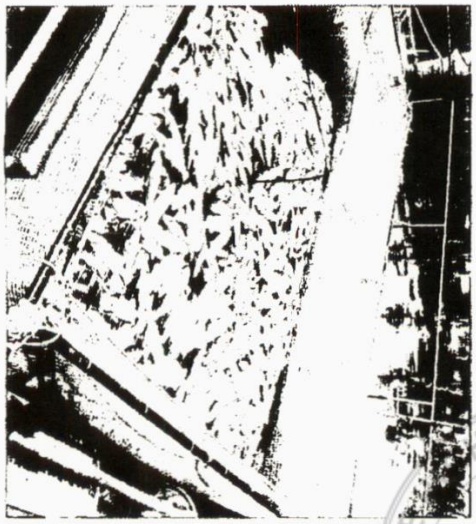
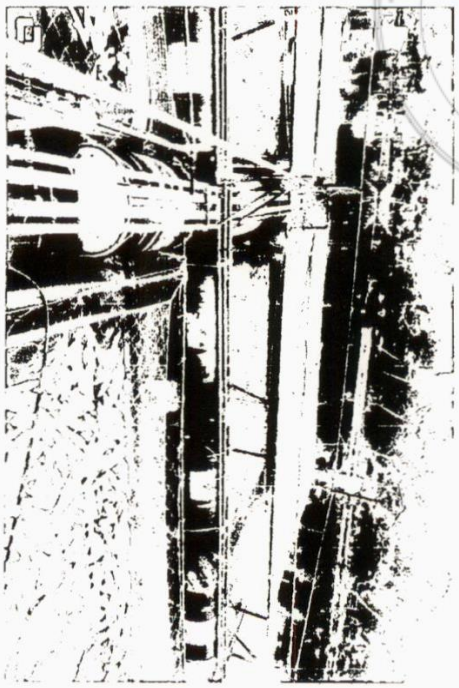
ANNEXURE

R3(a)22





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ANNEXURE

4(1)

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)		Conductivity(µS/cm)		Hardness(mg/L)		Chloride(mg/L)		Alkalinity(mg/L)			TDS(mg/L)		
		20.05.2024 (Morning)	20.05.2024 (9.30PM)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	20.05.2024 (Morning)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)
1	River Periyar Pathalam Bridge	6.87	–	0.2	–	16	–	301.2	70.29	42	–	48.12	–	26	–	20	174.3	–	40.68
2	River Periyar Pathalam Bund Upstream	6.75	6.58	1	0.5	24	44.8	268.6	61.25	40	39	179.4	49.75	32	26	20	205.4	155.5	35.45
3	River Periyar Pathalam Bund downstream	6.85	6.68	1.9	0.8	32	56	11320	2538	74.57	1400	500	16	2528.3	244.67	163.12	46	30	16	6552	1469	43.16
4	River Periyar Vettukadavu	6.89	6.75	7.21	3.9	0.9	1.9	34	50.4	10690	8120	296.8	1500	1100	38	2691.4	2120.5	163.12	44	42	16	6187	4700	171.8

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ANNEXURE 4 (2)

ANALYSIS REPORT OF RIVER WATER OF PERIYAR

Sl no	Source of sample	Dissolved Oxygen(mg/L)			Nitrate Nitrogen(mg/L)			Nitrite(mg/L)			Nitrate(mg/L)			Phosphate(mg/L)			Sulphate(mg/L)			Free Chlorine(mg/L)			Sulphide(mg/L)		
		20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)
1	River Periyar Pathalam Bridge	0.7	–	5.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2	River Periyar Path alam Bund Upstream	10.3	1	4.4	–	–	–	–	BDL	–	–	1.8	–	–	0.17	–	–	101	–	–	BDL	–	–	BDL	–
3	River Periyar Pathalam Bund downstream	2.7	2.1	4.6	–	–	–	–	BDL	–	–	1.3	–	–	0.05	–	–	9	–	–	BDL	–	–	BDL	–
4	River	6.8	3.2	4	–	2.26	–	–	0.3	–	–	10	–	–	0.68	–	–	590	–	–	3.55	–	–	BDL	–
5	River Periyar Eloor Ferry	–	6.85	7.1	–	0.5	1.7	–	61.4	28	–	10160	1254	–	1300	38	–	2202.1	55.46	–	46	14	–	5881	725.8
6	River Periyar PuthalamKadavu	6.72	–	7.04	2.9	–	1.8	12	–	8	92.63	–	71.49	16	–	19	17.94	–	13.86	20	–	24	53.61	–	41.38

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ANNEXURE 4(3)

ANALYSIS REPORT OF RIVER WATER OF PERIYAR

Sl no	Source of sample	Free Ammonia(mg/L)			Total Kjeldahl Nitrogen(mg/L)			Ammoniacal Nitrogen(mg/L)			Residual chlorine(mg/l)			Phenolic compounds(mg/L)			Sodium (mg/L)			Potassium(mg/L)			SAR(Sodium Absorption Ratio)(mg/L)		
		20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)
1	River Periyar Pathalam Bridge	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2	River PeriyarPathalam Bund Upstream	–	BDL	–	–	2.24	–	–	BDL	–	–	–	–	–	0.04	–	–	85.1	–	–	5.45	–	–	4.5	–
3	River Periyar Pathalam	–	0.003	–	–	3.36	–	–	0.56	–	–	–	–	–	0.04	–	–	86.4	–	–	5.5	–	–	4.6	–
	Periyar Vettukadavu																								
5	River Periyar Eloor Ferry	–	2.1	5.4	–	–	–	–	BDL	–	–	16	–	–	1.08	–	–	340	–	–	–	–	–	BDL	–
6	River Periyar PuthalamKadavu	4.2	–	3.9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

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ANNEXURE 4 (4)

ANALYSIS REPORT OF RIVER WATER OF PERIYAR

Sl no	Source of sample	Hexavalent Chromium(mg/L)			Cyanide(mg/L)			Fluorides(mg/L)			Zinc(mg/L)			Lead(mg/L)			Mercury(mg/L)			Arsenic(mg/L)					
		20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)			
1	River PeriyarPathalam Bridge	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–			
2	River PeriyarPathalam Bund Upstream	–	BDL	–	–	BDL	–	–	0.12	–	–	0.062	–	–	BDL	–	–	BDL	–	–	BDL	–			
	Bund downstream																								
4	River PeriyarVettukadavu	–	BDL	–	–	2.24	–	–	BDL	–	–	–	–	–	0.62	–	–	112	–	–	2.64	–	–	1.1	–
5	River PeriyarEloor Ferry	–	BDL	–	–	1.12	–	–	BDL	–	–	7.09	–	–	0.698	–	–	148.2	–	–	8.7	–	–	6	–
6	River PeriyarPuthalamKadavu	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

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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)			Boron(mg/L)			Vanadium(mg/L)		
		20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)	20.05.2024 (Morning)	20.05.2024 (9.30PM)	21.05.2024 (Morning)
1	River Periyar Pathalam Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	River	-	BDL	-	-	0.012	-	-	0.032	-	-	0.056	-	-	BDL	-	-	0.04	-	-	BDL	-
3	River PeriyarPathalam Bund downstream	-	BDL	-	-	BDL	-	-	0.17	-	-	0.015	-	-	BDL	-	-	BDL	-	-	BDL	-
4	River PeriyarVettukadavu	-	BDL	-	-	BDL	-	-	0.54	-	-	0.035	-	-	BDL	-	-	BDL	-	-	BDL	-
5	River PeriyarEloor Ferry	-	BDL	-	-	BDL	-	-	0.57	-	-	BDL	-	-	BDL	-	-	BDL	-	-	BDL	-
6	River PeriyarPuthalam Kadavu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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ANNEXURE

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	Periyar Pathalam Bund Upstream	–	BDL	–	–	–	BDL	–	–	0.042	–	–	BDL	–	–	0.02	–	–	BDL	–	–	–
3	River Periyar Pathalam Bund downstream	–	BDL	–	–	–	BDL	–	–	0.043	–	–	0.64	–	–	0.509	–	–	BDL	–	–	–
4	River Periyar Vettukadavu	–	0.02	–	–	0.072	–	–	BDL	–	–	0.041	–	–	BDL	–	–	0.02	–	–	BDL	–
5	River Periyar Eloor Ferry	–	BDL	–	–	BDL	–	–	BDL	–	–	–	BDL	–	–	–	–	–	BDL	–	–	–
6	River PeriyarPuthalamKadavu	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

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4(7)

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(µS/cm)	Sulphide (mg/L)	Oil&Grease (mg/L)
Edamula MUTTARBRANCH	Amrutha 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	407.8	12	21.87	120	0.4	20	495.279	855.7	BDL	0.64
	Kuzhikando mThodu	6.6	129.6	36.4	24.5	20	21.87	140	0.7	20	676.62	1169	BDL	0.08
	EloorFerry	6.8	99.36	50.8	342.5	20	26.73	160	0.8	20	985.12	1702	BDL	11.8
Pathala mEloorEdayar branch	MUTTINAKAM	6.9	108	16.4	81.6	12	9.72	70	1.4	30	252.88	436.9	BDL	3.16
	VETTUKADAVU	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 CHEMIE	6.9	82.08	BDL	46.3	12	2.43	40	1.2	30	64.883	112.1	BDL	11.36
	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

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ANNEXURE 4(B)

Source of sampling	Sampling locations	Ammonia calnitrogen(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)
Edamula-MUTTARBRANCH	Amrutha 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
	Kuzhikandom Thodu	0.4	0.21	128	0.09	0.13	1.23	3.8	0.22	BDL	0.014	BDL	BDL
	Eloor Ferry	0.3	0.11	125	0.12	0.15	1.85	3.5	0.66	BDL	0.038	BDL	BDL
Pathalm Eloor Edayar branch	MUTTINAKAM	0.5	0.27	BDL	0.16	0.11	1.7	3.8	0.43	BDL	0.02	BDL	BDL
	VETTUKADAVU	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
	SUDCHEMIE	BDL	BDL	BDL	0.27	0.07	1.27	3.6	1	BDL	0.02	BDL	BDL
	CMRL	0.3	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

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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)
Edamula-Muttar branch	Amrutha Pumping station	BDL	BDL	BDL	BDL	0.04	BDL
	FACT PD	BDL	BDL	BDL	BDL	0.143	BDL
	Kuzhikandom Thodu	BDL	BDL	BDL	BDL	0.04	BDL
	EloorFerry	BDL	BDL	BDL	BDL	0.045	BDL
Pathalam Eloor 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

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ANNEXURE 5(1)

Annexure 5- List of Effluent generating industries in Edayar Industrial Area

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	Wheather obtained consent or not.	Consent Validity
1	FACT Ltd., Udyogamandal Division, Eloor, Udyogamandal	Chemical Fertilizer	Red	Large	19075000	16800000	Neutralisation, Equalisation, Bio pond, Guard pond, Final clarifier, Denitrification reactor	To periyar	yes	30.06.2028
2	FACT Ltd., Petrochemical Division, Eloor, Udyogamandal	Petrochemical 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, Clariflocculator, 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 system for sewage effluent	reuse in process and irrigation	yes	30-06-2028
5	Sud Chemie India Private Limited Edayar Industrial Development Area, Binanipuram P.O. Pin - 683 502	chemical catalyst industry	Red	Large	450000	450000	1.oil traps 2.equilisation tank 3.flash mixer4.clarifier5.filter press 6. Delay tank	To river periyar (Downstream of Pathlam bund)	yes	30-06-2028
6	Cochin Minerals and Rutile Ltd., Industrial Development Area, Edayar, Muppathadom P.O.	Mining and ore beneficiation (wet -	Red	Large	3995000	659000	Neutralisation, Equalisation, Flash mixer, Secondary clarifier, vaccumbelt filter, filter press	To River periyar (Downstream of pathalam bund)	yes	30.06.2028
7	TMS Leathers Industrial Development Area Edayar, Muppathadom P.O.	Leather	Red	Large	123600	101000	Solar evaporation beds, Chrome recovery plant collection tank, Effluent collection tank, Equalisation tank, Chemical precipitation tank, Primary settling tank, Aeration tank, Secondary settling tank, Sludge drying bed.	To river Periyar(upstream side of pathalam bund)and reuse	yes	30.06.2028
8	Active Char Product Pvt. Ltd., Industrial Development Area, Edayar	Activated carbon	Red	Medium	100 000	4500	No trade effluent generated (only boiler blow down/back wash return after the process) STP (10 KLD) with MBR system for domestic effluent.	Percolation pit	yes	30.06.2028
9	Indo German Carbon Ltd, Industrial Development Area, Edayar, Binanipuram P.O	Activated carbon	Red	Large	139300	8600	collection tank, neutralisation, sand filter, and carbon filter and ultrafiltration system	For irrigation and percolation pit.	yes	30.06.2028
10	Alliance Marine Products Industrial Development Area, Edayar	RENDERING UNIT	Red	Medium	53.750	45,000	ETP of 100 KLD capacity - Screen chamber, grit chamber, fat & oil removal with DAF, fat & oil trap, High Rate Anaerobic Digester, Nitrification, equalisation tank, Anoxic tank, aeration tank, secondary settling tank, PSF, ACF, Ultrafiltration, treated water tank, filter press.	Reuse & Soak Pit	yes	31-07-2028
11	Ashan Exports & Furnishers Industrial Development Area Edayar, Muppathadom P.O	Bone Meal and Rendering unit	Red	Small	13,000	12,000	Multiple Effect Evaporator and Agitated Thin Film Drier	Reuse	yes	31.01.2027
12	Marksmen marine products Pvt Ltd, SyNo.61/6-10, IDA, Edayar	Fish meal & Fish oil Manufacturing	Orange	Medium	35000	52000	screen chamber,oil trap, collection tank, anaerobic system, equalisation tank, aeration tank, secondary clarifier, flash mixer, flocculation and settling tank, pressure sand filter, activated carbon filter, filter press, sludge drying bed, treated water tank	Reuse	yes	31.10.2026
13	Organo Fertilizers (India) Pvt. Ltd., Industrial Development Area, Edayar, Muppathadom P.O	Bone meal	Red	Medium	5000	20000			yes	31.12.2024
14	PARAKKAL INDUSTRIES VI, 592 A,IDA BINANIPURAM P.O EDAYAR - 683502	Bone meal	RED	Small	8000	7000	screen chamber, oil trap ,equalisation tank, flash mixer, primary settling tank, recirculation tank, anaerobic tank, plain settling tank, aerobic tank, flocculation tank, secondary settling tank, filter feed tank, pressure sand filter, activated carbon filter, treated water tank, sludge digester	Soak pit	yes	29-11-2026
15	FORMAL TRADE LINKS LLP Industrial Development Area Edayar, Binanipuram P.O. Ernakulam - 683502	Tallow unit	Red	Small	1200	200	screen chamber, collection tank, oil removal, aeration tank, clarifier, filter feed tank, pressure sand filter, activated carbon filter, treated water tank, sludge digester	Reuse	yes	31-03-2027
16	JKS INDUSTRIES V/597 INDUSTRAL DEVELOPEMENT AREA EDAYAR MUPPATHADAM ALUVA	Tallow unit	Red	Small	200	600	Screen & Oil Separator, Anaerobic Digestor 1 ,Anaerobic Digestor 2 ,Aeration Tank 1, Aeration Tank 2, settling tank, filter feed tank ,pressure sand filter, activated carbon filter	Soak pit	yes	25-07-2027
17	AMCOS XL PAINTS (INDIA) PVT. LTD, Unit 1, Industrial Development Area, Bund Road, Edayar, Muppathadom P.O.	Water based & solvent based paints	Orange	Small	1000	500	Collection tank, mixing channel, settling tanks, sand filter, filter press	Reused for floor cleaning	yes	31.07.2028
18	Cochin Petromins, Industrial Development Area, Edayar	Manufacturing of Thinner, Turpentine, Wall primer	Red	Small	500	100	collection tank,settling tank,chemical precipitation tank,aeration tank and filtration	Reuse	yes	31.01.2024
19	ALPHARUB CRUMB RUBBER P LTD V/793, IDA, EDAYAR, ALUVA - 683110	Crumb rubber	Orange	Medium	100000	85000	Rubber trap (2 nos.), collection tank, lime mixing tank, parallel plate settler, aeration tank, secondary clarifier, alum mixing tank, settling tank, aeration tank, treated water tank, sand filter, carbon filter and sludge drying bed.	Reused in the process	yes	31.01.2028

ANNEXURE 5(2)

20	Essar Enterprises Building No. 654 A Industrial Development Area Pin - 683 502	Crepe rubber	Orange	Small	10000	5000	rubber trap, chemical treatment, primary settling tank, aeration tank, secondary settling tank, disinfection, pressure sand filter and activated carbon filter.	Treated water reused in the process	yes	30.06.2023
21	Malaya Rub Tech Industries Industrial Development Area Edavar, Muppathadom P.O.	Rubber	Orange	Large	720800	710000	bar screen, rubber trap, oil & grease trap, primary settling tank, aeration tank, secondary settling tank, pressure sand filter, activated carbon filter, treated water tank, filter press, sludge drying bed	Reuse	yes	31.12.2026
22	Sunrise TSR Factory Industrial Development Area, Edayar, Muppathadom P.O	Crumb rubber unit	Orange	Small	302000	45000	rubber trap,collection tank,chemical treatment tank,primary settling tank,aeration tank(2 nos.),secondary settling tank,filter feed tank,Pressure	Reuse	yes	30.11.2024
23	Aristo Steel Fabricators Door V/688D, Edayar, Industrial Development Area, Muppathadom P.O	Engineering fabrication, powder coating	Red	Small	850	780	Collection tank, equalisation tank, aeration tank, settling tank and filtration and treated water tank	Reuse	yes	31-12-2023
24	Bright Coats, Edayar, Industrial Development Area, Binanipuram P.O., Pin - 683502	Anodising unit	Red	Small	500	50	collection tank, lime addition and settling tank	Soak pit	yes	30.06.2020
25	Exelon Hi-Fabs and Contractors Pvt. Ltd. (Matson Electro coats Pvt. Ltd), Industrial Development Area, Edayar, Muppathadom P.O.	Powder coating unit	Red	Small	4000	3000	collection cum equalisation tank, reduction and precipitation tank, alkali addition tank, settling tank, pressure sand filter, activated carbon filter, treated water tank, sludge drying bed	Reuse	yes	30.06.2029
26	Poly-Coat Industries (Ramanand Electrocoats), Industrial Development Area, Edayar, Muppathadom P.O.	Powder coating unit	Red	Small	4000	2000	collection cum neutralisation tank, oil trap, settling tank, filter feed tank, pressure sand filter, activated carbon filter, treated water tank, sludge drying bed	Reuse	yes	30.06.2028
27	KEMO GRAVURES IDA, EDAYAR, BINANIPURAM	PRINTING ROLLER	Red	Small	940	250	Neutralisation and precipitation tank settling tank, filter, treated water tank *Provided an ETP in the unit. But it was not properly operated. No augmentation is directed	Soak pit	yes	30.06.2024
28	Arjuna Natural Limited, Industrial Development Area, Binanipuram P.O. Edayar.	Oleo resins manufacturing unit	Orange	Medium	51,000	20,000	Collection tank, neutralisation tank, flocculation tank, aeration tank, settling tank, filtration, triple effect evaporator, filtration, and agitated thin film dryer	Land percolation and reuse	yes	18-03-2027
29	TMV Natural Oils and Extracts (P), Industrial Development Area, Edayar, Muppathadom P.O	Herbal extracts	Orange	Small	1700	1000	screen chamber, oil trap, equalisation, flocculation tank, primary settling tank, anaerobic tank, aeration tank, flocculation tank, secondary settling tank, filter feed tank, pressure sand filter, activated carbon filter, treated water tank	Soak pit	yes	30.06.2025
30	Cee Jee Lubricants, Industrial Development Area, Edayar, Binanipuram P.O.	Oil re-refining	Orange	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	yes	30-06-2028
31	CELLA SPACE LTD Industrial Development Area, Mupathadam Edayar, Ernakulam.	Ware House/ Godown	Orange	Medium	20000	20000	ETP of 25 KLD capacity - screen chamber, septic tank, up flow anaerobic reactor, collection/ equalisation tank, primary settling tank, secondary settling tank, filter feed tank, pressure sand filter, activated carbon filter, disinfection,	Soakpit	yes	31.10.2025
32	CGR Metalloys Pvt. Ltd., (Chemmanur Gold Refinery (P) Ltd., Century Gaskets & Rubber Works) No. Industrial Developmem Area, Edayar, Muppathadom, Aluva - Ernakulam	Gold purification	Red	Small	100	50	equalisation tank, chemical treatment tank, collection tank, final pH correction tank and filtration	Treated water reused for gold washing	yes	30.06.2028
33	Classic Concepts Home India Pvt. Ltd., VI/565, Industrial Development Area, Edayar, Binanipuram P.O.	Dyeing unit	Red	Small	37000	34000	oil& grease trap, flash mixer, clarifier, aeration tank, clarifier ,pressure sand filter, activated carbon filter, treated water tank, filter press	soak pit	yes	31-03-2028
34	Cloud Chemicals Door No. 18/770, Industrial Development Area, Edayar, Binanipuram P. O., Ernakulam - 683 502	Formalin & Urea formaldehyde Resin	Red	Medium	3500	2000	screening, equalisation, anaerobic system, aerobic system, flocculation, settling and filtration	Treated effluent reused in the process	yes	21-12-2027 (CE)
35	Deccan Industries Industrial Development Area Edayar, Binanipuram P.O. Ernakulam - 683 502	Urea formaldehyde Resin	Red	Small	2000	2000	collection tank, electro coagulation, settling cum clarifier, sand filter, carbon filter, treated water tank	Treated effluent reused in the process	yes	31.12.2025
36	Travancore Polymers V/779, Industrial Development Area, Edayar, Binanipuram P.O., Ernakulam - 683 110	Urea formaldehyde Resin	Red	Small	2000	2000	collection tank, electrocoagulation, poly dosing system, clarifier, pressure sand filter, activated carbon filter, treated water tank, sludge drying bed (ETP was	Soak pit	yes	30.06.2019
37	Euro Polymers Industrial Development Area Edayar, Binanipuram P.O.	Chemical	Red	Small	2000	2000	Collection tank, electrocoagulation, poly dosing system, clarifier, pressure sand filter, activated carbon filter, treated water tank, sludge drying bed	Reuse	yes	31-12-2025
38	Hi Power Industries VI/652, Industrial Development Area, Edayar, Binanipuram P.O. Pin - 683 502.	Chemical	Red	Small	2000	1000	Collection tank, Electro coagulation, Settling cum clarifier, Sludge drying bed, Sludge storage tank, Sand filter and Carbon filter	Reuse	yes	30-06-2023
39	KVS Polymers (Fai's Chemicals) V/716A, Industrial Development Area, Edayar, Muppathadom P.O. Ernakulam - 683 110	Chemical	Red	Small	1100	1100	collection tank, electro coagulation, settling cum clarifier, sand filter, carbon filter, treated water tank	Reuse	yes	31-07-2021
40	Inter Decore Industries, Industrial Development Area, Edayar Binanipuram P.O.	Fabrication unit	Orange	Medium	250	150	collection tank, chemical treatment facility & filter provided	Reuse	yes	30-06-2028

ANNEXURE 5(3)

41	Neptune Readymix Concrete Pvt. Ltd., Plot No. VI/58 & 59, Industrial Development Area, Edayar, Muppathadom P.O., Ernakulam - 683 110.	Concrete product unit	Green	Small	16000	5000	Neutralisation, Settling and filtration	Reuse	yes	30.06.2028
42	Jonarin Jaliz & Company Plot NO. 91/7A, NO. V/684A IDA, Edayar, Muppathadom P.O	Cleaning materials	Green	Small	5340	1500	collection tank, neutralisation and equalisation tank and sludge settling tank	soak pit	yes	30.06.2028
43	GLOBAL TRADERS Old Mosque Road, Edayar Industrial Area, Binanipuram P.O	Cleaning and Storage of Plastic barrels and Cans	Green	Small	2300	2000	ETP of 2KLD with the units such as grit chamber, three chambered collection tank, chemical addition and settling tank, disinfection, filter feed tank, pressure sand filter, activated carbon filter	Soak pit	yes	31.08.2026

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 INSPECTIONS (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 if Letter / Notice/ Direction issued based on non-compliance (Col.7)
1	M/s. FACT – PETROCHEMICAL UNIT, UDYOGAMANDAL	25.07.2024, 30.04.2024, 25.05.2024	3	N	N	NA	NA
2	M/s. FACT – FERTILIZER UNIT, UDYOGAMANDAL	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)

							reported, verified, no action pending
3	M/s. TRAVANCORE 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 33A 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 EP 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	N	Y	Y	Consent revoke intention notice issued (under Section 33A 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 (5)

		08.07.2024,					section 31A 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 66

							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	3	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 21 of the Air Act). Further action initiated

ANNEXURE 6(7)

21	M/s. TRAVANCORE 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. RUBBERO 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. JONARIN CHEMICALS	17.05.2024	1	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 (8)

							ongoing.
26	M/s. COCHIN PETROMINS PVT LTD	18.06.2024, 24.07.2024,	2	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); Not

ANNEXURE 6 (9)

							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. Ashan 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. Formal 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	3	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(6)

1

BEFORE THE HON'BLE HIGH COURT OF KERALA, ERNAKULAM

W.P.(C) No. 9534 of 2020

K.S.R. Menon		:::	Petitioner
	Vs.		
State of Kerala and others		::	Respondents

COUNTER AFFIDAVIT FILED ON BEHALF OF RESPONDETS 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

KERALA STATE POLLUTION CONTROL BOARD REGIONAL OFFICE

BABURAJAN P.K.
Chief Environmental Engineer

ANNEXURE 6(a)

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 ofriver
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

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Chief Environmental Engineer

ANNEXURE 6(a)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.

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Chief Environmental Engineer

ANNEXURE 6(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

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Chief Environmental Engineer

ANNEXURE 6(a)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	**PathalamBridge**		
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
COD	mg/L	16	6
Conductivity	µS/cm	301.2	70.29
Hardness	mg/L	42	18
Chloride	mg/L	48.12	12.23
Alkalinity	mg/L	26	20
TDS	mg/L	174.33	40.68
Dissolved Oxygen	mg/L	0.7	5.3

Station Name	**Pathalam Bund Upstream**			
Source of Sample	**River Periyar**			
Parameters	Unit	20.05.2024 (Morning)	20.05.2024 (9.30 PM)	21.05.2024 (Morning)
pH		6.75	6.58	7.18
BOD	mg/L	1	0.5	2.4
COD	mg/L	24	44.8	8
Conductivity	µS/cm	268.6	354.8	61.25

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ANNEXURE
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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	205.36	35.45
Dissolved Oxygen	mg/L	1.3	1	4.4
Nitrite	mg/L	-	BDL	-
Nitrates	mg/L	-	1.8	-
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	-	0.012	-
Chromium	mg/L	-	0.032	-
Manganese	mg/L	-	0.056	-
Nickel	mg/L	-	BDL	-
Boron	mg/L	-	0.04	-
Vanadium	mg/L	-	BDL	-

Station Name	**Pathalam Bund Downstream**			
Source of Sample	**River Periyar**			
Parameters	Unit	20.05.2024 (Morning)	20.05.2024 (9.30 PM)	21.05.2024 (Morning)
pH		6.85	6.68	6.91
BOD	mg/L	1.9	0.8	2.5
COD	mg/L	32	56	18
Conductivity	µS/cm	11320	2538	74.57
Hardness	mg/L	1400	500	16
Chloride	mg/L	2528.3	244.67	163.12

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Alkalinity	mg/L	46	30	16
TDS	mg/L	6552.01	1468.99	43.16
Dissolved Oxygen	mg/L	2.7	2.1	4.6
Nitrite	mg/L	-	BDL	-
Nitrates	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	-	3.36	-
Ammoniacal Nitrogen	mg/L	-	0.56	-
Phenolic Compounds	mg/L	-	0.04	-
Sodium	mg/L	-	86.4	-
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 Periyar**			
Parameters	Unit	20.05.2024 (Morning)	20.05.2024 (9.30 PM)	21.05.2024 (Morning)
pH		6.89	6.75	7.21
BOD	mg/L	3.9	0.9	1.9
COD	mg/L	34	50.4	24
Conductivity	µS/cm	10690	8120	296.8
Hardness	mg/L	1500	1100	38
Chloride	mg/L	2691.41	2120.5	163.12
Alkalinity	mg/L	44	42	16
TDS	mg/L	6187.37	4699.86	171.79
Dissolved Oxygen	mg/L	6.8	3.2	4

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ANNEXURE
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Nitrate Nitrogen	mg/L	-	2.26	-
Fluorides	mg/L	-	0.54	-
Nitrites	mg/L	-	0.3	-
Nitrates	mg/L	-	10	-
Phosphate	mg/L	-	0.68	-
Sulphate	mg/L	-	590	-
Free Chlorine	mg/L	-	3.55	-
Sulphide	mg/L	-	BDL	-
Free Ammonia	mg/L	-	BDL	-
Total Kjeldhal 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	-
Pottasium	mg/L	-	2.64	-
SAR(Sodium Absorption 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	**Eloor 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	0.5	1.7
COD	mg/L	61.4	28
Conductivity	µS/cm	10160	1254
Hardness	mg/L	1300	38
Chloride	mg/L	2202.07	55.46
Alkalinity	mg/L	46	14
TDS	mg/L	5880.61	725.82
Dissolved Oxygen	mg/L	2.1	5.4

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Chief Environmental Engineer

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ANNEXURE 6(a)10

Nitrite	mg/L	BDL	-
Nitrates	mg/L	16	-
Phosphate	mg/L	1.08	-
Sulphate	mg/L	340	-
Sulphide	mg/L	BDL	-
Free Ammonia	mg/L	BDL	-
Total Kjeldhal Nitrogen	mg/L	1.12	-
Ammoniacal Nitrogen	mg/L	BDL	-
Residual Chlorine	mg/L	7.09	-
Phenolic compounds	mg/L	0.698	-
Fluoride	mg/L	0.57	-
Sodium	mg/L	148.2	-
Pottasium	mg/L	8.7	-
SAR(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	-
Arsenic	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	PuthalamKadavu		
Source of Sample	River Periyar		
Parameters	Unit	20.05.2024 (Morning)	21.05.2024 (Morning)
pH		6.72	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	13.86
Alkalinity	mg/L	20	24
TDS	mg/L	53.61	41.38
Dissolved Oxygen	mg/L	4.2	3.9

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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

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ANNEXURE 6(a)12

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	**D**	• 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	**E**	• 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, on20/05/2024, 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**

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	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

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ANNEXURE

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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, Udyogamandal	12000 m^3/day (Pathalam 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

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ANNEXURE 6(a)15

5	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 MuttarRiver (Edamula Stream) in the Year2016.

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.

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ANNEXURE 6 a (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 Thumbungalthodu 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 manjummel regulator
Muttar bridge

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Chief Environmental Engineer

ANNEXURE 6(a) 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 on22.04.2020:

Board received various complaints on black discoloration of river

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Chief Environmental Engineer

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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 on22.04.2020.

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 08.06.2023, when the Pathalam 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.

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Chief Environmental Engineer

19 ANNEXURE 6(a) 19

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 is250mg/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.

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20 ANNEXURE 6(a)20

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.

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Chief Environmental Engineer

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ANNEXURE
6(a) 21

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

PCB/ESC/CM-33/08 Date: 10.01.2024

From

Environmental Engineer
Environmental Surveillance Centre
Eloor

To

Executive Engineer
Irrigation Division
Civil Station 2nd Floor
Kakkanad

Subject: Fish killing on 07.01.2024 in the Idamula tributary of the Periyar River

Sir,

In the last few days, the oxygen level in the river flowing through Kalamassery and Manjummel of the Periyar River has decreased and the colour of the water in the river has changed. There was a fish kill in Manjummel on 07.01.2024. To avoid such situations, the Pathalam and Manjummel regulators should be operated correctly according to the tide and ebb and flow and steps should be taken to maintain minimum flow.

Yours faithfully

Environmental Engineer (Full additional charge)

For the Director of Fisheries

Copy To :- Chief Environmental Engineer
Regional Office
Kerala State Pollution Control Board
Ernakulam

ANNEXURE 6(a)23

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 കാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡൽ പി. ഒ.,
എറണാകുളം-683 501

Exhibit R-3 (b)

REGD WITH AD

PCB/ESC/ CTE-11/2019 Date: 22.05.2024

Ref: 1.Consent No. KSPCB/ESC/ICO/10032341/2023 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,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 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(A)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
ELOOR UDYOGAMANDAL - 683 501

To

M/s. Alliance Marine Products,
Industrial Development Area,
Edayar, Muppathadom P.O,
Ernakulam

Copy to: The Chief Environmental Engineer
KSPCB, Regional Office, Ernakulam

ANNEXURE 6 A(25)

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 കോർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡൽ പി. ഒ.,
എറണാകുളം-683 501

Exhibit R-3(c)

PCB/ESC/CO-08/06 Date: 27.05.2024

Ref: 1. Consent to Operate KSPCB/ERRO/ICO/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, Edayar, Binanipuram comes 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 1 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
ELOOR, UDYOGAMANDAL - 683 501

To

M/s. Arjuna Natural Extracts,
Industrial Development Area,
Edayar.

Copy to: The Chief Environmental Engineer,
Kerala State Pollution Control Board,
Regional Office,
Ernakulam.

ANNEXURE 6(G) of 7

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

Exhibit R-3(d)

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;

FSO VERIFIED-38

ANNEXURE 6(a) 24

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
FLOOR UDYOGAMANDAL

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.

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

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

ANNEXURE 6(a) 29

Exhibit R-3 (e)

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-188/07 Date:27.05.2024

CLOSURE INTENTION NOTICE

Ref:- 1. Consent No. PCB/ESC/CO/IC-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, VI/587 A, Industrial Development Area, Edayar, Binanipuram 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 33A 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
FLOOR UDYOGAMANDAL - 683 501

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) 2

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 u/s 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. Shabeeer 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. Sakkir 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 Designation	Signature
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) 6

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: Eloor 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.KSR Menon
9	Sri.Shibu Manual
10	Sri.Abbas V.E District Collector , Ernakulam
11	Sri.Sakeer Husain M.M Periyar Malineekarana Virudha samidhi, Ernakulam
12	Smt.Geetha .P Chief Environmental Scientist, KSPCB.

ANNEXURE 6(b) 7

13	Dr.Josemin 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.Pravitha P.K AEE,KSPCB,HO, Thiruvananthapuram
20	Sri.Shiju M.A, SEE,KSPCB ESC,Eloor
21	Smt.Rameena V.V AEE,KSPCB ESC,Eloor
22	Sri.Ajith Babu C.R AE, ESC Eloor
23	Sri.Sayooj.K.Ullas GIS-Specialist, KSCPC,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/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 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-Eloor to Kalamassery in Priority-V) and OA 395/2013. The detailed discussion based on action plan items was carried out as follows.

ANNEXURE 6(c)2

No.	Activity	Timeline as per action plan	Status reported in meeting	Implementing Agency
1	Augmentation and Revamping of existing STP at near Adwaitha 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 in 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.	2020	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 6(c) 3

4	Identification of the establishments/commercial complexes/flats/houses/hotels etc who is discharging the sewage to the public drain and to collect fine 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 ThoombungalThodu	Sept 2019	Secretary, Kalamassery Municipality reported that Biomining is at tendering stage. KSWMP needs 6 months for completion and applied for consent of PCB. The EE,DO1, 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 biomining is being done	Kalamassery Municipality

ANNEXURE 6(4)

10	Constitution of squads for night surveillance for finding the unauthorized dumping of sewage at 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	Decembe r 2019	Secretary, Kalamassery Municipality reported that a comprehensive proposal for renovating the market is submitted and awaiting allocation of funds. EE,DO1,Ernakulam pointed out that there is direct discharge from Kalamassery market and Township. Secretary, Kalamassery municipality replied that there are some outlets into Muttar 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/hot els etc who is discharging the sewage to 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(c)

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 Edapally 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

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21	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 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 Periyar, 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, Ernakulam 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

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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 Pathalam 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 MCF 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 , Choornikkara Panchayath informed that no direct discharge from industry or others in the area.	Choornikkara Panchayath
27	Installation of cameras at the waste dumping spots (Choornikkara Panchayath)	2020	13 cameras installed.	Choornikkara 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 at 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 bund. The Chairperson asked about the test result of fish samples handed over by the Board and he agreed

ANNEXURE 6(c) 9

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 urgently.
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 bund 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

Sd/-
(Approved by mail)

1. Dr.Rathan U.Kelkar IAS
   Secretary to Government, Environment Department,
   Government of Kerala.

2. Er.J.Chandra Babu,
   Regional Director, Regional Directorate
   Central Pollution Control Board,
   Bengaluru, Karnataka.

3. Sri. Suneel Pamidi IFS,
   Director, Environment & Climate Change.

4. Er. 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	TDS (mg/L)	TSS (mg/L)	CHLORIDE (mg/L)	CYANIDE (mg/L)	FLUORIDE (mg/L)	NITRATE (NO3-) (mg/L)	PHOSPHOROUS (PO43-) (mg/L)	SULPHATE (SO42-) (mg/L)	CALCIUM(mg/L)	MAGNESIUM(mg/L)	SODIUM (mg/L)	POTASSIUM (mg/L)	IRON (mg/L)	COD(mg/L)	SULPHITE(mg/L)
1	Kuzhikandamthodu(Near HIL discharge)	622	29	65.5	0.07	0.95	6.1	0.03	172	12.02	38.88	69.09	BDL	4.64	12	BDL
2	Panachithodu	753	11	287.9	0.04	0.2	7.6	0.15	23.5	11.22	19.93	178.15	BDL	3.09	16	BDL
3	Kuzhikandam Thodu 50m behind from confluence point	578	23	73.5	0.05	0.81	11.8	0.04	112	24.01	21.38	65.92	9.72	3.23	12	1
4	Panachithodu 50m behind from confluence point	642	17	198.5	0.05	0.24	5.4	0.18	25.5	25.65	7.78	124.85	6.76	2.55	12	1.4
5	Unthithodu 50m from confluence point	716	17	243.2	0.04	0.26	3.7	0.17	52.5	20.04	14.09	108.8	6.68	3.17	12	1.4
6	Unthithodu 50m from Periyar river	531	18	134	0.04	0.34	7.2	0.12	29	16.83	10.21	88.65	5.77	1.34	12	BDL

ANNEXURE 7(a)

Kuzhikandam Thodu Water Sample (Heavy metals)

Date of sampling-24.06.2024,25.06.2024,26.06.2024

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	KuzhikandamThodu 50m behind from confluence point	BDL	BDL	BDL	BDL	0.45	BDL	0.1	BDL	BDL
2	Panachithodu 50m behind from confluence point	BDL	BDL	BDL	BDL	0.17	BDL	0.05	BDL	BDL
3	Unthithodu 50m from confluence point	BDL	BDL	BDL	BDL	0.14	BDL	0.03	BDL	BDL
4	Unthithodu 50m from Periyar river	BDL	BDL	BDL	BDL	0.05	BDL	0.03	BDL	BDL
5	Kuzhikandamthodu (NEAR HIL Discharge)	BDL	BDL	BDL	BDL	0.73	BDL	0.23	BDL	BDL
6	Panachithodu	BDL	BDL	BDL	BDL	0.18	BDL	0.03	BDL	BDL

ANNEXURE P(a) 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 DDD/DDE/DDT (mg/L)	1,2 DCA (mg/L)	TCE (mg/L)	1,1,2 TCA (mg/L)	1,1,1,2 TeCA (mg/L)
1	Kuzhikandam thodu(Near HIL discharge)	0.00079	0.00061	BDL	BDL	0.00006	0.00006	0.00071	0.00023	0.02313	0.00864	0.00475	0.0104	0.00152	0.0232	0.0112	0.0146	0.0167
2	Panachithodu	0.00006	0.00002	BDL	BDL	0.00002	0.00002	0.00006	BDL	0.0003	0.0017	BDL	0.00052	0.00012	BDL	BDL	BDL	BDL
3	Kuzhikandam Thodu 50m behind from confluence point	0.0005	0.00009	BDL	BDL	0.00009	0.00009	0.00014	0.00005	0.0043	0.01044	0.0001	0.01763	0.00077	BDL	BDL	BDL	BDL
4	Panachithodu 50m behind from confluence point	0.00004	0.00003	BDL	BDL	0.00004	0.00004	BDL	BDL	BDL	0.00007	BDL	0.00004	0.00015	BDL	BDL	BDL	BDL
5	Unthithodu 50m from confluence point	0.00012	0.00003	BDL	BDL	0.00003	0.00003	0.00006	0.00003	0.0004	0.00235	BDL	0.0007	0.00021	BDL	BDL	BDL	BDL
6	Unthithodu 50m from Periyar river	0.00006	BDL	BDL	BDL	BDL	BDL	0.0002	0.00004	0.0008	0.00707	0.00005	0.00221	0.00006	BDL	BDL	BDL	BDL

ANNEXURE A (3)

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)	Ammoniacal Nitrogen (mg/Kg)	pH	Cyanide (mg/Kg)	Nitrite (mg/Kg)	Fluoride (mg/Kg)
1	Kuzhikandamthodu(Near HIL discharge)	1070.66	478.38	84.6	6.39	0.68	BDL	36.67
2	Panachithodu	7500	4717	198.2	7	3.3	4.717	19.386
3	KuzhikandamThodu 50m behind from confluence point	1287.97	338.37	71.7	7.2	0.87	BDL	33.84
4	Panachithodu 50m behind from confluence point	600.888	815.48	85.6	7.6	0.64	BDL	12.87
5	Unthithodu 50m from confluence point	1631.7	1190.7	210	7.13	1.32	BDL	93.58
6	Unthithodu 50m from Periyar river	552.96	472.32	113.1	4.13	0.69	4.6	15.09

ANNEXURE 6(c)4

Kuzhikandam Thodu Sediment Sample (Heavy metals)

Date of sampling-24.06.2024,25.06.2024,26.06.2024

Sl No	Source of sample	Mercury (mg/Kg)	Copper (mg/Kg)	Zinc (mg/Kg)	Arsenic (mg/Kg)	Cadmium (mg/Kg)	Lead (mg/Kg)	Iron (mg/Kg)	Manganese (mg/Kg)	Hexavalent Chromium (mg/Kg)	Total Chromium (mg/Kg)
1	Kuzhikandamthodu(Near HIL discharge)	BDL	48.64	391.23	BDL	BDL	76.66	23914	74.67	BDL	47.76
2	Panachithodu	BDL	35.97	233.8	BDL	BDL	28.31	47819	103.86	BDL	66.3
3	KuzhikandamThodu 50m behind from confluence point	BDL	14.48	223.78	BDL	BDL	20.02	19539	38.46	BDL	33.39
4	Panachithodu 50m behind from confluence point	BDL	7.34	47.16	BDL	BDL	10.68	18144	35.6	BDL	32.44
5	Unthithodu 50m from confluence point	BDL	162.83	793	BDL	BDL	165	53383	172.5	BDL	261.5
6	Unthithodu 50m from Periyar river	BDL	15.39	133.92	BDL	BDL	12.82	10997	25.52	BDL	23.9

ANNEXURE 7(a)

Kuzhikandam Thodu Sediment Sample (Pesticides)

Date of sampling-24.06.2024,25.06.2024,26.06.2024

Sl no	Source of sample	o,p DDT (mg /Kg)	p,p DDT (mg/ Kg)	o,p DDE (mg /Kg)	p,p DDE (mg/ Kg)	o,p DDD (mg/ Kg)	p,p DDD (mg/ Kg)	Sum of DDD/D DE/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)	1,1,2 TCA (mg/ Kg)	1,1,1,2 TeCA (mg/ Kg)
1	Kuzhikandamthodu(Near HIL discharge)	53.628	41.673	39.378	29.253	36.951	9.535	210.418	43.726	4.961	24.317	57.066	34.734	2.666	0.501	0.711	0.411	0.391
2	Panachithodu	0.519	2.015	0.187	0.44	2.017	2.143	7.321	BDL	BDL	BDL	0.163	BDL	0.016	0.12	0.099	0.131	0.121
3	Kuzhikandam Thodu 50m behind from confluence point	15.625	22.81	2.933	5.363	22.827	24.27	93.828	0.306	0.069	0.166	4.128	0.218	0.231	0.212	0.244	0.181	0.199
4	Panachithodu 50m behind from confluence point	0.038	0.519	0.519	0.414	0.49	0.517	2.497	0.053	0.016	0.05	0.228	BDL	BDL	0.02	0.031	0.021	0.029
5	Unthithodu 50m from confluence point	0.913	6.909	1.38	2.284	7.002	7.299	25.787	0.098	0.032	0.114	1.247	0.112	0.064	0.102	BDL	0.104	0.105
6	Unthithodu 50m from Periyar river	4.693	7.798	0.616	0.737	7.844	8.296	29.984	0.021	BDL	0.019	0.325	BDL	0.023	BDL	0.173	0.164	BDL

ANNEXURE 7A (c)

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 Organic Carbon (mg/L)	Sulphite (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 combined Storm water outlet between Malaya Rubtech&Alpharub Crumb Rubber.	0.36	1	1	BDL	BDL	BDL	BDL	20	74.2	BDL	31.8	11.8	0.7	480	160	2080
2	River Periyar near TMS Leather authorized outlet	0.35	1	BDL	1.6	BDL	BDL	BDL	12	48.1	BDL	24	10.9	0.1	200	80	2640
3	River Periyar near storm water outlet of CMRL-Shree Shakthi boundary	0.33	1	1.4	BDL	BDL	BDL	0.04	10	53	BDL	31.5	9.7	0.5	160	20	2720
4	River Periyar near Storm water outlet at CMRL & National Industries boundary	0.34	1	1	1.12	BDL	BDL	BDL	18	49	BDL	24.9	6.9	0.1	400	520	1920

ANNEXURE 7(b)

5	River PeriyarPathalam Bund upstream	0.3	1	1.4	BDL	BDL	BDL	BDL	8	36.7	BDL	27	7.4	0.1	140	20	1360
6	River Periyar near CMRL authorized outlet	0.18	1	BDL	BDL	BDL	BDL	BDL	16	70.9	BDL	22.7	11.5	0.1	140	40	2800
7	River Periyar near SudChemie	0.3	1	BDL	BDL	0.16	0.004	BDL	22	60.7	BDL	14.4	11.8	0.1	200	300	1600
8	River Periyar near TCC Storm water drain at TCC-FACT boundary	0.5	5	1.4	BDL	BDL	BDL	BDL	24	419	BDL	20.5	13.3	3.3	0	0	0
9	River Periyar near FACT-D drain storm water outlet	0.42	4	1	BDL	0.16	0.006	BDL	18	99	BDL	11	10.5	0.7	0	0	260
10	River Periyar near FACT storm water outlet	0.05	2	BDL	BDL	4.65	BDL	BDL	22	143.2	BDL	BDL	12.3	28	0	0	1280
11	River Periyar near storm water drain of IREL at IREL-FACT Boundary	0.41	2	4.5	BDL	BDL	BDL	BDL	16	83.1	BDL	7.6	10.7	0.2	0	20	120
12	River Periyar near IREL Outlet	BDL	1	BDL	BDL	BDL	BDL	BDL	82	137.2	BDL	13.5	10.5	0.2	0	20	160
13	River Periyar near Binani zinc storm water outlet	0.68	1	0.96	BDL	BDL	BDL	BDL	20	68.4	BDL	12.4	10.8	0.1	0	140	320

ANNEXURE 7(g)

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 combined Storm water outlet between Malaya Rubtech&Alpharub Crumb Rubber.	0.02	BDL	BDL	BDL	BDL	BDL	0.022	BDL	BDL
2	River Periyar near TMS Leather authorized outlet	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	River Periyar near storm water outlet of CMRL-Shree Shakthi boundary	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	River Periyar near Storm water outlet at CMRL & National Industries boundary	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	River PeriyarPathalam Bund upstream	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	River Periyar near CMRL authorized outlet	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	River Periyar near SudChemie	BDL	BDL	BDL	BDL	0.07	BDL	0.04	BDL	BDL
8	River Periyar near TCC Storm water drain at TCC-FACT boundary	BDL	BDL	0.02	0.02	0.01	BDL	0.06	BDL	BDL
9	River Periyar near FACT-D drain storm water outlet	0.01	BDL	BDL	BDL	0.13	BDL	0.086	BDL	BDL
10	River Periyar near FACT storm water outlet	BDL	BDL	0.02	BDL	0.22	BDL	0.35	BDL	BDL
11	River Periyar near storm water drain of IREL at IREL-FACT Boundary	BDL	BDL	BDL	BDL	BDL	BDL	0.04	BDL	BDL
12	River Periyar near IREL Outlet	BDL	BDL	BDL	BDL	0.05	BDL	0.19	BDL	BDL
13	River Periyar near Binani zinc storm water outlet	BDL	BDL	BDL	BDL	BDL	BDL	0.3	BDL	BDL

ANNEXURE A6(3)

River Water Sample (Pesticides) Eloor Stretch

Date of Sampling-29.06.2024, 03.07.2024, 27.07.2024,

Sl no	PESTCIDES	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 DDD/DDE/DDT (mg/L)	1,2 DCA (mg/L)	TCE (mg/L)	1,1,2 TCA (mg/L)	1,1,1,2 TeCA (mg/L)
1	River PeriyarPathalam Bund upstream	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	River Periyar near CMRL authorized outlet	0.00012	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.00002	0.00012	BDL	BDL	BDL	BDL
3	River Periyar near SudChemie	0.00006	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.00006	0.0006	BDL	BDL	BDL	BDL
4	River Periyar near TCC 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 drain 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	0.00006	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.00003	BDL	0.0001	0.00006	BDL	BDL	BDL	BDL
7	River Periyar near storm water drain of IREL at IREL-FACT	0.00014	0.00036	0.00016	0.00011	0.0004	0.00036	BDL	BDL	BDL	0.00006	BDL	BDL	0.00153	BDL	BDL	BDL	BDL

ANNEXURE 76(4)

8	Boundary River Periyar near IREL Outlet	0.00005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.00006	0.00201	BDL	0.00005	0.00005	BDL	BDL	BDL	BDL
9	River Periyar near Binani zinc storm water outlet	0.00069	0.00013	BDL	0.00004	0.00013	0.00013	BDL	BDL	BDL	BDL	BDL.	BDL	0.00112	BDL	BDL.	BDL	BDL

River Water Sample (General Parameters) Edamula Stretch

Date of Sampling-29.06.2024, 02.07.2024, 19.08.2024 (15 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 (NO3-) (mg/L)	Phosphorous (PO43-) (mg/L)	Sulphate (SO42-) (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)
1	River Periyar near Fact ammonia guard pond outlet	7.07	16	5.1	1.6	68	BDL	16.9	BDL	0.08	2.9	0.02	4.4	2.8	0.97	7.87	1.66
2	River Periyar near Fact PD authorized outlet	7.01	16	5.2	0.9	277	15.6	25.8	BDL	0.29	32.4	0.01	43	8.4	15.76	17.14	2.2
3	River Periyar at OngithoduPeriyar confluence point	7	12	5.3	1	65	BDL	18.8	BDL	0.09	3.6	0.02	9.8	2.8	0.73	9.98	1.78
4	River Periyar at Eloor Ferry junction	6.9	24	5.4	1.3	65	BDL	13.9	BDL	BDL	3.5	0.08	2	2.4	1.22	10.63	1.75

River Water Sample (General Parameters) Edamula 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)	Sulphite (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	104.9	BDL	24.4	11.5	2.2	520	240	2160
2	River Periyar near Fact PD authorized outlet	0.24	1	BDL	BDL	BDL	BDL	BDL	22	86.1	BDL	18.3	10.7	0.1	720	80	2560
3	River Periyar at OngithoduPeriyar 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 Ferry junction	0.38	1	BDL	BDL	BDL	BDL	BDL	16	73.5	BDL	17.7	10.6	0.2	20	180	2400

ANNEXURE-I (6)

River Water Sample (Heavy Metals) 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 PD authorized outlet	BDL	BDL	BDL	BDL	0.09	BDL	0.08	BDL	BDL
3	River Periyar at UnthithoduPeriyar confluence point	.01	BDL	BDL	BDL	0.06	BDL	0.02	BDL	BDL
4	River Periyar at Eloor Ferry junction	BDL	BDL	BDL	BDL	BDL	BDL	0.03	BDL	BDL

ANNEXURE 79(E)

River Water Sample (Pesticides) Edamula Stretch

of Sampling-29.06.2024, 02.07.2024

Sl no	Pestcides	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 DDD/DDE/DDT (mg/L)	1,2 DCA (mg/L)	TCE (mg/L)	1,1,2 TCA (mg/L)	1,1,1,2 TeCA (mg/L)
1	River Periyar near Fact 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 Fact PD authorized outlet	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	River Periyar at Ongithodu Periyar confluence point	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	River Periyar at Eloor Ferry junction	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

ANNEXURE 7(d) & ANNEXURE 8

ANNEXURE 7 (c)

Sediment sample-(General, Heavy metals)- Eloor Stretch

Date of Sampling-29.06.2024,02.07.2024, 03.07.2024, 27.07.2024

		Heavy metals										General						
SL No	Source of sample	Mercury (mg/Kg)	Copper (mg/Kg)	Zinc (mg/Kg)	Arsenic (mg/Kg)	Cadmium (mg/Kg)	Lead (mg/Kg)	Iron (mg/Kg)	Manganese (mg/Kg)	Hexavalent Chromium (mg/Kg)	Total Chromium (mg/Kg)	Chloride (mg/Kg)	Sulphate (mg/Kg)	Ammoniacal Nitrogen (mg/Kg)	pH	Cyanide(mg/Kg)	Nitrite (mg/Kg)	Fluoride (mg/Kg)
1	River Periyar near combined Storm water outlet between Malaya Rubtech&Alpha rub Crumb Rubber.	BDL	157.46	132.08	BDL	BDL	34.1	46079	311.53	BDL	750.6	29.8	119	264.7	7.15	BDL	BDL	BDL
2	River Periyar near TMS Leather authorized outlet	BDL	234.79	125.01	BDL	BDL	29.72	14773	137.76	BDL	50.05	8.9	76	82.25	6.93	BDL	BDL	BDL
3	River Periyar near storm water outlet of CMRL-Shree Shakthi boundary	BDL	11.92	23.67	BDL	BDL	29.72	14943	272.62	BDL	45.89	67.5	72	526.5	6.8	0.02	BDL	BDL
4	River Periyar near Storm water outlet at CMRL &National Industries boundary	BDL	24.327	136.69	BDL	BDL	47.04	38194	675.64	BDL	56.42	29.8	113	145	7.12	BDL	BDL	0.13

ANNEXURE 7(c)

5	River PeriyarPathalam Bund upstream	BDL	0.17	3.7	BDL	BDL	BDL	3201.9	4.62	BDL	3.28	7.9	8	17.4	6.64	BDL	BDL	BDL
6	River Periyar near CMRL authorized outlet	BDL	10.27	36.42	BDL	BDL	5.1	15568	208.52	BDL	87.75	35.73	81	388.9	7.12	BDL	BDL	0.06
7	River Periyar near TCC Storm water drain at TCC-FACT boundary	BDL	22.31	170.4	BDL	BDL	13.95	14982	134.81	BDL	35.22	53.6	310	337.7	8.57	0.02	BDL	1.26
8	River Periyar near FACT-D drain storm water outlet	BDL	20.88	138.74	BDL	BDL	19.47	27109	164.4	BDL	59.8	37.72	100	229.6	6.72	BDL	BDL	0.87
9	River Periyar near FACT storm water outlet	BDL	44.21	73.93	BDL	BDL	31.37	17705	46.72	BDL	84.14	11.9	177	1713.2	4.24	BDL	BDL	1.49
10	River Periyar near storm water drain of IREL at IREL-FACT Boundary	BDL	1040	2465	BDL	1.9	111	77203	496.3	BDL	178.84	190.6	370	198.06	7.66	BDL	BDL	1.29
11	River Periyar near IREL Outlet	BDL	14.18	645.63	BDL	2.19	8.81	12429	72.2	BDL	27.94	180.65	885	225.8	6.04	BDL	BDL	0.11
12	River Periyar near Binani zinc storm water outlet	BDL	28.08	14022	BDL	10.34	42.12	18292	373.64	BDL	68.69	117.1	342	175.2	6.27	BDL	BDL	0.67
13	River Periyar at Eloor Depot	BDL	10.55	121.66	BDL	BDL	5.67	15783	239.31	BDL	31.12	41.7	230	225.3	6.98	BDL	BDL	0.07

Sediment Samples (Pesticides)- Eloor Stretch

Date of Sampling-29.06.2024, 02.07.2024, 03.07.202427.07.2024

ANNEXURE 7(2)

SL No	Source of sample	o,p DDT (mg/Kg)	p,p DDT (mg/Kg)	o,p DDE (mg/Kg)	p,p DDE (mg/Kg)	o,p DDD (mg/Kg)	p,p DDD (mg/Kg)	Sum of DDD/DDE/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)	1,1,2 TCA (mg/Kg)	1,1,1,2 TeCA (mg/Kg)
1	River Periyar near combined Storm water outlet between Malaya Rubtech&Alpharub Crumb Rubber.	0.173	0.704	0.043	0.12	0.714	0.742	2.496	BDL	BDL	BDL	0.02	BDL	BDL	0.101	BDL	BDL	0.114
2	River Periyar near TMS Leather authorized outlet	0.017	0.06	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 Shakthi boundary	0.014	0.04	BDL	BDL	0.041	0.043	0.138	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	1.955	BDL	BDL	BDL	BDL	BDL	BDL	0.144	BDL	0.167	0.156
5	River PeriyarPathalam Bund upstream	0.014	0.024	BDL	BDL	0.025	0.025	0.088	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

ANNEXURE 7C (3)

	authorized outlet																	
7	River Periyar near TCC Storm water drain at TCC-FACT boundary	0.116	0.626	0.063	0.087	0.635	0.66	2.187	BDL	BDL	BDL	BDL	BDL	BDL	0.196	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 at IREL-FACT Boundary	0.054	0.234	BDL	0.037	0.228	0.244	0.806	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	River Periyar near IREL Outlet	0.104	0.54	0.067	0.137	0.537	0.576	1.961	BDL	BDL	BDL	0.041	BDL	BDL	0.019	BDL	BDL	0.018
12	River Periyar near Binani 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) Edamula Stretch

Date of Sampling-29.06.2024, 02.07.2024

		HEAVY METALS										GENERAL PARAMETERS						
SL No	Source of sample	Mercury (mg/Kg)	Copper (mg/Kg)	Zinc (mg/Kg)	Arsenic (mg/Kg)	Cadmium (mg/Kg)	Lead (mg/Kg)	Iron (mg/Kg)	Manganese (mg/Kg)	Hexavalent Chromium (mg/Kg)	Total Chromium (mg/Kg)	Chloride (mg/Kg)	Sulphate (mg/Kg)	Ammoniacal Nitrogen (mg/Kg)	pH	Cyanide	Nitrite	Fluoride
1	River Periyar near FACT Ammonia Guard pond outlet	BDL	17.14	524.57	BDL	BDL	5.77	10354	40.32	BDL	15.01	25.8	520	270.5	6.92	BDL	BDL	BDL
2	River Periyar near FACT PD Authorized outlet	BDL	52.49	329.25	BDL	BDL	12.23	14719	44.84	BDL	31.12	21.8	162	130	6.86	BDL	BDL	0.37
3	River Periyar at Unthithodu Periyar confluence point	BDL	40.44	169.01	BDL	BDL	26.71	14844	40.83	BDL	49.16	131.2	230	133.6	7.27	0.02	BDL	0.63
4	River Periyar at Eloor Ferry Junction	BDL	6.38	135.99	BDL	BDL	3.78	12586	50.88	BDL	26.51	61.5	136	27.6	7.22	BDL	BDL	0.26

ANNEXURE A7

Sediment Samples (Pesticides)- Edamula Stretch

Date of Sampling-29.06.2024, 02.07.2024

Sl No	Source of samples	o,p DDT (mg/Kg)	p,p DDT (mg/Kg)	o,p DDE (mg/Kg)	p,p DDE (mg/Kg)	o,p DDD (mg/Kg)	p,p DDD (mg/Kg)	Sum of DDD/DDE/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)	1,1,2 TCA (mg/Kg)	1,1,1,2 TeCA (mg/Kg)
1	River Periyar near FACT Ammonia Guard pond oulet	0.021	0.159	0.012	0.106	0.158	0.166	0.622	BDL	BDL	BDL	BDL	0.047	0.151	BDL	BDL	BDL	BDL
2	River Periyar near FACT PD Authorized outlet	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	River Periyar at Ongithoduperiyar confluence point	1.005	3.566	1.492	1.153	3.618	3.846	14.68	0.079	0.034	0.108	1.793	0.037	0.044	0.281	0.114	0.271	0.145
4	River Periyar at Eloor Ferry Junction	0.741	3.548	0.163	0.379	3.624	3.774	12.228	0.013	BDL	BDL	0.146	BDL	0.014	0.325	0.281	0.331	0.191

ANNEXURE

ANNEXURE 7 (d)

Storm Water Sample (General Parameters)

Date of Sampling-29.06.2024, 03.07.2024,27.07.2024,19.08.2024 (15 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 (NO3-) (mg/L)	Phosphorous (PO43-) (mg/L)	Sulphate (SO42-) (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)
1	Storm water outlet between Malaya Rubtech&Alpharub Crumb Rubber.	7.25	56.56	1.2	23.52	480	19	148.9	BDL	0.13	5	0.45	69	40	27.95	50.18	31.32
2	IREL Storm water outlet(Northern side of the unit)	7.79	44	6.4	3.1	11556	66	6849	BDL	0.63	40	0.05	108	48	27.95	4039	6.87
3	IREL Storm water outlet(southern side of the unit)	10.62	48	5.7	3.5	8322	615	248	0.03	2.77	740	0.36	2600	BDL	BDL	2502	9.3
4	Fact storm water drain near Ammonia barge loading	6.72	36	7.3	6.6	665	BDL	223.3	BDL	0.26	24.4	0.74	50.5	4.8	23.33	130.15	5.99

ANNEXURE 7(d)

Storm Water Sample (General Parameters)

Date of Sampling-29.06.2024, 03.07.2024,27.07.2024,19.08.2024 (15 parameters)

SL No	Source of sample	Iron (mg/L)	Total Organic Carbon (mg/L)	Sulphite (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/100 mL)	Total Coliforms (CFU/100 mL)
1	Storm water outlet between Malaya Rubtech&Alpharub Crumb Rubber.		3	1.92	1.92	10.85	BDL	BDL	180	785	BDL	141	29.9	9.2	1060	5020	2720
2	IREL Storm water outlet(Northern side of the unit)	1.63	1	1	BDL	4.65	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	18	2020	BDL	20	22.5	0.4	0	20	0
4	Fact storm water drain near Ammonia barge loading	0.29	2	1.92	BDL	8.53	0.05	BDL	100	695	BDL	7.8	7.6	3	260	4440	4800

ANNEXURE 7(d)

ANNEXURE 7(e)

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
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 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

ANNEXURE 7(e)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,
Ernakulam.

2) The Senior Environmental Engineer,
KSPCB, ESC Eloor.

193

ANNEXURE 7(e) 3

☎: 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**

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

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,
Ernakulam.

2) The Senior Environmental Engineer,
KSPCB, ESC Eloor.

ANNEXURE 7(e) 5

☎: 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

ANNEXURE 7(e)(207)
6

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.

ANNEXURE 7(e) 7

☎: 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
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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. Sud Chemie India Pvt Ltd.,
Edayar Industrial Developement 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

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, ESC Eloor.

ANNEXURE 7(e) 9

☎: 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
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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

ANNEXURE 7(e) 10

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.

ANNEXURE 3(a)

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**

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

ANNEXURE 8(a)2

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,Ernakulam

2) The Senior Environmental Engineer
KSPCB, ESC Eloor

ANNEXURE 8(b)

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

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., 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:**

FSO VERIFIED-38

ANNEXURE 8(b)2

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 ^{0} 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 Eloor.

ANNEXURE 8(b)

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**

Reg. with A/D

To

M/s Cochin Minerals and Rutile Limited,
Industrial Development Area,Edayar,
Muppathodam 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:**

FSO VERIFIED-38

ANNEXURE 8 (Ea)

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 360^0 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(c) 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 Eloor

ANNEXURE 8(d),

General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
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പട്ടം പി.ഒ., തിരുവനന്തപുരം – 695 004

KSPCB/1078/2024-SEE-1 **Date: 29/07/2024**

Reg. with A/D

To

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":**

FSO VERIFIED-38

ANNEXURE .8(d)2

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 ^{0} 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 Eloor

ANNEXURE 8(e))

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

Reg. with A/D

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, Ernakulam – 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;

FSO VERIFIED-38

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 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.

ANNEXURE 8(e) 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 Eloor

ANNEXURE 8(f),

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**

Reg. with A/D

To

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

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ANNEXURE 8(f)2

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 ETPtanks, 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(f) 3

11. Provide 360 ^{0} 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 Eloor

ANNEXURE 8(g),

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**

Reg. with A/D

To

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)2

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 8(g)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 8(h)

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**

Reg. with A/D

To

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":**

FSO VERIFIED-38

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(h) 3

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 -9

TABLE1 - INDUSRTY SAMPLES

Date of sampling-10.07.2024

Sl No	Parameters	Alpharub Crumb Rubber		Sunrise TSR Factory		TMS Leathers		Malaya Rub Tech Industries		Organo Fertilizers		Cochin Minerals And Rutile Ltd	
		Value	Limit	Value	Limit	Value	Limit	Value	Limit	Value	Limit	Value	Limit
1	pH (25C)	7.47	6-8.5	7.42	6-8.5	8.05	6-9	7.67	6-8.5	8.4	6.5-8.5	6.93	6-8.5
2	TSS (mg/L)	106	100	12	100	BDL	50	81	100	BDL	100	121	100
3	Oil & Grease	BDL	10	14	10	BDL	10	BDL	10	BDL	10	BDL	10
4	COD (mg/L)	184	250	156	250	12	250	400	250	136	250	NA	NA
5	BOD (mg/L)	59.6	30	27.8	30	5.9	20	62.8	30	30.8	30	NA	NA
6	Total Kjeldahl Nitrogen (mg/L)	14.56	50	53.76	50	NA	NA	81.76	50	NA	NA	NA	NA
7	Sulphide (mg/L)	15.2	2	15.2	2	8	2	15.2	2	15.2	2	NA	NA
8	Ammoniacal Nitrogen (mg/L)	2.8	25	44.24	25	NA	NA	56.56	25	1139.6	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	BDL	0.1	NA	NA	NA	NA	BDL	1
11	Total Chromium (mg/L)	NA	NA	NA	NA	BDL	2	NA	NA	NA	NA	BDL	2

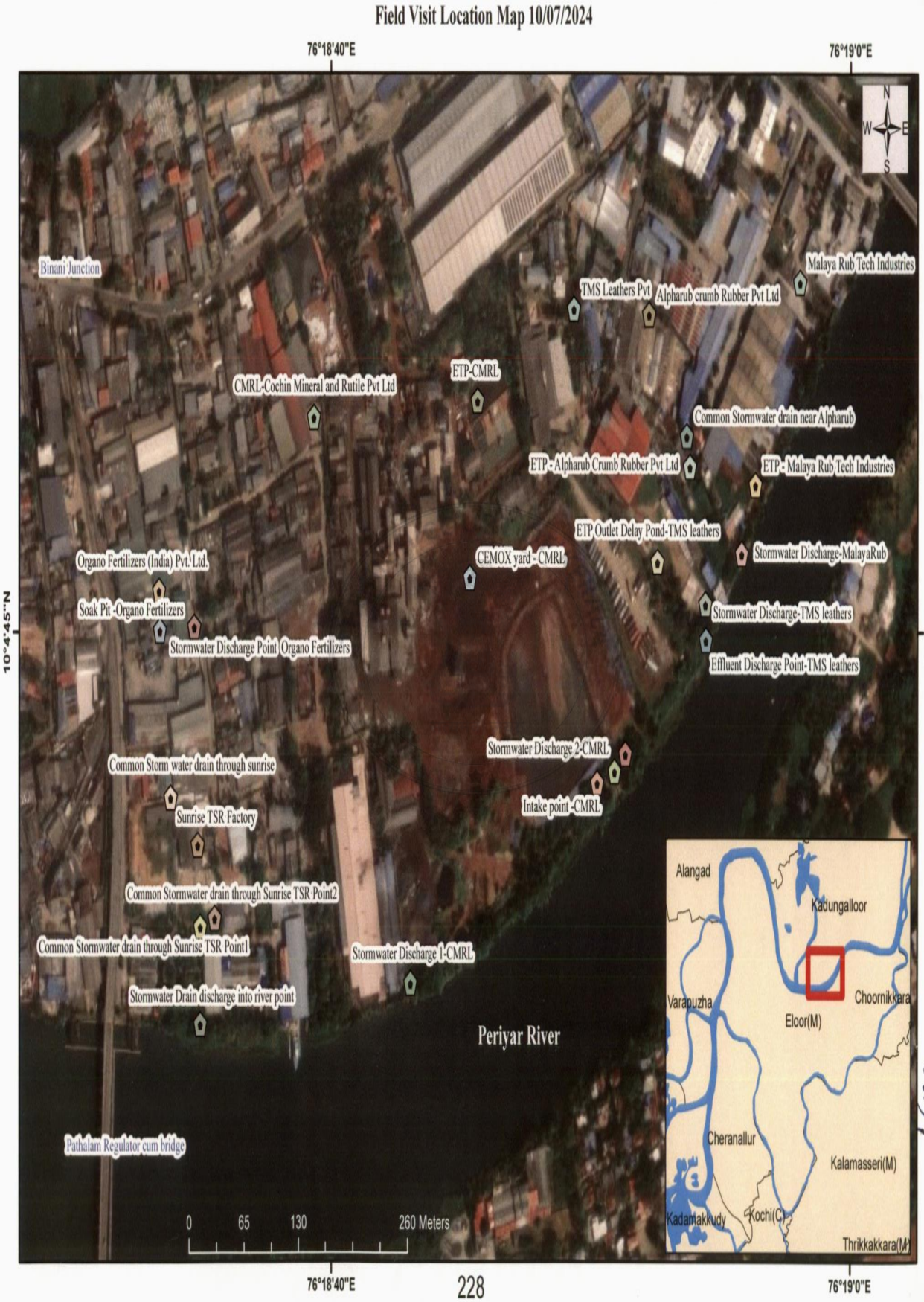
ANNEXURE 9(c)

TABLE 2 - INDUSTRY SAMPLES - STORMWATER

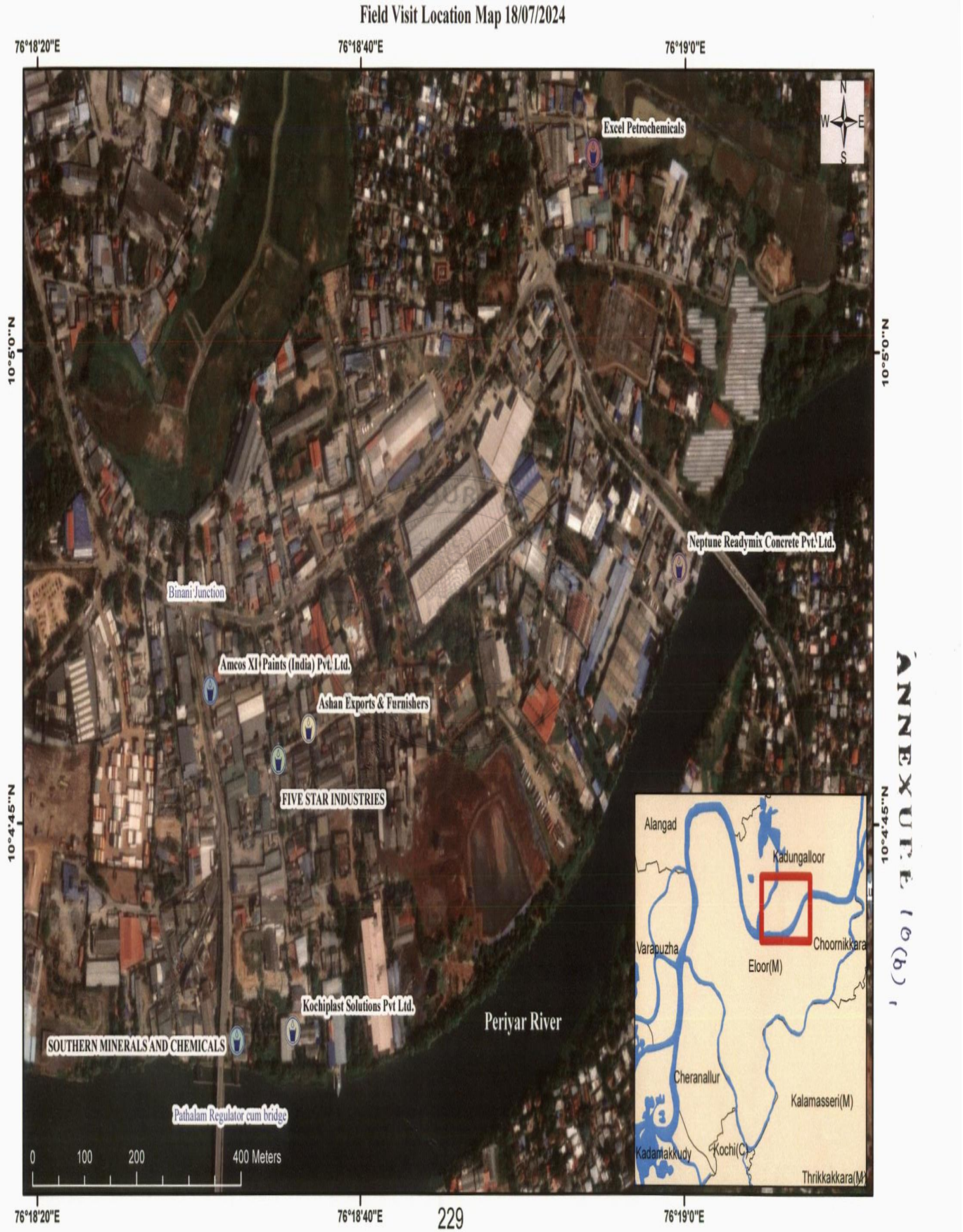
Date of sampling-10.07.2024

SL No	Source of sample	Sample point	pH (25C)	COD (mg/L)	Oil & Grease	Chloride (mg/L)	Magnesium (mg/L)	TSS (mg/L)	Colour	Electrical Conductivity (mg/L)	Calcium (mg/L)	Total Hardness (mg/L)	Sulphate (mg/L)	Iron (mg/L)	Ammoniacal Nitogen (mg/L)	Phosphate (mg/L)	BOD (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Sulphide (mg/L)	TDS (mg/L)	Hexavalent Chromium (mg/L)	Total Chromium (mg/L)
1	Alpharub Crumb Rubber	Stormwater drain of Alpharub Crumb rubber	6.8	48	BDL	134	40.8	31	18.6	682	11.2	196	80	0.448	3.92	0.2	5.7	8.96	15.2			
2	Sunrise TSR factory	Common stormwater drain near Sunrise TSR Factory 1	7.77	256	BDL.	108.2	9.2	1041	88.8	1161	28	108	53.6	2.855	50.4	0.6	51.6	59.36	15.2			
3	Sunrise TSR factory	Common stormwater drain near Sunrise TSR Factory 2	7.96	40	BDL	220.4	38.88	65	59.2	1208	56	300	110	0.596	38.08	0.7	1.5	44.8	14.8			
4	TMS Leathers	Stormwater drain of TMS Leathers	2.74	36	BDL	1826.4	442.26	BDL	9	5911	176	2260	47	23.368	3.92	0.1	3.2		4	4221	BDL	BDL
5	Organo Fertilizers	Stormwater drain of Organo Fertilizers	7.84	76	BDL	105.2	14	26	57.2	633	25.6	122	74	0.637	22.4	0.3	38		14.4			
6	Cochin Minerals And Rutile Ltd	Stormwater drain of CMRL near Cella Space Ltd	3.77	72	BDL	254.1	BDL	54	10.4	1304	BDL	BDL.	84	324.089	2.24	0.2					BDL	0.108
7	Cochin Minerals And Rutile Ltd	Stormwater drain of CMRL near National Industries	7.05	56	BDL	198.5	42.2	74	32.4	995	25.6	238	130	2.31	15.12	2.8					BDL	BDL.

ANNEXURE A(2)



ANNEXURE 10(c)



ANNEXURE 1(c)(b)

229

CB/ESC/CO-19/06 I/16110/2024

ANNEXURE I(1)

KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501
Phone : 0484 2545678 , E-mail: escelour@yahoo.co.in
കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ
ഫാക്ട് ക്വാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡൽ പി.ഒ.
എറണാകുളം-683 501

LiFE Lifestyle for Environment

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;

FSO VERIFIED-38

CB/ESC/CO-19/06 I/16110/2024

ANNEXURE II(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,

CB/ESC/CO-19/06

I/16110/2024

ANNEXURE II(3)

KSPCB , Regional Office , Ernakulam

ANNEXURE II(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 8525

TEST REPORT

Analysis Report No.	PCB/CL/539/2024-25	**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:3025 (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,24th Ed., 2023	1
2	Total Suspended Solids	mg/L	121	APHA, 2540-D, 24th Ed., 2023	10 mg/L
3	Oil & Grease	mg/L	BDL	APHA, 5520-B, 24th 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, 24th Ed.,2023	0.01 mg/L
2	Total Chromium	mg/L	BDL	APHA, 3120 – B, 24th Ed.,2023	0.03 mg/L

--End of Report--

23/08/2024
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 authorised signatory of the lab.

GANDHI NAGAR, KOCHI - 682 020 ഗാന്ധിനഗർ, കൊച്ചി - 682 020
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UKAS MANAGEMENT SYSTEMS 0008

ANNEXURE II(5)

KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
ESC Office No.N-5, UDYOGAMANDAL P.O., ERNAKULAM-683501
Phone : 0484 2545078, E-mail: escelour@yahoo.co.in
കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
പരിസ്ഥിതിനിരീക്ഷണ സർവൈലൻസ് സെന്റർ
[illegible] 683 501

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 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(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
ELOOR, UDYOGAMANDAL - 683 501

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 II (7)

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/540/2024-25	**Date**	22.08.2024	Format No. PCB/CL/CH/F-7
Ref. No.	PCB/ESC/CO-472 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 Organo Fertilizers (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: ORG-ETP

Sl. No	Parameters	Unit	Value	Test Method	Lowest Detection Limit
1	pH	---	8.4	APHA, 4500-H+B,24th Ed., 2023	1
2	Total Suspended Solids	mg/L	BDL	APHA, 2540-D, 24th Ed., 2023	10 mg/l
3	Oil & Grease	mg/L	BDL	APHA, 5520-B, 24th Ed., 2023	10 mg/L
4	BOD	mg/L	30.8	IS 3025 Part(44): 1993	2 mg/L
5	COD	mg/L	136	APHA, 5220-B, 24th Ed., 2023	4 mg/L
6	Ammoniacal Nitrogen	mg/L	1139.6	APHA-4500 NH3-C, 24th Ed., 2023	0.02 mg/L
7	Sulphide	mg/L	15.2	APHA, 4500 S2 F, 24th Ed., 2023	1 mg/L

--End of Report--

23/08/2024
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 ഗാന്ധിനഗർ, കൊച്ചി - 682 020
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ANNEXURE 11(8)

KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501
Phone : 0484 2545078 , E-mail: excelbpcc@yahoo.co.in
കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ
ഫാക്ട് ക്വാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡൽ പി.ഒ
എറണാകുളം-683 501

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/538/2024-25 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(9)

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 Khjeldhal 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

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
ELOOR, UDYOGAMANDAL - 683 501

ANNEXURE 11(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 പരീക്ഷണശാല
An Environmental Laboratory recognised under E(P)A 1986 TC 8525

TEST REPORT

Analysis Report No.	PCB/CL/538/2024-25	**Date**	22.08.2024	Format No. PCB/CL/CH/F-7
Ref. No.	PCB/ESC/CO-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.24th Ed., 2023	1
2	Total Suspended Solids	mg/L	81	APHA. 2540-D, 24th Ed., 2023	10 mg/L
3	Oil & Grease	mg/L	BDL	APHA. 5520-B. 24th Ed., 2023	10 mg/L
4	BOD	mg/L	62.8	IS 3025 Part(44): 1993	2 mg/L
5	COD	mg/L	400	APHA. 5220-B. 24th Ed., 2023	4 mg/L
6	Total Kjeldahl Nitrogen	mg/L	81.76	APHA. 4500-N org B. 24th Ed. 2023	0.2 mg/L
7	Sulphide	mg/L	15.2	APHA. 4500 S2 F. 24th Ed., 2023	1 mg/L
8	Ammoniacal Nitrogen	mg/L	56.56	APHA-4500 NH3-C, 24th Ed., 2023	0.02 mg/L

--End of Report--

23/08/2024

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.

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ANNEXURE 11(12)

KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501
Phone : 0484 2545678 , E-mail: eseloor@yahoo.co.in
കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ

21-10-2024

PCB/ESC/CO-95/07

Ref: 1) Consent No: PCB/ESC/CO/IC-690/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

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

To

M/s. TMS Leathers,
I.D.A.,Edayar, Muppathadom,
Ernakulam-683110.

Copy to: The Chief Environmental Engineer,
KSPCB , Regional Office , Ernakulam

ANNEXURE 11/14

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/537/2024-25	**Date** 20.08.2024	Format No. PCB/CL/CH F-7
Ref. No.	PCB/ESC/CO-40/07 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 TMS Leather, (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: TMS-ETP

Sl. No	Parameters	Unit	Value	Test Method	Lowest Detection Limit
1	pH	---	8.05	APHA, 4500-H+B,24th Ed., 2023	1
2	Total Suspended Solids	mg/L	BDL	APHA, 2540-D, 24th Ed., 2023	10 mg/l
3	Oil & Grease	mg/L	BDL	APHA, 5520-B, 24th Ed., 2023	10 mg/L
4	Sulphide	mg/L	8	APHA, 4500 S2 F, 24th Ed., 2023	1 mg/l
5	Total Dissolved Solids	mg/L	1796	APHA, 2540-C, 24th Ed., 2023	10 mg/L
6	COD	mg/L	12	APHA, 5220-B, 24th Ed., 2023	4 mg/l
7	BOD	mg/L	5.9	IS 3025 Part(44): 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-B, 24th Ed.,2023	0.01 mg/l
2	Total Chromium	mg/L	BDL	APHA, 3120 – B, 24th Ed.,2023	0.03 mg/l

--End of Report--

GANDHI NAGAR, KOCHI - 682 020 ഗാന്ധിനഗർ, കൊച്ചി - 682 020
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ANNEXURE 11(15)

23/09/2024

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.

ANNEXURE 11(16)

KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
FACT-Qr.No.N-5, UDYOGAMANDAL P.O., ERNAKULAM-683501
Phone : 0484 2545678, E-mail: excelourava@yahoo.co.in
കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ
വാടക കെട്ടിടം നമ്പർ S-5 ഉദ്യോഗമണ്ഡൽ പി.ഒ
എറണാകുളം-683 501

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 Alpharub Crumb Rubber P Ltd, V/793, IDA, 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(7)

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 SURVEILLANCE CENTRE
ELOOR, UDYOGAMANDAL - 683 501

To

M/s Alpharub Crumb Rubber P Ltd,
V 793, IDA, Edayar, Aluva,
Pin -683110

Copy to: The Chief Environmental Engineer,

ANNEXURE 11(18)

KSPCB , Regional Office , Ernakulam

ANNEXURE 11(9)

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/542/2024-25	**Date**	22.08.2024	Format No. PCB/CL/CH/F-7	
Ref. No.	PCB/ESC/CO-40/07 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	Final treatment tank of Alpharub Crumb Rubber (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: ALP-ETP

Sl. No	Parameters	Unit	Value	Test Method	Lowest Detection Limit
1	pH	---	7.47	APHA, 4500-H+B,24th Ed., 2023	1
2	Total Suspended Solids	mg/L	106	APHA, 2540-D, 24th Ed., 2023	10 mg/l
3	Oil & Grease	mg/L	BDL	APHA, 5520-B, 24th Ed., 2023	10 mg/L
4	COD	mg/L	184	APHA, 5220-B, 24th Ed., 2023	4 mg/L
5	BOD	mg/L	59.6	IS 3025 Part(44): 1993	2 mg/L
6	Total Kjeldahl Nitrogen	mg/L	14.56	APHA, 4500-N org B, 24th Ed. 2023	0.2 mg/L
7	Sulphide	mg/L	15.2	APHA, 4500 S2 F, 24th Ed., 2023	1 mg/L
8	Ammoniacal Nitrogen	mg/L	2.8	APHA-4500 NH3-C, 24th Ed., 2023	0.02 mg/L

--End of Report--

23/08/2024

Checked By

Sowmya T M
Assistant Scientific Officer

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.

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ANNEXURE 11(29)

KERALA STATE POLLUTION CONTROL BOARD
ENVIRONMENTAL SURVEILLANCE CENTRE
FACT-Qr.No.S-5, UDYOGAMANDAL P.O., ERNAKULAM-683501
Phone : 0484 2545678 , E-mail: escelour@yahoo.co.in
കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
എൻവയോൺമെന്റൽ സർവൈലൻസ് സെന്റർ
ഫാക്ട് ക്വാർട്ടേഴ്സ് നമ്പർ S-5, ഉദ്യോഗമണ്ഡൽ പി.ഒ.
എറണാകുളം-683 501

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 (24)

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
ELOOR, UDYOGAMANDAL - 683 501

ANNEXURE 11(2)

To

M/s. Sun Rise TSR Factory,
Edayar, IDA, Muppathadam P.O,
PIN-683110

Copy to: The Chief Environmental Engineer,
KSPCB , Regional Office , Ernakulam

ANNEXURE II (23)

KERALA STATE POLLUTION CONTROL BOARD
CENTRAL LABORATORY
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കേന്ദ്ര പരീക്ഷണശാല

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TEST REPORT

Analysis Report No.	PCB/CL/541/2024-25	**Date**	22.08.2024	Format No. PCB/CL/CH/F
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,24th Ed., 2023	1
2	Total Suspended Solids	mg/L	12	APHA, 2540-D, 24th Ed., 2023	10 mg/L
3	Oil & Grease	mg/L	14	APHA, 5520-B, 24th Ed., 2023	10 mg/L
4	Sulphide	mg/L	15.2	APHA, 4500 S2 F, 24th Ed., 2023	1 mg/L
5	Ammoniacal Nitrogen	mg/L	44.24	APHA-4500 NH3-C, 24th Ed., 2023	0.02 mg/L
6	COD	mg/L	156	APHA, 5220-B, 24th 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, 24th Ed. 2023	0.2 mg/L

--End of Report--

23/08/2024

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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Certified for OHSMS (ISO 45001:2018)

UKAS MANAGEMENT SYSTEMS 0008

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 ambient air 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 bund (upstream), Pathalam bund (downstream) Vettukadavu (downstream) and Puthalamkadavu. 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 12(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 abnormality, 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 R1(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 (1)

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.(Rt) No. 52/2022/Envt dated 12.07.2022 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 27.05.2022reiterates 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 29.07.2022, 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

ANNEXURE 3(2)

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, 996/2012 & 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-Kalamassery) 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 13 (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 than3 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 (Convenor), 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. (Rt) No. 135/2018/Envt dated 12.12.2018 under overall supervision and co-ordination of Additional Chief Secrerary, Environment Department and also by Chief Secretary. RRC meetings convened on 23.02.2022, 01.04.2022, 15.07.2022, 13.10.2022, 2/12/2022, 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, 25.03.2024, 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, Choornikkara 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 intial 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 /encroachments	Local bodies/KSPCB	Completed
2	a.Legacy waste management b. Solid Waste management	Munnar 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 (31 Nos)	Vazhakulam GP	Completed
6	Preventing pollution of Periyar through the pipe installed near upstream of Pathalam regulator leading to Edayattuchal 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)

8	Construction of retaining wall with HDPE liner at Kalamassery dumping yard in order to prevent the leachate discharge from the yard to Thoombungal Thodu.	Kalamasery municipality	Completed

Completed activities for Solid & Liquid waste management (RRF, MCF, Harithakarma Sena, community and institutional facilities, CSTP, FSTP etc.)		
Sl. No.	Urban Local Body	Completed activities for solid & Liquid waste management (RRF, MCF, Harithakarmasena, 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 Thumboormuzhi -32 50 TPD BSF Plant* 2 =100 TPD construction completed and 2 plants are functional from 8th March 2024. FABBCO 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 11,108.15MT RDF dispatched to cement factories. 100 KLD FSTP @ Brahmapuram (existing),100 KLD FSTP @ Willington Island. 5 MLD at Elamkulam with septage treatment facility at Kochi, Ernakulam 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

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. Credai 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 Paravoor	HKS-46, MCF -2, Mini MCF - 21 (Functional)
9	Kodungallur	HKS-85, Mini MCF-40, MCF -5, 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 (37)

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
1	**ALUVA MUNICIPALITY**			
1	Augmentation and Revamping of existing STP at near Adwaitha 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 38)

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.	KalamasseryMunicipality	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	**ELOOR MUNICIPALITY**			
a	Installation of Sewage/ Septage treatment Plant	Eloor Municipality,	2020	DC, Ernakulam reported that land of FACT is available for FSTP, Eloor and Ministry of Fertilizers is to accept the proposal. Possibility of sharing the facility for Kalamassery also to be explored.
4	**IRRIGATION DEPARTMENT**			
a	Identification of natural drains/thodu reaching river 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 depart ment	3 years	It is reported that work already completed near Pathalam and currently normal flow maintained.
c	Maintaining of Minimum flow in river during lean period and periodical operation of Regulators at River in-order to maintain minimum flow.	Irrigation depart ment	3 years	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. Protocol for operation of regulator is being finalized.

ANNEXURE 13(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 • Eloor Municipality have installed 84 cameras • In Kodungallur Panchayath, at Onjithodu8 cameras were already installed and 2 nos near MCF at Padinjare Kadungallur. 33 cameras are being installed and work orders have already been issued . • At Choornikara Panchayat, 13 cameras are installed.
6	Construction of internal roads and proper drainage in Edayar industrial estate.	Industries Department		Completed 13 nos internal road and 11 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 Departme nt, 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 point	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 /Idukki/ Thrissur/ private entreprene urs	3 Y	TS have been issued for a Slaughter house at Thrissur through KIIFB. Thodupuzha Municipality has taken up a proposal and further proceedings are under progress
10	Controlling the excessive use of pesticides for farming	LSGI, District Administra tion, Agricu lture	-	LSGI/Agri 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.	LSGI, 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 thodu 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 Sanakaracharya University, Kalady.

ANNEXURE 13(14)

13	Installation of FSTPs for septage treatment at least in Block level	District Panchayat Ernakulam /Idukki/ Thrissur/ private entreprene ur	3 Y	Existing FSTP/ CSTP with cotreatment 1) 5 MLD STP at Elamkulam with Co-treatment facility 2) 0.1 MLD FSTP at Wellington Island 3) 0.1 MLD FSTP at Brahmapuram 4) 3 MLD at Guruvayoor with co treatment facility 5)10 KLD FSTP at Mattampuram, Madakkathara, Thrissur Thrissur District Panchayath- 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 • 50 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.

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 Departments		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 /3(16)

15	Beautification of the river stretches (Edamula 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 RR 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/ LSGIs		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(17)

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 Akri app and Aravind Associate Pvt. Ltd.
21	Collection and safe disposal of Electronic waste	LSGIs/ PPP/ KSPCB		Regular activity. E-waste being collected through HarithakarmaSena 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

ANNEXURE 13(18)

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 - Ernakulam, 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 Ernakulam	265	119
2	DO 2 Ernakulam	268	53
3	ESC Eloor	5487	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.18720807/-	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 Samarth 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 (cGanga) 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, wastewater, 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.