BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH NEW DELHI

Original Application No.143 of 2020 (SZ)
With
Original Application no. 182 of 2021(SZ)

Applicant : K K Muhammed Iqbal

Versus

Respondent : The Kerala Sate Pollution Control Board & Others

with

Applicant : Mahesh Kumar, Ernakulam

Versus

Respondent : The Kerala State Pollution Control Board & Others

REPORT OF THE JOINT COMMITTEE IN THE MATTER OF ORIGINAL APPLICATION NO. 143 OF 2020 & ORIGINAL APPLICATION NO. 182 of 2021

Standing counsel for the 1st respondent

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

BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL PRINCIPAL BENCH NEW DELHI

Original Application No.143 of 2020 (SZ)
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& Others

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Dated this the 15th day of July 2023.

Rema Smrithi. V. K., Advocate
Standing Counsel for the 1st Respondent

REPORT OF THE JOINT COMMITTEE IN THE MATTER OF ORIGINAL APPLICATION NO. 143 OF 2020, K MUHAMMED IQBAL Vs KERALA STATE POLLUTION CONTROL BOARD AND OTHERS & ORIGINAL APPLICATION NO. 182 of 2021, SRI. MAHESHKUMAR Vs KERALA STATE POLLUTION CONTROL BOARD AND OTHERS SUBMITTED BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL, SOUTH ZONE

1. In the matter of original application No. 143 of 2020 K Muhammed Iqbal Vs Kerala State pollution Control Board and Others, the National Green Tribunal (SZ) *constituted a joint committee vide its order dated 13.04.2021* comprising of Senior Officer from Central Pollution Control Board (CPCB), Kerala State Pollution control Board (KSPCB), Scientist from Kerala Agricultural University and Senior Soil conservation officer, Department of Soil Survey and Soil Conservation to look into the following matters.

1. Whether the activities of respondent company had contributed for the contamination of soil in the nearby agricultural lands
2. Whether the respondent company are complying with conditions imposed by the regulators in their consent/clearance granted
3. Whether the industrial waste that is being generated during their manufacturing process have been dealt with scientifically as per the respective rules dealing with the hazardous substance disposals.
4. Whether any of the past activities of respondent company still continues, which results in continues pollution causing contamination of that area and if that be the case what is the extent of the contamination caused on account of contribution if any, made by the activities of respondents, what is the nature of remediation of action to be taken up for the purpose of remedying the situation in that area and what is the quantum of compensation that has to be realised from the person responsible for such contribution of taking into account of the nature of violation committed by them and polluted activity that has been produced on account of their operational methods in running the industry.

2. Pursuant to the order, a Joint Committee was formed with the following officials from the respective departments as members of the committee.

1. Chief Environmental Engineer, KSPCB, Regional Office, Ernakulam
2. Sri. Vivek K, SEE/Scientist D, CPCB, RD-Bengaluru
3. Dr. A.K. Sreelatha, Assistant Professor & Head, Rice Research Station, Vyttila
4. Dr. Garggi G, Soil Survey Officer, Office of the Assistant Director, Ernakulam

It is respectfully submitted that the first meeting of the committee was convened on 22.11.2021 through video conference and the following decisions were taken in the meeting.

a) To conduct a physical meeting (second meeting of the committee) and joint inspection in the company premises and alleged areas by the first or second week of December, 2021.

b) KSPCB shall present the details with respect to the points 2, 3 & 4 mentioned in the order dated 13.04.2021

c) CPCB shall coordinate with M/s. ERM (India) Private Limited, the consultant firm who prepared the DPR for the remediation of contaminated site under NCEF project, to make arrangements for the presentation of DPR and the study details. Copy of the minutes of the first joint committee meeting is produced herewith and marked as **Annexure 1**.

3. The second meeting and inspection of the Joint Committee was held on 24.06.2022. Prior intimation was given to the 9th and 10th respondent company about the meeting of the Committee as the Committee was directed to allow the participation of alleged polluting companies during the meeting and to associate in inspections as directed by the Hon'ble Tribunal in its order dated 13.04.2021. But the company representatives informed their inconvenience for attending the meeting and a representation from them was received through email, which mainly include their willingness to remove jarosite kept in 3 old ponds in their premises by safely disposing it in Pond No.4 constructed as per CPCB guidelines with leak proof HDPE liner and other safe measures, contention about the already prepared DPR in the aspect that the consultancy team had not taken in to consideration of 4 other industrial units working in Edayar Industrial Area, apart from their company and the DPR has been prepared on a hypothetical assumption that the offsites in Edayar was contaminated due to the operation of their unit. The DPR did not consider the available studies regarding the site such as the EIA study report made by the Local Area Environment

Committee. Also they reported that during the remedial investigation or in the finalisation of DPR, they couldn't get an opportunity to place their concerns with respect to the subject matter since the unit was not in operation and possession of the premises was taken over by the secured creditor bank. Moreover, the remedial plan and methodology was prepared on the sample analysis taken much earlier in the year 2015 and 2017. Now more than 5 years have been elapsed since the date of available data. The Edayar area was prone to the massive flood witnessed by the state in the year 2018 and the heavy downpour in the year 2019. Two massive flood and heavy monsoon in the following 5 years, might have impacted many ramifications on the intensity of contamination and on morphology of soil and groundwater in the area. Also they requested to have a detailed remedial investigation in the site enabling formulation of a sound and realistic remedial methodology considering the actual status existing on the ground and by taking note of the data gap occurred after the finalisation of DPR.

4. In the second meeting of the Committee, the representative of M/s.ERM (India) Private Limited conducted a detailed presentation of the DPR prepared for the remediation of Edayattuchal–Chakarachal before the Committee on 24.06.2022. The presentation covered the overview of the project, introduction to the study area and subject sites, reconnaissance and preliminary assessment, preliminary investigation of the contaminated site and development of conceptual plans and sampling protocols, detailed site characterization, detailed site investigation and Tier 1 Risk Assessment, Tier 2 risk assessment, Human health Risk assessment, remedial action plan etc. After detailed discussions and deliberations, the Committee members also made a site visit to the Edayattuchal, Chakarachal, Binani School ground and the premises of M/s. Binani Zinc Ltd (presently Edayar Zinc Ltd), including the capped and uncapped jarosite pond areas.

5. It was observed during the visit that most of the Edayattuchal and Chakarachal area was waterlogged and in submerged condition, making it impossible to access the areas, which were earlier demarcated as having higher levels of contamination. Samples of soil, drain water and well water from the accessible locations were collected for analysis. In the meeting it was decided that the results of the samples taken during the visit and other historical data available with the present owners of the unit shall be considered for further preparation of the report. Copy of the minutes of the second joint committee meeting is produced herewith and marked as **Annexure 2** and the photographs taken during the visit is produced herewith and marked **as Annexure 3.**

6. M/s. Edayar Zinc Ltd. (formerly M/s. Binani Zinc Limited) situated at Binanipuram, Kadunagalloor Village, Paravur Taluk in Ernakulam District was a Zinc smelting unit where the Zinc concentrates (ores that contain Zinc) are converted into pure Zinc, established in the year 1967. The zinc extraction process followed at Binani Zinc limited was based on the hydrometallurgical route and comprises of Roasting,Leaching, Purification,Electrolysis ,melting and casting steps.Jarosite is generated in the Leaching step of the zinc extraction process.The zinc concentrate (ZnS) is roasted in the roaster furnace and converted to Zinc Calcine(ZnO).This Zinc Calcine contains zinc in the form of zinc oxide and zinc ferrite.Zinc from Zinc Oxide is extracted in the neutral leach stage of the Leaching section,leaving behind the residue containing Zinc Ferrite.Zinc from Zinc Ferrite is extracted by breaking it into Zinc Sulphate and Ferric suplphate in an acid medium,using Jarosite process. This process of recovering Zinc from Zinc ferrite results in the dissolution of iron, in the form of Ferric Sulphate,which has to be eliminated from the solution to prevent its accumulation. For this, the ferric sulphate is precipitated as sodium jarosite using sodium sulphate.The Jarosite residue is filtered,washed well and stored in an impervious secured landfill in compliance with the statutory stipulations.The company had stored the jarosite in the pond no.1,2 & 3 ,before the Hazardous Wastes(Management & Handling) Rules,1989 came in to force.In the year 2001,the Board had issued Consent to Establish for solid residue pond (Jarosite Pond No.4) and the Design Proposal of Jarosite Pond no.4 is approved by the Board in the year 2002. The pond no.1,2 and 3 are established prior to the statutes and said to be capped.As per the available records jarosite quantity of 9 lakh tonnes is stored in the pond no.4. The unit obtained Consent to Operate of the KSPCB with validity up to 30.06.2015 for the production of Zinc Metal- 110MT/day, Zinc alloy(byproduct)- 54MT/day, Sulphuric acid- 194MT/day and Cadmium metal- 220kg/day. The unit was closed down in the year 2014.The chemicals stored in the unit was removed from the company under the supervision of KSPCB. The company is now in almost demolished stage and the property is under Punjab National Bank.

7. From the records available with the KSPCB, it was understood that after the visit to M/s. Binani Zinc Ltd during March 2006, Supreme Court Monitoring Committee (SCMC) had directed the Board to examine, how the present Jarosite pond can be brought in line with CPCB guidelines. The Board also directed the company to re-examine the procedure of converting the solid waste into slurry to enable the company to conveniently transport this waste to the Jarosite pond. The proposal for the conversion of jarosite to jarofix is a solution for the prevention of further contamination of Edayattuchal and ground water in and around Binanipuram. The respondent company itself admitted that the pond no.1,2, and 3 are not secured landfills designed as per the hazardous waste rules as the company was established in 1967 and statutes and guidelines came after that only. But since the company has been shut down permanently in the year 2014, the operational pollution from the industry has become nil.

8. Overall findings of M/s.ERM India Private Limited, the agency engaged for the preparation of the DPR are: Primary sources are areas which contain the chemical of concern and continue to release or leach them into soil, groundwater, surface water streams and sediments. Analytical results obtained after the preliminary investigation and site investigation assessment indicate that heavy metals are the primary chemicals of concern (COCs). The primary and secondary sources of impact which have high concentrations of the COCs exceeding the conservative standard are:

• Swamp areas of erstwhile off-Site paddy fields near Binani Zinc; and

• Groundwater in the northern area of Binani Zinc, and off-Site areas north of Binani Zinc.

As per the additional investigation done at Binani Zinc Limited, it is recommended that all old jarosite ponds should be capped with impervious lining system and surface drainage to prevent any seepage from the source area and some degree of in situ stabilization also suggested prior to capping.

9. Consolidated details of analysis reports of samples collected from Binani School ground and other contaminated areas on 24.06.2022 is furnished below:

Table 1: Analysis report of the soil sample collected from Middle of BZL School Ground

SOIL SAMPLE-BZL SCHOOL GROUND MIDDLE							
SL NO	**PARAMETERS**	**UNIT**	**VALUE**	**PERMISSIBLE LIMITS (as per HW rules)**	**As per guidance document for assessment and remediation of contaminated sites in India, MOEF**		
					RESPONSE LEVEL	**SCREENING LEVEL**	
						Residential	**Industrial**
1	Total Chromium	mg/kg	86.2	64	_	64	87
2	Hexavalent Chromium	mg/kg	BDL	0.4	50	0.4	1.4
3	Nickel	mg/kg	6.6	50	100	50	50
4	Copper	mg/kg	33.2	63	190	63	91
5	Zinc	mg/kg	1110	200	720	200	360
6	Lead	mg/kg	33.4	140	530	140	600
7	Cadmium	mg/kg	1.2	10	13	10	22
8	Fluorides	mg/kg	1.39	400	_	400	2000

Table:2 Analysis report of the soil sample collected from BZL School Ground East South side

SOIL SAMPLE - BZL SCHOOL GROUND EAST SOUTH SIDE							
SL NO	**PARAMETERS**	**UNIT**	**VALUE**	**PERMISSIBLE LIMITS (as per HW rules)**	**As per guidance document for assessment and remediation of contaminated sites in India, MOEF**		
					RESPONSE LEVEL	**SCREENING LEVEL**	
						Residential	**Industrial**
1	Total Chromium	mg/Kg	52.8	64	_	64	87
2	Hexavalent Chromium	mg/Kg	BDL	0.4	50	0.4	1.4
3	Nickel	mg/Kg	6.2	50	100	50	50
4	Copper	mg/Kg	20.6	63	190	63	91
5	Zinc	mg/Kg	557	200	720	200	360
6	Lead	mg/Kg	27.4	140	530	140	600
7	Cadmium	mg/Kg	BDL	10	13	10	22
8	Fluorides	mg/Kg	0.66	400	_	400	2000

Table 3: Analysis report of the water sample collected from open well near BZL School Ground

WATER SAMPLE -OPEN WELL NEAR SCHOOL GROUND				
SL NO	**PARAMETERS**	**UNIT**	**VALUE**	**PERMISSIBLE LIMITS IS 10500 : 2012**
1	Hexavalent Chromium	mg/L	BDL	0.05
2	Manganese	mg/L	79.4	0.1
3	Iron	mg/L	0.43	0.3
4	Nickel	mg/L	0.12	0.02
5	Copper	mg/L	0.08	1.5
6	Zinc	mg/L	322.6	5
7	Lead	mg/L	0.04	0.01
8	Cadmium	mg/L	0.12	0.003
9	Chloride	mg/L	18.86	250
10	Flurides	mg/L	0.56	1
11	Calcium	mg/L	109	75
12	Sulphate	mg/L	67.9	200

Table 4: Analysis report of the water sample collected from Kuthu thodu starting point

WATER SAMPLE-KUTHUTHODU STARTING POINT				
SL NO	**PARAMETERS**	**UNIT**	**VALUE**	**PERMISSIBLE LIMITS (Canadian water quality Guidelines for the protection of Agriculture) Irrigation [µg/ L]**
1	Hexavalent Chromium	µg/ L	BDL	8
2	Manganese	µg/ L	320	200
3	Iron	µg/ L	5260	5000
4	Nickel	µg/ L	BDL	200
5	Copper	µg/ L	BDL	Variable
6	Lead	µg/ L	BDL	200
7	Cadmium	µg/ L	BDL	5.1
8	Chloride	µg/ L	28800	Variable
9	Fluorides	µg/ L	100	1000

Table 5: Analysis report of the water sample collected from thodu near Glastec Industries

WATER SAMPLE- THODU NEAR GLASTEC INDUSTRIES				
SL NO	**PARAMETERS**	**UNIT**	**VALUE**	**PERMISSIBLE LIMITS (Canadian water quality Guidelines for the protection of Agriculture) Irrigation [µg/ L]**
1	Manganese	µg/ L	12000	200
2	Chloride	µg/ L	31800	Variable
3	Fluorides	µg/ L	310	1000
4	Copper	µg/ L	30	Variable
5	Lead	µg/ L	20	200
6	Cadmium	µg/ L	BDL	5.1
7	Nickel	µg/ L	40	200

10. The third meeting of the committee was held on 25.10.2022 to discuss the analysis report of the samples taken by the committee during the last site visit conducted on 24.06.2022. As per the analysis report of the soil sample collected from the middle of the Binani School ground, zinc concentration obtained is 1110 mg/kg against 720 mg/kg, the response level prescribed for remediation, sample collected from the south east side of the ground is 557 mg/kg, which is below the response level, but above the screening level of 200 mg/kg. In the nearest open

well, zinc concentration obtained is 322.6mg/l against the permissible limit of 5 mg/l. The analysis reports reveal the possibility of leakage from the pond no.4 of the unit, which is reported to be scientifically designed as per the CPCB guidelines. After the discussion, the following decisions were taken by the committee.

Copy of the minutes of the third meeting of the committee is produced herewith and marked as **Annexure 4**.

11. In compliance with the decisions taken during the meeting, the committee had filed an interim report before the Hon'ble tribunal on 14.02.2023. Jarosite samples from the pond no.4 of the unit and water samples from 10 no. of randomly chosen wells were collected and analysed. The analysis report of the jarosite samples and well water samples collected are tabulated and furnished as Table 7 and Table 8 respectively and given below;

Table 6: Analysis report of the jarosite sample collected from pond no.4

SL No	PARAMETERS	UNIT	VALUE	CONCENTRATION LIMIT as per HWM Rules,2016 mg/l
1	Flourides	mg/L	1.42	180
2	Hexavalent Chromium	mg/L	BDL	5
3	**Manganese**	**mg/L**	**60204.2**	**10**
4	**Copper**	**mg/L**	**1845.7**	**25**
5	**Total Chromium**	mg/L	**45.35**	**5**
6	Zinc	mg/L	124.4	250
7	**Lead**	mg/L	**66145.4**	**5**
8	**Cadmium**	mg/L	**881.3**	**1**
9	Nickel	mg/L	11.88	20

* Values are reported for 5% suspension in reagent water

Table 7: Analysis report of the well water samples collected within 2km distance

			Well-1	**Well-2**	**Well-3**	**Well -4**	**Well - 5**	
Sl.No.	**Parameters**	**Unit**	**Value**	**Value**	**Value**	**Value**	**Value**	**Acceptable limit as per IS 10500 (2012)**
1	pH		**3.85**	**5.81**	**5.01**	**5.43**	6.45	6.5-8.5
2	Nitrate	mg/L	9.38	4.87	0.997	15.08	2.264	45
3	Ammoniacal Nitrogen	mg/L	**1.719**	BDL	0.134	0.134	BDL	0.5
4	TDS	mg/L	**1436**	104.24	168.34	85.32	232.08	500
5	Chloride	mg/L	49.6	48.7	24.8	28.8	62.4	250
6	Sulphate	mg/L	21.34	1.21	13.44	4.65	7.325	200
7	Total Chromium	mg/L	**0.108**	**0.106**	**0.098**	**0.09**	**0.097**	0.05
8	Zinc	mg/L	**390.0**	1.98	0.25	**38.5**	0.112	5
9	Lead	mg/L	BDL	BDL	BDL	BDL	BDL	0.01
10	Cadmium	mg/L	**0.103**	BDL	BDL	BDL	BDL	0.003
11	Copper	mg/L	0.07	0.020	BDL	0.02	BDL	0.05
12	Nickel	mg/L	**0.166**	BDL	BDL	BDL	0.028	0.02
13	Manganese	mg/L	**0.993**	**0.593**	0.097	7.0	0.363	0.1
14	Iron	mg/L	**0.495**	**0.596**	**0.378**	**0.35**	**0.560**	0.300
15	Arsenic	mg/L	BDL	BDL	**0.025**	**0.05**	**0.044**	0.01
16	Mercury	mg/L	BDL	BDL	BDL	BDL	BDL	0.001
17	Barium	mg/L	0.075	0.599	0.422	0.116	0.293	0.7
			Well-6	**Well-7**	**Well-8**	**Well -9**	**Well-10**	
Sl.No.	**Parameters**	**Unit**	**Value**	**Value**	**Value**	**Value**	**Value**	**Acceptable limit as per IS 10500 (2012)**
1	pH	mg/L	**6.18**	6.47	**6.05**	7.56	**6.1**	6.5-8.5

2	Nitrate	mg/L	11.66	11.89	13.12	5.2	17.36	45
3	Ammoniacal Nitrogen	mg/L	0.067	0.067	BDL	BDL	0.296	0.5
4	TDS	mg/L	117.32	79.59	61.006	269.547	112.808	500
5	Magnesium	mg/L	9.477	0.243	2.43	26	0.972	30
6	Calcium	mg/L	13.6	11.2	7.2	4.8	10.4	75
7	Chloride	mg/L	35.7	25.8	12.9	39.7	30.8	250
8	Sulphate	mg/L	4.904	2.866	1.72	16.37	11.53	200
9	Total Chromium	mg/L	**0.099**	**0.10**	**0.09**	**0.099**	**0.093**	0.05
10	Zinc	mg/L	0.063	0.07	0.14	0.053	0.246	5
11	Lead	mg/L	BDL	BDL	BDL	BDL	BDL	0.01
12	Cadmium	mg/L	BDL	BDL	BDL	BDL	BDL	0.003
13	Copper	mg/L	0.02	0.04	BDL	BDL	BDL	0.05
14	Nickel	mg/L	BDL	BDL	BDL	0.029	BDL	0.02
15	Manganese	mg/L	BDL	0.09	0.12	0.147	0.07	0.1
16	Iron	mg/L	0.65	0.54	0.43	0.360	0.46	0.300
17	Arsenic	mg/L	0.02	0.02	BDL	0.017	0.01	0.01
18	Mercury	mg/L	BDL	BDL	BDL	BDL	BDL	0.001
19	Barium	mg/L	0.29	0.15	0.16	0.172	0.21	0.7

Well-1-Residence near Binani school ground

Well-2 -Residence opposite to Binani school

Well- 3-Residence near Manappuzha Narasimha swami Kshethram

Well -4-Residence near Vettukadavu

Well-5-Residence near Kuthuthodu

Well-6-Residence near Pump House (Edayattuchal)

Well-7 -Hybrid Coatings (Near Edayattuchal Paddy field)

Well- 8-Residence south of Edayattuchal Paddy field

Well -9-Pink house south of Chakkarachal Paddy field

Well-10-Residence near Chakkarachal Paddy field

12. The fourth meeting of the committee was held on 27.06.2023 and discussed the analysis reports of the samples collected from the jarosite pond, well water and the main contents of the counter affidavit filed by the respondent company. The analysis reports of the water samples taken from the wells situated within 2km radius of the company showed that the water quality is not much affected except for the wells situated near to the jarosite pond. The main contention of the respondent company as per the counter affidavit is that *"As per the Environment Impact Assessment Report prepared by LAEC, the heavy metals found in groundwater, soil and sediment samples from Edayattuchal and Chakkarachal area in Edayar is Zinc, Iron, Lead, Cadmium, Copper, Nickel and Total Chromium. The analysis of sludge from the jarosite pond of this respondent company made by LAEC found only the presence of Zinc, Iron, Lead, Cadmium, Copper and Nickel. The presence of total Chromium in the ground water, soil and sediment samples of Edayattuchal, which was found absent in our sludge shows that there are other sources for contamination of the paddy fields. The analysis made by LAEC on the soil and sludge accumulated on the CMRL land near to the river on the upstream of ChakalaThodu, a canal leading to Edayattuchal from the river Periyar, found with presence of heavy metals like Zinc, Iron, Lead, Cadmium, Nickel, Total Chromium and Manganese. The sludge of SudChemie was also found with Total Chromium, Zinc, Lead, Copper, Nickel and Manganese. The sludge from two units of Merchem found with Zinc, Iron, Lead, Cadmium, Nickel and Total Chromium. The sludge from the 3 leather tanning units located in Edayar area was containing with Zinc, Iron, Lead, Cadmium, Copper, Nickel and Total Chromium. Therefore, it can be seen that there are multiple source for the contaminant heavy metals found present in the groundwater soil and sediment of Edayar sites, as per the LAEC report which made the genesis for DPR and remediation projection."*

13. The committee, while verifying the LAEC report annexed with the counter affidavit filed by the respondent company, observed that total chromium was not analysed in the jarosite samples and only zinc, iron, lead, mercury, cadmium, copper and nickel were analysed in the report. As per the recent analysis of the

jarosite sample done by the Kerala State Pollution Control Board, based on the direction of the Committee, the presence of Total Chromium was also found and the concentration reported is 45.35 mg/l against the permissible limit of 5 mg/l. The other parameters such as Manganese, lead, copper and cadmium values also showed exceedance of the values specified in the HWM Rules,2016. Thus the claim of the company that *"the presence of total Chromium in the ground water, soil and sediment samples of Edayattuchal, which was found absent in our sludge shows that there are other sources for contamination of the paddy fields"* is not acceptable. Also the committee opined that even though CMRL, Sud Chemie, TMS Leather is still working, only a small quantity of waste is generated when compared to the waste generated by M/s. Binani Zinc and there is only remote chance for these heavy metals to reach Edayattuchal through Chakala Thodu since these units are located in the banks of Periyar river. As the presence of heavy metals were already found in the analysis report of the soil sample collected from the Binani School ground and water samples from the nearest well, there is no relevance to the claim of the respondent company and the cost required for the remediation has to be borne by the respondent company. Copy of the minutes of the third meeting of the committee is produced herewith and marked as **Annexure 5.**

14. Meanwhile, the proposal submitted by Sri. Harish Kandhari to utilize the Jarosite by converting the same in to crystalline gypsum with about 50% purity for potential utilization in cement plants is now under the consideration of the committee constituted by the CPCB and hence the final decision on the remediation procedure to be followed can be taken after that. Also, the committee is of the opinion that sampling of sediment/soil shall be done from the Edayattuchal/Chakkarachal paddy fields where already analysis was done during the preparation of DPR to verify whether any natural decrease in the contamination is happening and also to collect and analyse the crops/plant samples to check whether the contamination has affected the crops/plants and also to verify the cultivability of the soil there.

15. Hence it is respectfully submitted that, based on the analysis of soil/sediments/water samples done and based on the data collected pertaining to

the industry, the Committee came to the conclusion that the respondent industry can be attributed for the contamination of Edayattuchal- Chakkarachal and the industry shall be charged of the expenses for the remediation. The industry has not operated since the preparation of detailed project report after conducting extensive monitoring and sampling, much changes are not expected with respect to the waste stored within the industry premises and its impact in the nearby areas. It will be essential to assess the feasibility of the proposal for utilisation of the Jarosite stored within the industry premises, after the proposed trial run study, to decide upon the remediation aspects. Meanwhile, as proposed, further sampling of sediment/soil and the crops/plant shall be conducted from the Edayattuchal/Chakkarachal paddy fields to verify the present status, requirement of remediation and the cultivability of the soil.

Vivek K,
***SEE*/Scientist D,**
CPCB, RD-Bengaluru

Baburajan P.K
KSPCB,CEE,RO, Ernakulam

Dr. A.K. Sreelatha
Associate Professor & Head,
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Dr. Garggi G
Soil Survey Officer
Office of the Assistant Director,
Ernakulam

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Dated this the 15th day of July , 2023.

Rema Smrithi. V. K., Advocate
Standing Counsel for the 1st Respondent

ANNEXURE 1

Minutes of the first meeting (video conference) of the committee constituted as per the order dated 13.04.2021 of the Hon'ble NGT in O.A no.143/2020 held on 22.11.2021

Meeting started at 11.00AM.

The following members and officials were attended the meeting.

1. Sri. Baiju M.A, Chief Environmental Engineer, KSPCB, Regional Office, Ernakulam
2. Sri. Vivek K, SEE/Scientist D, CPCB, RD-Bengaluru
3. Dr. A.K. Sreelatha, Assistant Professor & Head, Rice Research Station, Vyttila
4. Dr. Garggi G, Soil Survey Officer, Office of the Assistant Director (Soil Survey), Ernakulam
5. Smt. Vinaya K S, Senior Environmental Engineer, KSPCB, Environmental Surveillance Centre, Eloor
6. Smt.ShahanaM.A,Assistant Environmental Engineer,KSPCB, Regional Office, Ernakulam
7. Smt.Susan P Thomas,Assistant Engineer, KSPCB, Regional Office, Ernakulam

Chief Environmental Engineer, Kerala State Pollution Control Board,Regional Office,Ernakulam, the nodal officer of the committee, in his welcome speech, gave a brief introduction about the O.A.No.143 of 2020 filed before the Hon'ble NGT. He pointed out that the grievance of the petitioner is that serious environmental degradation has been caused to the nearby agricultural land in Edayar Areaon account of the operation of M/s.Edayar Zinc Ltd (formerly Binani Zinc Limited), a zinc smelting unit.He further explained that a Detailed Project Report(DPR) for an amount of Rs.47.88 crore was prepared by M/s ERM (India) Private Limited, an accredited agency appointed by the Central Pollution Control Board(CPCB).Board had initiated certain steps to recover the amount from the company.But the respondent company had filed a counter affidavit denying the allegations made against them explaining that there are other industries also which were functioning along that area and contributed to such pollution load. *They had made further contentions that nature of the heavy*

metals found in the contaminated soil will go to show that no part of the waste that is being generated in the processof the company and as such they cannot be directed to pay the amount towards remediation process. In response to the counter affidavit filed by the company, the Hon'ble NGT through the order dated 13.04.2021 constituted this committee to look into the following matters.

1. Whether the activities of respondent company had contributed for the contamination of soil in the nearby agricultural lands
2. Whether the respondent company are complying with conditions imposed by the regulators in their consent/clearance granted
3. Whether the industrial waste that is being generated during their manufacturing process have been dealt with scientifically as per the respective rules dealing with the hazardous substance disposals
4. Whether any of the past activities of respondent company still continues,which results in continues pollution causing contamination of that area and if that be the case what is the extend of the contamination caused on account of contribution if any, made by the activities of respondents what is the nature of remediation of action to be taken up for the purpose of remedying the situation in that area and what is the quantum of compensation that has to be realised from the person responsible for such contribution of taking into account of the nature of violation committed by them and polluted activity that has been produced on account of their operational methods in running the industry.

After detailed deliberations, it was decided to invite M/s.ERM (India) Private Limited for a detailed presentation of the DPR by which the role of the industry in question could be revealed/identified. Sri. Vivek, SEE/Scientist D, CPCB, RD-Bengaluru also brought the directions given by Hon'ble NGT in another connected matter, i.e OA No. 182 of 2021, to the notice of the Committee, wherein the same Committee is entrusted to look into the contentions raised by the petitioner. Further it was informed that CPCB shall try to coordinate with representatives of M/s ERM for making arrangement for presenting the DPR study findings before the Committee.

Dr. Garggi G, Soil Survey Officer, Office of the Assistant Director, Ernakulam made a request that a brief note on this issue may be made available for better understanding on this issue

After the discussions, the following decisions were taken.

1. Conduct a physical meeting (second meeting of the committee) and joint inspection in the company premises and alleged areas by the first or second week of December,2021.
2. KSPCB shall present the details with respect to the points **2,3&4** directions of the Hon'ble NGT order mentioned above.
3. CPCB shall coordinate with M/s. ERM (India) Private Limited to make arrangements for the presentation of DPR and the study details.

Meeting ended at 11.45 PM.

Dr. A.K. Sreelatha,

Asst. Professor and Head,

Rice Research Station,

Vytilla,

Dr.Garggi G

Soil Survey officer

Office of the Assistant

Director (Soil Survey),

Ernakulam

Vivek K,*SEE*/Scientist D,

CPCB, RD-Bengaluru

Baiju M A

CEE, RO, Ernakulam

ANNEXURE 2

Minutes of the second meeting of the Committee constituted as per the order dated 13.04.2021 of the Hon'ble NGT in O.A no.143/2020 held on 24.06.2022

Meeting of the Committee started at 10.30AM.

The following members and officials were present during the meeting.

1. Sri. Baburajan P K, Chief Environmental Engineer, KSPCB, Regional Office, Ernakulam
2. Sri. Vivek K, SEE/Scientist D, CPCB, RD-Bengaluru
3. Dr. A.K. Sreelatha, Associate Professor & Head, Rice Research Station, Vyttila
4. Dr. Garggi G, Soil Survey Officer, Office of the Assistant Director, Department of Soil Survey & Soil Conservation, Ernakulam
5. Smt. Vinaya K S, Senior Environmental Engineer, KSPCB, Environmental Surveillance Centre, Eloor
6. Smt. Shahana M.A, Assistant Environmental Engineer, KSPCB, Regional Office, Ernakulam
7. Sri. Sajeesh Joy, Assistant Environmental Engineer, KSPCB, Environmental Surveillance Centre, Eloor
8. Kumari. Anagha S, Assistant Engineer, KSPCB, Regional Office, Ernakulam

The Chief Environmental Engineer, nodal officer of the Committee gave a brief introduction of the O.A.No.143 of 2020 filed before the Hon'ble NGT in his welcome speech. He pointed out that KSPCB already shared the brief note on the consent compliance, action taken against the violations noticed, etc. with the committee members. He also informed that intimation was given to the 9th and 10th respondent companies about the meeting of the committee, as committee members were directed to allow the participation of alleged polluting companies during the meeting and

inspections as directed by the Hon'ble Tribunal in its order dated 13.04.2021. But the company representatives informed their inconvenience for attending the meeting. The Chief Environmental Engineer therefore requested the company to submit their representation in writing, if any, to the committee. After that, he invited the representative of M/s.ERM (India) Private Limited for a detailed presentation of the DPR. Sri. Padmanabhan Girnathan Nair, representative of M/s.ERM (India) Ltd, presented the DPR prepared for the remediation of Edayattuchal–Chakarachal. The presentation covered the overview of the project, introduction to the study area and subject sites, reconnaissance and preliminary assessment, preliminary investigation of the contaminated site and development of conceptual plans and sampling protocols, detailed site characterization, detailed site investigation and Tier 1 Risk Assessment, Tier 2 risk assessment, Human health Risk assessment, remedial action plan etc. After detailed discussions and deliberations, the Committee members visited the Edayattuchal, Chakarachal, Binani School ground and the premises of M/s. Binani Zinc (presently Edayar Zinc Ltd.), including the capped and uncapped jarosite pond areas. Samples of soil, drain water and well water from the accessible locations were also collected, as detailed below and handed over to the Central laboratory for analysis.

1. Binani School Ground (Middle) : Soil
2. Binani School Ground(South side) :Soil
3. Binani School Ground :Water
4. Open well near school ground : surface water
5. Kuthuthodu Starting point :Water
6. Thodu near Glastec industries :Water

During the visit, it was observed that most of the Edayattuchal and Chakarachal area was water logged and in submerged condition, making it impossible to access the areas, which were earlier demarcated as having higher levels of contamination. As observed during the presentation, higher levels of heavy metal Zinc was mostly observed during the DPR preparation studies, in these locations, both in surface soil and ground water.

It was decided that the results of the samples taken during the visit and other historical data available with the present owners of the unit shall be considered for further preparation of the report and if required, adequate time shall be sought from the Tribunal, considering the present status of the area. All the Committee members were also requested to report their views/comments, if any, to the nodal officer at the earliest as the committee is required to file the preliminary report before the Hon'ble Tribunal before 25.07.2022, the next hearing date of this application.

Meeting and inspection of the Joint Committee ended at 5.00PM.

Vivek K, *SEE*/Scientist D,

CPCB, RD-Bengaluru

Baburajan PK

CEE,RO,Ernakulam

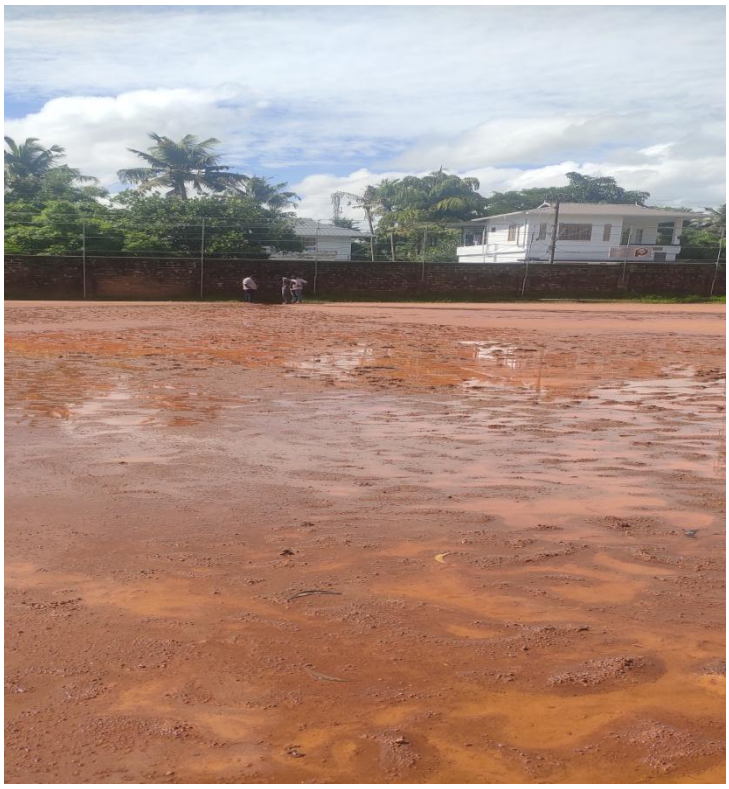
Dr.Sreelatha.A.K
Associate Professor & Head
Rice Research Station, Vyttila
Ernakulam

Dr.Garggi G

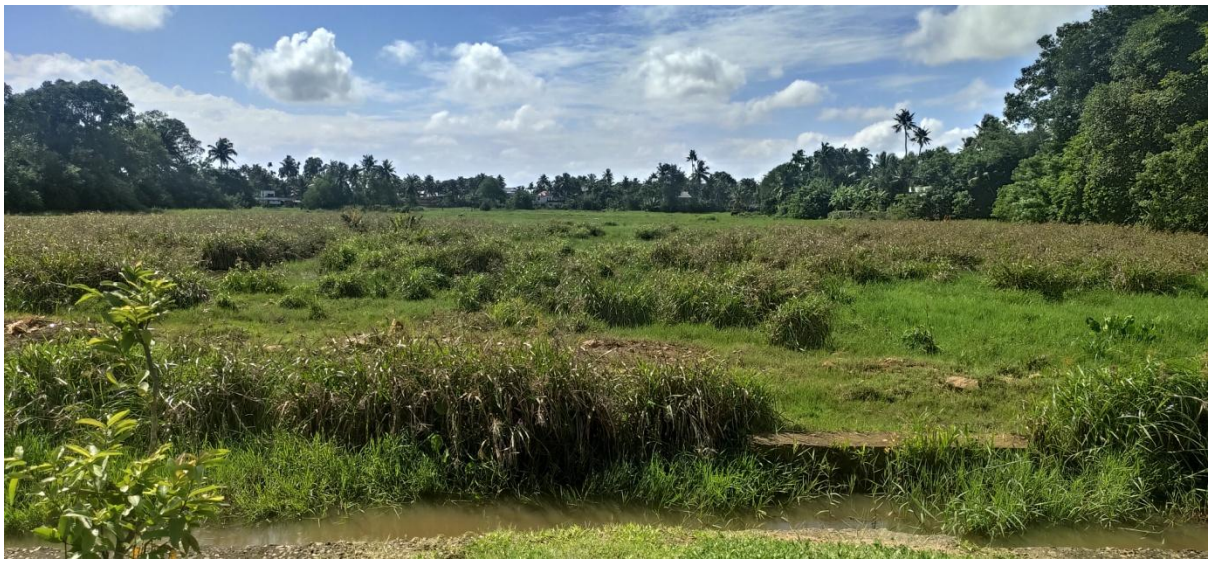
Soil Survey officer

Office of the Assistant Director

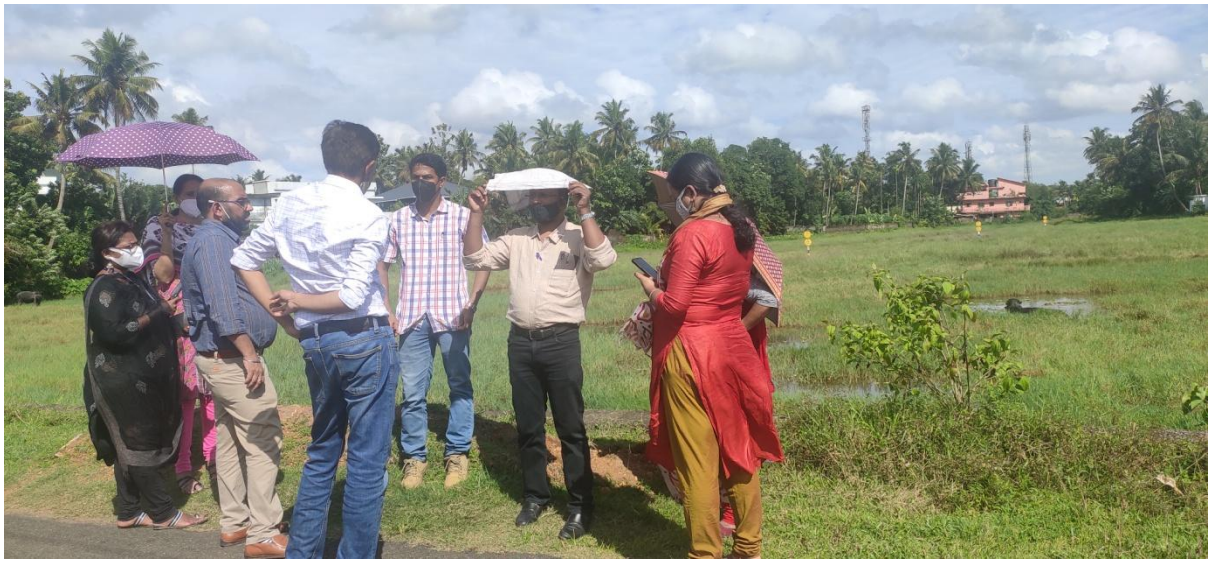
Photographs taken during the inspection on 24.06.2022



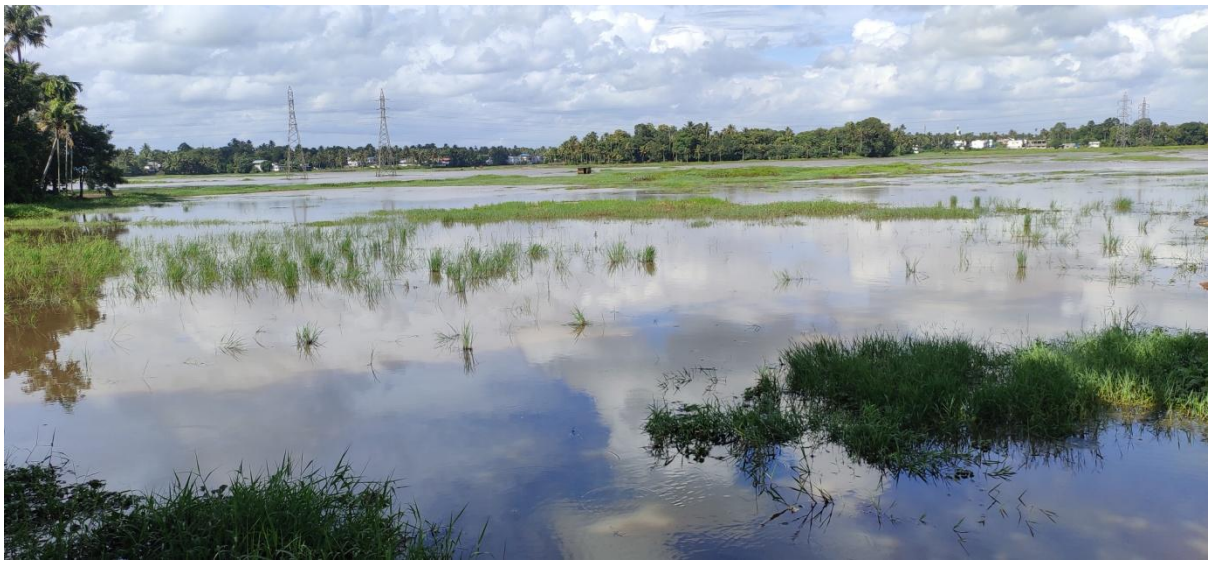
Binani School ground



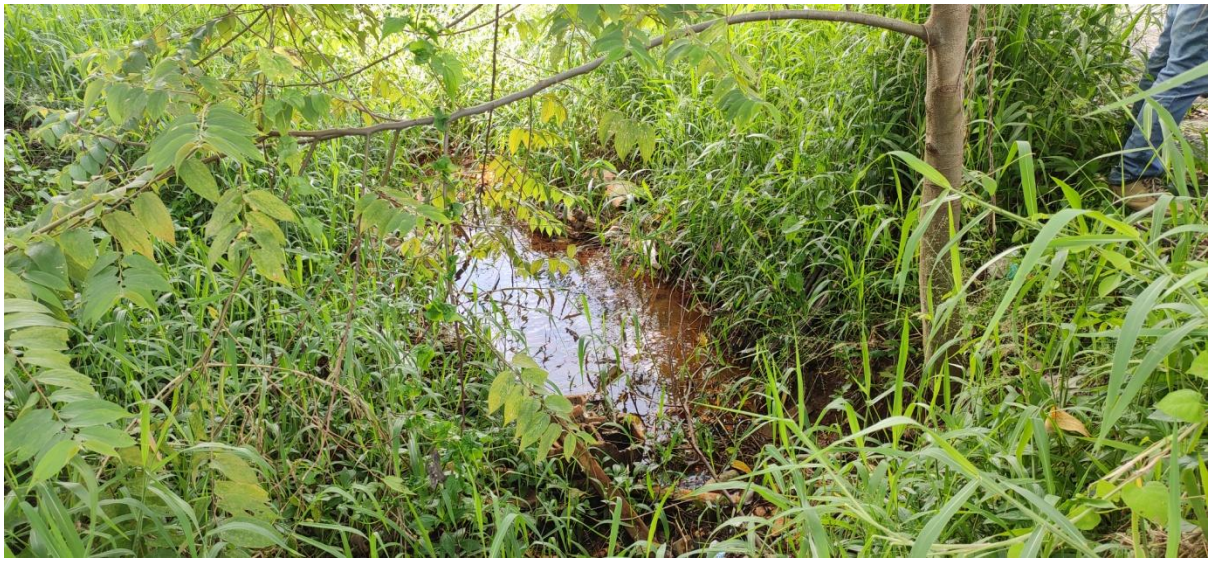
Inaccessible water logged and in submerged areas of Edayattuchal and Chakarachal (1)



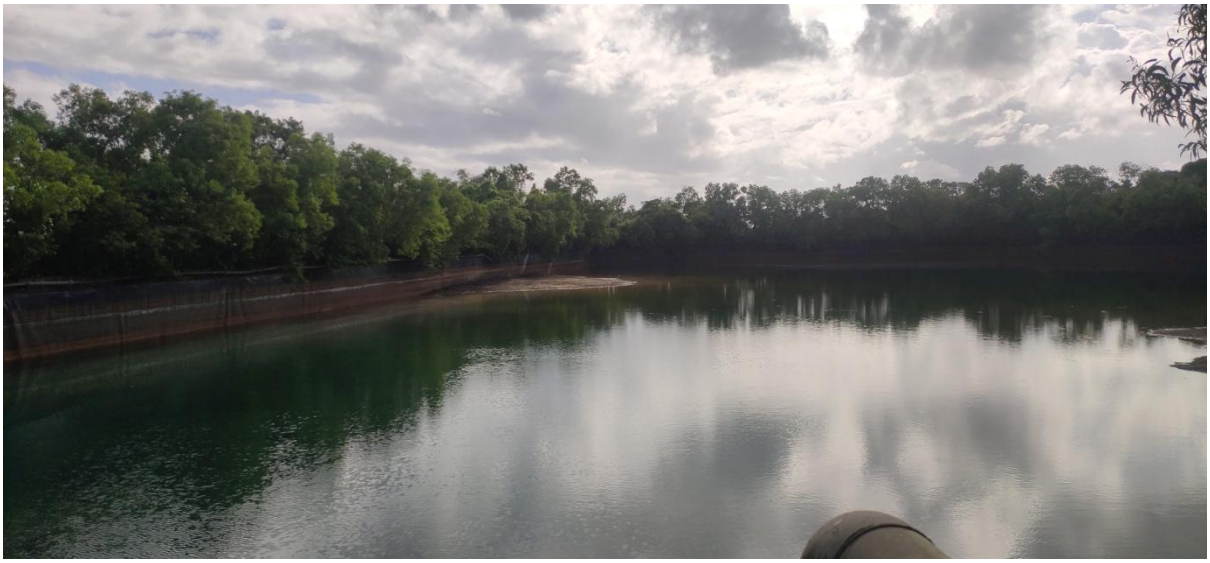
Inaccessible water logged and in submerged areas of Edayattuchal and Chakarachal (2)



Inaccessible water logged and in submerged areas of Edayattuchal and Chakarachal (3)



Thodu near Glastec industries



SLF pond no. 4 of M/s. Binani Zinc Ltd.

ANNEXURE 4

Minutes of the third meeting of the Committee constituted as per the order dated 13.04.2021 by the Hon'ble NGT in O.A. No.143/2020, held on 25.10.2022

Third meeting of the Committee, constituted as above, was conducted at KSPCB, Regional Office, Ernakulam and started at 10.30 AM. The following members and officials were present during the meeting and attended the meeting through VC, except officials from KSPCB, Regional Office, Ernakulam.

1. Sri.BaburajanPK,ChiefEnvironmentalEngineer,KSPCB,RegionalOffice,Ernakulam
2. Sri. Vivek K, SEE/Scientist D, CPCB, RD-Bengaluru
3. Dr. A. K. Sreelatha, Assistant Professor & Head, Rice Research Station, Vyttila
4. Dr. Garggi G, Soil Survey Officer, Office of the Assistant Director, Department of Soil Survey & Soil Conservation, Ernakulam
5. Smt. Vinaya K S, Senior Environmental Engineer, KSPCB, Environmental Surveillance Centre, Eloor
6. Smt. Shahana M. A, Assistant Environmental Engineer, KSPCB, Regional Office, Ernakulam

The Chief Environmental Engineer, Nodal Officer of the Committee, welcomed all to the meeting and presented the analysis report of the samples taken by the committee during the last site visit held on 24.06.2022. He pointed out that as per the analysis report of the soil sample collected from the middle of the Binani School ground, zinc concentration obtained is 1110 mg/kg against 720 mg/kg, the response level prescribed for

remediation. Similarly soil sample collected from the south east side of the ground reported 557mg/kg of zinc, which is below the response level, but above the screening level of 200mg/kg. In the seepage water sample collected at the ground, the concentration of zinc obtained is 536.5mg/l against the permissible limit of 5mg/l. Further the nearest well water sample collected depicts zinc concentration as 322.6mg/l against the permissible limit of 5mg/l. The analysis reports primarily indicates the possibility of leakage from the SLF pond no.4 of the unit claims to be constructed scientifically and designed as per the CPCB guidelines.

Sri. Vivek K, SEE/Scientist D, CPCB, RD-Bengaluru opined that even if Jarosite is delisted from the hazardous waste as per the amended Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, the samples of Jarosite/ waste stored in the SLF ponds needs to be analysed to assess the present condition and to correlate with the results obtained. The location and present condition of the other 3 ponds, which were previously used by the unit for storing Jarosite/ waste also needs to be identified and assessed. Dr. Garggi G, Soil Survey Officer, Office of the Assistant Director, Department of Soil Survey & Soil Conservation, Ernakulam opined that since the nearest open well reflects contamination, a random monitoring of other nearby wells shall be helpful to assess the spread and possibility of contamination. She also enquired regarding availability of any health data in the area concerned and suggested for collecting the same, if not available. Dr. A. K. Sreelatha, Assistant Professor & Head, Rice Research Station, Vyttila informed that the data regarding the ground water monitoring wells is available with the website of CGWD and can be obtained.

After discussions, the following decisions were taken.

1. KSPCB shall share the analysis reports of the samples

collected during the last visit to all the committee members.

2. Health data within 2-3km radius shall be collected from the Primary Health Centres. (Action: SEE, ESC, Eloor)
3. Random sampling shall be conducted from the wells already monitored during the preparation of DPR. (Action: SEE, ESC, Eloor)
4. Jarosite sample from the pond no.4 (composite sample) (shall be collected and analyzed with prior intimation to the company. (Action: SEE, ESC, Eloor)
5. Location of the pond nos. 1, 2 & 3 and the monitoring wells inside the company shall be identified with the help of company authorities
6. An interim report shall be submitted to the tribunal before the next date of hearing, i.e on 29.11.2022.

Meeting of the Joint Committee ended at11.45 PM with thanks to the chair.

Vivek K,
***SEE*/Scientist D,**
CPCB, RD-Bengaluru

Baburajan P K
CEE, RO, Ernakulam

Dr. A. K. Sreelatha,
Associate Professor & Head,
Rice Research Station, Vyttila
Ernakulam

Dr. GarggiG
Soil Survey officer
Office of the Assistant
Director, Ernakulam

Minutes of the fourth meeting of the Committee constituted as per the order dated 13.04.2021 of the Hon'ble NGT in O.A. No.143/2020 held on 27.06.2023

Meeting of the Committee started at 11.00 AM. The following members and officials were present during the meeting.

1. Sri. Baburajan P.K, Chief Environmental Engineer, KSPCB, Regional Office, Ernakulam
2. Sri. Vivek K, SEE/Scientist D, CPCB, RD- Bengaluru
3. Dr. A.K. Sreelatha, Associate Professor & Head, Rice Research Station, Vyttila
4. Dr. Garggi G, Soil Survey Officer, Office of the Assistant Director, Department of Soil Survey & Soil Conservation, Ernakulam
5. Sri. Krishnan M.N, Environmental Engineer, KSPCB, Environmental Surveillance Centre, Eloor
6. Smt. ShahanaM.A, Assistant Environmental Engineer, KSPCB, Regional Office, Ernakulam

The Chief Environmental Engineer, Nodal Officer of the Committee welcomed all to the meeting and summarized the decisions taken in the last committee meeting held on 25.10.2022 and the action taken on the basis of the same. He informed that the jarosite samples from pond no.4 in the premises of M/s. Binani Zinc Ltd were collected and analysed by KSPCB and samples were collected from the randomly chosen 10 numbers of wells within 2km radius. The Hon'ble National Green Tribunal in its last hearing held on 09.05.2023, directed to file its final report before the Tribunal before the next hearing proposed on

18.07.2023.He also pointed out that in the counter affidavit filed by the company it was mentioned that:

"As per the Environment Impact Assessment Report prepared by LAEC, the heavy metals found in groundwater, soil and sediment samples from Edayattuchal and Chakkarachal area in Edayar is Zinc, Iron, Lead, Cadmium, Copper, Nickel and Total Chromium. The analysis of sludge from the jarosite pond of this respondent company made by LAEC found only the presence of Zinc, Iron, Lead, Cadmium, Copper and Nickel. The presence of total Chromium in the ground water, soil and sediment samples of Edayattuchal, which was found absent in our sludge shows that there are other sources for contamination of the paddy fields.
The analysis made by LAEC on the soil and sludge accumulated on the CMRL land near to the river on the upstream of ChakalaThodu, a canal leading to Edayattuchal from the river Periyar, found with presence of heavy metals like Zinc, Iron, Lead, Cadmium, Nickel, Total Chromium and Manganese. The sludge of SudChemie was also found with Total Chromium, Zinc, Lead, Copper, Nickel and Manganese. The sludge from two units of Merchem found with Zinc, Iron, Lead, Cadmium, Nickel and Total Chromium. The sludge from the 3 leather tanning units located in Edayar area was containing with Zinc, Iron, Lead, Cadmium, Copper, Nickel and Total Chromium. Therefore, it can be seen that there are multiple source for the contaminant heavy metals found present in the groundwater soil and sediment of Edayar sites, as per the LAEC report which made the genesis for DPR and remediation projection."

The Chief Environmental Engineer added that while verifying the LAEC report annexed with the counter affidavit, it was noticed that total chromium was not tested in the Jarosite samples. They have only checked zinc, iron lead, mercury, cadmium, copper and nickel. He informed that as per the recent analysis done by the Board, Jarosite sample shows the presence of Total Chromium also

and the concentration obtained is 45.35 mg/l against the permissible limit of 5 mg/l. Thus the claim of the company that *the presence of total Chromium in the ground water, soil and sediment samples of Edayattuchal, which was found absent in our sludge shows that there are other sources for contamination of the paddy fields* is not acceptable.

Sri. Vivek K, SEE/Scientist D, CPCB, RD- Bengaluru opined that even though other industries such as M/s. CMRL, M/s. Sud Chemie, M/s. TMS etc. are also operational in the nearby areas, the quantity of generation of waste is in a small quantity, when compared to the waste generated by M/s. Binani Zinc. He also pointed out that presence of similar heavy metal profile, as found in the Jarosite pond samples was already found in the analysis report of the soil sample collected from the Binani School ground. Chief Environmental Engineer also added that there is only remote chance for heavy metal bearing waste from the any other industries, apart from M/s. Binani Zinc, to reach Edayattuchal through Chakala Thodu, since these units are located in the banks of 'Periyar' River.

Sri. Vivek K also pointed out that as per the proposal submitted by Sri. Harish Kandhari in I.A No 99/2022 in the same OA, it was mentioned that he intended to utilize the Jarosite by converting the same in to crystalline gypsum with about 50% purity for potential utilization in cement plants and that he has requested for 100 kg sludge sample from M/s Binani Zinc in order to find the feasibility of the study. He also informed that even in the meeting of the committee constituted for the evaluation of the proposal by Sri. Harish Kandhari, complete details on the proposed technology has not been revealed and a trial run study will be required to evaluate the feasibility, as recommended by the Committee. The formal approval for

transportation of Jarosite sample has been accorded and the proposal is under the consideration of KSPCB, CPCB and the committee constituted by the CPCB. A decision on the disposal/utilization of the waste stored within the premises of erstwhile M/s Binani Zinc Ltd. can be taken after the proposed trial run study and examining the feasibility of the new proposal.

He further informed that with respect to the alleged contamination of areas outside the industry, the samples of soil could not be collected from these paddy fields during the last visit to the area by the Committee, since it was inaccessible due to excessive waterlogging at the time. He added that the present status of the area, with respect to concentrations of Heavy Metals or other contaminants in the soil/subsoil/ground water matrix shall be necessary for the Committee to recommend remediation measures, if required. Dr. A.K. Sreelatha, Associate Professor & Head, Rice Research Station, Vyttila and Dr. Garggi G, Soil Survey Officer, Office of the Assistant Director, Department of Soil Survey & Soil Conservation, Ernakulam opined that sampling of vegetation (plants/vegetable crops), soil sampling from the paddy fields and its analysis would be helpful to assess the contamination potential of that area.

After discussions, the following decisions were taken.

1. Sampling shall be done from the Edayattuchal/Chakkarachal paddy fields, where already sampling & analysis was done during the preparation of existing DPR. (Action: EE, ESC, Eloor)
2. Samples of vegetation (Plant samples/vegetable crops) shall

also be collected from paddy fields &analyzed for relevant parameters. (Action: EE, ESC, Eloor, and Associate Professor & Head, Rice Research Station)

3. A report shall be submitted to the tribunal before the next date of hearing, i.e on 18.07.2023.

Meeting of the Joint Committee ended at 11.45 PM.

Vivek K,
***SEE*/Scientist D,**
CPCB, RD-Bengaluru

Baburajan P.K
KSPCB,CEE,RO,
Ernakulam

Dr. A.K. Sreelatha,
Associate Professor & Head,
Rice Research Station, Vyttila
Ernakulam

Dr. GarggiG
Soil Survey Officer
Office of the Assistant
Director, Ernakulam