

BEFORE THE HONOURABLE NATIONAL GREEN
TRIBUNAL
SOUTH ZONE, CHENNAI

I.A. No. 99 of 2022 (SZ) in Original Application No.143 of 2020 (SZ)

Applicant : K.K. Muhammed Iqbal

Vs

Respondents : The Kerala State Pollution Control Board &
Others

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



Standing counsel for the 1st respondent

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

BEFORE THE HONOURABLE NATIONAL GREEN
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& Others

VOLUME – I

INDEX

Sl. No.	Description	Page
1.	Report filed by the Chief Environmental Engineer for and on behalf of the Kerala State Pollution Control Board	1 -4

Dated this the 14th day of July, 2023.

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

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&
Others

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 1st Respondent in the above I.A. I know the facts and circumstances of the case. The factual




BABURAJAN P.K.
Chief Environmental Engineer

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 was already submitted that in the order of the Hon'ble National Green Tribunal in the matter I.A 99/2022 in O.A No. 143/2020 (SZ) dated 15/02/2023, CPCB and SPCB were directed to consider the applicant's (Harish Kandhari) technology for using the Jarosite waste to optimum use and also work out the cost component of the same and also directed to file independent report before the Hon'ble Tribunal after consulting with the experts. In compliance with the above order, the CPCB has constituted an expert committee and its first meeting was held on 21/03/2023. The minutes of the meeting is produced herewith and marked as **Annexure 1**. In compliance with the decision taken during the meeting, the Board has issued a letter on 06.05.2023 to the applicant requesting to furnish the proposal that outlines the process in detail, list of prospective utilizers, list of industrial waste proposed for mixing, source and quantity of spent acid required, guarantee on acceptance of the finished product by the cement plants, quality requirements of the products intended to be derived by the utilizers and break-up of the cost of technology. A copy of the letter issued to the applicant is produced herewith and marked as **Annexure 2**.

2. It is also submitted that the proponent has requested to send 100 Kilograms of Jarosite samples in order to prepare around 75 kg of low moisture dry Gypsum at Udaipur and to send it to Kerala SPCB under information to Bengaluru CPCB for joint collaboration testing and product validation support. However since a trial run is requested to be carried out as per the provision of Rule 9 of Hazardous and other wastes (Management and Trans boundary




BABURAJAN P.K.
Chief Environmental Engineer

Movement) (HOWM) Rules, 2016, Board has sent letters on 06.05.2023 and 14.06.2023 to CPCB for advice on whether the applicant may be directed to collect samples. A copy of the letters are produced herewith and marked as **Annexure 3 and annexure 4** respectively. In reply to the above letters, CPCB informed that the KSPCB may consider allowing the applicant to lift about 100 kg of jarosite from the premises of erstwhile Binani Zinc Limited for the purpose of conducting research. It is also directed the Board to collect the details of studies conducted by the applicant. Based on that the Board has issued a letter to the applicant on 07.07.2023 allowing lifting 100kg of jarosite from the premises of Binani Zinc Limited with the support of KSPCB.

3. In reply to the above communication, the applicant has sent an email to the Central and State Boards stating the following that :

- i. KSPCB has not mentioned where the prepared jarosite gypsum sample should be sent and who would thereafter get it tested from Cement Factories of TN, AP & Karnataka because Kerala has only one functional cement plant.
- ii. The applicant is required to carry out above described exercise, then he will have to visit at least 8 - 10 cement plants of these states, explain personally to their technical / QC officers about its testing methods & processes, resend improved sample if asked for with certain changes and finally receive their product validation reports & willingness consents for field trials in their plants through truck loads bulk supply of said Binani Zinc jarosite converted chemical gypsum produced within EZL premises.
- iii. As it would be a long drawn three months process, a part disbursement out of Rs. 2 crore DPR & validation trials Grant from - Govt. / MoEF / CPCB sanction is essential and requested to be approved / disbursed for




BABURAJAN P.K.
Chief Environmental Engineer

conducting above described product validation services / job, based on which DPR preparation & bulk jarosite conversion operations could thereafter proceed further under information & directions of Hon'ble NGT, Chennai.

4. It is submitted that as the Board has sought advice from the CPCB on the demands raised by the applicant and further action will be taken as per the advice of the CPCB. Copy of the letter sent to CPCB on 14.07.2023 is produced herewith and marked as **Annexure 5**.

All that is stated above are true to the best of my knowledge information and belief.

Dated this the 14th of July 2023



Chief Environmental Engineer
BABURAJAN P.K.
Chief Environmental Engineer

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& Others

VOLUME – II

INDEX

Sl. No.	Description	Page
1.	Annexure 1- Copy of the minutes of the meeting held on 21.03.2023	1-6
2.	Annexure 2- Copy of the letter issued to the applicant on 06.05.2023	7
3.	Annexure 3- Copy of the letter sent to the CPCB on 06.05.2023	8-18
4.	Annexure 4- Copy of the letter sent to the CPCB on 14.06.2023	19
5.	Annexure 5- Copy of the letter sent to the CPCB on 14.07.2023	20

Dated this the 14th day of July, 2023.

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

Minutes of Meeting held in Compliance of Hon'ble NGT (Southern Zone) order dated 15/02/2023 in the matter of I.A No. 99/2022 in O.A No. 143/2020

Hon'ble NGT (SZ) while hearing the matter of I.A No. 99/2022 in O.A No. 143/2020 (SZ) on 15/02/2023 directed CPCB and Kerala SPCB to consider the applicant's technology for using the Jarosite waste to optimum use and also work out the cost component of the same and file report on above matter after consulting with the experts.

In compliance of the aforesaid order, a meeting of Experts was held alongwith officials of CPCB, Kerala SPCB, wherein the Applicant in IA was invited to make technical presentation on the proposed technology. The meeting was held virtually through video conferencing on 21/03/2023. The list of participants is appended as **Annexure-I**.

Sh. B. Vinod Babu, Scientist 'F' & Head, Waste Management-II Division, welcomed all the participants and briefed the background in the matter and the experts were requested to examine and give their views on the applicability and viability of the proposed technology of the Applicant.

He informed that as per Schedule-I of the Hazardous and Other Wastes (Management and Transboundary Movement) (HOWM) Rules, 2016, Jarosite has been categorized as High-Volume Low effect waste (HVLE) and required to be managed as per the CPCB guidelines.

Further, CPCB has prepared draft Guidelines for Handling and Management of Jarosite, and the said guidelines are available at CPCB website seeking public comments/feedback by 31.03.2023. He said that the draft guidelines outline various options for utilization of Jarosite such as in cement making, construction of roads, etc. The guidelines also highlight the need for stabilization of Jarosite, extent of treatment required for utilization including utilization targets. The guidelines will be finalized after examining and reviewing the comments received from public or stakeholders.

Thereafter, Ms. Ramaya G, Environmental Engineer, Kerala SPCB presented details on the case. She informed about the matter of Hon'ble NGT (SZ) in O.A No. 143/2020 related to contamination caused by discharge/dumping of effluent and Jarosite generated by M/s Binani Zinc Ltd. to the nearby agricultural land in Edayar Area and contamination of sites with Zinc and other heavy metals. The industry responsible for causing such contamination, that is the erstwhile closed M/s Binani Zinc Ltd. has challenged the detailed investigation and DPR prepared by CPCB under National Clean

Energy Fund (NCEF) regarding the extent of contamination in Edyaar area claiming that there may be other industries responsible for pollution of the said area. In this context, the Applicant filed an I.A 99/2022 in the aforesaid OA before the Hon'ble NGT (SZ), stating that the remediation cost mentioned in CPCB's DPR is much higher, compared to the technology developed by the Applicant, with which, the Jarosite waste lying in unlined ponds can be converted into gypsum, that can be utilised by Cement plants.

Further, it was informed that, Hon'ble NGT while hearing the said matter on 15/02/2023 noted that the total project cost as per the DPR prepared by CPCB was Rs. 47.88 Crores, whereas as per applicant the jarosite will be converted into useful product at a cost of Rs. 17 crores and accordingly directed CPCB & KSPCB to call applicant and consider his technology.

In this regard, the concerned Division, in CPCB clarified that the said remediation cost of Rs. 47.88 Crore was assessed based on detailed site assessment carried out, with an objective to remediate the contaminated soils and groundwater in Edyaar area due to historic operations of erstwhile closed M/s Binani Zinc Ltd. DPR prepared by CPCB provides scope of work and cost estimates for remediation of contaminated soil, contaminated groundwater and transfer of jarosite from unlined landfills (No. 1, 2 and 3) into the secured landfill No. 4 followed by chemical stabilization. The primary objective of DPR was to contain any active source of contamination from the jarosite stored within premises of M/s Binani Zinc Ltd.

The cost break-up of the remediating contaminated areas at Edyaar is given below;

1. Excavation and off-site disposal of contaminated soil at an estimated cost of Rs. 12.91 Crores;
2. Pump and ex-situ treatment of Groundwater (including installation of monitoring wells & treatment system and long term monitoring) at an estimated cost of Rs. 6.02 Crores over a period of 10 years.
3. Excavation of Jarosite from unlined Ponds 1, 2 & 3 and transfer to lined pond No. 04, capping of same and site restoration / reclamation at an estimated cost of Rs. 28.95 Crores.

It was informed that, large quantity of Jarosite has been disposed in unlined ponds 1,2 & 3. It was decided to shift the same into lined pond no. 04, in order to prevent further contamination of from unlined ponds.

Sh. Harish Kandhari informed the experts that he intends to utilize the Jarosite by converting the same into a crystalline gypsum with about 50% purity for potential utilization in cement plants. He explained that in his patented process, the fresh and stabilized jarosite waste materials can be mixed with other locally available industrial wastes and spent sulphuric acid to produce crystalline Gypsum to meets requirements of cement plants. He has not provided details about the proposed industrial waste, sources of spent acid proposed for treatment and the potential utilizers. Further, he has clarified that, he has not carried out any trial study on the Jarosite of M/s Binani Zinc, and requested that samples of Jarosite waste may be provided to him to carry out studies on his proposal.

After detailed deliberations, the following points were observed by the Expert Members:

- (i) The proposal of Applicant is to convert the Jarosite in pond 1,2 and 3 into gypsum for use in cement plants, whereas the DPR prepared by CPCB aims to contain the active contamination from Jarosite ponds 1,2 and 3 and also to remediate the soil and groundwater in and round the premises of M/s Binani Zinc; hence these costs are not comparable.
- (ii) Further, the cost proposed by Applicant is not related to remediation of contaminated site but limited to utilisation of Jarosite (lying in Ponds 1,2, and 3) by cement industries. Thus, it covers only part of scope of work proposed by CPCB and not on work of remediation of contaminated site (soil and groundwater)
- (iii) In the hierarchy of waste management, utilization of waste is always preferred option over disposal. The proposal of Applicant to utilize the waste lying in ponds is better option provided it is proven and the material is acceptable to the users (cement plants).
- (iv) The applicant has yet to establish the use of product derived through its technology. He has not yet provided the following details, which are required to consider the proposal:
 - a. Details and availability of the proposed industrial solid wastes for mixing with Jarosite.
 - b. Sources of spent acid proposed for treatment of Jarosite and its availability.



- c. Willingness of potential utilizers (cement plants), including the quality requirement of the Gypsum produced by the Applicant's technology.
 - d. Characterization of the Jarosite waste lying in the premises of M/s Binani Zinc.
- (v) The applicant intends to utilize hazardous waste that is spent sulphuric acid for treating Jarosite, therefore a trial run is required to be carried out as per the provisions of Rule 9 of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
- (vi) The technology for conversion of Jarosite to Gypsum as mentioned by the Applicant, is based on the studies carried out by him on the Jarosite generated by M/s Hindustan Zinc Ltd. in Rajasthan and not on the jarosite lying at M/s Binani Zinc Ltd. at Kerala. In this context, Committee is of the opinion that characteristics of Jarosite waste generated by M/s Hindustan Zinc Ltd and M/s Binani Zinc Ltd. could differ due to technological and operational practices, and hence specific studies on suitability of jarosite waste for conversion to gypsum and its utilization in Cement industries would be necessary.
- (vii) Sulphate present in the Jarosite are in complex form, therefore, the same may not be available for reaction to produce the intended Gypsum. Further, the Jarosite of M/s Binani Zinc has already been treated with lime in the past, hence the characteristics of the same will be different from freshly generated Jarosite. In this context, the Applicant is required to provide the characteristics of the waste and also demonstrate the same for producing gypsum in a trail utilization study.
- (viii) The role of Applicant is limited to facilitating the utilization of material. However, the project of this magnitude would be feasible only in case there is demand for the gypsum produced from Jarosite using the Applicant's technology. Further, the proposal is limited to utilization of Jarosite lying in 3 ponds without addressing the primary requirement of containing contamination after the removal of Jarosite as well as remediation of soil and ground water in and around the premises of M/s Binani Zinc.
- (ix) At this stage the proponent has only a conceptual plan, and the feasibility of the Applicant's technology is yet to be determined alongwith cost of infrastructure,

material handling, treatment and transportation mitigation measures required, if any, during the entire process.

- (x) The Jarosite as excavated from the ponds will have high moisture and will require drying to bring the moisture level to < 20% for which the applicant proposes to install a dryer. However, the fact that excavated jarosite will need processing and for the period of the processing, Jarosite pond(s) will remain exposed to atmosphere, poses the risk of active leaching into groundwater during monsoon period. Therefore, the applicant may address the same in his proposal.

Recommendation of the Committee:

- i. The committee is of the opinion that a solution oriented approach be adopted that shall assess the demand of the gypsum derived through the Applicant's technology and also address the methodology for containing the contamination during period of processing and after removal of Jarosite as well as remediation of soil and ground water in and around the premises of M/s Binani Zinc.
- ii. Therefore, the Experts suggested that the Applicant may submit a detailed proposal in collaboration with prospective utilizers (cement plants) of Gypsum derived through Applicant's technology to Kerala SPCB with copy to CPCB for review of the proposal. The said proposal shall outline the process in detail alongwith quantity of Jarosite required for conducting trial study, list of industrial waste proposed for mixing, source and quantity of spent acid required, guarantee on acceptance of the finished product (gypsum) by the cement plants and quality requirements of product intended to be derived by the utilizers.

Further, the Applicant may provide break-up for the Cost of Rs. 17 Crore mentioned for his technology.



Annexure-I**List of participants**

Applicant of I.A 99/2022 in O.A 143/2020 (SZ):

1. Sh. Harish Kandhari

Expert Members:

2. Sh. N.K Verma, Former Additional Director, CPCB
3. Sh. R.K Bansal, Member, Expert involved in preparation of Guidelines on Handling and Management of Jarosite
4. Sh. Ullas Parlikar, ARF expert, Cement Plants
5. Dr. Mahendra Patil, Chief Scientist & Head, Solid & Hazardous Division, NEERI-Nagpur
6. Sh. B. Vinod Babu, Scientist 'F' & Head, Waste Management-II Division, CPCB
7. Sh. Rajneesh Jain, Incharge-Hazardous Waste, Rajasthan SPCB.
8. Sh. G. Rambabu, Scientist 'D', Waste Management-I Division, CPCB – on behalf of Divisional Head, Waste Management-I Division, CPCB
9. Ms. Ramya G, Environmental Engineer, Kerala SPCB – On behalf of Chief Environmental Engineer, Regional Officer, Ernakulam, Kerala SPCB

Invite Members:

10. Sh. J.C Babu, Regional Director, Regional Directorate-Bengaluru, CPCB.
11. Ms. Deepti Kapil, Scientist 'D', Waste Management-II Division, CPCB
12. Sh. Vivek, Scientist 'D', Regional Directorate-Bengaluru, CPCB
13. Ms. Sunitra, Environmental Engineer, Kerala SPCB
14. Ms. Vinaya, Environmental Engineer, Kerala SPCB
15. Sh. Sahil Patel, Scientist 'C', Waste Management-II Division, CPCB
16. Dr. Gargi Biswas, RA, Waste Management-I Division, CPCB

☎: 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



Date: 06/05/2023

PCB/HWM/A/9/90/ (1)

From

Member Secretary,
 Kerala State Pollution Control Board,
 Thiruvananthapuram.

To

Sri.Harish Kandhari,
 Applicant of IA No.99/2022 in OA.No-143/2020
 Eco Bounty Highway Private Limited,
 DPIIT Regd Start up/MSME Co.
 13C Town Hall, Udaipur-212001 Rajasthan.

Sub:- Minutes of the meeting held on 21/03/2023 in the matter of
 I.A No. 99/2022 in O.A No.143/2020-reg.

Ref:- Letter No.F.No.CM-13013/1/2023-WM-11-HO-CPCB-HO-
 182 dated 06th April 2023.

Sir,

With reference to the above, as per the minutes of the meeting held on 21/03/2023 in the matter of I.A No.99/2022 in OA No.143/2020, the expert committee has recommended that a detailed proposal shall be submitted by the applicant in collaboration with prospective utilizers (cement plants) of gypsum derived through the applicant's technology. In Compliance with the same you are requested to furnish the proposal that outlines the process in detail, list of prospective utilizers, list of industrial waste proposed for mixing, source and quantity of spent acid required, guarantee on acceptance of the finished product by the Cement plants, quality requirements of the product intended to be derived by the utilizers and breakup of the cost of technology.

Yours faithfully,

Slu

MEMBER SECRETARY

☎: 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



PCB/HWM/A/9/90/(2)

Date: 06/05/2023

From

Member Secretary,
Kerala State Pollution Control Board,
Thiruvananthapuram.

To

The Member Secretary,
Central Pollution Control Board,
Parivesh Bhavan, East Arjun Nagar,
Delhi - 110032

Sub:- Forwarding of Email Submitted by Sri.Harish Kandhari, in compliance with the minutes of the meeting held on 21/03/2023 in the matter of IA No.99/2022 in O.A No.143/2020-reg.

Ref:- 1) Letter No.F.No.CM-13013/1/2023-WM-11-HO-CPCB-HO-182 dated 06th April 2023.
2) Letter No. PCB/HWM/A/9/90/(2) dated: 06/05/2023.

Madam,

With reference to the above, Sri.Harish Kandhari, has sent an email, copy of which is attached herewith. However a detailed proposal as recommended by the committee is not submitted. Hence, the applicant has been addressed vide letter cited (2) to submit a detailed proposal, as recommended by the Committee (copy enclosed). Further the proponent has requested to send 100 Kilograms of Jarosite samples in order to prepare around 75 kg of low moisture dry Gypsum at Udaipur and to send it to Kerala SPCB under information to Bengaluru CPCB for joint collaboration testing and product

validation support. However since a trial run is requested to be carried out as per the provision of Rule 9 of Hazardous and other wastes (Management and Transboundary Movement) (HOWM) Rules, 2016, kindly advise whether the applicant may be directed to collect samples at this point of time.

Yours faithfully,

Shweta

MEMBER SECRETARY



17/04/2023
 केंद्रीय प्रदूषण नियंत्रण बोर्ड
 CENTRAL POLLUTION CONTROL BOARD
 पर्यावरण, वन एवं जलवायु परिवर्तन विभाग
 MINISTRY OF ENVIRONMENT FOREST & CLIMATE CHANGE GOVT OF INDIA

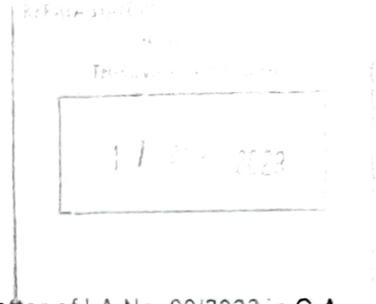
By Speed Post

F No. CM-13013/1/2023-WM-II-HO-CPCB-HO 182

06th April 2023

To.

Sh. Harish Kandhari,
 Applicant of I.A No. 99/2022 in O.A No. 143/2020
 Eco Bounty Highway P. Ltd.
 DPIIT Regd Startup/MSME Co.
 13C Town Hall, Udaipur-313001 Rajasthan.



Sub: Minutes of the meeting held on 21/03/2023 in the matter of I.A No. 99/2022 in O.A No. 143/2020 -reg.

Sir,

This has reference to the meeting held on 21/03/2023 to discuss the technology referred by applicant (Sh. Harish Kandhari) in I.A No. 99/2022 in O.A No. 143/2020 for conversion of Jarosite to Gypsum as per the Hon'ble NGT (Southern Zone) orders dated 15/02/2023

In this regard, the minutes of the meeting are attached herewith for kind information

Yours faithfully,

(B. Vinod Babu)
 Scientist 'F' & Head
 Waste Management-II Division

Copy to:

The Member Secretary,
 Kerala State Pollution Control Board,
 Plamoodu Jn., Pattom Palace P.O
 Thiruvananthapuram-695 004.

For kind information and necessary action

(B. Vinod Babu)

'परिवेश भवन' पर्वी अर्जुन नगर, दिल्ली-110032

Parivesh Bhawan, East Arjun Nagar, Delhi-110032

दूरभाष/Tel : 43102030, 22305792, वेबसाइट/Website : www.cpcb.nic.in

Minutes of Meeting held in Compliance of Hon'ble NGT (Southern Zone) order dated 15/02/2023 in the matter of I.A No. 99/2022 in O.A No. 143/2020

Hon'ble NGT (SZ) while hearing the matter of I.A No. 99/2022 in O.A No. 143/2020 (SZ) on 15/02/2023 directed CPCB and Kerala SPCB to consider the applicant's technology for using the Jarosite waste to optimum use and also work out the cost component of the same and file report on above matter after consulting with the experts.

In compliance of the aforesaid order, a meeting of Experts was held alongwith officials of CPCB, Kerala SPCB, wherein the Applicant in IA was invited to make technical presentation on the proposed technology. The meeting was held virtually through video conferencing on 21/03/2023. The list of participants is appended as **Annexure-I**.

Sh. B. Vinod Babu, Scientist 'F' & Head, Waste Management-II Division, welcomed all the participants and briefed the background in the matter and the experts were requested to examine and give their views on the applicability and viability of the proposed technology of the Applicant.

He informed that as per Schedule-I of the Hazardous and Other Wastes (Management and Transboundary Movement) (HOWM) Rules, 2016, Jarosite has been categorized as High-Volume Low effect waste (HVLE) and required to be managed as per the CPCB guidelines.

Further, CPCB has prepared draft Guidelines for Handling and Management of Jarosite and the said guidelines are available at CPCB website seeking public comments/feedback by 31.03.2023. He said that the draft guidelines outline various options for utilization of Jarosite such as in cement making, construction of roads, etc. The guidelines also highlight the need for stabilization of Jarosite, extent of treatment required for utilization including utilization targets. The guidelines will be finalized after examining and reviewing the comments received from public or stakeholders.

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2/11/23

Energy Fund (NCEF) regarding the extent of contamination in Edyaar area claiming that there may be other industries responsible for pollution of the said area. In this context, the Applicant filed an I.A 99/2022 in the aforesaid OA before the Hon'ble NGT (SZ), stating that the remediation cost mentioned in CPCB's DPR is much higher, compared to the technology developed by the Applicant, with which, the Jarosite waste lying in unlined ponds can be converted into gypsum, that can be utilised by Cement plants.

Further, it was informed that, Hon'ble NGT while hearing the said matter on 15/02/2023 noted that the total project cost as per the DPR prepared by CPCB was Rs. 47.88 Crores, whereas as per applicant the jarosite will be converted into useful product at a cost of Rs. 17 crores and accordingly directed CPCB & KSPCB to call applicant and consider his technology.

In this regard, the concerned Division, in CPCB clarified that the said remediation cost of Rs. 47.88 Crore was assessed based on detailed site assessment carried out, with an objective to remediate the contaminated soils and groundwater in Edyaar area due to historic operations of erstwhile closed M/s Binani Zinc Ltd. DPR prepared by CPCB provides scope of work and cost estimates for remediation of contaminated soil, contaminated groundwater and transfer of jarosite from unlined landfills (No. 1, 2 and 3) into the secured landfill No. 4 followed by chemical stabilization. The primary objective of DPR was to contain any active source of contamination from the jarosite stored within premises of M/s Binani Zinc Ltd.

The cost break-up of the remediating contaminated areas at Edyaar is given below;

1. Excavation and off-site disposal of contaminated soil at an estimated cost of Rs. 12.91 Crores;
2. Pump and ex-situ treatment of Groundwater (including installation of monitoring wells & treatment system and long term monitoring) at an estimated cost of Rs. 6.02 Crores over a period of 10 years.
3. Excavation of Jarosite from unlined Ponds 1, 2 & 3 and transfer to lined pond No 04, capping of same and site restoration / reclamation at an estimated cost of Rs. 28.95 Crores.

It was informed that, large quantity of Jarosite has been disposed in unlined ponds 1, 2 & 3. It was decided to shift the same into lined pond no. 04, in order to prevent further contamination of from unlined ponds.

Sh. Harish Kandhari informed the experts that he intends to utilize the Jarosite by converting the same into a crystalline gypsum with about 50% purity for potential utilization in cement plants. He explained that in his patented process, the fresh and stabilized jarosite waste materials can be mixed with other locally available industrial wastes and spent sulphuric acid to produce crystalline Gypsum to meets requirements of cement plants. He has not provided details about the proposed industrial waste, sources of spent acid proposed for treatment and the potential utilizers. Further, he has clarified that, he has not carried out any trial study on the Jarosite of M/s Binani Zinc, and requested that samples of Jarosite waste may be provided to him to carry out studies on his proposal.

After detailed deliberations, the following points were observed by the Expert Members:

- (i) The proposal of Applicant is to convert the Jarosite in pond 1,2 and 3 into gypsum for use in cement plants, whereas the DPR prepared by CPCB aims to contain the active contamination from Jarosite ponds 1,2 and 3 and also to remediate the soil and groundwater in and round the premises of M/s Binani Zinc; hence these costs are not comparable.
- (ii) Further, the cost proposed by Applicant is not related to remediation of contaminated site but limited to utilisation of Jarosite (lying in Ponds 1,2, and 3) by cement industries. Thus, it covers only part of scope of work proposed by CPCB and not on work of remediation of contaminated site (soil and groundwater)
- (iii) In the hierarchy of waste management, utilization of waste is always preferred option over disposal. The proposal of Applicant to utilize the waste lying in ponds is better option provided it is proven and the material is acceptable to the users (cement plants).
- (iv) The applicant has yet to establish the use of product derived through its technology. He has not yet provided the following details, which are required to consider the proposal:
 - a. Details and availability of the proposed industrial solid wastes for mixing with Jarosite.
 - b. Sources of spent acid proposed for treatment of Jarosite and its availability.

- c. Willingness of potential utilizers (cement plants), including the quality requirement of the Gypsum produced by the Applicant's technology.
 - d. Characterization of the Jarosite waste lying in the premises of M/s Binani Zinc.
- (v) The applicant intends to utilize hazardous waste that is spent sulphuric acid for treating Jarosite, therefore a trial run is required to be carried out as per the provisions of Rule 9 of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
- (vi) The technology for conversion of Jarosite to Gypsum as mentioned by the Applicant, is based on the studies carried out by him on the Jarosite generated by M/s Hindustan Zinc Ltd. in Rajasthan and not on the jarosite lying at M/s Binani Zinc Ltd. at Kerala. In this context, Committee is of the opinion that characteristics of Jarosite waste generated by M/s Hindustan Zinc Ltd and M/s Binani Zinc Ltd. could differ due to technological and operational practices, and hence specific studies on suitability of jarosite waste for conversion to gypsum and its utilization in Cement industries would be necessary.
- (vii) Sulphate present in the Jarosite are in complex form, therefore, the same may not be available for reaction to produce the intended Gypsum. Further, the Jarosite of M/s Binani Zinc has already been treated with lime in the past, hence the characteristics of the same will be different from freshly generated Jarosite. In this context, the Applicant is required to provide the characteristics of the waste and also demonstrate the same for producing gypsum in a trial utilization study.
- (viii) The role of Applicant is limited to facilitating the utilization of material. However, the project of this magnitude would be feasible only in case there is demand for the gypsum produced from Jarosite using the Applicant's technology. Further, the proposal is limited to utilization of Jarosite lying in 3 ponds without addressing the primary requirement of containing contamination after the removal of Jarosite as well as remediation of soil and ground water in and around the premises of M/s Binani Zinc.
- (ix) At this stage the proponent has only a conceptual plan, and the feasibility of the Applicant's technology is yet to be determined alongwith cost of infrastructure,

material handling, treatment and transportation mitigation measures required, if any, during the entire process.

- (x) The Jarosite as excavated from the ponds will have high moisture and will require drying to bring the moisture level to < 20% for which the applicant proposes to install a dryer. However, the fact that excavated jarosite will need processing and for the period of the processing, Jarosite pond(s) will remain exposed to atmosphere, poses the risk of active leaching into groundwater during monsoon period. Therefore, the applicant may address the same in his proposal.

Recommendation of the Committee:

- i. The committee is of the opinion that a solution oriented approach be adopted that shall assess the demand of the gypsum derived through the Applicant's technology and also address the methodology for containing the contamination during period of processing and after removal of Jarosite as well as remediation of soil and ground water in and around the premises of M/s Binani Zinc.
- ii. Therefore, the Experts suggested that the Applicant may submit a detailed proposal in collaboration with prospective utilizers (cement plants) of Gypsum derived through Applicant's technology to Kerala SPCB with copy to CPCB for review of the proposal. The said proposal shall outline the process in detail alongwith quantity of Jarosite required for conducting trial study, list of industrial waste proposed for mixing, source and quantity of spent acid required, guarantee on acceptance of the finished product (gypsum) by the cement plants and quality requirements of product intended to be derived by the utilizers.

Further, the Applicant may provide break-up for the Cost of Rs. 17 Crore mentioned for his technology.



Annexure-I**List of participants**

Applicant of I.A 99/2022 in O.A 143/2020 (SZ):

1. Sh. Harish Kandhari

Expert Members:

2. Sh. N.K Verma, Former Additional Director, CPCB
3. Sh. R.K Bansal, Member, Expert involved in preparation of Guidelines on Handling and Management of Jarosite
4. Sh. Ullas Parlikar, ARF expert, Cement Plants
5. Dr. Mahendra Patil, Chief Scientist & Head, Solid & Hazardous Division, NEERI-Nagpur
6. Sh. B. Vinod Babu, Scientist 'F' & Head, Waste Management-II Division, CPCB
7. Sh. Rajneesh Jain, Incharge-Hazardous Waste, Rajasthan SPCB.
8. Sh. G. Rambabu, Scientist 'D', Waste Management-I Division, CPCB – on behalf of Divisional Head, Waste Management-I Division, CPCB
9. Ms. Ramya G, Environmental Engineer, Kerala SPCB – On behalf of Chief Environmental Engineer, Regional Officer, Ernakulam, Kerala SPCB

Invite Members:

10. Sh. J.C Babu, Regional Director, Regional Directorate-Bengaluru, CPCB.
11. Ms. Deepti Kapil, Scientist 'D', Waste Management-II Division, CPCB
12. Sh. Vivek, Scientist 'D', Regional Directorate Bengaluru, CPCB
13. Ms. Sunitra, Environmental Engineer, Kerala SPCB
14. Ms. Vinaya, Environmental Engineer, Kerala SPCB
15. Sh. Sahil Patel, Scientist 'C', Waste Management II Division, CPCB
16. Dr. Gargi Biswas, RA, Waste Management I Division, CPCB



consentaction@pochococonsent1@gmail.com

Fwd: Response to CPCB Letter dated 6th April,2023 In regard with attached Minutes of the Meeting held on 21/03/2023

Sheela A M <ms.kspcb@gov.in>
 To: 'CPCB' <rcb.cspcb@kerala.gov.in>; 'cnc.kspcb' <cnc.kspcb@gmail.com>; 'CHAIRMAN K'SPCB' <cnc.kspcb@gmail.com>; 'pochococonsent1' <pochococonsent1@gmail.com>

11:03 AM (urgent)

From: Sheela A M <ms.kspcb@gov.in>
 To: Vinod Babu Bommathula <sh.babu@pochoco.com>; "Sheela A M" <ms.kspcb@gov.in>; "Vivok K" <vivok.k@pochoco.com>
 Sent: Saturday, April 15, 2023 4:23:55 PM
 Subject: Response to CPCB Letter dated 6th April 2023 in regard with attached Minutes of the Meeting held on 21/03/2023

KAO: Sh. Vinod Babu, Waste Management II, Division CPCB and Id. participants of the meeting

The following para on Pg.2 of the minutes explains cost estimation of entire Edydar Area Remediation Project costing Rs.47.88 Crore describing as under

In this regard, the concerned Division in CPCB clarified that the said remediation cost of Rs. 47.88 Crore was assessed based on detailed site assessment carried out with an objective to remediate the contaminated soils and groundwater in Edydar area due to historic operations of erstwhile closed M/s Binani Zinc Ltd. DPR prepared by CPCB provides scope of work and cost estimates for remediation of contaminated soil, contaminated groundwater and transfer of jarosite from unlined landfills (to 1, 2 and

3) into the secured landfill No. 4 followed by chemical stabilization

The primary objective of DPR was to contain any active source of contamination from the jarosite stored within premises of M/s Binani Zinc Ltd.

The cost break-up of the remediating contaminated areas at Edydar is given below:

1. Excavation and off-site disposal of contaminated soil at an estimated cost of Rs. 12.91 Crores.
2. Pump and ex-situ treatment of Groundwater (including installation of monitoring wells & treatment system and long term monitoring) at an estimated cost of Rs. 6.02 Crores over a period of 10 years
3. Excavation of Jarosite from unlined Ponds 1, 2 & 3 and transfer to lined pond No. 04, capping of same and site restoration / reclamation at an estimated cost of Rs. 28.95 Crores.

It was informed that large quantity of Jarosite has been disposed in unlined ponds 1, 2 & 3. It was decided to shift the same into lined pond no. 04, in order to prevent further contamination from unlined ponds."

In ref. with above, our involvement with regard to conversion of contaminated Jarosite into usable gypsum product for Cement plants, relates only on cost break up proposal at para 3 - Excavation of Jarosite from ponds, its redeposit in lined pond & capping costing Rs.28.95 crore - against which we have offered estimated cost of only Rs.17.00 crores through preparation of DPR, plant set up within Binani Zinc premises & progressive limited excavation of weekly or bimonthly Jarosite consumption for gypsum conversion through partial opening of one pond at a time, transporting simultaneously the dried finished product to cement plants. This would eliminate full opened pond exposure of contaminated jarosite to atmosphere & any active leaching into groundwater during monsoon period could be eliminated through rain protected covering of partially opened pond.

With regard to the observations by the Expert members, para (iv) at pg.3 states as under:

(iv) The applicant has yet to establish the use of product derived through its technology. He has not yet provided the following details, which are required to consider the proposal:

- i) Details and availability of the proposed industrial solid wastes for mixing with Jarosite.
- ii) Sources of spent acid proposed for treatment of Jarosite and its availability.
- iii) Willingness of potential utilizers (cement plants), including the quality requirement of the Gypsum produced by the Applicant's technology.
- iv) Characterization of the Jarosite waste lying in the premises of M/s Binani Zinc

Other details under para (v) to para (ix) are also asked to be replied

Similarly under heading Recommendations of the Committee para ii, which states as below

Therefore, the Experts suggested that the Applicant may submit a detailed proposal in collaboration with prospective utilizers (cement plants) of Gypsum derived through applicant's technology to Kerala SPCB with copy to CPCB for review of the proposal. The said proposal shall outline the process in detail alongwith quantity of Jarosite required for conducting trial study, list of industrial waste proposed for mixing, source and quantity of spent acid required, guarantee on acceptance of the finished product (gypsum) by the cement plants and quality requirements of product intended to be derived by the utilizers

Further, the Applicant may provide break-up for the Cost of Rs. 17 Crore mentioned for his technology."

It is most humbly mentioned that all above detailed proposal & information asked are part of DPR and will get included therein for which we have earlier mentioned in our mails as below

Rs. 2.00 crores to be provided as "Grant for preparation of Jarosite utilization cum 20 acre silted contaminated land & Ponds remediation within EZI premises Project DPR cum Feasibility report / Cost benefit Analysis - CBA/ Cash flow Projections / Gypsum product Validation - Field trials at user cement factories through gypsum production by hired machines / Logistics Solutions for far distant cement factories delivery as Kerala having only 50 cement factories/ Technical Personnel training etc - In consultation with and assistance of different Research Institutions.

Interest free Loan Assistance of Rs.15 crores for plant set up in EZI premises - Capex / Opex, to be repaid in 3 years with one year moratorium period through sale of Jarosite converted gypsum material to cement plants for Green Alternate Raw Material reuse, cash flow projections with repayment schedules to be prepared with DPR."

The above financial matter also came up during current 21.03.2023 meeting discussions and towards its consideration post Lab scale product validation, it was suggested that The Kerala SPCB would send around 100 kgs of Jarosite sample lying in silted ponds to Mr. Harish Kandhan (HK) in Udapuzha

Kanjarum would make assessment of compatible wastes & spent acid availability in bulk in the near surroundings of Edydar - Ernakulam, receive samples in Udapuzha, prepare around 75 kgs of low moisture dry Gypsum and send to Kerala SPCB under information to Bengaluru CPCB for their joint

https://mail.google.com/mail/u/1/?ik=f4afe4ba7a&view=pt&search=all&permhid=thread-f-1763244030268678272&siml=msg-f-1763244030268678272 1/2

Lab Scale Trial Taken with Chemical Gypsum Sample Received from Udaipur Send by Mr. Harish Khandari
(Three nos. Chemical gypsum sample received)

Description	UOM	Running Cement Sample (Mother Sample)	Cement Sample With Chemical Gypsum A (Mr. Harish Khandari, Udaipur)	Cement Sample With Chemical Gypsum B (Mr. Harish Khandari, Udaipur)	Cement Sample With Chemical Gypsum C (Mr. Harish Khandari, Udaipur)	Remark
Sample Casting Date		28/Jul/2022	29/Jul/2022	29/Jul/2022	29/Jul/2022	
Fineness	m ² /kg	333	333	330	328	
N.C	%	25.50	23.25	25.50	25.75	
Setting Time	Minutes					
Initial		75	125	115	110	
Final		100	150	140	135	
Soundness						
Le-Charlier	mm	1.0	1.0	1.0	1.0	
Auto clay	%	0.06	0.13	0.09	0.10	
Comp.Strength	Date					
1 day	7/29/2022	30.1	29.7 (98.67)	27.4 (91.03)	27.1 (90.03)	
3 days	7/31/2022	42.5	41.8 (98.35)	40.8 (96.0)	38.5 (90.52)	
7 days	8/4/2022	49.5	52.1 (105.25)	47.7 (96.36)	46.1 (93.13)	
28 days	8/25/2022	60.6	60.8 (100.33)	60.85 (100.50)	51.7 (85.31)	
Chemical						
LOI	%	1.23	1.67	1.83	2.02	
SO3	%	2.32	2.16	2.16	2.13	
CaO	%	63.11	60.72	62.7	62.83	
MgO	%	0.93	1.02	0.91	0.88	
Purity (Chemical Gypsum)	%		38.84	62.85	66.38	Chemical Gypsum Produce by mix combination of Zorita & Industry Waste (Gujrat)

☎: 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



PCB/HWM/A/9/90

Date:14/06/2023

Reminder

From

The Member Secretary

To

The Member Secretary
Central Pollution Control Board
Parivesh Bhavan, East Arjun Nagar
Delhi- 110032

Sub:- Matter of I.A No. 99/2022 in OA No.143/2020- Disposal of Jarosite from Edayar Zinc Ltd- reg.

Ref: Letter no. PCB/HWM/A/9/90(2) dated 06.05.2023

Sir,

Kind attention is invited to the matter cited above. It was informed vide reference that the proponent Sri Harish Kandhari has requested to send 100 kilograms of Jarosite samples in order to prepare around 75kg of low moisture dry Gypsum at Udaipur and to send it to Kerala SPCB under information to Bengaluru CPCB for joint collaboration testing and product validation support. Hence advice was requested on 06.05.2023 on the collection of samples vide the letter cited (copy enclosed). Kindly bestow your personal attention and offer advice at the earliest, since the case is posted on 18.07.2023 before the Hon'ble NGT.

Yours faithfully,

Skumar A J

MEMBER SECRETARY

Copy To

1. The Regional Director
Regional Directorate –Bangalore
A-Block, Nisarga Bhavan , 1st and 2nd floors
7th D Cross, Thimmaiah Road, Shivanagar
Bangalore-560079
2. The Chief Environmental Engineer
Regional Office
Ernakulam
3. The Environmental Engineer
Environmental Surveillance Centre
Eloor, Ernakulam

☎: 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



PCB/HWM/A/9/90

Date: 14/07/2023

From

The Member Secretary

To

The Member Secretary,
Central Pollution Control Board,
Parivesh Bhavan,
East Arjun Nagar, Delhi
110032.

Sub:- Matter of I.A No.99/2022 in O.A No.143/2020 related to disposal of Jarosite from Edayar Zinc Limited – reg.

Ref:- 1.Letter No.CM-13013/1/2023-WM-11-HO-CPCB-HO-Part (1) dated:28/06/2023.
2. Letter No. PCB/HWM/A/9/90 dated 07.07.2023

Sir,

Kind attention is invited to the matter cited. As per the letter under reference (1) Sri.Harish Kandhari is allowed to lift 100kg of Jarosite from the premises of erstwhile M/s.Binani Zinc Limited for the purpose of conversion into gypsum at Udaipur and Chief Environmental Engineer, Regional Office, Ernakulam, who is also a member of the expert committee, is instructed to provide necessary support in this regard. A copy of the letter is issued to Chief Environmental Engineer, Regional Office, Ernakulam and to Sri. Harish Kandhari was submitted vide letter cited 2nd for kind reference. Now vide e mail of 11th July, the proponent has addressed CPCB and SPCB wherein it is stated that KSPCB has not mentioned where the prepared Jarosite gypsum sample should be sent and thereafter who would get it tested from cement factories of TN,AP and Karnataka. He has also requested part disbursement out of Rs 2 Crores DPR & validation trials grant from Govt/MoEF/CPCB. Kindly advise on further course of action as it is an interstate matter.

Yours faithfully,

Stu-AJ

MEMBER SECRETARY

Copy to:-

✓ The Chief Environmental Engineer,
Regional Office,
Ernakulam.