### REPORT

### ON

On-site Dechlorination of PCB contaminated oil using CPRI mobile de-chlorination unit Project Site: Kerala State Electricity Board, 220kV Substation Kalamassery, Kerala Period: 04.06.2023 to 04.09.2023





Dielectric Materials Division Central Power Research Institute Bengaluru-560 080, India.

Work Order No: 09/23-24, Dt. 24.05.2023

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## <u>Report on PCB De-Chlorination Activity at KSEB, 220kV Substation</u> <u>Kalamassery</u>

### 1. Introduction:

Polychlorinated Biphenyls (PCBs) are materials that were used as a liquid dielectrics in Power Transformers and capacitors prior 1980s. Due to their high chemical stability, hazardous properties and ability to persist in the environment, these materials have serious pollution potential. These chemicals are classified under Persistent Organic Pollutants (POPs). Such materials, if left untraced or identified, will continue contaminating food, water, soil and bio accumulating for very long periods. Therefore, if proper care is not taken in the collection and safe disposal of these materials, the cost incurred to correct the consequences will be very high.

Awareness about pollution and toxicity of PCBs had resulted in the international treaty, "Stockholm Convention on Persistent Organic Pollutants". Under this convention, more than 196 countries have resolved to eliminate such polluting materials from their countries. India is also a signatory to this convention and is obliged to eliminate these types of materials. Under the guidelines of MoEFCC( Ministry of Environment, Forest and Climate Change) and UNIDO (United Nations Industrial Development Organization), the project " Reduction and Elimination of PCBs, prioritizing the Power sector in India" has been taken up. Central Power Research Institute (CPRI) has been identified as the nodal organization for coordinating the disposal activity in the country.

### 2. Background:

CPRI has sent letters to M/s, KSEB 220kV Substation Kalamassery for undertaking the PCB dechlorination activity. Letter enclosed. (Annexure 1)

Dr. P. Thomas, Additional Director/ HOD, Dielectric Materials Division, Central Power Research Institute, visited M/s, KSEB 220kV Substation Kalamassery on 08.12.2017 to have detailed technical discussions for undertaking the PCB de-chlorination activity at M/s, KSEB 220kV Substation Kalamassery, and a MOM was signed between M/s, KSEB and M/s, CPRI. Copy enclosed. (Annexure 2)

CPRI had received an email request from M/s, KSEB 220 kV Substation Kalamassery, to take up this PCB de-chlorination activity as soon as possible. Copy enclosed. (Annexure 3)

A budgetary offer along with site requirement has been sent to office of the Assistant Executive Engineer, 220 kV Substation, Kerala State Electricity Board Ltd. Kalamassery. Copy enclosed. (Annexure 4)

CPRI has received a letter from M/s, KSEB that 50% advance payment could not be initiated and requested CPRI to waive off 50% advance. Copy enclosed. (Annexure 5)

After approval from CPRI management, CPRI agreed to undertake PCB de-chlorination work at 220 kV Substation, Kerala State Electricity Board Ltd. Kalamassery, without any advance with the condition that full amount to be paid immediately, (within15days) after the completion of work.

Finally, CPRI has received work order from M/s, KSEB Kalamassery for the dechlorination of around 117.72KL of PCB contaminated oil, Work Oder No: 09/23-24, Dt. 24.05.2023. Copy enclosed. (Annexure 6)

## <u>3. PCB De-chlorination Activities Carried out at KSEB, 220 kV Substation</u> <u>Kalamassery from 04.06.2023 to 04.09.2023.</u>

Based on the confirmation received from KSEB,220 kV Substation Kalamassery, CPRI team visited the site on 04 June 2023 to take up the PCB de-chlorination activity.

The following team members were involved in the PCB de-chlorination activity:

Shri. Dr. P. Thomas, Additional Director, Head-DMD & PCB Project Leader,

Shri. P. Sadasiva Murthy, Joint Director, DMD

Mr. Thilak A, Project Engineer, PCB Project.

Mr. Anil Chavan, Project Engineer, PCB Project.

Mr. Tom Jose, Project Engineer, PCB Project.

Mr. M.Senthamilarasan, Project Engineer, PCB Project.

Mr. Vinay A Revankar, Project Engineer, PCB Project.

Mr. Nagaraju C B, Technician, PCB Project.

Mr. Santhana Kumar G, Driver, PCB Project.

Mr. Sathish Kumar M, Driver, PCB Project.

PCB team inspected the preparedness at 220kV Substation Kalamassery, and found that the following arrangements were made ready by M/s. KSEB.

- Area of sodium dispersion barrels storage (Given instruction to keep sodium dispersion free from moisture).
- > Tanks for storing the de-chlorinated oil was provided.
- PCB team made necessary arrangement, such as powering the stepdown transformer, checking the power connection, made connection from PCB contaminated transformer to PCB unit, water supply connection and nitrogen cylinders, etc.

## 4. Sodium Dispersion Preparation Process:

Around 680 kg of Sodium dispersed in oil was prepared using sodium dispersion unit stationed at CPRI,Bengaluru. The details of the sodium dispersion prepared is given in the below Table 1.

Batch	Date	Batchsize inKg.	Sodium metal in	Oil inKg.	Sodium dispersion	Particle size in microns			
No.		initig.	Kg.		preparation	in inci ons			
					in Hrs.				
1.	16.05.2023 to 19.05.2023	340	136	204	22	10-15			
2.	22.05.2023 to 24.05.2023	340	136	204	21	10-15			
	Total: 680 Kg								

## Table 1: Details of Sodium Dispersed in oil.

Optical microscope image analysis is carried out to measure the particle size for the sodiumdispersed oil (Fig. 1&2) is given below:

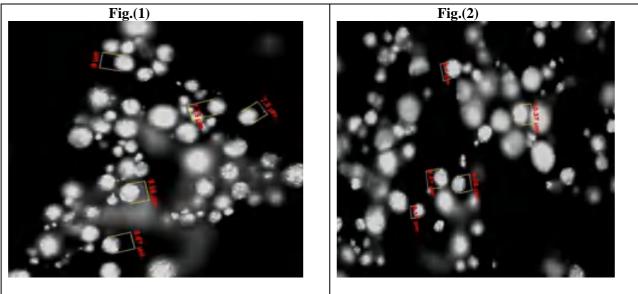


Fig. (1)& (2) : Particle size in the range 10-15  $\mu m$ 

## 5. Preparation works undertaken for de-chlorination activity:-

CPRI received work order (No.09/23-24,Dt:24.05.2023) Copy enclosed. (**Annexure 6**) from M/s. KSEB, Kalamassery for undertaking PCB dechlorination activity of PCB contaminated oil of 117.72 KL at 220 kV substation KSEB,Kalamassery, Kochi.PCB staff reached the site on 04.06.2023.

The details of preparation activities are as follows:

- 1. Parking of Volvo PCB De-chlorination plant
- 2. Plant erection and power supply connections
- 3. Setting up of laboratory for PCB extraction
- 4. Sodium mixer area covered with tarpaulin sheets
- 5. Nitrogen cylinder connectors repair
- 6. *Replace new Battery*
- 7. UPS service and repair
- 8. DCS command response rectification
- 9. Oil loading

Volvo truck bearing Reg. No-KA04MU6886 and the Prakash parcel services vehicle bearing Reg.No-MH04FJ9844 has reached KSEB, 220 kV Substation Kalamassery premises on 06.06.2023. The PCB unit has parked at the appropriate location and all the PCB accessories such as step down transformer, sodium dispersion drums, ladders etc. were unloaded.



Figure 3 :Unloading of PCB accessories such as step down transformer, sodium dispersion drums etc.

The exhaust and chain pulley rod connections were attached to PCB-unit. The tank for storage of dechlorinated oil were placed in appropriate locations.



Figure 4: Chain pulley connection to PCB unit

Figure 5: Tank for storage of PCB dechlorinated oil is kept near the PCB unit

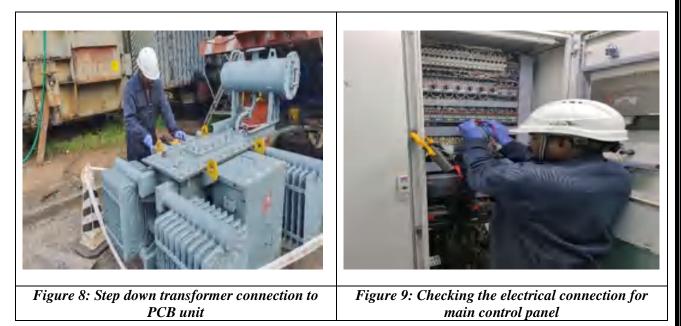
The step down transformer was connected to the PCB unit from the main power supply provided by M/s. KSEB. The control panel and nitrogen line were checked. Sodium dispersion mixer, ladders, and other items were arranged near the PCB unit.



Figure 6: Power supply connections to control panel

Figure 7: Earthing connections and step down transformer connection

All the panel connections were checked and found short-circuited connection, which is suspected to be happened during transportation which has rectified and put back to use.



The loading and unloading pipeline connections were delivered between PCB contaminated transformer to PCB de-chlorination Plant and PCB de-chlorination Plant to PCB dechlorinated oil storage tank.



Figure 10: Transferring sodium dispersion drum

Figure 11: PCB oil loading line connection

After the power connection and setting up of the PCB plant, leakage in pipelines were checked before the commencement of operation.

The laboratory setup was made for the PCB extraction in the space provided in KSEB. GC-ECD used for the PCB testing was switched on and the same was calibrated using PCB standard 1242, 1254 &1260 Aroclor.

GC fixed on the table, GC gas regulator connections were done, and the nitrogen gas line control panel was checked. After the connections, GC was started and checked for working condition.



Figure 12: Chemical lab setup for PCB oil extraction

Figure 13: GC-ECD instrument used for PCB analysis

PCB plant sodium mixture area has been covered with tarpaulin sheets as the preventive measure for unexpected rain, since water and sodium are vigorously reactive.

The nitrogen cylinder connectors to the manifold was found to be in broken condition suspected to broken during the transportation, it was welded and put back to use.



Figure 14: Sodium mixer area covered with tarpaulin sheets

Figure 15:Nitrogen cylinder connection

The UPS was not providing proper power backup. It was observed that battery was swelled, the swelled battery were replaced with new ones.

The internal transformer component of UPS was not working and the same was rectified and put back to use.

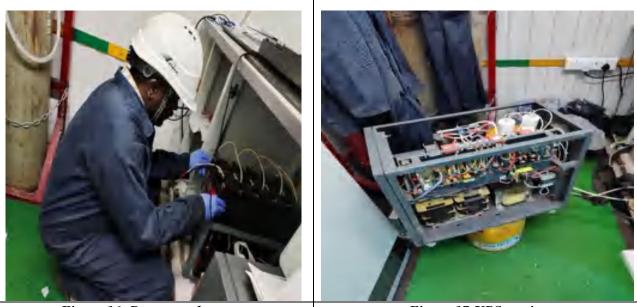


Figure 16: Battery replacement

Figure 17:UPS service

During loading operation of sodium dispersion from the drum to the sodium tank it was found the DCS command in PCB main unit was not working, the same was checked and rectified.

The first batch oil loading was done from the first transformer (Sl.No-D577147) having around 30KL PCB contaminated oil.

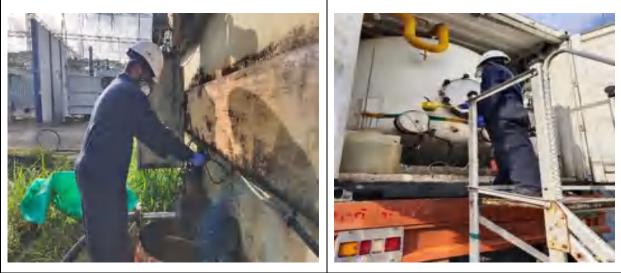


Figure 18:Oil drain connection from PCB contaminated transformer

Figure 19: Sample is collected for PCB analysis

## Presentation on the PCB De-chlorination activity

Dr. P. Thomas, Additional Director/ HOD, Dielectric Materials Division, Central Power Research Institute, Bengaluru visited KSEB, 220 kV Kalamassery on 09.06.2023, and made presentation on "A Management service on treatment of transformer mineral oil containing PCB's using mobile dechlorination system"

A MOM was signed on 09.06.2023 between M/s. KSEB and M/s. CPRI. Copy enclosed. (Annexure 7)



Figure 20: Dr. P. Thomas, Additional Director/ HOD, Dielectric Materials Division, CPRI, giving presentation about PCB management and made visit to the site

## 6. PCB de-chlorination Process:

PCB de-chlorination process was carried out by loading a known volume of PCB contaminated oil into the reactor. The oil was passed through pre heaters and degasified, where water and volatile compounds were removed. This PCB contaminated oil is heated to a temperature of 120°C and a sample was drawn from the reactor to check the initial concentration of PCB content. Depending upon the initial concentration of PCB content in the oil, calculated amount ofsodium dispersed in oil (NaD) was added from sodium storage tank to the reactor.

The PCB de-chlorination reaction was carried out at a temperature of 120 °C under nitrogen purging in the reactor. The samples were drawn at every hour and analyzed using GC-ECD to check the level of PCB content as per IEC 61619. The reaction was continued till the PCB content less than 2 ppm is achieved.

After the completion of reaction, excess of sodium in the reaction vessel was neutralized by adding water and the hydrogen gas released during the neutralization is purged with nitrogen and vented to the atmosphere. Then the treated oil containing sludge in the reaction vessel is transferred to the settling tank.

The treated oil containing sludge was kept for one day to separate sludge by gravity and it was settled at the bottom of the settling tank. The sludge generated in the PCB de-chlorination contains sodium chloride, sodium hydroxide, water and biphenyls and this was drained into

barrels and kept in safe custody for disposal. The treated oil from the settling tank also drained to the barrels.

The batch wise details are given in Table 2. The PCB analysis was carried out on all batches before and after the dechlorination.

The PCB analysis chromatograph reports of each Batch 1 to 27 are enclosed. (Annexure 8)

Transformer. Sl.No	Batch No	Date	2	Qty. ofoil (Ltr)	Qty of NaD	Initial PCB conc.(ppm)	Final PCB conc.	Unloading in 2	200ltrsDrums
	FROM	то	()	(Ltr)		(ppm)	Water	Sludge	
	1	14.06.23	16.06.23	4308	40		0.28	1.5	0.25
-	2	19.06.23	20.06.23	4306	40	_	0.13	1.5	0.25
-	3	21.06.23	22.06.23	4315	40	_	0.23	1.5	0.25
-	4	23.06.23	24.06.23	4306	40	-	0.22	1.5	0.25
-	5	26.06.23	27.06.23	4306	40	8.92	0.26	1.5	0.25
D577147	6	30.06.23	01.07.23	4310	40	-	0.15	1.5	0.25
-	7	03.07.23	04.07.23	4325	40	-	0.24	1.5	0.25
Dil after flushing from D577147	8	05.07.23	07.07.23	3627	40	2.9	0.26	1.5	0.25
D3//14/	9	10.07.23	11.07.23	3606	40	2.4	0.16	1.5	0.25
	10	12.07.23	13.07.23	4306	40		0.29	1.5	0.25
	11	14.07.23	15.07.23	4306	40	-	0.23	1.5	0.25
	12	17.07.23	18.07.23	4308	40	-	0.14	1.5	0.25
-	13	19.07.23	20.07.23	4307	40	8.2	0.16	1.5	0.25
D577146	14	21.07.23	22.07.23	4325	40	-	0.18	1.5	0.25
-	15	24.07.23	25.07.23	4306	40	-	0.22	1.5	0.25
-	16	26.07.23	27.07.23	4501	40	-	0.16	1.5	0.25
Dil after flushing from	17	28.07.23	29.07.23	3622	40	2.85	0.09	1.5	0.25
D577146	18	31.07.23	01.08.23	3622	40	2.07	0.05	1.5	0.25
	19	02.08.23	03.08.23	4306	40		0.12	1.5	0.25
-	20	04.08.23	05.08.23	4306	40	-	0.08	1.5	0.25
-	21	07.08.23	08.08.23	4306	40	-	0.06	1.5	0.25
-	22	09.08.23	10.08.23	4306	40	_	0.07	1.5	0.25
D577148	23	11.08.23	12.08.23	4334	40	7.06	0.15	1.5	0.25
	24	16.08.23	17.08.23	4376	40	1	0.25	1.5	0.25
ł	25	18.08.23	21.08.23	4371	40	1	0.25	1.5	0.25
Dil after flushing from	26	22.08.23	24.08.23	4129	40	2.89	0.39	1.5	0.25
D577148	27	25.08.23	25.08.23	4315	40	2.89	0.40	1.5	0.25
		Total quantity Dechlorina		113761					

### Table 2: Details of PCB de-chlorination activity at KSEB Kalamassery

PCB contaminated oil from three Transformers (Make: GE, 220/110 kV, 40 MVA scrap transformers) Sl.No-D577147, Sl.No-D577146, Sl.No-D577148, was de-chlorinated in twenty seven batches with various batch sizes of around 4.2 kl and each transformers is having around 30 KL PCB contaminated oil.

After draining all PCB contaminated oil from the transformers around 18529 litres of oil used for flushing the transformers

Total 113761 litres of PCB contaminated oil was dechlorinated, which includes 18529 litres of flushing oil.

It is to be noted that after dechlorination of 113.761 KL of PCB contaminated oil, around 7 barrels of sludge, 41 drums of water has been generated. These sludge generated is hazardous in nature needs to be disposed of to the recyclers authorized by State Pollution Control Board. This responsibility lies with M/s.KSEB.

The sludge (i.e.7drums of sludge and 41drums of water) generated during the dechlorination process was handed over to M/s. KSEB for further necessary action.

The minutes of meeting was signed between M/s. CPRI & M/s. KSEB officials, the same is enclosed in the (Annexure 9)

After completion of the PCB dechlorination activity at M/s. KSEB 220kV Substation Kalamassery site, the Volvo truck with PCB de-chlorination unit left the site on 04.09.2023, and remaining accessories were taken out on 04.09.2023.

# 7. Conclusion:

CPRI has been successfully completed de-chlorination of around 113.761 KL of PCB contaminated oil from three Transformers (Make: GE, 220/110 kV, 40 MVA scrap transformers) Sl.No-D577147, Sl.No-D577146, Sl.No-D577148, against Work Order No: 09/23-24, Dt. 24.05.2023

Final PCB concentration de-chlorinated oil is having around 0.05 to 0.4 ppm of pcb's which is within the permissible limit(<2 ppm)

The sludge (i.e.7 drums of sludge and 41 drums of water) generated during the dechlorination process was handed over to M/s. KSEB and t is the responsibility of M/s. KSEB to dispose the sludge as per Pollution Control Board norms and produce disposable certificate to M/s. CPRI.

### Annexure 1



By overing Polt

केन्द्रीय विद्युत अनुसंधान संस्थान (भारत सरसर की लोगाइरी, विद्युत नंत्रालय)

र मीर बी रामन रोड़, कराजिकागर प्राप्त पर, थी था, में 8086, बेमपुर - 140 080

#### CENTRAL POWER RESEARCH INSTITUTE

Prof. Sir C.V. Reman Road, Sadashivanagar P.O., P.B. No. 8066, Bangelow - 550 080, India THTT:/withola. http://www.cpl.in

### DIELECTRIC MATERIALS DIVISION

### REF. NO. . CPRI/DMD/PCB/KSEB

DATE 19.10.2015

The Chief Executive Engineer: Office of the Executive Engineer Transformer Division Kalamassery, Kerala State Electricity Board Ltd Vydyschi Bhavanam, Pattoor, Thiruvananthapuram 695004 Kerala, India

Subject: De-chlurination of Transformer Oli Containing PC9

Dear Sir.

In connection with the 'Letter No. DBE-7/Substation General/2016-17/840' dated 17.10.2016 and DMD/LDL/PCB-0540-0541/KSEB, Kalamassery dated 04.01.2016, we hereby inform you that the transformer oils with PCB can be decontaminated under the supervision of CPRI with the help of our patented in house method, on chargeable basis as peathe unit approved by Ministry of Environment, Forest and Glimate Change (MOEPCC), Govt, of India, Rs. 50 per kg of transformer oil is the tariff for PCB decontamination work using CPRI technology which is likely to be approved by our management. Once this is received, we will send the quatation for the same.

The total PCB containing transformer oil content of your three transformers are ~88-90 tenne (645001b ×3). Our patented technology is able to decontaminate oil maximum 500kg per day. Thus, the decontamination process may take 20-30 days depending on the quantity of the oil and other circumstances.

Your organization has to provide bunctive dates for us to take up the de-chlorination works at your place and kind self to issue the necessary instructions to the concerned engineers of KESB. Kalamassery, to make all the arrangements for the decontramination and clean up of transformers, tasks and drams when the CPRI de-chlorination facility will be brought to your organization.

O/E

With warm regards,

Yours Faithfully, (V.V. Pattarshett)

Additional Director & Ilead SHIT RESTRE / Additional Director To one (RESTRE / Additional Director REDUP HEAD (DMD), RTL (K) & RTLY(0) Labor To one (RESTRE Additional Company Canton Provide Additional Director Canton Provide Additiona

CPRI has sent letters to M/s, KSEB 220Kv Substation Kalamassery for undertaking the PCB dechlorination activity

	Annexure 2
	Minutes of meeting held on 08/12/2017 between CPRI officials and KSEBL regarding the PCB dechlorination of 2 Nos, of 120MVA transformers at 220kV Substation, Kulamassery.
	The members present:
	<ol> <li>Dr. P. Thomas, Joint Director, CPRL Bangalore</li> <li>Sri, Sreelal S, Project Engineer, CPRI Bangalore</li> <li>Sri, George Y James, Dy Chief Engineer, Transmission Circle, Solamassery</li> <li>Sri, M.I. Vurghese, Executive Engineer, Transmission Division, Kalamassery</li> <li>Sri, Riyas L.A., Asst. Executive Engineer, 220kV Substation, Kalamassery</li> </ol>
0	The meeting was arranged to discuss and to finalize the modalities to undertake the PCB Deschloringtion of 2 Nos. of 120MVA(3 Nos. of 40MVA single phase) transformers, one is faulty and one is in service. Previously, the proposal was submitted to K.S.L.B. Limited, but certain clarifleations were required. The CPRI team made a power point presentation on inventory and the various methods of PCB treatment methods and also visited the substation yard to take stock of the situation.
	After due deliberation and discussions, and analyzing all possible options available, the following conclusions were arrived:
	<ol> <li>For the 120 MVA faulty transformer, the oil with PCB will be drained, the core and window will be flashed with PCB free transformer oil and the oil will be transported to CPRF or PCB dechlarmation. The oil after treatment will be handed over or CPRF for disposal. The core window and tank will be disposed by K81(B). If the PCB content whest that 2ppnt.</li> <li>The 120 MVA transformer which is in service having the PCB contamination, all will be disined, the core and winding will be flushed with fresh oil. The contamination, all will be diamed over to CPRF for the PCB dechlorination and further disposal. The transformer will be fulled over to CPRF for the PCB dechlorination and further disposal. The transformer will be filled with the new mineral oil and pat back to service.</li> </ol>
\$	The CPRI feam suggested that even through there are many methods of PCB dechlorination, the most cost effective and environment friendly process for huge quantity of oil is the Sodium dechlorination technology. Hence this rechnology is adopted under this Project in India. This facility is available with CPRI which is the authorized nodal agency in India for PCII dechlorination. The CPRI team has indicated the charges towards the de-chlorination at the rate of Rs.20% per kg and the team has indicated the charges towards the de-chlorination at the rate of Rs.20% per kg.
	the PCB treatment. The draining, flashing etc. would be carried our by KSLBL under the supervision of CPRI personnel.
	For CPRI For KSEBL
	Dr. P. Thomas Sri. Guarge V James Crempton 49
	Sei Sneelal S Smilel T Sn. M.L. Varghese
	Sn. Rivas 1 . 1 Brow Distant

Annex	
Re: Onsite de-chlorination of PCB contamina Kalamassery	ated oil at 220kV Substation,
From : aee220klsy@gmail.com	Mon, Aug 01, 2022 04:07 PM
Subject : Re: Onsite de-chlorination of PCB conta 220kV Substation, Kalamassery	minated oil at
To : Sadasiva Murthy <ssmurthy@cpri.in>, PCB GROUP <pcbgroup@cpri.in></pcbgroup@cpri.in></ssmurthy@cpri.in>	tomas@cpri.in,
Sir,	
The details are as follows.	
<ol> <li>For scrap transformer bank (3 Nos.) of 120 the test report No. is DMD/LDL/PCB-0540-0541 quantity of oil is 8640 Gallon in each units (9810)</li> </ol>	/KSEB, Kalamassery dated 04.01.2016
(2) For transformer bank No.4 (3 Nos.) of 120M the test report No. is DMD/LDL/PCB-1592-1593, quantity of oil is 8640 Gallon in each units (9810	/KSEB, Kalamassery dated 31.03.2017
Please give your offer for the onsite-dechlorina at 220kV Substation, Kalamassery. Since the transformer bank No.4 is in service, it scrap transformer bank first. Please give your of	is planning to do the dechlorination of the ffer for carrying out the dechlorination of
transformer oils in the above two transformer be remarks on the cost effectiveness of the work if (a) the two works are executed one by one wit and	
(b) if both the works are carried out at a time. Regards	
Assistant Executive Engineer	
220 kV Substation Subdivision Kalamasse 220kV Substation Compound, HMT Colony.P.O	ry
Kalamassery-683503 aee220klsy@gmail.com / =:9496009191	

### Annexure 4

#### DIELECTRIC MATERIALS DIVISION CENTRAL POWER RESEARCH INSTITUTE SIR C. V. RAMAN ROAD, P. B. No. 8066, BENGALURU - 560 080 PHONE: 080 - 22072428, 22072421 Email : dmd@cprl.in / thomas@cprl.in **Budgetary Offer**



Date 03.08.2022

No. DMD/PCB/2022/KSFB-KALAMASSERY

To, The Assistant Executive Engineer Kerala State Electricity Board Ltd. 220 kV Substation Subdivision Kalamassery. 220 kV Substation Compound, HMT Colony P.O., Kalamassery - 683 503

Sub . De-chlorination of PCB contaminated oil of transformer bank at M/s KSFB Limied,Kalmassery Ref. E-mail, Dt. 01.08 2022

St. No.	Description	Quantity, Itrs	Unit Rate //tr (Rs.)	Total Amount (Rs.)	
1	Onsite dechlorination of PCB contaminated oil using CPRI Mobile PCB dechlorination unit (scrap transformer)	1,96,214	20.00	39,24,260.00	
2	Flushing of PCB contaminated Transformer with new oil (20% of 196214L= 39243 L)	39,243	20.00	7,84,856,00	
			Tota	47.09,136.00	
	IGST (18%)				
	· · · · · · · · · · · · · · · · · · ·		Grand Total	55,56,780,48	

#### Terms & Conditions ;

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 Construction
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5 Please provide your GSTIN, HSN and SAC No. 5 Validity of offer: 3 months 7 GST/GST: 18% (presently) (as applicable at the time of billing) 8 Final bill/Invoice:As per actual quantity treated

Dr. P. Thomas

Additional Director

Budgetary offer for carrying out PCB de-chlorination activity

#### <u>Annexure</u>

PCB Dechlorination unit : Batch Process. Batch Capacity : 3.5 to 4.0 KL of oil per batch Duration : 2 days per batch.

#### General Site Requirements for undertaking PCB de-chlorination activity.

- Placement of vehicle (Sime : 40 foot in length x 15 feet in height x 8 foot in width, weight : 30 MT) : Leveled concreted pad / Hard Surface platform with lightning protection.
- 2) Power supply: 3-phase, 430V, 340 Amps, 260kW, frequency 50Hz, with solid earth facility.
- 3) Water facility: 200 300 liters per day.
- Safety : Suitable firefighting system, such as Sodium bicarbonate for PCB dechlorination, eddldonal firefighting system (Fire Hydrant) near the plant
- Storage Tanks : 2 Nos. of each SKL capacity ( one for storage of PCB contaminated oil and another for PCB decontaminated oil)
- 6) 3 HP Motor: 1 No. (For transferring PCB contaminated oil from drums to SKL tank).
- New Minaral Insulating oil (PCB free): Sufficient quantity of oil for flushing of PCB transformer ( at least two times flushing i.e. 20% of the total transformer capacity ). (if required)
- PCB contaminated oil is to be provided near to the PCB dechlorination unit is the responsible of PCB stake holder.
- Storage drame: Sufficient quantity of empty drams to be provided to store treated oil and sludge generated during the process.
- Sindge disposel; As per pollution control board norms by PCB stake holder.
- 11) Site office/ Testing laboratory: one room (app. 10 foct x 20 feet) with table, chair and water facility.
- 12) Storage Room: one room (App. 20 feet x 20 feet) to store sodium metal dispersed in oil drums, process chemicals and PCB unit accessories with suitable safety.
- Accommodation: Free todging facility to be provided for 7 Nos. (1 executives, 3 project engineers, 1 technicians and 2 drivers officers)
- Local conveyance: Pickup and drop facility for PCB project team from Ouest house to place of work
- Nitregen cylinders: 110 Nos. for whole operation (120kg/cm<sup>2</sup> capacity of commercial grade nitrogen)
- 16) Contract Labors : 2 Nos.

1

General site requirement for carrying out PCB de-chlorination activity.

### Annexure 5

HMT Colony P. O., Kalamassery - 663 503 Phone: 0484 2988682 FCT : 9496009118 E- mail: <u>doetxisy@omail.com</u> CN: 040100KL20115GC027424 GST : 324AECK2277NB21

Date: 31.12.2022

#### No. TCK/ DB1/220kV KLSY /2022-23/ 1342

To

Dr. P. Thomas Additional Director/HOD Dielectric Material Division Central Power Research Institute Bengaluru

5ir,...

Sub - PCB de-chlorination work at 220kV Substation Kalamassery - reg.

Ref.- 1) Your email and offer No: DMD/PCB/2022/KSEB KALAMASSERY dated 03.08.2022 2) Order No. CETS-SE1/2022/3085(2)/1387 Tym dated 22.12.2022 of the CE TS

Kind attention is invited to the following.

Referring to your Budgetary Offer vide reference (1) above, for the work-'Onsite de-chlorination of PCB contaminated transformer oil at 220kV Substation Kalamassery', please note that even though we have 2 Nos. 120MVA, 220/110kV GE make transformers having PCB contaminated transformer oil at 220kV Substation Kalamassery, Sanction has been obtained for executing the onsite de-chlorination of the PCB contaminated transformer oil in the 'Scrap transformer only' at present. The de-chlorination work of the transformer in service will be carried out as another work later.

As per your offer vide ref (1), a requirement of 50% advance payment is specified. Since it is against the prevailing rules of KSEBL, it is requested to kindly waive this condition so as to issue Work Order for executing the work at the earliest.

Payment will be effected as per the conditions mentioned in our work order at the earliest, subsequent to the completion of the work.

Awaiting a favorable order at the earliest.

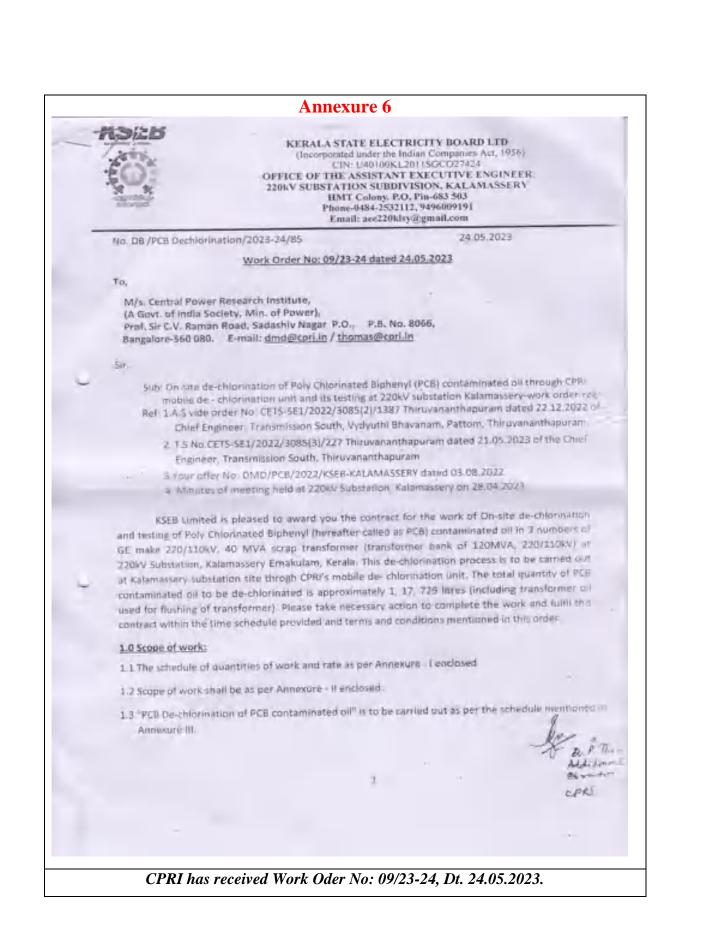
Yours faithfully,

**Deputy Chief Engineer** 

Copy to: The Executive Engineer, Transmission Division, Kalamassery. Copy to : The Assistant Executive Engineer, 220kV Substation Subdivision, Kalamassery

1 21-3955

Communication between M/s. CPRI and M/s. KSEB



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## Annexure 7

KERALA STATE ELECTRICITY BOARD LTD (Incorporated under the Indian Companies Act, 1956) CIN: U40100KL2011SGC027424 OFFICE OF THE ASSISTANT EXECUTIVE ENGINEER 220kV SUBSTATION SUBDIVISION, KALAMASSERY HMT Colony, P.O., Pin-683 503 Phone- 9496009191. Email: acc220klsy/a/gmail.com

MINUTES OF MEETING CONVENED ON 09.06.2023 AT 220kV SUBSTATION SUB DIVISION, KALAMASSERV REGARDING ONSITE DECHLORINATION OF PCB CONTAMINATED OIL IN 120MVA SCRAP TRANSFORMERS BANK AT 220kV SUBSTATION, KALAMASSERY

Meeting commenced at 12:30Hrs with Assistant Executive Engineer, 220kV Substation Subdivision, Kalamassery in the Chair. The Chair welcomed all the participants to the meeting. Dr P.Thomas, Additional Director/HOD, Dielectric Material Division, CPRI visited 220 KV Substation Kalamassery on 09.06,2023 and made a presentation about "the PCB de-chlorinated activity" at the Conference Hall of Transmission Circle, Kalamassery. He then inspect the site for the anangements done to undertake the PCB de-chlorination work- "Onsite dechlorination of PCB contaminated oil in 120 MVA scrap Transformer Bank at 220kV Substation, Kalamassery" which is scheduled to be commenced by 12.06,2023.

The following points were discussed.

- The onsite de-chlorination plant and lour Project Engineers from CPRI have already arrived at the on 05/06/2023 and arrangements are being done for the de-chlorination work. The work is expected to be commenced by the next week.
- PCB dechlorimation work will be carried out in a batch process and in one batch around 4000 litres of PCB oil will be dechlorimated and this process will take 2 days.
- To complete the de-chlorination work of whole quantity of PCB contaminated oil available at Kalamassery, it may take about 90 days taking into account the rainy season. No dechlorination work will be done on Sundays and important Holidays.
- KSEBL agreed to support all the site requirements as per the terms and conditions given in the quotation. Accordingly the site preparation works are being carried out by KSEBL.
- 5. The mixer unit is placed between the scrap transformers and the unsite de-chlorination plant and a suitable covering will be provided by KSEBI, over the mixer unit in order to avoid occurance of accidents when Sodium Dispersed Oil come in contact with water when it rains.
- A separate store room is provided to store the Sodium dispersion drums with some space for setting up of the testing of PCBs.
- The treated oil and sludge generated contains Sodium chloride, Sodium hydroxide, Water, Hiphenyl etc. which is free from PCB are required to be disposed as per the norms of Kerala State Pollutian Control Board.
- KSEBL will identify suitable agency who is authorized by the Kerala State Pollution Control Board to dispose the sludge and treated oil
- 9. For each batch (4000 litres) of PCB dechlorination oil, around % drums of sludge (contains Sodium Chloride, Sodium Hydroxide, Water and Biphenyi) and 1.5 drum of water with little oil will be collected, which required to be dispused as per the norms of State Pollution Control Board
- 11. The De-chlorination work is planned to be taken up in a phased number as given in the below table.

Regd. Office: Vydyathi Bhavanam, Pattorn, Thiravananthaparam - 695 004, website: www.kseb.in

Minutes of Meeting Held Between M/s. CPRI and M/s. KSEB on 09.06.2023

	Unit No	Quantity in Litres	Duration
1	GE make, 220/110kV , 40 MVA ,Unit no:1	32702+20% (Jushing(6540)+-39,242	From June 12 to July 4th
2	GE make , 220/110kV, 40 MVA ,Unit no:2	32702+20% flushing(6540)= 39,242	From July 5 <sup>th</sup> to July 27th
3	GE make , 220/110kV, 40 MVA.Unit no:3	32702+20% flushing(6540)=39,242	From July 28th to Aug 19th

#### Participants

SLno	Name and Designation	Signature
1	Smt.A.A. Ruksana, Assistant Executive Engineer, 220kV Substation Subdivision, Kalamassery	AL
2	Dr. P. Thomas, Additional Director/HOD, Dielectric Material Division, CPRI Bangalore	Ja.
3.	Sri. Akhinkumar S, Assistant Engineer, Maintenance Section I, 220kV Substation Kalamassery	Ste
4.	Sri. Anilkumar G. Assistant Engineer, Maintenance Section II, 220kV Substation Kalamassery	- States
5	Sri. Tom Jose, Project Engineer, CPRI Bangalore	Q

Meeting concluded at 13:15Hrs.

Assistant Executive Engineer

Copy submitted to: 1. The Deputy Chief Engineer, Transmission Circle, Kalamassery

2. The Executive Engineer, Transmission Division, Kalamassery

Copy to: All Participants

Endt on: DB10/PCB/2023-24/ \22 dated 09.06.2023

Assistant Executive Engineer

Regd. Office: Vydyuthi Bhavanam, Pattom. Thiruvananthapurum - 695 004, website: www.kseb.in

Minutes of Meeting Held Between M/s. CPRI and M/s. KSEB on 09.06.2023

## **Annexure 8** (PCB Analysis Chromatographs)

### **Batch 1 - PCB Chromatograph – Before Dechlorination (Transformer Sl.No.D57147)**

Software Version Operator	: 6.3.2.0646 : manager	Date Sample Name	: 16-06-2023 15:26:47 : BATCH-1-BD-SLNO-D577147-PCB
Sample Number	: 002	Study	: PCB ANALYSIS
AutoSampler	: NONE	Rack/Vial	0/0
nstrument Name Instrument Serial #	: Clarus 680 : None	Channel A/D mV Range	1000
Jelay Time	: 0.00 min	End Time	34.60 min
Sampling Rate	12,5000 pts/s	Child Hillie	. 54.05 1141
Sample Volume	: 1.000000 ul	Anna Balance	
Sample Amount	: 1.0000	Area Reject	: 0.000000
Data Acquisition Time	: 16-06-2023 14:47:06	Dilution Factor Cycle	1.00
roc Method : C:\GC F alib Method : C:\GC I teport Format File: C:	SEB KALAMESSERY(16.00 PCB Analysis/Method/METH PCB Analysis/Method/METH IGC PCB Analysis/Method/ PCB Analysis/Sequence/1	HODS 2023\1260, HODS 2023\1260, METHODS 2023\1	16.03.2023-1.mth from
Proc Method : C:\GC F Callb Method : C:\GC I Report Format File: C:	CB Analysis/Method/METH PCB Analysis/Method/METH GC PCB Analysis/Method/ PCB Analysis/Sequence/1	HODS 2023\1260, HODS 2023\1260, METHODS 2023\1 6.06.23 PCB seq	16.03.2023-1.mth from
Proc Method : C:\GC F Callb Method : C:\GC I Report Format File: C:	CB Analysis/Method/METH PCB Analysis/Method/METH GC PCB Analysis/Method/ PCB Analysis/Sequence/1	HODS 2023\1260, HODS 2023\1260, METHODS 2023\1 6.06.23 PCB.seq	16.03.2023-1.mth from
Proc Method : C:\GC F Calib Method : C:\GC I Report Format File: C:	CB Analysis/Method/METH PCB Analysis/Method/METH GC PCB Analysis/Method/ PCB Analysis/Sequence/1	HODS 2023\1260, HODS 2023\1260, METHODS 2023\1 6.06.23 PCB seq	16.03.2023-1.mth from
Proc Method : C:\GC F Calib Method : C:\GC I Report Format File: C:	CB Analysis/Method/METH PCB Analysis/Method/METH GC PCB Analysis/Method/ PCB Analysis/Sequence/1	HODS 2023\1260, HODS 2023\1260, METHODS 2023\1 6.06.23 PCB seq	16.03.2023-1.mth from
Proc Method : C:\GC F Calib Method : C:\GC I Report Format File: C:	CB Analysis/Method/METH PCB Analysis/Method/METH GC PCB Analysis/Method/ PCB Analysis/Sequence/1	HODS 2023\1260, HODS 2023\1260, METHODS 2023\1 6.06.23 PCB seq	16.03.2023-1.mth from

# PCB ANALYSIS REPORT

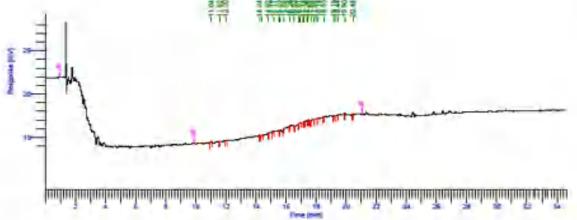
#### CPRI DMD

Peak #	Component Name	Time (min)	Area [uV*sec]	Height [uV]	Area [%]	PCB PPM
	PCB 1260	15.465	89053,18	21772.18	100.00	8.9290

89053.18 21772.18 100.00 8.9290

**Batch 1 - PCB Chromatograph – After Dechlorination** 

Software Version	: 6.3.2.0646	Date	: 16-06-2023 17:31:13
Operator	: manager	Sample Name	
Sample Number	: 004		: PCB ANALYSIS
AutoSampler	NONE	Rack/Vial	: 0/0
Instrument Name	: Clarus 680	Channel	: A
Instrument Serial #	: None	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 34.60 min
Sampling Rate			
Sample Volume	: 1,000000 ul	Acres Delast	0.000000
Sample Amount	: 1.0000	Area Reject	0.000000
Data Acquisition Time	16-06-2023 16:22:15	Dilution Factor	
		Cycle	5.1
Inst Method : C:\GC I Analysis\Data\PCB K	(SEB KALAMESSERY\16.06	ODS 2023\1260.1 5.2023\1004.raw	6.03.2023-1 from C:\GC PCB
Proc Method : C:\GC	PCB Analysis\Method\METH	HODS 2023\1260.1	16.03.2023-1 mth from
	PCB Analysis\Method\MET		
Report Format File: ()	:\GC PCB Analysis\Method\	METHODS 2023	260.16.03.2023-1.rpt
report officer inc. c		6.06.23 PCB.seq	



# PCB ANALYSIS REPORT

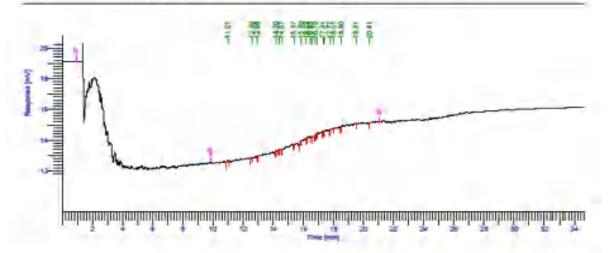
CPRI DMD						
Peak #	Component Name		Area [uV*sec]	Height [uV]	Area [%]	PCB PPM
	PCB 1260	15.465	2885,79	924.11	100.00	0.2893
			2885.79	924.11	100.00	0.2893

**Batch 2 - PCB Chromatograph – After Dechlorination** 

Page 1 of 1

: 6.3.2.0646 manager	Date 20-06-2023 13:58:49 Sample Name BATCH-2-AD-SLNO-D577147-PC
: 002	Study : PCB
: NONE	Rack/Viai : 0/0
Clarus 680	Channel , A
: None	A/D mV Range : 1000
: 0.00 min	End Time 34,60 min
12.5000 pts/s	
: 1.000000 ul	Area Delest : 0.000000
: 1.0000	Area Reject 0.000000
20-06-2023 12:56:33	Dilution Factor : 1.00 Cycle :-1
	: manager : 002 : NONE : Clarus 680 : None : 0.00 min : 12.5000 pts/s : 1.000000 ul : 1.0000

Raw Data File : C:\GC PCB Analysis\Data\PC8 KSEB KALAMESSERY\20-06-23\1002.raw Inst Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 from C:\GC PCB Analysis\Data\PC8 KSEB KALAMESSERY\20-06-23\1002.raw Proc Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Calib Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Report Format File: C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.rpt Sequence File : C:\GC PCB Analysis\Sequence\20-06-23.seq



## PCB ANALYSIS REPORT

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Peak #	Component Name	Time (min)			Area [%]	PCB PPM	
	PCB 1260	15.465	1384.53	354.85	100.00	0.1388	

1384.53 354.85 100.00 0.1388

			Page 1 of 1
Software Version Operator Sample Number	: 6.3.2.0646 : manager : 002	Date Sample Name Study	22-06-2023 14:13:29 BATCH-3-AD-SLNO-D577147-PC PCB
AutoSampler	NONE	Rack/Vial	0/0
nstrument Name			- A
nstrument Serial #	: Clarus 680 : None	A/D mV Range	
	· · · · · · · · · · · · · · · · · · ·		: 34.60 min
Delay Time	: 0.00 min	End Time	. 34.00 min
Sampling Rate	: 12.5000 pts/s		
Sample Volume	: 1.000000 ul	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	22-06-2023 13:08:27	Cycle	: 1
	PCB Analysis\Method\MET \GC PCB Analysis\Method\		
	PCB Analysis\Sequence\2		
		2.06.2023-1.seq	
Sequence File ; C:\GC	PCB Analysis Sequence 2	2.06.2023-1.seq	

### **Batch 3 - PCB Chromatograph – After Dechlorination**

CPRI DMD

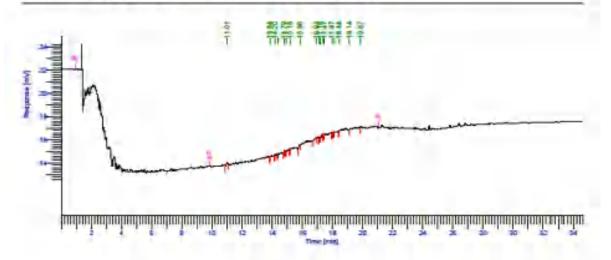
Peak #	Component Name	Time (min)	Area (uV*sec)	Height [u∨]	Area [%]	PCB PPM
_	PCB 1260	15.465	2320.77	548.31	100.00	0.2327
			2320.77	548.31	100.00	0.2327

#### **Batch 4 - PCB Chromatograph – After Dechlorination**

Page 1 of 1

Software Version	: 6.3.2.0646	Date	24-06-2023 15:23:47
Operator	: manager	Sample Name	: BATCH-4-AD-SLNO-D577147 PCB
Sample Number	002	Study	: PCB
AutoSampler	NONE	Rack/Vial	0/0
Instrument Name	: Clarus 680	Channel	- A
Instrument Serial #	: 680S16090202	A/D mV Range	1000
Delay Time	: 0.00 min	End Time	: 34.60 min
Sampling Rate	: 12.5000 pts/s		
Sample Volume	: 1.000000 ul	and a local sector	a second second
Sample Amount	1.0000	Area Reject	; 0.000000
Data Acquisition Time	and the second se	Dilution Factor	1.00
Date / independent future		Cycle	=1

Raw Data File : C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\24.06.2023\1002.raw Inst Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 from C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\24.06.2023\1002.raw Proc Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Calib Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Report Format File: C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth Sequence File : C:\GC PCB Analysis\Sequence\24.06.2023-1.seq



## PCB ANALYSIS REPORT

CPRI DMD

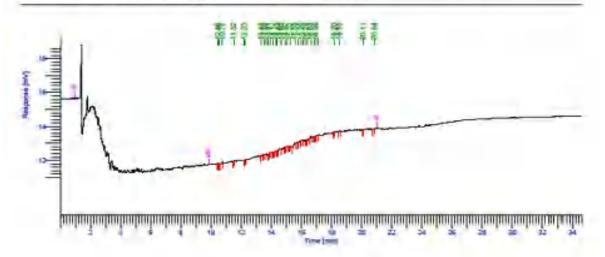
Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
	PCB 1260	15.465	2290.08	560.11	100.00	0.2296
			2290.08	560.11	100.00	0.2296

### **Batch 5 - PCB Chromatograph – After Dechlorination**

Page 1 of 1

Software Version	: 6.3.2.0646	Date	: 27-06-2023 13:44:25
Operator	manager	Sample Name	: BATCH-5-AD-SLNO-D577147 PCB
Sample Number	: 002	Study	pcb
AutoSampler	NONE	Rack/Vial	0/0
Instrument Name	Clarus 680	Channel	A
Instrument Serial #	None	A/D mV Range	1000
Delay Time	: 0.00 min	End Time	: 34.60 min
Sampling Rate	12.5000 pts/s		
Sample Volume	1.000000 ul	Information Country	a second
Sample Amount	1.0000	Area Reject	- 0.000000
	: 27-06-2023 13:08:10	Dilution Factor	: 1.00
Data Acquisition Time	. 21-00-2025 15:00.10	Cycle	21

Raw Data File : C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\27.06.2023\1002.raw Inst Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 from C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\27.06.2023\1002.raw Proc Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 mth from Calib Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 mth from Report Format File: C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth Sequence File : C:\GC PCB Analysis\Sequence\27.06.2023.seq



## PCB ANALYSIS REPORT

CPRIDMD						
Peak #	Component Name		Area [uV*sec]	Height [uV]	Area [%]	PCB PPM
	PCB 1260	15.465	2617.49	561.01	100.00	0.2624
			2617.49	561.01	100.00	0.2624

### **Batch 6 - PCB Chromatograph – After Dechlorination**

Page 1 of 1

Software Version	: 6.3.2.0646	Date	: 01-07-2023 15:05:22
Operator	: manager	Sample Name	: BATCH-6-AD-SLNO-D577147-PC
ample Number	: 002	Study	: PCB
utoSampler	: NONE	Rack/Vial	: 0/0
istrument Name	: Clarus 680	Channel	: A
istrument Serial #	: None	A/D mV Range	: 1000
elay Time	: 0.00 min	End Time	: 34.60 min
ampling Rate	: 12.5000 pts/s		
ample Volume	: 1.000000 ul	A CONTRACTOR	1 a manufacture
ample Amount	: 1.0000	Area Reject	0.000000
ata Acquisition Time	01-07-2023 13:32:04	Dilution Factor	: 1.00
	Contraction of the second s	Cycle	:1
eport Format File: C:	PCB Analysis\Method\MET \GC PCB Analysis\Method\ PCB Analysis\Sequence\0	METHODS 2023\1	
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2 4	5- 6 10 12 W	Time (min)	22 24 25 28 26 21 34
	DOD ANIALY	VOIC DED	OPT

## PCB ANALYSIS REPORT

### CPRI DMD

Peak	Component	Time	Area	Height	Area	PCB
#	Name	(min)	(uV*sec)	[uV]	[%]	PPM
	PCB 1260	15.465	1569,62	317.95	100,00	0.1574

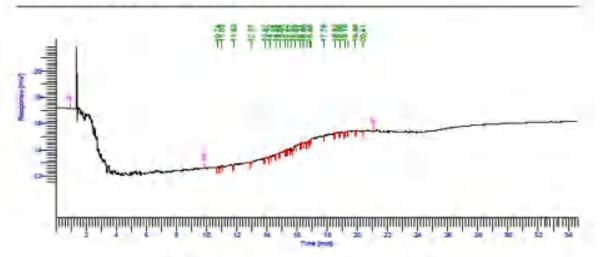
1569.62 317.95 100.00 0.1574

**Batch 7 - PCB Chromatograph – After Dechlorination** 

Page 1 of 1

Software Version Operator	: 6.3.2.0646 : manager	Date Sample Name	: 04-07-2023 16:26:09 : BATCH-7-AD-SLNO-D577147-PCB
Sample Number	004	Study	PCB
AutoSampler	NONE	Rack/Vial	: 0/0
Instrument Name	: Clarus 680	Channel	: A
Instrument Serial #	: None	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 34.60 min
Sampling Rate	: 12,5000 pts/s		
Sample Volume	: 1.000000 ul	Area Reject	: 0.000000
Sample Amount	: 1.0000		
Data Acquisition Time	04-07-2023 15:03:11	Dilution Factor Cycle	: 1.00

Raw Data File : C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\04.07.23\1004.raw Inst Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 from C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\04.07.23\1004.raw Proc Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Calib Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Report Format File: C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.rpt. Sequence File : C:\GC PCB Analysis\Sequence\04.07.23.seq



## PCB ANALYSIS REPORT

Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM	
	PCB 1260	15.465	2490,66	596.41	100.00	0.2497	
			2490.66	596.41	100.00	0.2497	

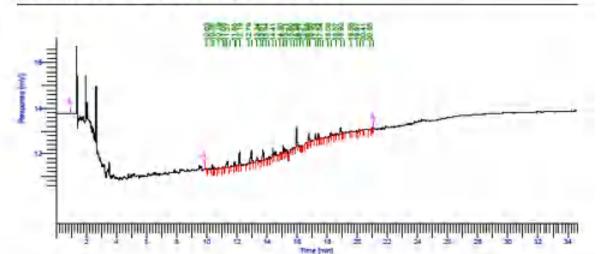
CPRI DMD

#### **Batch 8 - PCB Chromatograph – Before Dechlorination**

Page 1 of 1

: 6.3.2.0646	Date	: 07-07-2023 12:37:24
: manager	Sample Name	: BATCH-8-BD-SLNO-D577147 PCE
: 002	Study	: PCB
: NONE	Rack/Vial	: 0/0
: Clarus 680	Channel	A
: None	A/D mV Range	: 1000
: 0.00 min	End Time	: 34.60 min
: 12.5000 pts/s	- net tanp	Contract and the second s
	Sec. Sec. Sec. Sec. Sec. Sec. Sec. Sec.	
1.0000	Area Reject	0.000000
	Dilution Factor	: 1.00
01 01 2025 11.40.50	Cycle	:1
	: manager : 002 : NONE : Clarus 680 : None	manager     Sample Name       002     Study       NONE     Rack/Vial       Clarus 680     Channel       None     A/D mV Range       0.00 min     End Time       12.5000 pts/s     Intervention       1.00000 ul     Area Reject       07-07-2023 11:48:30     Dilution Factor

Raw Data File : C:\GC PCB Analysis\Data\PCB KSEB KALAMESSER\V07.07.23\1002.raw Inst Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 from C:\GC PCB Analysis\Data\PCB KSEB KALAMESSER\V07.07.23\1002.raw Proc Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Calib Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Report Format File: C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.rpt Sequence File : C:\GC PCB Analysis\Sequence\07.07.23.seq



## PCB ANALYSIS REPORT

#### CPRI DMD

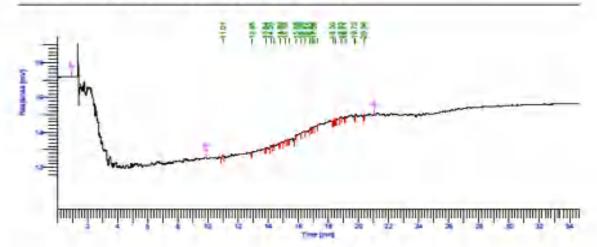
Peak #	Component Name	Time (min)	Area [uV*sec]	Height [uV]	Area [%]	PCB PPM
_	PCB 1260	15.465	28947.97	6992.24	100.00	2.9025
			28947.97	6992 24	100.00	2.9025

#### **Batch 8 - PCB Chromatograph – After Dechlorination**

Page 1 of 1

Software Version	: 6.3.2.0646	Date	: 07-07-2023 15:46:35
Operator	: manager	Sample Name	: BATCH-8-AD-SLNO-D577147 PCE
Sample Number	004	Study	: PCB
AutoSampler	NONE	Rack/Vial	0/0
Instrument Name	Clarus 680	Channel	A
Instrument Serial #	None	A/D mV Range	
Delay Time	: 0.00 min	End Time	: 34.60 min
	12.5000 pts/s	-ite finte	
	: 1.000000 ul	a second of the	a subsector
Sample Amount	: 1.0000	Area Reject	0.000000
	: 07-07-2023 13:55:49	Dilution Factor	: 1.00
Constructure to the		Cycle	2.1
	PCB Analysis\Data\PCB K		RY\07.07.23\1004.raw 5.03.2023-1 from C:\GC PCB

Analysis\Data\PCB KSEB KALAMESSERY\07.07.23\1004.raw Proc Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Calib Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Report Format File: C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth Sequence File : C:\GC PCB Analysis\Sequence\07.07.23.seq



## PCB ANALYSIS REPORT

CPRI DMD								
Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM		
	PCB 1260	15.465	2689.48	643.50	100.00	0.2697		
					_	_		

2689.48 643.50 100.00 0.2697

### **Batch 9- PCB Chromatograph – Before Dechlorination**

Page 1 of 1

Software Version			
	: 6.3.2.0646	Date	11-07-2023 13:44:03
Operator	: manager	Sample Name	BATCH-9-BD-SLNO-D577147 PC
Sample Number	: 002 : NONE	Study Rack/Vial	PCB
utoSampler		a second a second	0/0
nstrument Name	: Clarus 680	Channel	A
nstrument Serial #	: None	A/D mV Range	1000
Delay Time	: 0.00 min	End Time	34.60 min
Sampling Rate	: 12.5000 pts/s		
Sample Volume	: 1.000000 ul	Area Reject	0.000000
Sample Amount	1.0000	Dilution Factor	1.00
Data Acquisition Time	11-07-2023 12:54:20	Cycle	1
Calib Method : C:\GC F Report Format File: C:\	CB Analysis/Method/MET PCB Analysis/Method/MET IGC PCB Analysis/Method PCB Analysis/Sequence/1	HODS 2023\1260.1 METHODS 2023\12	6.03.2023-1.mth from
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	And a second a		

# PCB ANALYSIS REPORT

#### CPRI DMD

Peak	Component	Time	Area	Height	Area	PCB
#	Name	(min)	[UV*sec]	[uV]	[%]	PPM
	PCB 1260	15.465	24076.80	6216,55	100,00	2.4141

24076.80 6216.55 100.00 2.4141

## **Batch 9 - PCB Chromatograph – After Dechlorination**

Page 1 of 1

			1 434 1 41 1
Software Version	: 6.3.2.0646	Date	: 11-07-2023 15:06:08
Operator	: manager	Sample Name	: BATCH-9-AD-SLNO-D577147 PC
Sample Number	: 004	Study	: PCB
utoSampler	NONE	Rack/Vial	: 0/0
nstrument Name	: Clarus 680	Channel	A
nstrument Serial #	: None	A/D mV Range	: 1000
Jelay Time	: 0.00 min	End Time	: 34.60 min
Sampling Rate	: 12.5000 pts/s		
Sample Volume	: 1.000000 ul	Area Reject	0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	11-07-2023 14:18:23	Cycle	- 1
Calib Method : C:\GC F Report Format File: C:\	PCB Analysis\Method\METH PCB Analysis\Method\MET IGC PCB Analysis\Method\ PCB Analysis\Sequence\1	HODS 2023\1260. METHODS 2023\1	16.03.2023-1.mth from
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### CPRI DMD

Peak	Component	Time	Area	Height	Area	PCB	
#	Name	(min)	(uV*sec)	[uV]	[%]	PPM	
	PCB 1260	15.465	1668.63	487.79	100,00	0.1673	

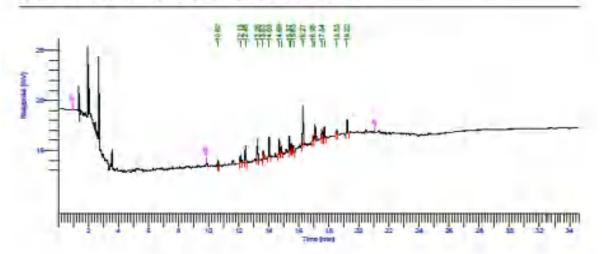
1668.63 487.79 100.00 0.1673

**Batch 10 - PCB Chromatograph – Before Dechlorination (Transformer Sl.No.D57146)** 

Page 1 of 1

Software Version	6.3.2.0646	Date Sample Name	13-07-2023 12:47:05 BATCH-10-BD-D577146 PCB
Operator	manager	a second the second term	the second
Sample Number	- 004	Study	= PCB
AutoSampler	NONE	Rack/Vial	= Q/D
Instrument Name	Clarus 680	Channel	A
Instrument Serial #	None	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 34.60 min
Sampling Rate	12.5000 pts/s		
Sample Volume	1.000000 ul		
Sample Amount	: 1,0000	Area Reject	- 0.000000
		Dilution Factor	: 1.00
Data Acquisition Time	: 13-07-2023 12:07:07	Cycle	21

Raw Data File : C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\13.07.2023\1004.raw Inst Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 from C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\13.07.2023\1004.raw Proc Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Calib Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Report Format File: C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.rpt Sequence File : C:\GC PCB Analysis\Sequence\13.07.2023.seq



# PCB ANALYSIS REPORT

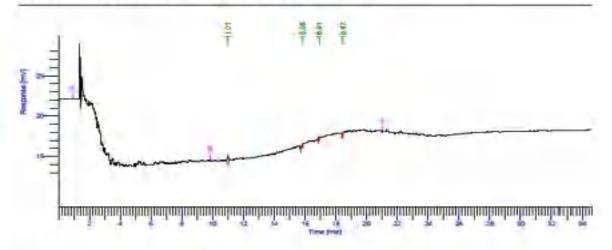
Component         Time         Area         Height         Area         PCB           Name         [min]         [uV*sec]         [uV]         [%]         PPM           PCB         1260         15.465         82120.65         21626.29         100.00         8.233	CPRI	DMD					
PCB 1260 15.465 82120.65 21626.29 100.00 8.233	Peak #	and the second sec					PCB PPM
		PCB 1260	15,465	82120.65	21626.29	100.00	8.2339

82120.65 21626.29 100.00 8.2339

#### **Batch 10 - PCB Chromatograph – After Dechlorination**

			Page 1 of 1
Software Version	6.3.2.0646	Date	13-07-2023 16:40:33
Operator Sample Number	: manager : 006	Sample Name Study	: BATCH-10-AD-D577146 PCB : PCB
AutoSampler	NONE	Rack/Vial	0/0
Instrument Name	Clarus 680	Channel	: A
Instrument Serial #	None	A/D mV Range	
Delay Time Sampling Rate Sample Volume	0.00 min 12.5000 pts/s 1.000000 ul	End Time	< 34.60 min
Sample Amount	1.0000	Area Reject	: 0.000000
Data Acquisition Time		Dilution Factor Cycle	1,00

Raw Data File : C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\13.07.2023\1006.raw Inst Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 from C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\13.07.2023\1006.raw Proc Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 mth from Calib Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 mth from Report Format File: C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 mth from Sequence File : C:\GC PCB Analysis\Sequence\13.07.2023.seq



# PCB ANALYSIS REPORT

CPRI DMD

Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
-	PCB 1260	15.465	2893.49	752.73	100.00	0.2901

2893.49 752.73 100.00 0.2901

# **Batch 11 - PCB Chromatograph – After Dechlorination**

6 . . F . A

			Page 1 of 1
Software Version	: 6.3.2.0646	Date	: 15-07-2023 16:14:53
Operator	: manager	Sample Name	: BATCH-11-AD-SLNO-D577146 PC
Sample Number	: 006	Church .	000
utoSampler	NONE	Study	PCB
nstrument Name	: Clarus 680	Rack/Vial	- 0/0
nstrument Senal #	: None	Channel	A C
Jelay Time	: 0.00 min	A/D mV Range	: 1000
Sampling Rate	: 12.5000 pts/s	End Time	: 34,60 min
Sample Volume	: 1.000000 ul		
Sample Amount	1.0000	Area Reject	- 0.000000
ata Acquisition Time	15-07-2023 15:38:39	Dilution Factor	: 1.00
		Cycle	- 1
aw Data File : C1GC	PCB Analysis\Data\PCB K		PV15 07 202311005 raw
			.03.2023-1 from C:\GC PCB
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			C 02 2022 4
	CB Analysis Method METH		
	PCB Analysis\Method\MET		
Report Format File: C.1	GC PCB Analysis/Method/	METHODS 2023\1	260.16.03.2023-1.npt
Sequence File : C:\GC	PCB Analysis\Sequence\1	5.07.23 N.seq	
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		Time (min)	

# PCB ANALYSIS REPORT

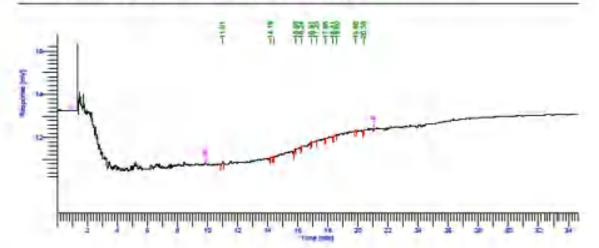
Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
	PCB 1260	15,465	2358.66	695.68	100.00	0.2365
			2358.66	695.68	100.00	0.2365

#### **Batch 12 - PCB Chromatograph – After Dechlorination**

Page 1 of 1

Software Version	; 6.3.2.0646	Date : 18-07-2023 14:50:41
Operator	manager	Sample Name : BATCH-12-AD-SLNO-D577146 PC
Sample Number	: 002	and the second second second second second second
AutoSampler	NONE	Study : PCB
Instrument Name	Clarus 680	Rack/Vial : 0/0
Instrument Serial #	: None	Channel : A
Delay Time	: 0.00 min	A/D mV Range : 1000
Sampling Rate	12.5000 pts/s	End Time : 34 60 min
Sample Volume	1.000000 ul	
Sample Amount	. 1.0000	and the second sec
Data Acquisition Time	e : 18-07-2023 14:05:10	Area Reject = 0.000000
		Dilution Factor : 1.00
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Cycle : 1 Raw Data File : C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\18.07.2023\1002.raw Inst Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 from C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\18.07.2023\1002.raw Proc Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Calib Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Report Format File: C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.rpt Sequence File : C:\GC PCB Analysis\Sequence\18.07.2023.seq



# PCB ANALYSIS REPORT

Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
-	PCB 1260	15.465	1436.71	263.91	100.00	0.1441
			1436.71	263.91	100.00	0.1441

## **Batch 13 - PCB Chromatograph – After Dechlorination**

Page 1 of 1

						_			_	
Software Version	: 6.3,2,064	6				ate			. 1	20-07-2023 14:45:36
Operator	: manager							lame	9	BATCH-13-AD-SLNO-577146 PC
Sample Number	: 004					tudy			1.5	PCB
AutoSampler	: NONE					lack			-	0/0
nstrument Name	: Clarus 68	0			_	han				A
nstrument Serial #	: None							Rang	e	1000
Delay Time	: 0.00 min	1.0			E	nd 1	ime	2	1.7	34,60 min
Sampling Rate	: 12.5000 p									
Sample Volume	: 1.000000	ul				rea	Poir	net.		0.000000
Sample Amount	: 1.0000	1.1						acto	10	1.00
Data Acquisition Time	20-07-202	23 14:	07:1:	3	_	ycle		acto	1	1
Calib Method : C:\GC Report Format File: C: Sequence File : C:\GC	IGC PCB An	alysis	Met	hod/	MET	HO	DS :	2023		6.03.2023-1.mth from 60.16.03.2023-1.mt
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# PCB ANALYSIS REPORT

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Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
	PCB 1260	15.465	1644.28	199.41	100.00	0.1649
			10.00	100		10.000

1644.28 199.41 100.00 0.1649

# **Batch 14 - PCB Chromatograph – After Dechlorination**

Page 1 of 1

Software Version Operator Sample Number AutoSampler Instrument Name Instrument Serial # Delay Time Sampling Rate	6.3.2.0646 manager 002 NONE Clarus 680 None 0.00 min	Date Sample Name Study Rack/Vial Channel	22-07-2023 13:31:55 BATCH-14-AD-SLNO-D577146 PC PCB ANALYSIS 0/0
Sample Number AutoSampler Instrument Name Instrument Serial # Delay Time	: 002 NONE : Clarus 680 : None	Study Rack/Vial	PCB ANALYSIS
AutoSampler nstrument Name nstrument Serial # Delay Time	NONE Clarus 680 None	Rack/Vial	
nstrument Name nstrument Serial # Delay Time	Clarus 680 None	Rack/Vial	
nstrument Serial # : Delay Time :	None		: 0/0
Delay Time		Channel	
	0.00 min	and have not a set	A
Sampling Rate		A/D mV Range	: 1000
	12.5000 pts/s	End Time	: 34.60 min
Sample Volume	: 1.000000 ul		
Sample Amount	1.0000	Area Reject	: 0.000000
Data Acquisition Time	22-07-2023 12:48:06	Dilution Factor	- 100
		Cycle	1
aw Data File : C1GC I	PCB Analysis\Data\PCB K		
Calib Method : C:\GC P Report Format File: C:\	CB Analysis/Method/MET CB Analysis/Method/MET GC PCB Analysis/Method PCB Analysis/Sequence/2	HODS 2023\1260.1 METHODS 2023\1	16.03.2023-1.mth from
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Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
	PCB 1260	15,465	1798.47	303.70	100.00	0.1803
			1798.47	303.70	100.00	0.1803

# **Batch 15 - PCB Chromatograph – After Dechlorination**

Page 1 of 1

Software Version Operator	: 6.3.2.0646 : manager	Date Sample Name	25-07-2023 15:45:27 BATCH-15-AD-SLNO-D577146 PCE
Sample Number	: 004		
AutoSampler	NONE	Study	: PCB
Instrument Name	: Clarus 680	Rack/Vial	: 0/0
Instrument Serial #	: None	Channel	A
Delay Time	: 0.00 min	A/D mV Range	: 1000
Sampling Rate	: 12.5000 pts/s	End Time	: 34,60 min
Sample Volume	: 1.000000 ul		
Sample Amount	1.0000	Area Reject	: 0.000000
Data Acquisition Time	25-07-2023 15:07:41	Dilution Factor	: 1.00
		Cycle	: 1
Raw Data File : C1GC	PCB Analysis\Data\PCB K		
Report Format File: C:1	PCB Analysis\Method\MET GC PCB Analysis\Method\ PCB Analysis\Sequence\2	METHODS 2023\1	
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Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
	PCB 1260	15,465	2198.49	423.20	100.00	0.2204
			2198.49	423.20	100.00	0.2204

# **Batch 16 - PCB Chromatograph – After Dechlorination**

Page 1 of 1

Software Version	: 6.3.2.0646	Date	27-07-2023 15:29:42
Operator	manager	Sample Name	: BATCH-16-AD-SLNO-D577146 PC
Sample Number	: 002		a seden in the constraint of a
AutoSampler	NONE	Study	: PCB
instrument Name	: Clarus 680	Rack/Vial	: 0/0
instrument Serial #	: 680S16090202	Channel	A
Delay Time	: 0.00 min	A/D mV Range	: 1000
Sampling Rate	: 12.5000 pts/s	End Time	: 34,60 min
Sample Volume	: 1.000000 ut		
Sample Amount	: 1.0000	· · · · · · · · · · · · · · · · · · ·	
Data Acquisition Time	27-07-2023 14:53:20	Area Reject	0.000000
		Dilution Factor	: 1.00
	DCD Analysis Data DCD W	Cycle	: 1
	PCB Analysis\Data\PCB K		
			5.03.2023-1 from C:\GC PCB
	EB KALAMESSERY\27-0		
	CB Analysis/Method/METI		
	PCB Analysis\Method\MET		
Report Format File: C:	GC PCB Analysis Method	METHODS 2023\1	260.16.03.2023-1.rpt
Sequence File : C:\GC	PCB Analysis\Sequence\2	7-07-23 seg	Sector March 1991
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		Time (min)	
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Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
	PCB 1260	15,465	1653.66	328.16	100.00	0.1658
			1653.66	328.16	100.00	0.1658

# **Batch 17 - PCB Chromatograph – Before Dechlorination**

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			Fage 1 01 1
Software Version	: 6.3.2.0646	Date	29-07-2023 12:54:33
Operator	: manager	Sample Name	:BATCH-17-BD-SLNO-D577146 PC
Sample Number	: 002		F
AutoSampler	NONE		
nstrument Name	: Clarus 680	Study	: PCB
nstrument Serial #	: None	Rack/Vial	: 0/0
Delay Time	: 0.00 min	Channel	: A
Sampling Rate	: 12.5000 pts/s	A/D mV Range	: 1000
Sample Volume	: 1.000000 ul	End Time	: 34.60 min
Sample Amount	: 1.0000		
Data Acquisition Time	29-07-2023 10:58:12	Area Dalast	- 0.000000
		Area Reject	: 0.000000
		Dilution Factor	: 1.00
Deu Dele Die color	DOD tool all Detailord	Cycle	1
taw Data File . C.IGC	PCB Analysis\Data\PCB K	DEB NALAMESSE	CO 2002 4 from CACC DOD
			6.03.2023-1 from C:\GC PCB
	SEB KALAMESSERY 29-07		10 00 0000 4 It 4
	CB Analysis Method METH		
	PCB Analysis\Method\MET		
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CPRI DMD			
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		Area PCB	
# Name [n	nin] [uV*sec] [uV]	[%] PPM	
D00 1000 10			

_							
	PCB 1260	15.465	28483.91	7413.04	100.00	2.8560	

28483.91 7413.04 100.00 2.8560

## **Batch 17- PCB Chromatograph – After Dechlorination**

			Page 1 of 1
Software Version Operator Sample Number AutoSampler	= 6.3.2.0646 = manager = 004 = NONE	Date Sample Name	- 01-08-2023 10:08:03 - BATCH-17-AD-SLNO-D577146 PCI F
Instrument Name Instrument Serial # Delay Time Sampling Rate Sample Volume Sample Amount	Clarus 680 None 0.00 min 12.5000 pts/s 1.000000 ul	Study Rack/Vial Channel A/D mV Range End Time	PCB 0/0 A 1000 34.60 min
Data Acquisition Time		Area Reject Dilution Factor Cycle	= 0.000000 = 1.00
Inst Method : C:\GC P Analysis\Data\PCB K Proc Method : C:\GC P Calib Method : C:\GC Report Format File: C:	PCB Analysis\Data\PCB K CB Analysis\Method\METH SEB KALAMESSERY\29-0 PCB Analysis\Method\MET PCB Analysis\Method\MET \GC PCB Analysis\Method PCB Analysis\Sequence\2	HODS 2023\1260.10 7-23\1004.raw HODS 2023\1260.1 THODS 2023\1260.1 THODS 2023\1260. METHODS 2023\1	6.03.2023-1 from C:\GC PCB 6.03.2023-1.mth from 16.03.2023-1.mth from
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Peak #	Component Name		Area [uV*sec]	Height [uV]	Area [%]	PCB
	PCB 1260	15.465	894.78	223.12	100.00	0.0897
			894.78	223.12	100.00	0.0897

Software Version			
Operator Sample Number AutoSampler	: 6.3.2.0646 : manager : 002 : NONE	Date Sample Name	: 29-07-2023 12:54:33 : BATCH-17-BD-SLNO-D577146 PC F
instrument Name	Clarus 680	Study	PCB
instrument Serial #	: None	Rack/Vial	: 0/0
Delay Time	: 0.00 min	Channel	A
Sampling Rate	: 12.5000 pts/s	A/D mV Range	1000
Sample Volume	: 1.000000 ul	End Time	: 34.60 min
Sample Amount	1.0000	End mile	
Data Acquisition Time	29-07-2023 10:58:12		
a state i state si	a de de antes recentin	Area Reject	: 0.000000
		Dilution Factor	: 1.00
	PCB Analysis\Data\PCB K	Cycle	11
	GC PCB Analysis Method		16.03.2023-1.mth from 260.16.03.2023-1.mt
	PCB Analysis Sequence 2	9-07-23.seq	
	PCB Analysis Sequence 2		
	PCB Analysis Sequence	9-07-23.seq	
	PCB Analysis Sequence	9-07-23.seq	

## **Batch 18 - PCB Chromatograph – Before Dechlorination**

1.1.1.1.1

-

# PCB ANALYSIS REPORT

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	PCB PPM
-	PCB 1260	15.465	28483.91	7413.04	100.00	2.8560
			28483 01	7413.04	100.00	2 8560

# **Batch 18 - PCB Chromatograph – After Dechlorination**

1.00.0

			Page 1 of 1
Software Version	: 6.3.2.0646	Date	01-08-2023 14:56:23
Operator	: manager	Sample Name	: BATCH-18-AD-SLNO-D577146 PC
Sample Number	: 004		
utoSampler	NONE	Study	: PCB
istrument Name	: Clarus 680	Rack/Vial	- 0/0
strument Serial #	: None	Channel	A
lelay Time	: 0.00 min	A/D mV Range	
ampling Rate	: 12.5000 pts/s	End Time	: 34,60 min
ample Volume	: 1.000000 ul		
ample Amount	. 1.0000	Area Reject	0.000000
ata Acquisition Time	01-08-2023 14:16:47	Dilution Factor	1.00
		Cycle	- 1.00
aw Data Eila : C1CC	PCB Analysis\Data\PCB K		PM01.09.2211004 man
			6.03.2023-1 from C:\GC PCB
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	CB Analysis Method METH		
	PCB Analysis\Method\MET		
	GC PCB Analysis/Method/		1260.16.03.2023-1.rpt
Sequence File : C:\GC	PCB Analysis\Sequence\0	1-08-23.seq	
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		Time (min)	

# PCB ANALYSIS REPORT

#### CPRI DMD

Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
	PCB 1260	15,465	591.03	176.70	100.00	0.0593
			591.03	176.70	100.00	0.0593

Batch 19 - PCB Chromatograph – Before Dechlorination (Transformer Sl.No.D57148)

			Page 1 of 1
Software Version Operator Sample Number	: 6.3.2.0646 : manager : 002	Date Sample Name	: 03-08-2023 12:17:43 : BATCH-19-BD-SLNO-D577148 PCI
AutoSampler	NONE	Chudu	: PCB
nstrument Name	The second se	Study Rack/Vial	- 0/0
nstrument Serial #	: Clarus 680 : None	Channel	A
Delay Time	: 0.00 min	A/D mV Range	1000
Sampling Rate	: 12.5000 pts/s	End Time	: 34.60 min
Sample Volume	: 1.000000 ul	chu time	. 34,00 mm
Sample Amount	1.0000		
Data Acquisition Time	03-08-2023 10:59:09	Area Reject	0.000000
vara Acquisiuori Tittie	03-00-2023 10,33,03	Dilution Factor	: 1.00
		Cycle	31
aw Data File : C:\GC	PCB Analysis\Data\PCB K	SEB KALAMESSE	RY/03-08-23\1002 raw
			6.03.2023-1 from C:\GC PCB
			0.03.2023-1 ITOIN C.YOC PCB
	EB KALAMESSERYV03-08		in the second second second
			16.03.2023-1 - Copy.mth from
Calib Method : C:\GC F	PCB Analysis/Method/MET	HODS 2023\1260.	16.03.2023-1 - Copy.mth from
Report Format File: C:1	GC PCB Analysis Method	METHODS 2023	260.16.03.2023-1.mt
Sequence File : C:\GC	PCB Analysis\Sequence\0	3-08-23 560	
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		Time (min)	
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	PCB ANAL	VSIS REP	ORT

# PCB ANALYSIS REPORT

Peak #	Component Name		Area [uV*sec]	Height [uV]	Area [%]	PCB PPM
	PCB 1260	15,465	35224.84	9226.49	100.00	7.0637
			35224.84	9226.49	100.00	7.0637

Software Version Operator	: 6.3.2.0646	Date Sample Name	<ul> <li>03-08-2023 16:22:32</li> <li>BATCH-19-AD-SLNO-D577148 PCI</li> </ul>
Sample Number	: manager : 004	Sample Name	BATCH-19-AD-5LNO-D5//148 PG
AutoSampler	NONE	Study	2 PCB
nstrument Name	Clarus 680	Rack/Vial	0/0
nstrument Serial #	None	Channel	A
Delay Time	: 0.00 min	A/D mV Range	1000
Sampling Rate	: 12.5000 pts/s	End Time	34.60 min
Sample Volume	1.000000 ul		
Sample Amount	: 1.0000	Area Delect	2 0.000000
Data Acquisition Time	03-08-2023 15:37 36	Area Reject Dilution Factor	1.00
		Cycle	1.00
Data File : CICC	PCB Analysis\Data\PCB K		DV02 00 2211004 row
roc Method : C:\GC F alib Method : C:\GC I	PCB Analysis\Method\MET	8-23\1004.raw HODS 2023\1260.1 HODS 2023\1260.1	6.03.2023-1 from C:\GC PCB 16.03.2023-1 - Copy.mth from 16.03.2023-1 - Copy.mth from 260.16.03.2023-1 mt
Proc Method : C:\GC F Calib Method : C:\GC I Report Format File: C:	CB Analysis\Method\MET	8-23\1004.raw HODS 2023\1260.1 HODS 2023\1260. METHODS 2023\1	16.03.2023-1 - Copy.mth from 16.03.2023-1 - Copy.mth from
Proc Method : C:\GC F Calib Method : C:\GC I Report Format File: C:	PCB Analysis\Method\MET PCB Analysis\Method\MET \GC PCB Analysis\Method	8-23\1004.raw HODS 2023\1260. HODS 2023\1260. METHODS 2023\1 I3-08-23.seq	16.03.2023-1 - Copy.mth from 16.03.2023-1 - Copy.mth from
Proc Method : C:\GC F Calib Method : C:\GC I Report Format File: C:	PCB Analysis\Method\MET PCB Analysis\Method\MET \GC PCB Analysis\Method	8-23\1004.raw HODS 2023\1260. HODS 2023\1260. METHODS 2023\1 I3-08-23.seq	16.03.2023-1 - Copy.mth from 16.03.2023-1 - Copy.mth from
Proc Method : C:\GC F Calib Method : C:\GC I Report Format File: C:	PCB Analysis\Method\MET PCB Analysis\Method\MET \GC PCB Analysis\Method	8-23\1004.raw HODS 2023\1260. HODS 2023\1260. METHODS 2023\1 I3-08-23.seq	16.03.2023-1 - Copy.mth from 16.03.2023-1 - Copy.mth from

## **Batch 19 - PCB Chromatograph – After Dechlorination**

# PCB ANALYSIS REPORT

Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
	PCB 1260	15.465	635.37	162.34	100.00	0.1274
			635.37	162.34	100.00	0.1274

# **Batch 20 - PCB Chromatograph – After Dechlorination**

Page 1 of 1

Software Version	: 6.3.2.0646	Date	: 05-08-2023 16:00:19
Operator	: manager	Sample Name	
Sample Number	002		
lutoSampler	NONE	Study	: PCB
nstrument Name	Clarus 680	Rack/Vial	- 0/0
instrument Serial #	680S16090202	Channel	A
Delay Time	: 0.00 min	A/D mV Range	: 1000
Sampling Rate	12.5000 pts/s	End Time	: 34.60 min
ample Volume	: 1.000000 ul		PERIOD PARTY
Sample Amount	1.0000		
Data Acquisition Time	05-08-2023 15:23:09	Area Reject	0.000000
and the laising it this.		Dilution Factor	: 1.00
		Cycle	11
Raw Data File : C:\GC	PCB Analysis\Data\PCB K	SEB KALAMESSE	ERY\05-08-23\1002.raw
nst Method : C:\GC P(	CB Analysis/Method/METH	ODS 2023\1260.1	6.03.2023-1 from C:\GC PCB
	SEB KALAMESSERY/05-0		Concernent of the state of the
	CB Analysis Method MET		16 03 2023-1 mth from
	PCB Analysis\Method\MET		
	GC PCB Analysis/Method		
	PCB Analysis\Sequence\0		1200.10.03.2023-1.1pt
Sequence File . C.16C	FCB Analysis/Sequenceru	10-06-23.56Q	
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		Time (min)	
		Louis set	
	PCB ANAL	YSIS REP	ORT

## PCB ANALYSIS REPORT

Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
	PCB 1260	15,465	838.07	230.40	100.00	0.0840
			838.07	230.40	100.00	0.0840

# **Batch 21 - PCB Chromatograph – After Dechlorination**

Page 1	of 1

Software Version	: 6.3.2.0646	Date	: 08-06-2023 16:13:54
Operator	: manager	Sample Name	: BATCH-21-AD-SLNO-D577148 PC
ample Number	: 002		Contrast and the second second second
utoSampler	: NONE	Study	: PCB
nstrument Name	: Clarus 680	Rack/Vial	- 0/0
nstrument Serial #	: None	Channel	A
Delay Time	: 0.00 min	A/D mV Range	: 1000
Sampling Rate	: 12.5000 pts/s : 1.000000 ul	End Time	: 34.60 min
Sample Volume Sample Amount	1.0000 00 01		
Data Acquisition Time	08-08-2023 15:25:22	Area Reject	0.000000
And Acquisicon nine	. 00-00-2023 13,23,22	Dilution Factor	: 1.00
		Cycle	14
aw Data File : C:\GC	PCB Analysis\Data\PCB K	SEB KALAMESSE	RY\08.08.23\1002 raw
st Method : C:\GC P	CB Analysis Method METH	ODS 2023\1260 a	1,15.07.2023 from C:\GC PCB
	SEB KALAMESSERY\08.08		al inter a state a state a state
	PCB Analysis/Method/METH		ad 15 07 2023 mth from
	PCB Analysis Method MET		
	GC PCB Analysis/Method		
	PCB Analysis\Sequence\0		200.10.05.2025-1.1pt
bequeirce File . C.IOC	PCD Analysis bequericesu	10.00.23.58Y	
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Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
	PCB 1260	15,465	2095.80	406.14	100.00	0.0696
			2095.80	406.14	100.00	0.0696

Software Version	6.3.2.0646	Date	: 10-08-2023 16:45:05
Operator	: manager	Sample Name	: BATCH-22-AD-SLNO-D577148 PCI
Sample Number	: 002		Contraction of the second second second
AutoSampler	: NONE	Study	PCB
Instrument Name	: Clarus 680	Rack/Vial	0/0
instrument Serial #	: None	Channel	⇒ A
Delay Time	: 0.00 min	A/D mV Rang	
Sampling Rate	: 12.5000 pts/s	End Time	: 34,60 min
Sample Volume	: 1.000000 ul		
Sample Amount	: 1.0000	Area Deleat	- 0.000000
Data Acquisition Time	: 10-08-2023 15:19:42	Area Reject Dilution Facto	
		Cycle	
nst Method : C:\GC P	CB Analysis\Method\ME	THODS 2023\1260.	ERY\10.08.2023\1002.raw 16.03.2023-1 from C:\GC PCB
Inst Method : C:\GC P Analysis\Data\PCB K Proc Method : C:\GC Calib Method : C:\GC Report Format File: C	CB Analysis\Method\ME SEB KALAMESSERY\10 PCB Analysis\Method\ME PCB Analysis\Method\MI \\GC PCB Analysis\Method	THODS 2023\1260. .08.2023\1002.raw ETHODS 2023\1260 ETHODS 2023\1260 od\METHODS 2023\1260 od\METHODS 2023	16.03.2023-1 from C:\GC PCB .ad, 15.07.2023.mth from 0.ad, 15.07.2023.mth from \1260.16.03.2023-1.rpt
Inst Method : C:\GC P Analysis\Data\PCB K Proc Method : C:\GC Calib Method : C:\GC Report Format File: C	CB Analysis\Method\ME SEB KALAMESSERY\10 PCB Analysis\Method\ME PCB Analysis\Method\MI	THODS 2023\1260. .08.2023\1002.raw ETHODS 2023\1260 ETHODS 2023\1260 od\METHODS 2023\1260 od\METHODS 2023	16.03.2023-1 from C:\GC PCB .ad, 15.07.2023.mlh from 0.ad, 15.07.2023.mlh from 1.260.16.03.2023-1.rpt

**Batch 22 - PCB Chromatograph – After Dechlorination** 

Page 1 of 1

# 

# PCB ANALYSIS REPORT

Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
	PCB 1260	15,465	2401.26	490.51	100.00	0.0798
			2401.26	490.51	100.00	0.0798

			Page 1 of 1
Software Version Operator	: 6.3.2.0646 : manager	Date Sample Name	12-08-2023 16:31:40 BATCH-23-SLN0-D577148 PCB
Sample Number	: 002	Study	: PCB
AutoSampler Instrument Name	: NONE : Clarus 680	Rack/Vial Channel	- 0/0 - A
Instrument Senal #	: None	A/D mV Range	1000
Delay Time Sampling Rate	2.000 min 2.5000 pts/s 1.000000 ul	End Time	: 34.60 min
Sample Volume Sample Amount	1,000000 01	Area Reject	. 0.000000

Dilution Factor 1 1.00

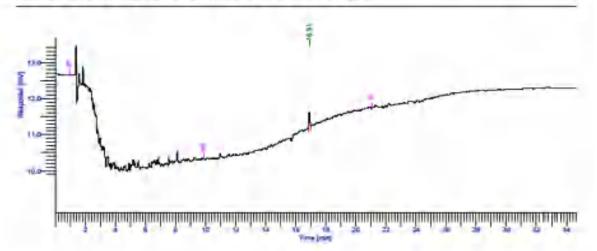
**Batch 23 - PCB Chromatograph – After Dechlorination** 

Cycle 1 Raw Data File : C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\12.08.2023\1002.raw Inst Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 from C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\12.08.2023\1002.raw Proc Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Calib Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from

Report Format File: C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.rpt Sequence File : C:\GC PCB Analysis\Sequence\12.08.2023.seq

: 1.0000

Data Acquisition Time : 12-08-2023 15:50:54



# PCB ANALYSIS REPORT

CPRI DMD

Sample Amount

Peak #	Component Name					PCB PPM
	PCB 1260	15.465	1537.63	381.08	100.00	0.1542

1537.63 381.08 100.00 0.1542

## **Batch 24- PCB Chromatograph – After Dechlorination**

Page 1 of 1

			1141 111
Software Version	: 6.3.2.0646	Date	: 17-08-2023 19:00:06
Operator	manager	Sample Name	: BATCH-24-AD-SLNO-D577148 PC
ample Number	: 002		A REALIZED REAL PROPERTY OF A REAL PROPERTY
utoSampler	NONE	Study	pcb
strument Name	: Clarus 680	Rack/Vial	0/0
nstrument Serial #	None	Channel	A
Jelay Time	0.00 min	A/D mV Range	: 1000
Sampling Rate	: 12.5000 pts/s	End Time	: 34,60 min
Sample Volume	: 1.000000 ul	Line mine	. 04,00 1111
Sample Amount	1,0000		
Data Acquisition Time	17-08-2023 17:28:24	Area Reject	0.000000
vara medalandu milie	11-00-2025 11-20,24	Dilution Factor	: 1.00
		Cycle	11
aw Data File : C1GC	PCB Analysis\Data\PCB K		RY\17.08.2023\1002 raw
			6.03.2023-1 from C:\GC PCB
	SEB KALAMESSERY17.08		0.03.2023-110010.1001.001
			16 02 2022 1 mills from
	CB Analysis/Method/METH		
	PCB Analysis\Method\MET		
	GC PCB Analysis Method		1260.16.03.2023-1.rpt
Sequence File : C:\GC	PCB Analysis\Sequence\1	7.08.2023.seq	
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		Time (min)	
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## PCB ANALYSIS REPORT

Component Name				Area [%]	PCB PPM
PCB 1260	15,465	2563.00	492.80	100.00	0.2570
		2563.00	492.80	100.00	0.2570
	Name	Name [min]	Name         [min]         [uV*sec]           PCB 1260         15.465         2563.00	Name         [min]         [uV*sec]         [uV]           PCB 1260         15.465         2563.00         492.80	The same in the same in the same of the sa

Software Version Operator Sample Number NutoSampler	: 6.3.2.0646 : manager : 002 : NONE	Date Sample Name	21-08-2023 15:45:53 BATCH-25-AD-AD-SLNO:D577148 F CB
nstrument Name	: Clarus 680	Study	PCB
nstrument Serial #	: 680S16090202	Rack/Vial	: 0/0
elay Time Sampling Rate	: 0.00 min : 12.5000 pts/s	Channel A/D mV Range	A 1000
ample Volume ample Amount	: 1.000000 ul : 1.0000	End Time	: 34.60 min
ata Acquisition Time	21-08-2023 15:08:10	Area Reject	- 0.000000
		Dilution Factor	1.00
		Cycle	1
nst Method : C:\GC P	PCB Analysis\Data\data00 CB Analysis\Method\METH	2-20230821-15083 ODS 2023\1260.1	5.03.2023-1 from C:\GC PCB
nst Method : C:\GC P Analysis\Data\data002 Proc Method : C:\GC F Calib Method : C:\GC I Report Format File; C:	PCB Analysis\Data\data00 CB Analysis\Method\METH 2-20230821-150831.raw PCB Analysis\Method\METH PCB Analysis\Method\MET \GC PCB Analysis\Method\ PCB Analysis\Sequence\2	IODS 2023\1260.1 HODS 2023\1260.2 HODS 2023\1260.3 METHODS 2023\1	6.03.2023-1 from C:\GC PCB ad, 15.07.2023 mth from ad, 15.07.2023 mth from
nst Method : C:\GC P Analysis\Data\data002 Proc Method : C:\GC F Calib Method : C:\GC I Report Format File; C:	CB Analysis\Method\METH 2-20230821-150831.raw PCB Analysis\Method\METH PCB Analysis\Method\METH \GC PCB Analysis\Method\	IODS 2023\1260.1 HODS 2023\1260.2 HODS 2023\1260.3 METHODS 2023\1	6.03.2023-1 from C:\GC PCB ad, 15.07.2023 mth from ad, 15.07.2023 mth from

## **Batch 25- PCB Chromatograph – After Dechlorination**

# PCB ANALYSIS REPORT

Peak #	Component Name		Area [uV*sec]	Height [uV]	Area [%]	PCB PPM
_	PCB 1260	15.465	2274.86	690.69	100.00	0.0756
			2274.86	690.69	100.00	0.0756

## **Batch 26- PCB Chromatograph – Before Dechlorination**

Page 1 of 1

Software Version			
SOUWARE VEISION	: 6.3.2.0646	Date	24-08-2023 14:29:46
Operator	: manager	Sample Name	: BATCH-26 BD SLNO:D577148 PC
Sample Number	: 002		
AutoSampler	NONE	Study	: PCB
instrument Name	: Clarus 680	Rack/Vial	: 0/0
instrument Serial #	: None	Channel	A
Delay Time	: 0.00 min	A/D mV Range	: 1000
Sampling Rate	: 12.5000 pts/s	End Time	: 34,60 min
Sample Volume	: 1.000000 ul		
Sample Amount	: 1.0000	Area Reject	0.000000
Data Acquisition Time	24-08-2023 12:58:29	Dilution Factor	: 1.00
		Cycle	1
Paw Data File - C1GC	PCB Analysis\Data\PCB K		
Calib Method : C:\GC Report Format File: C	PCB Analysis/Method/MET PCB Analysis/Method/MET \GC PCB Analysis/Method	HODS 2023\1260.1 METHODS 2023\1	6.03.2023-1.mth from
Sequence File : C:\GC	PCB Analysis\Sequence\2	4.08.2023.seq	5 - 11 - 201 - 1 / 1 - 1 - 1 - 1 - 1
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		tie (a st Time (min)	2'2'2'2' <u>2</u> '4'2'4
	1.1.7.7.7.7	tie (a st Time (min)	2'2'2'2' <u>2</u> '4'2'4
աստվոսկակով	1.1.7.7.7.7	tie (a st Time (min)	********
CPRI DMD	PCB ANAL	tie (a st Time (min)	********

PCB 1260 15.465 27953.39 6551.28 100.00 2.8928

27953.39 6551.28 100.00 2.8928

# **Batch 26- PCB Chromatograph – After Dechlorination**

Page 1 of 1

Software Version			
	: 6.3.2.0646	Date	24-08-2023 16:48:30
perator	: manager	Sample Name	: BATCH-26 AD SLNO:D577148 PC
ample Number	: 004		
utoSampler	NONE	Study	PCB
strument Name	: Clarus 680	Rack/Vial	- 0/0
strument Serial #	: None	Channel	A
elay Time	: 0.00 min	A/D mV Range	: 1000
ampling Rate	: 12.5000 pts/s	End Time	: 34.60 min
ample Volume	: 1.000000 ul	Print Parks	1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-
ample Amount	1.0000	A set and the	a failure of
ata Acquisition Time	24-08-2023 16:12:56	Area Reject	0.000000
	a min the same farmers	Dilution Factor	: 1.00
		Cycle	<b>11</b>
	PCB Analysis\Data\PCB K		
			.03.2023-1 from C:\GC PCB
Analysis\Data\PCB KS	SEB KALAMESSERY\24.08	3.23\1004.raw	
Proc Method : C:\GC P	CB Analysis/Method/METH	HODS 2023\1260.1	6.03.2023-1.mth from
alib Method : C:\GC F	PCB Analysis\Method\MET	HODS 2023\1260.1	6.03.2023-1.mth from
	GC PCB Analysis/Method/		
	PCB Analysis\Sequence\2		CALIFORNIA CAL
110	ក៏ពីរីរីរីរ៉ា		
10 March 10	water of the second		

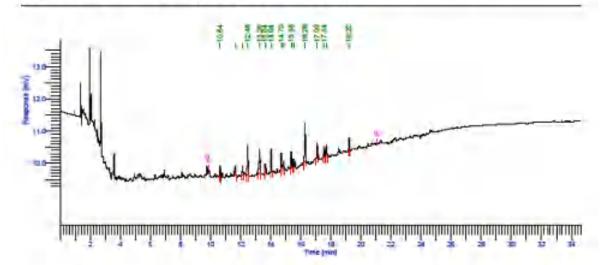
# PCB ANALYSIS REPORT

Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
	PCB 1260	15,465	3913.85	768.74	100.00	0.3924
			3913.85	768.74	100.00	0.3924

#### **Batch 27- PCB Chromatograph – Before Dechlorination**

Page 1 of 1 : 25-08-2023 12:54:33 Software Version 6.3.2.0646 Date Operator Sample Name : BATCH-27-BD-SLNO-D577148 PCB manager Sample Number 002 F AutoSampler NONE Instrument Name Clarus 680 Study PCB Rack/Vial Instrument Serial # None 0/0 Delay Time 0.00 min Channel А A/D mV Range Sampling Rate 12.5000 pts/s 1000 Sample Volume 1.000000 ul End Time 34.60 min Sample Amount 1.0000 Data Acquisition Time : 25-08-2023 11:58:18 Area Reject 0.000000 **Dilution Factor** 1.00 Cycle

Raw Data File : C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\25-08-23\1002.raw Inst Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1 from C:\GC PCB Analysis\Data\PCB KSEB KALAMESSERY\25-08-23\1002.raw Proc Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Callb Method : C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth from Report Format File: C:\GC PCB Analysis\Method\METHODS 2023\1260.16.03.2023-1.mth Sequence File : C:\GC PCB Analysis\Sequence\25-08-23.seq



# PCB ANALYSIS REPORT

$\mathbf{C}$			<b>n</b> .		
-	-	RI	u	VI.	•

Peak	Component	Time	Area	Height	Area	PCB
#	Name	[min]	[uV*sec]	[uV]	[%]	PPM
	PCB 1260	15.465	28483.91	7413.04 1	00.00 2.	8940

28483.91 7413.04 100.00 2,8940

## **Batch 27- PCB Chromatograph – After Dechlorination**

Dana d of d

Software Version Operator Sample Number AutoSampler Instrument Name Instrument Serial #	: 6.3.2.0646 manager : 004 : NONE : Clarus 680	Date Sample Name :	: 25-08-2023 20:02:57 BATCH-27AD SLNO:D577148 FLUS H PCB
Instrument Name			
Delay Time	None	Study Rack/Vial Channel	: PCB : 0/0 - A
Sampling Rate Sample Volume	12.5000 pts/s 1.000000 ul	A/D mV Range End Time	
Sample Amount Data Acquisition Time	: 1.0000 : 25-08-2023 19:24:56	Area Reject Dilution Factor Cycle	0.000000 1.00
	PCB Analysis\Data\PCB K	SEB	
Analysis\Data\PCB K Proc Method : C:\GC F Calib Method : C:\GC Report Format File: C:	SEB KALAMESSERY\25.08 PCB Analysis\Method\METH PCB Analysis\Method\METH \GC PCB Analysis\Method\ PCB Analysis\Sequence\2	3.2023\1001-2023( HODS 2023\1260. HODS 2023\1260. METHODS 2023\1	16.03.2023-1.mth from 16.03.2023-1.mth from
12.0			
		and the second	
	the second	TTATION	
mut la	Number of the second		
unindindanihada	mhadaalaadaalaadaalaadaalaadaa		diaphy internation in the second second

# PCB ANALYSIS REPORT

n	DM	
	LAM	
-	 	-

Peak #	Component Name		Area [uV*sec]		Area [%]	PCB PPM
_	PCB 1260	15.465	4021.22	887.10	100.00	0.4032
			1004.00		100.00	0.1000

4021.22 887.10 100.00 0.4032

#### Annexure 9 (Minutes of Meeting Held between M/s. CPRI and M/s.KSEB on 26.08.2023)

## MINUTES OF MRETING CONVENED ON 24.88 JO23 IN COMMECTION WITH ON SITE DE CHLORINATION OF FOR IN TUANSPORMERS AT 220KV SUBSTATION KALAM ASS/RY

Ref: WO No. 09/07/3-24, Dr. 24 01.2/123 of Assistant Executive Ragoleer, 220kV Substation Subdivision Kalamassery

M/s. Central Prover Research Institute (CPRI), Renga'uru visited M/s. KSE 0 Litrated against above treatilized work order:" En-site de-chlorination and testing of PCB concentrated oil using CPRI residule de-chlorination unit at 220°CV Substation Kalenassery \* and the co-chlorination work of the PCB contaminated transformer all in 120MVA scrap transformer bank ( SI, No: D577147, D577146 & D577148) was carried out from 14.06-2023 to 26.0B.2023. During this visit KNERI, provided able readiness for all transformers.

The details of activities are as follows:

CFRi PCB staff reached due site 04.06.2023. PCB dowblorthation unit reached the site on 03.06.2023. After solting up of the plant, the dowblorthation activity of PCB contaminated oil 113761 filers of 3Not of GE molec transformers has been done as Juliows:

e. 95232 fittes of PCB contain nated oil.

b. 18529 litres of cit used for flushing the PCB contominated transformer.

Entire PCB contaminated oil along with theshed oil (total 11376) USTRS) were do chloricested in 27 batches. The details are given below:

Tras. Social Vo	Betch · No	Dr	ŧr	Qiy. xi cil (Lim	City of SinD (1.47)	Faltini PCB COGC. (ppm)	Final PCB CMc.	i dan Itting	
		FROM	π				(ppm)	Water	Studge
	:	14.06.25	16.06.23	4393	10		0.28	1.5	0,25
	2	19.06.27	20.06.73	<b>4</b> 73.)5	a))	]	0.13	L.\$	0.25
	,	21.36.23	22.0623	4315	49	ļ	124	1!	0.25
	4	23.05.23	24.06.23	1306	40	1	0 22	i	3.25
C577:47	ڌ	25.05.23	27.66.23	-306	10	5,92	[ 026 <sup>–</sup>	1.5	025
•		39.0521	41.41.23	4310	40	-	0.15	<u>.</u>	025
	7	03,07,23	04.07.22	4325	40	-	0.51	1.5	0.25
Oi attar 1 ashing 1 cm 1 cm	9	85.07.23	0°.0°.23	3627 (1404- PCB SIL-7523 - Bussing cill)	40	2.9	a.)á	15	0.25

		Fotal goannity ( Lite-chilorinal		113761		1	ļ	18.5	6.75
finshing from Door (148	27	25.06 23	21.0673	4215 (2011- PD:R od=7302- thanking o J)	41)	289	0.4	13	0 25
O(1aita	2ń	22.05.29	24,08,23	÷129	÷C	2 789	0.75	L.5	0.25 i
	23	18.05.23	21.03.23	4371	40		0.25	15	0.25
	24	16.03.23	17.03.23	4375	40	]	0.25	15	0.25
	23	11.03.23	12.98.23	4334	40	]	0.15	1.5	0.25
D577118	21	09.03.23	19.38.23	4306	-40	205	9.07	15	<b>e</b> .25
	٤ı	07.35.Z3	04.38.23	4336	•	- 	0.06	1.5	0.25
	20	94.38.23	05/08.23	4336	40	•	9.06	1.5	0.25
	17	07 38 75	06 OK 23	443h	40		51.0	1.5	0.25
D377146	- ۱۱	3	01.08.23	3677	40	2.07	0.05	i,i	0.25
Oli atter Gushing From	17	24,37,23	29.00.20	3022 (977- PCE ol1+2645- (Jushing ol)	43	5.85	u/09	1,5	6.25
	16	26 07.23	25.07.23	4501	40		0.14	1.5	0.43
1	15	24.07,21	25.07,25	4306	40		0.22	<u> </u>	0.23
	_,Ζ	21,07,20	12.01.11	4323	40		0.11		0.25
0277146	.5	L9.07.23	20.07.22	1307	\$0	¢.2	Ç.,6	1.2	D.25
	!2	17.05.25	18.67.23	4308	10	]	<u> </u>	<u>_!\$</u>	
1	11	14,07,23	15.07.23	4066	16		0.22	_15	025 025
	10	12.07,23	13.07.23	4066	40		11:19	15	0.21
1	9	10.07.23	11.07.23	3606	40	2.4	0.16	<u>[5</u> ]	_

Maximum allowable PCB contamination is < 2ppm.

Before and after de-oblorination, samples are tested for PCB concentration. The PCB concents of the oblatter de-chlorination is < 2ppm of PCB.

Around 7 drams of sludge and 41 drams of water has been collected, it is the responsibility of MAS KSERI. to dispose the items as per the State Poliation Control Board norms.

After the completion of the PCB de-chlorination activity, the vehicles along with the accessories will leave the site on 01.09.2023 (tentatively), till that time CPRI engineers will be present at site.

CPRI will submit detailed report within one month. The PCB freeness certificate will be issued by M/s CPRI to KSEBL for making payment.

M/s KSEBL representatives

 A.A.Ruksana Assistant Executive Engineer, 220kV Substation Subdivision Kalamassery

2. Aniekimiar,G

Assistant Engineer Maintenance Section J 220kV Substation, Kalamassery M/s CPRJ representative

Dr. P. Thomas Additional Director PCB Project Leader CPRI, Bengaluna

Minutes of Meeting Held Between M/s. CPRI and M/s. KSEB on 26.08.2023

# **Annexure 10** (Returnable & Non-Returnable Gate Pass)

Dielectric Material Division Ref: CPRI/DMD/PCB/2023/KSEB-KLM Date: 02.06.2023 Returnable Items (Annexure A) – Prakash Parcel Service [MH 04 FJ 9844] No.   DESCRIPTION OF ITEMS QUANTITY IN No's   PURCHASE COST
ND DESCRIPTION OF ITEMS QUANTITY IN No's PURCHASE COST
100 Ltrs Sodium Dispersion 34 No*
Ladders 4 No's
Step down Transformer GCW make. 1 No
S. No. 017D310091 Drum Mixer / No
Dram Mixer Motor I No
Nitrogen cylinder stand I No
Nitrogen Manifold T No
Vent Pipe 1.No
Chain Palley 1.No
Chain Pulley rod I No Electrical distribution box with cables I No + 5 Cable's
Provide a state state of the st
Accessories of PUB
de-chlorination unit
Extension Box 1 No
Extension Box 30 m (Length) 1 No
coprise network
eter oftend as
See along Contract
Steel Buckets 2 No's
Barrel Pump 1 No
Plastic mug 3 No's
The second
Troiling
Connecting cables     \$ No's     Accessories of PCB       Carbon bose pipes     6 No's     de-chlorination unit       Flood Light     1 No     de-chlorination unit       Extension Box     1 No     de-chlorination unit       Earth wire     5 Metre     Solution       Sprit level     2 No's     Sampling Holder       Oil Sprayer     1 No     Plastic Buckets       Steel Buckets     3 No's     Steel Buckets       Barrel Pump     1 No     Plastic mug



Prof. Sir. C.V. Raman Road, Sadashiwanagar Post Office, P.B. No. 6060, Bengaluru - 560 080 India Inwije / website -http://www.oprum

### **Dielectric Material Division**

#### Ref: CPRI/DMD/PCB/2023/KSEB

#### Date: 02.06.2023

Returnable Items (Annexure B) - Prakash Parcel Service [MH 04 FJ 9844]

01	Air Drier, Make : Orbit	1	Rs: 1000/-
02	Drilling Machine, (M0801B)	1	Rs: 1000/-
03	Cutting Machine (Bosch) GMS 600	1	Rs: 1500/-
04	Multimeter (M266 Mastech)	1 No	Rs: 200/-
05	Vernier Calliper scale	1 No	Rs: 200/-
06	Drill bits	2 Sets	Rs: 200/-
07	Allen Keys	2 Sets	Rs: 200/-
08	Tools Box [ Taparia]	1	Rs:2500/-
09	Adjustable spanner	1 No	Rs: 500/-
10	Pipe Ringe	1 No	Rs: 50/+
11	Hammor	1 No	Rs: 50/-
12	Cutting plier	2 No's	Rs: 200/-
13	Spanners	43 No's	Rs: 500/-
[4	Screw Driver	4 No's	Rs: 250/-
15	Chisel	I No	Rs: 50/-
16	Measuring Tape	2 No's	Rs: 50/-
17	Nose Plier	1 Na	Rs: 50/-
18	Brush	1 No	Rs: 50/-
19	Cylinder Key	2 No's	Rs: 50/-
20	Scissors	1 No	Rs: 20/-
21	Knife	1 No.	Rs: 50/-
22	Wire Cutier	1 No	Rs: 50/-



#### AD (HOD-DMD) PCB Project Leader

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Joint Director



# केन्द्रीय विद्युत अनुसंधान संस्थान

(चाल सरकार की कोसाइटी, विद्रुत मंत्रालद) जो सर सी वी. गमन रोड, सर्वाइंजनगर डाफ घर, घो.ब.सं. 8066, बेंचलूरु – 560.080

#### CENTRAL POWER RESEARCH INSTITUTE (A.GovLof India Society, Ministry of Power)

Prof. Sir. C.V. Raman Road, Sadasitivanagar Post Office, P.B. No. 8006, Bengaluru - 560.080 India fempt / website .http://www.cpil.in

#### Dielectric Material Division

#### Ref: CPRI/DMD/PCB/2023/KSEB

#### Date: 02.06.2023

#### Returnable Items (Annexure C) - Prakash Parcel Service [MH 04 FJ 9844]

	SAFETY A	CCESSORIES	
01	Cartridge Mask	5 No's	Rs: 500/-
02	Yellow Safety Uniform	2 No's	RS: 1000/-
03	Yellow Front Body Cover Dress	1 No	RS: 500/-
04	Face Shield	2 No's	Rs: 200/-
05	Normal Googles	3 No's	Rs: 500/-
06	Helmets	5 No's	RS: 1000/-
07	Safety Uniform	15 No's	RS: 2000/-
08	Lab Coat	5 No's	RS: 500/-
	LAB CHEMICA	L ACCESSORIE	S
09	Auto Dispenser	1 No	Rs: 500/-
10	Vacuum Pump	1 No	RS: 2000/-
11	Cartridge Glass filter unit	7 No	RS: 1000/-
12	Micropipette (10-100micro L.)	1 No	Rs: 500/-
13	Micropipette (100-1000 )micro L	2 No's	Rs: 500/-
14	GC kit	I Box	RS: 1000/-

\$

AD (HOD-DMD) PCB Project Leader

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Joint Director DMD



DE AD DIOD DMD PCB Project Lymber = a unp/a/p-Mo 1990

Pestcuritury (06) 2015



# केन्द्रीय विद्युत अनुसंधान संस्थान

(भाग सरका की सोसाइये, विदुत गणावर) जोसर होरे से मान्य सेड, संसंविधनान काम थर, परे भागा, BOGS, जैनलूम - 560 DBD CENTRAL POWER RESEARCH INSTITUTE

(A.Govt.of India Society, Ministry of Prower)

Prof. Sir. C.V. Raman Ross, Sadashivanagar Post Diffice, P.B. No. 8066, Bengalaru - 560 060 india freep: / website :http://www.cpri.in

#### **Dielectric Material Division**

#### Ref: CPRI/DMD/PCB/2023/KSEB

#### Date: 02.06.2023

Non-Returnable Items [Consumables] (Annexure B) - Prakash Parcel Service [MH 04 FJ 9844]

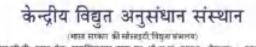
SL.No	CHEMICAL LAB CONSUMABLES	QUANTITY IN No's
01	Iso octanic 2.5 Lins	2 No's
02	Sulphurie acid 2.5 Ltrs	I No
03	Tissue rulls	25 No's
04	Aluminium Foil	3 No
05	Micropipettes tips Iml	3 Packets
06	Silica Cartridge (100 Units)	Box
07	Filter Paper (100 Units)	3 Box
08	Vials Box	2 Box
09	Laboline (5 Ltrs)	2 No's
10	Sample Bottles (HDPE60 ml)	1 Box
11	Measuring cylinder (5ml)	20 No's
12	Measuring cylinder (10ml)	38 No's
13	Volumetrie Flask (20ml)	48 No's
14	50 ml Reagent Bottle	30 No's
15	Volumetric Flask (250ml)	4 No's
16	Glass Beaker (100 ml)	4 No's
17	Glass Beaker (500 ml)	2 No's
18	Glass Funnel	3 No's
19	100 ml Vacuum Conical Flask	5 No's
20	Cotton Waste	20 Kg

#### AD (HOD-DMIT) PCB Project Lender

THE STATE OF ALL AND A

 Joint Director DMD

# **Annexure 11** (Volvo Returnable Gate Pass)



CENTRAL POWER RESEARCH INSTITUTE (A Govier india Society, Minary of Power)

Prof. Sir. C.V. Raman Road, Sadashiwanagar Post Dflice, P.B. No. 8066, Bengalura – 560 D82 India Brenz (Website :http://www.cprl.in

Dielectric Material Division

	NABLE ITEMS [VOLVO] KA 04 MU 6886	MAKE/SL. NO IF ANY	QTY
SLN0	DESCRIPTION OF MATERIAL	MARE/SL. NO IF ANT	4.1
1	GC-ECD Instrument with wooden box.	Make Perkin Elmer, SLNo:680S 16090202	I No
2	UPS	Make; Alpha	I No
3	Exide Batteries (Sealed Lead acid)	12 V, 18Ah	10 No's
4	Fire extinguisher	SI.No:A5827-06-16 SI.No:A5815-06-16	2 No's
5	Nitrogen cylinder	SL.No;6022, SL.No;69034	2 No's
6	Ladder	-NA-	1 No
7	Spare wheel	-NA-	T No
8	Road safety cones	-NA-	2 No's
9	Air gauge (for air filling of tyres)	-NA-	I No
10	Jack lever	-NA-	I No
11	Wall Clock	-NA-	1 No
12	Jockey	-NA-	3 No's
13	Wheel Choke	-NA-	2 No's
14	Hammer	-NA-	1 No.
15	Fuse Box & Light	-NA-	1 No
16	Fire Extinguisher	-NA-	1 No
17	Air Hose	-NA-	1 Set
18	Funnel	-NA-	i No
19	Tarpaulin	-NA-	1 No
20	Kerosene Pump	-NA-	I No
21	T-Cycle	-NA-	1 No
22	Taparia Tools box	-NA-	I No
23	Ratchet Belt	-NA-	2 No's

PEStudy Joint Director of 2022 DMD

AD (HOD-DMD) PCB Project Lender

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# **Annexure 12 (PCB Freeness Certificate)**

	भो सर सी. बी. रामन	य विद्युत अनुसंध गरत सरकार की सोसाइटी, कि यह, बसाविजनार सन घर के	पुल मंचालय) ग. स. २०६६, बे	WER - 560 000	
0		POWER RESEA		STITUTE	
Prof. Sir	C.V. Raman Road	A Govt of India Society under Mir I, Sadashivanagar P.O., P.B. 7	to ROME Ra	rated 080 084 - NO	
	1.	Remotivebalte : http://www.	cpri.in	regardent - sone poor, a stati	
		Dielectric Materials Division	-		
Rel : CPRAPCIS 2023/KSE Din is to certify flue the fo 220 kV Substation subdivis	dowing Orisite PCB d		ed out by CPR	Dr. 64.10.2023 Las Kenila State Electricity Board I 24, Dr.24.05.2023	м.
	Client			KSEB, Kalamassery	1
PCB contaminated Transformer/Transformer/Transformer	isformers (Make Cit bank of 128 MVA, 22	220/LH0 KV, 40 MVA. scrap 0/110 KV)	D 5774	46, D 577147 & D 577148	1
Transformer Serial No.	Baich No	Quantity of PCII containented fits.	Oil Treated,	Final PCB concentration" ; ppm (mg/kg)	1
_	1	4308	-	0.28	1
	2	4366		0.13	1
	Ĵ.	4315		0.23	
	4	4305	-	11.32	
D577147	3	4360		0.26	4
	6	4310		0.15	-
	1	4325 3627		0.24	4
		3666	-	0.16	1
	40	4306		0.29	1
	U	4306		6.25	t -
DS77146	12	4308		6.14	1
	U	4307		0.16	1
	- 14	4325		6.18	1.
	B.	4506	-	6.22	1
		4501		0.16	4
	17	3622		0.09	1
	10	4306		0.12	1
	20	4306		0.05	1
	7.1	4306		0.05	1
	22	4306		0.07	1
D577148	23	4334		u.15	
20211140	24	4376		0.25	1
	25	4371	-	11.25	-
	25	4129		0.39	
	Total	10751			1
Accepted limit + 2 ppm in		1			-
Hence the above bascher o presented during the proces		viarimation	अपर रिटेशक प्राय वे द्यु Dielectric केन्द्रीय विष् Central Pow प्रे स्ट स क सर्वाजितना	Additional Disactor Additional Disactor A eartraft upperformed Malerrate Biologianhowed Lea in arganetic finature of P-B. No. 8056 / Sadashivanagar impalton - 560 080	