केन्द्रीय विद्युत अनुसंधान संस्थान
(भारत सरकार की सोसाइटी, विद्युत मंत्रालय)
प्रो.सर.सी. वी. रामन रोड, सदाशिवनगर डाक घर, पो. बा. सं. 8066, बेंगलूरु - 560 080
CENTRAL POWER RESEARCH INSTITUTE
(A Govt. of India Society under Min. of Power)
Prof. Sir.C.V. Raman Road, Sadashivanagar P.O., P.B. No. 8066, Bengaluru - 560 080. India
वेब साइट/website : http://www.cpri.in

Dielectric materials Division

Ref No: CPRI/DMD/PCB/GOODYEAR

Date: 27.02.2020

M/s GoodYear India Limited,
21/4 Milestone, NH-2 Mathura Road,
Ballabgarh, Dist. Faridabad,
Hrayana-121 004

Dear Sir,

Sub: PCB de-chlorination work Pertaining to M/s GoodYear India Limited.
Ref: Email dt:22.10.2018.

With reference to the above subject, PCB contaminated oil drums of 4 No's (950 Ltrs) were received from M/s GoodYear India Ltd, Faridabad on 07.03.2019. All 4 drums of PCB contaminated oil was successfully de-chlorinated using PCB de-chlorination unit available at CPRI, Bangalore on 06.11.2019.

The detailed report of the PCB de-chlorination process is enclosed here with for your kind information.

Thanks and Regards,

27/02/2020

Dr. P. Thomas
Additional Director/HOD/DMD
Email Id: thomas@cpri.in
P[h]: 9449041168

PCB de-chlorination work

pertaining to

M/s GoodYear India Limited, Faridabad, Haryana.

By

Dielectric Materials Division

Central Power Research Institute

Bengaluru -560080, India

PCB de-chlorination work pertaining to M/s GoodYear India Limited, Faridabad, Haryana.

CPRI had submitted the PCB test report (No.CPRIBLRDMDPCB1819T1612-1615, dt: 27.08.2018) to M/s GoodYear India Limited. It was observed that one transformer with PCB contamination and three transformers were filled with Pure PCB.

An email dated. 22.10.2018 has been received from Plant Head Engineering, GoodYear India Ltd.,(**Annexure A**) requesting guidelines for PCB de-chlorination, Subsequently CPRI requested M/s GoodYear India Limited, to send the PCB contaminated oil to CPRI, Bangalore for PCB de-chlorination activity (Email Dt:22.10.2018).

M/s GoodYear India Ltd. made arrangements and sent around 950 liters of oil to CPRI, Bangalore on 07.03.2019 for PCB de-chlorination activity (**Annexure B**). The details are given below in Table no.1

Table No.1: Details of PCB contaminated oil drums received at CPRI, Bangalore.

Sl. No	Date	Qty of Barrels (No.)	Vehicle No.
1.	07.03.2019	4	HR38Y6702

Upon receipt of oil Barrels, the PCB content of each Barrels was analyzed and the reports is given in Fig.1-4. It is observed that the PCB contamination is about 18 to 25ppm.

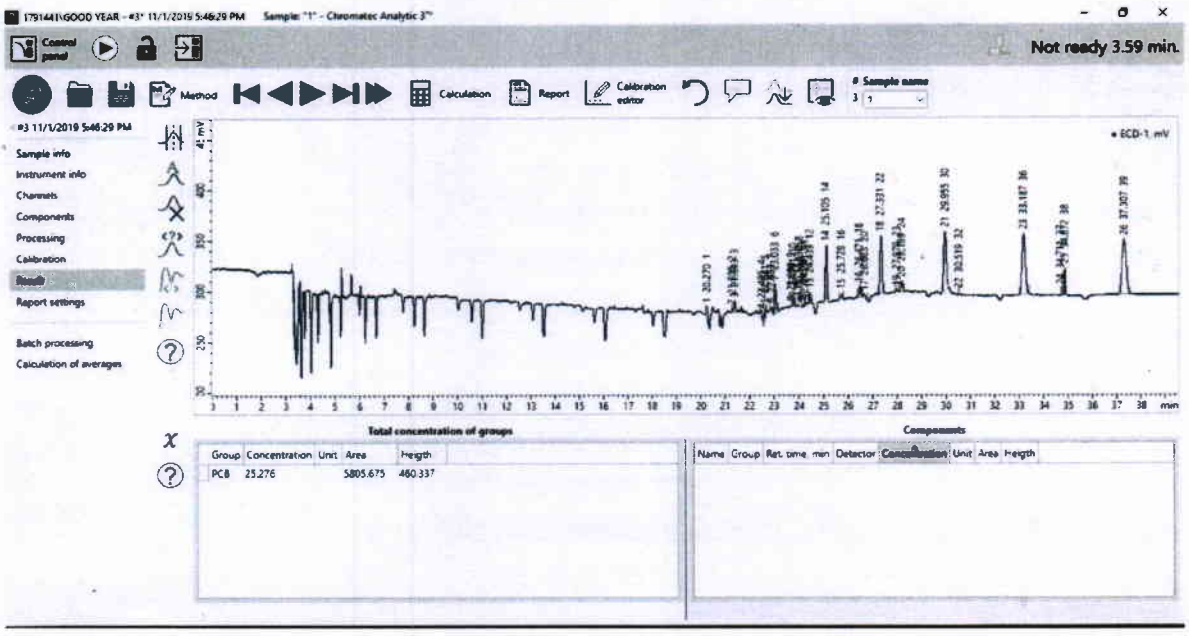


Fig.1: Drum No. 1- PCB analysis report (Concentration 25.2ppm)

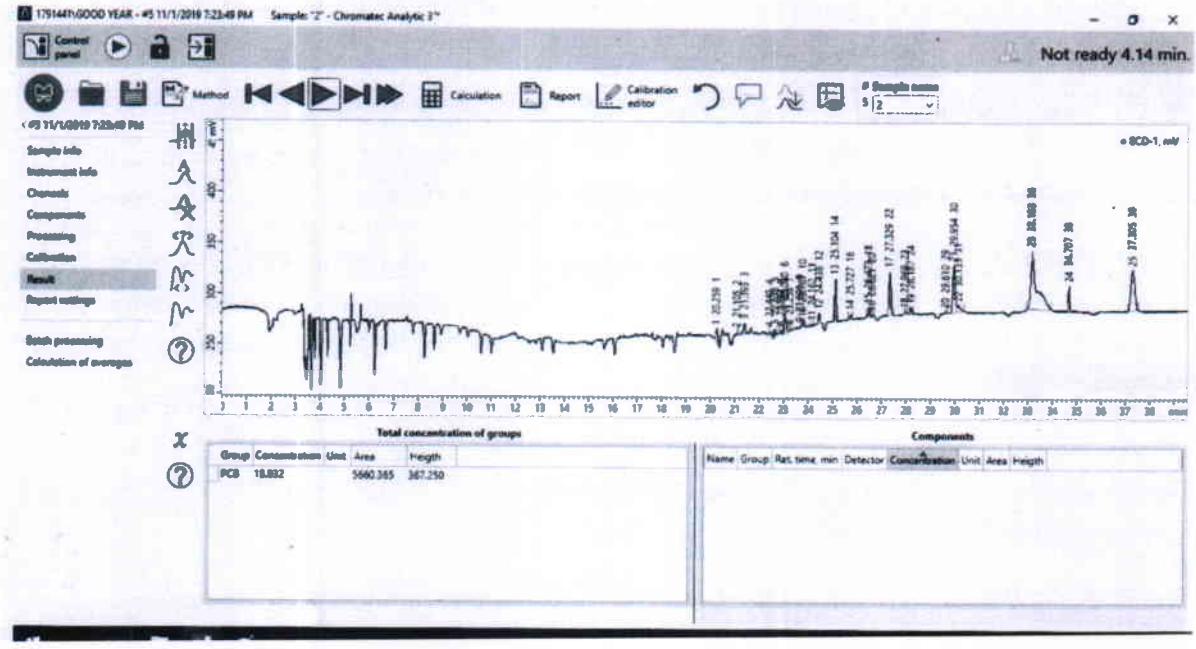


Fig.2: Drum No.2- PCB analysis report (Concentration 18.9ppm)

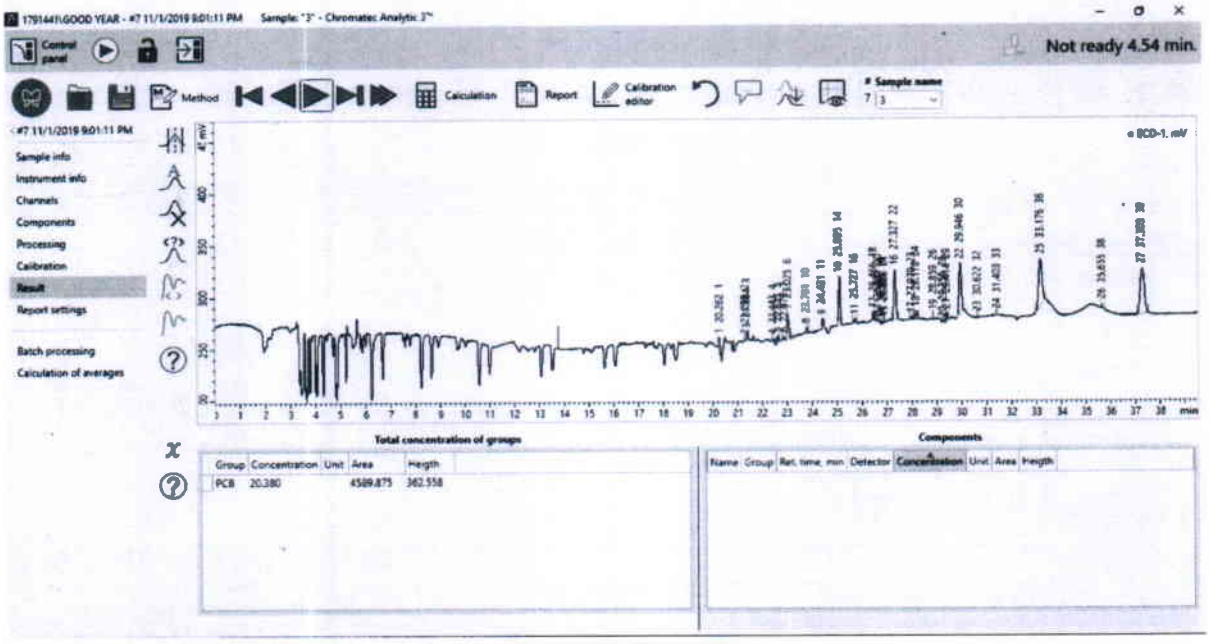


Fig.3: Drum No. 3- PCB analysis report (Concentration 20.38ppm)

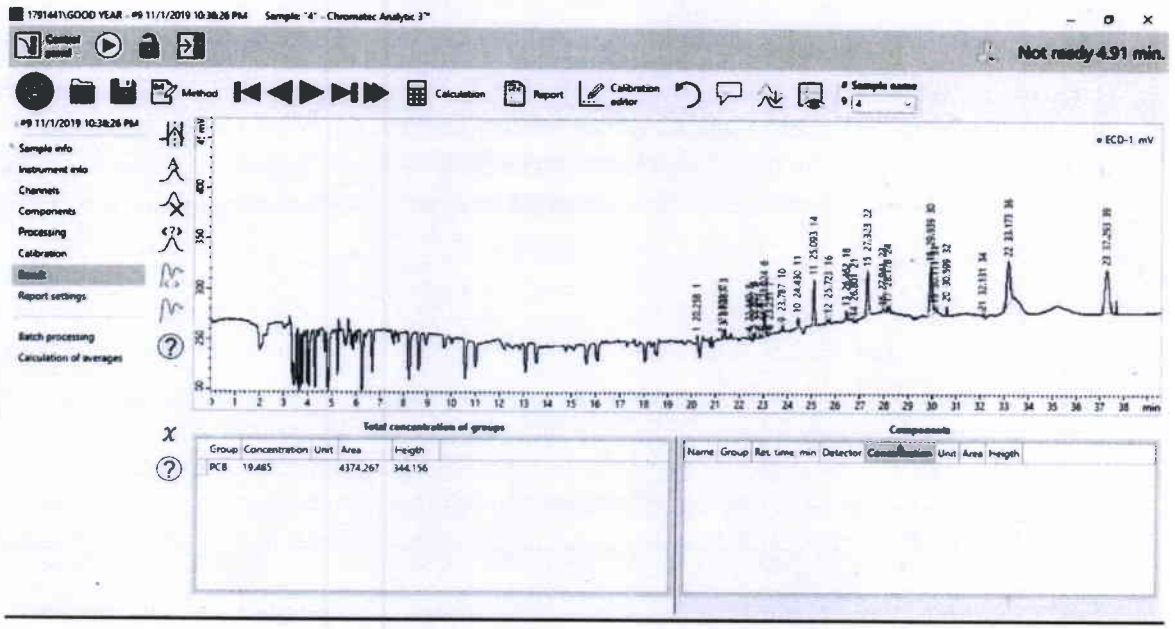


Fig.4: Drum No.4- PCB analysis report (Concentration 19.48ppm)

The PCB contaminated oil in the barrels were transferred and stored in 6kl MS tank available at CPRI (Fig.5&6).

Fig.5: Unloading of PCB contaminated transformer oil drums received from Vehicle

Fig.6: PCB contaminated oil stored in 6kl MS tank

Around 300kg of sodium dispersion was prepared using sodium metal and mineral oil in the ratio 40:60 in sodium dispersion unit. This sodium dispersion is used during PCB de-chlorination reaction.

The PCB dechlorination process was operated in batches with minimum batch size of about 3000 l/batch and can be treated up to 10000ppm of PCB content in oil. To makeup the batch

size of the reactor, the PCB contaminated oil pertaining to other PCB stake holder was mixed with this oil and loaded into reactor (Fig.7).

The oil was passed through two heaters and degasifier, where water and volatile compounds were removed. This PCB contaminated oil was stirred for one hour 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 of sodium dispersion was added into the reactor.

The PCB de-chlorination reaction was carried out at a temperature of 120 degree Celsius with nitrogen purging in the reactor. The samples were drawn at every hour and analyzed using GC-ECD to check the level of PCB content (Fig.8). The reaction was continued till the PCB content less than 2 ppm achieved.

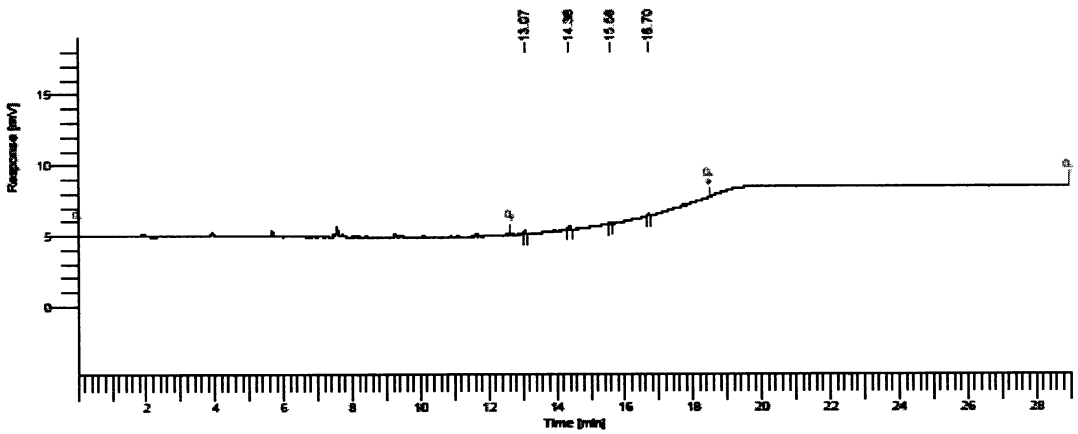
After completion of reaction, excess of sodium in the reaction vessel was neutralized by adding water and the hydrogen gas released during the neutralization is purged with nitrogen and vented
to atmosphere. Then the reaction mass in the reaction vessel is transferred to settling tank. The reaction mass 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 oil from the settling tank also drained to the barrels. The PCB de-chlorination activity was carried out on 06.11.2019. The PCB content after PCB de-chlorination was found to be 0.672ppm. The results are given in Fig.9.

Fig.7: PCB staff members loading transformer oil to reactor through inlet hose pipe of PCB de-chlorination unit.

Fig.8: Sampling of oil from the reactor for PCB analysis by PCB team member.

Software Version	: 6.3.2.0646	Date	: 05-12-2019 15:18:02
Sample Name	: pcb	Data Acquisition Time	: 05-12-2019 13:42:05
Instrument Name	: Clarus 680	Channel	: A
Rack/Vial	: 0/0	Operator	: manager
Sample Amount	: 1.000000	Dilution Factor	: 1.000000
Cycle	: 1		

Result File :
Sequence File : C:\GC PCB Analysis\Sequence\05.12.2019.seq



PCB ANALYSIS

Peak #	Component Name	Time [min]	Area [uV*sec]	Height [uV]	Area [%]	PCB IN PPM
	PCB	16.000	2427.24	773.23	100.00	0.6722
			2427.24	773.23	100.00	0.6722

Fig.9: PCB test report after PCB de-chlorination.

Details of PCB de-chlorinated oil and sludge generated during PCB de-chlorination process.

During the PCB de-chlorination process, around 200 Kg of sludge (Fig.10) and the treated oil free from PCBs (Fig.11) around 750 lts has been generated. The amount of oil sludge generated and the total quantity of oil after PCB treatment is given in the Table.2. CPRI had identified an recycler M/s KarRecycle centre LLP. Who is authorized by Karnataka State Pollution control Board to handle both treated oil and sludge. The generated, sludge and the oil were sent to M/s KarRecycle Centre LLP, for disposal (Fig.12).

Fig10: Sludge stored in drums for incineration

Fig.11: Oil after PCB de-chlorination stored in 5Kl Plastic tank for disposal

Table. 2: Details of PCB de-chlorinated oil and sludge generated.

Sl. No	Details of work done	PCB Contaminated oil	Oil after de-chlorination	Qty. of Sludge Generated
1.	M/s Good Year India Ltd.	950 lts	750 lts	200 Kg

Fig.12: Loading of PCB de-chlorinated oil and sludge to the vehicle of M/s KarRecycle Centre LLP, for disposal.

The 4 drums (950 ltrs) of PCB contaminated oil with 18 to 25ppm belonging to M/s GoodYear India Ltd., was successfully dechlorinated to less than 2 ppm using PCB mobile dechlorination unit at CPRI, Bangalore on 06.11.2019.

Annexure A

Email **pcbgroup@cpri.in**

RE: [EXT] Reg: PCB testing of Transformer oil.

From : Rajeev Saxena <rajeev_saxena@goodyear.com> Mon, Oct 22, 2018 12:28 PM
Subject : RE: [EXT] Reg: PCB testing of Transformer oil. 2 attachments
To : pcbgroup@cpri.in
Cc : Neeraj Ompal Singh <neeraj_singh@goodyear.com>

Dear Sir

Referring to your offer for de-chlorination of our one transformer oil (Quantity 960 Ltrs), please suggest the way for moving ahead for same.
Would appreciate if you can reduce the price for same procedure.

Regards

Rajeev Saxena

From: Rajeev Saxena
Sent: Monday, August 27, 2018 12:07 PM
To: 'pcbgroup@cpri.in' <pcbgroup@cpri.in>
Subject: RE: [EXT] Reg: PCB testing of Transformer oil.

Dear Sir

Please ignore the earlier mail The quantity is in Gallen not in LBs

Transformer # 1 – 367 Gallon
Transformer # 2 – 337 Gallons
Transformer # 3 – May be considered 1000 Litres
Transformer # 4 – 960 Liters

Regards

Rajeev Saxena

From: Rajeev Saxena
Sent: Monday, August 27, 2018 10:19 AM
To: 'pcbgroup@cpri.in' <pcbgroup@cpri.in>
Subject: RE: [EXT] Reg: PCB testing of Transformer oil.

Dear Sir

Below Pl. find the oil quantity in each transformer. Please suggest the way to dispose of the oil.
Oil Quantity in transformer # 3 may be considered similar as in Transformer # 1 & 2.

Email dated 22.10.2018 received from Plant head Engineering, Good Year India Ltd., requesting guidelines for PCb de-chlorination.

S.N	TRANSFORMERS	T/F S.NO.	MAKE	OIL
1	1000KVA T/F CONTROL ROOM S/S #1	3296563	ALLIS CHALMER	367 Lbs
2	1000KVA CONTROL ROOM S/S #2	3505637	ALLIS CHALMER	337 Lbs
3	1000KVA CONTROL ROOM S/S #3	NO PLATE	BHARAT BIJLEE	NO PLATE
4	1000KVA POWER HOUSE S/S#4	3228/1	BHARAT BIJLEE	950 Ltrs

Regards

Rajeev Saxena

From: pcbgroup@cpri.in <pcbgroup@cpri.in>
Sent: Saturday, August 25, 2018 12:37 PM
To: Rajeev Saxena <rajeev_saxena@goodyear.com>
Subject: [EXT] Reg: PCB testing of Transformer oil.

CAUTION: EXTERNAL email. Please think before clicking on any links or attachments.

Dear Sir,

The transformer oil samples sent to CPRI, Bangalore for PCB testing have been evaluated. It has observed that the transformers are filled with PCB contaminated oil,

1. PHSS#4 Transformer= 55.35 ppm
2. CRSS#1 Transformer= Pure PCB's
3. CRSS#2 Transformer= Pure PCB's
4. CRSS#3 Transformer= Pure PCB's

It is requested to give the amount of oil present in each transformer.

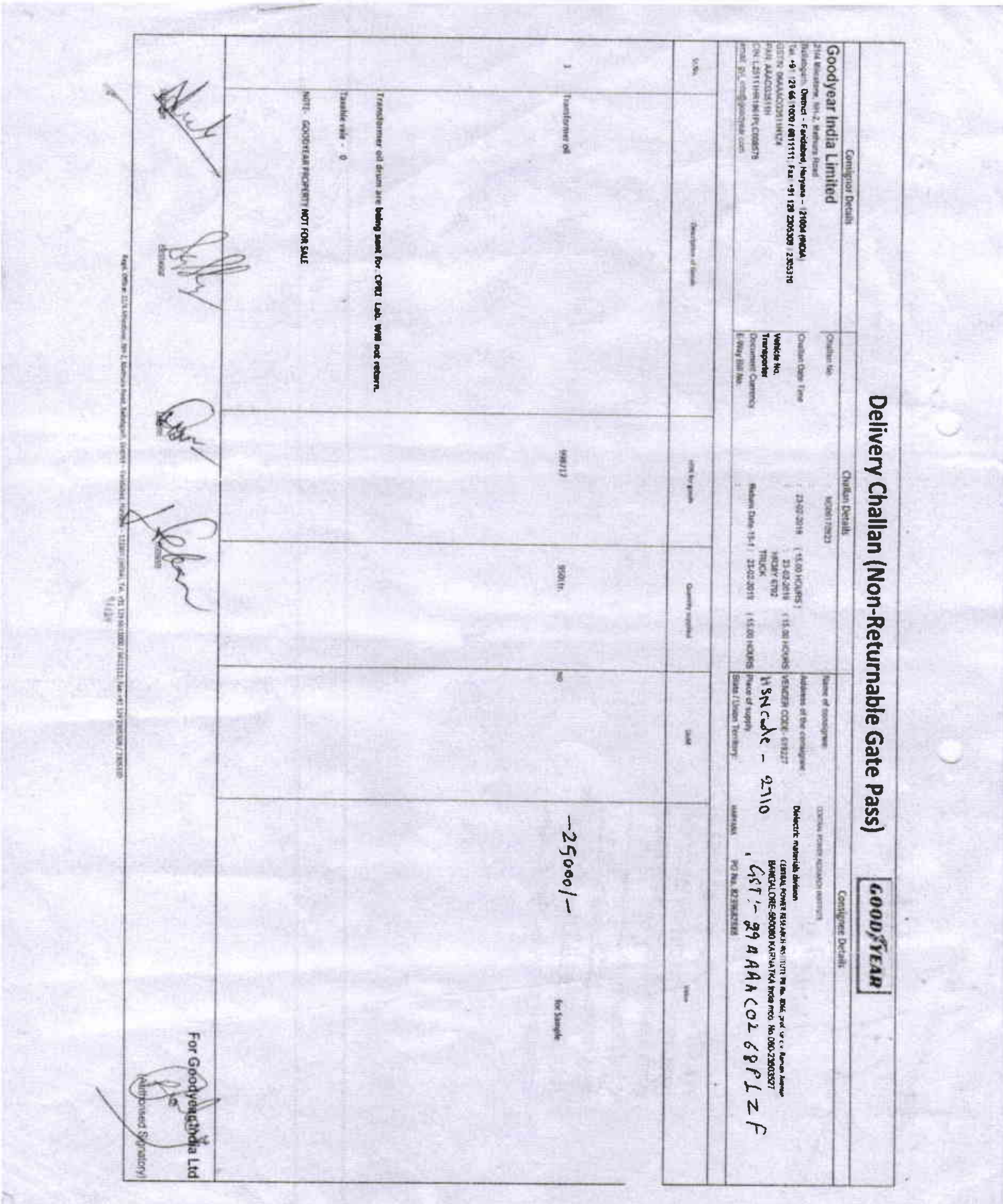
Thanks and Regards,
Bharath G R

PCB Group
NIP (PCB Reduction & Elimination) on POP's
Project Sponsored by UNIDO & MOEF

Dielectric Materials Division
Central Power Research Institute
PB No. 8066, Prof. Sir C.V Raman Avenue
Bangalore - 560 080
Karnataka, India
Work Phone: 080-22072429

CPRI Report soft.pdf
1 MB

Annexure B


Delivery Challan (Non-Returnable Gate Pass)

GOODYEAR

Goodyear India Limited

Transformer oil drum are being sent for CPRI Lab. Will not return.

NOTE: GOODYEAR PROPERTY NOT FOR SALE

950Ltr.

For Sample

-25000/-

For Goodyear India Ltd

(Authorised Signatory)

Around 950Ltrs of PCB contaminated oil received at CPRI Bangalore on 07.03.2019 by M/s Good Year India Ltd., for PCB de-chlorination activity.

केन्द्रीय विद्युत अनुसंधान संस्थान
(भारत सरकार की सोसाइटी, विद्युत मंत्रालय)
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वेब सइट/website : http://www.cpri.in

Dielectric materials Division

Ref No: CPRI/DMD/PCB/KSEBKAKKAYAM

Date: 28.02.2020

Office of the Assistant Executive Engineer,
Electrical Maintenance sub Division,
Kerala State Electricity Board Ltd.,
Kakkayam, Kozhikode, Kerala-673 615.

Dear Sir,

Sub: PCB de-chlorination work Pertaining to M/s KSEB, Kakkayam, Kerala.
Ref: Letter No: EMSD/PCB/2019-20/28/, Dt: 18.05.2019.

With reference to the above subject, PCB contaminated oil drums of 5 No's (1050 Liters) were received from M/s KSEB, Kakkayam on 22.05.2019. All 5 drums of PCB contaminated oil was successfully de-chlorinated using PCB de-chlorination unit available at CPRI, Bangalore on 06.11.2019.

The detailed report of the PCB de-chlorination process is enclosed here with for your kind information.

Thanks and Regards,

28/02/2020

Dr. P. Thomas
Additional Director/HOD/DMD
Email Id: thomas@cpri.in
P$^{h.}$: 9449041168