







PETROLAB SERVICES independent laboratory







2nd Phase of Extended PCB Inventory in Indonesia under The Project "Introduction of an Environmentally – Sound Management and Disposal System for PCB Wastes and PCB – Contaminated Equipment

Final Report



TABLE OF CONTENTS

TA	BLE O	F CON	ITENTS	1
1.	INT	RODU	JCTION	2
1	L.1.	Back	ground	2
1	L.2.	Purp	oose, Objective and Expected Output	3
1	L.3.	Scop	be and Period of Reporting	4
2.	PRC	DJECT	IMPLEMENTATION AND RESULTS	7
2	2.1.	Proj	ect Implementation	7
	2.1.	.1.	Project Implementation in the 1 st Quarter (15 July 2019 – 26 June 2020)	7
	2.1.	.2.	Project Implementation in the 2 nd Quarter (27 June 2020 – 16 October 2020)	8
	2.1.	.3.	Project Implementation in the 3 rd Quarter (17 October 2020 – 18 December 2020)	8
	2.1.	.4.	Project Implementation in the 4 th Quarter (19 December 2020 – 5 October 2021)	9
2	2.2.	Proj	ect Outputs and Achievements1	1
	2.2.	.1.	Official Consultative Meetings1	1
	2.2.	.2.	Training of Trainers (ToT) for PLN1	2
	2.2.	.3.	Focus Group Discussion (FGD) Events1	2
	2.2.	.4.	Sampling Activity and Update of Inventory Database1	5
	2.2.	.5.	PCBs Management Plan 2	3
	2.2.	.6.	GIS Data Mapping 2	4
2	2.3.	Impl	lementation Issues and Coping Strategy 2	4
3.	COI	NCLUS	SIONS AND RECOMMENDATIONS	7
AN	NEXE	S		8
ŀ	Annex	(1: W	orkplan, Activities and Project Progress Chart2	8
A	Annex	2: GI	S Data Mapping	1
ļ	Annex	3: Inv	ventory Labels Design	6
A	Annex	4: De	elivery Receipt of Inventory Labels and Testing Result Reports	8

1. INTRODUCTION

The Final Report compiled and provided highlights of the overall process and achievement of deliverables during the project implementation period from the 1st quarter until project completion. The deliverables, activities and events compiled here were based on the project Terms of Reference (ToR). This document also elaborated implementation issues that occurred during project implementation and the strategies taken to cope with those issues.

1.1. Background

The Stockholm Convention on Persistent Organic Pollutants is an international environmental treaty that aims to eliminate or restrict the production and use of persistent organic pollutants (POPs), as these substances can inflict harmful impacts on human health and on the environment. Polychlorinated Biphenyls (PCBs) that contaminates transformer oil is one of the substances that can be categorized as POPs. For Indonesia, the ratification of Stockholm Convention On Persistent Organic Pollutants was established through the issuance of Law No. 19 of 2009.

PCBs removal and disposal are among national priorities in implementing Stockholm Convention, as stated in the 2008 National Implementation Plan (NIP). This NIP was then reviewed and updated in 2014, in which removal and disposal of PCBs remained as one of the national priorities. The Ministry of Environment and Forestry (MoEF) and UNIDO is working together on this issue, with PT. Perusahaan Listrik Negara (PLN) being actively involved.

In regards to Indonesia's effort to implement the National Implementation Plan, PT. Petrolab Services (Petrolab) has been awarded as the contractor to assist MoEF and UNIDO in the 2nd Phase of Extended PCBs Inventory in Indonesia under the Project "Introduction of an Environmentally – Sound Management and Disposal System for PCBs Wastes and PCBs – Contaminated Equipment" on July 2019. The project is a continuation of the 1st Phase of Extended PCBs Inventory project in 2015-2016, which collected 3015 samples from Java Island.

The 2nd PCBs extended inventory involved 62 private companies located in 12 provinces in Java and Sumatra, and PT. Perusahaan Listrik Negara (PT. PLN—Indonesia Electrical Company) equipment all over Indonesia. However, this project did not include or performed analysis of trasformers data from PT. PLN, because it was not included in the project's TOR (not part of the scope of work), dan data from PLN was not yet submitted to the project when this report was arranged. The project focuses on nine (9) energy-intensive industrial sectors, which are: 1) pulp and paper; 2) oil refinery, 3) smelter/metallurgy; 4) iron and steel; 5) power plant; 6) mining; 7) oleochemical; 8) oil & gas; and 9) petrochemical/fertilizer.

1.2. Purpose, Objective and Expected Output

The purpose of the project is derived from one of the priorities and key objectives stated in the National Implementation Plan (NIP), which is to "measure PCBs contamination, especially in mining activities, industrial zones and power plant, ships and vessels". More specifically, the objectives of the 2nd PCBs extended inventory activity are to establish at least 1500 samples inventory and to update the PCBs management plan. The activity covers sampling and analysis of insulating oil in online transformers, updating national database and development of Geographical Information System (GIS) and PCBs Management Plan.

In terms of project implementation arrangement based on the project terms of references (TOR), the implementation period was divided into quarters, in which each quarter had its own Key Performance Indicators (KPIs). The KPIs were also considered as the expected outputs for each quarter, and can be found in the following table.

Quarter		Key Performance Indicators/Outputs			
1	1.	Finalize and/or elaborate:			
		a. Detailed workplan			
		b. Methodology for PCBs inventory			
		c. Method for transformer selection			
		d. Safety procedures of sampling			
		e. List of sample industries and PLN			
		f. Structure of inventory database			
		g. PCBs Database Management			
		h. Job description of PCBs Inventory Team			
		i. Design of inventory label			
	2.	Organize Induction Meetings in Java and Sumatera			
	3.	Organize Kick-off and Planning Workshop for PLN			
	4.	Organize The 1 st official Consultative Meeting			
2	1.	Carry out sampling and screen test for at least 600 samples.			
	2.	Update PCBs inventory database.			
	3.	Organize four (4) Training of Trainer (ToT) for PLN.			
	4.	Deliver a total 2,500 bottle samples to PLN along with equipment.			
	5.	Deliver reagents, and consumables for screen test of 2,500 samples to PLN			
	6.	Organize the 2 nd Official Consultative Meeting			
3	1.	Carry out sampling and screen test to, at least, 1,200 in-services and offline industrial			
		transformers in Sumatera and Java (80% of the minimum target), cumulatively;			
	2.	Procure and deliver to PTL BPPT reagents, chemicals, and consumables for sample			
		preparation and analysis of 125 PLN samples by GC-ECD;			
	3.	Update PCBs Inventory Database;			
	4.	Develop GIS according to the results of inventory;			
	5.	Elaborate PCBs Management Plan;			
	6.	Organize the 3 ^{ro} Official Consultative Meeting as a monitoring and evaluation			
		mechanism to the activity, draft and submit its report no later than two (2) weeks			
		after the organization of the meeting; and			
4	1.	Carry out sampling and screen test to, at least, 1500 in-services and offline industrial			
		transformers in Sumatera and Java (100% of the minimum target), cumulatively;			

Table 1 Key Performance Indicators/Outputs per Project Implementation Quarter

Quarter		Key Performance Indicators/Outputs
	2.	Carry out GC analysis to 5% of the samples (75 samples), particularly to those equal or above (\geq) 50 ppm;
	3.	Produce at least 4,000 inventory labels according to the results of screen test or as suggested by the existing policy and regulation, as follows:
		 At least 1,500 labels for Industrial Inventory;
		At least 2,500 labels for PLN Inventory
	4.	Update PCBs Inventory Database;
	5.	Finalize GIS according to final results of inventory;
	6.	Finalize PCBs Management Plan;
	7.	Manage an environmentally-sound disposal of samples and wastes generated during the activity (oil samples, solvent, used-equipments possibly contaminated with PCBs, etc.) as PCBs wastes or hazardous waste, in compliance with national policy and regulations, including those produce during PLN Inventory;
	8.	Organize Final Official Consultative Meeting as a monitoring and evaluation mechanism to the activity, draft and submit its report no later than two (2) weeks after the organization of the meeting;

Source: Project Terms of Reference (TOR)

As seen in Table 1 above, the outputs per quarter acted as stages for the final outputs expected in the final quarter. Therefore, this report would summarize the outputs in quarter 1-3 (not elaborated in details), and focused more on the final outputs achieved in the 4th quarter.

1.3. Scope and Period of Reporting

Due to delays on the overall project implementation, particularly due to the forest fire disaster in Sumatera region during the 1st quarter and the COVID-19 Pandemic situation for most of 2020, the project implementation period could not follow the initial timeline as stated in the project TOR. As mentioned earlier, the project implementation was arranged into four (4) quarters, in which each quarter had its own deliverable documentation and reporting requirements.

Based on the Project Terms of Reference, documentation and reporting per quarter during project implementation were as follow:

Quarter	Minimum Samples Collected or Tested	Deliverables Documentation	Reporting
1	-	 Approved/elaborated workplan. 	 Report of the Kick-off and Planning Workshop for PLN
		Approved/elaborated	inventory.
		methodology for PCBs inventory.	Report of the 1st official consultative meeting.
		 Approved/elaborate method for transformer selection. 	3. The 1st quarterly report covering progress and results

Table 2 Deliverables Documentation and Reporting per Period

Quarter	Minimum Samples Collected or Tested	Deliverables Documentation	Reporting
		 Approved/elaborate safety procedures of sampling. Approved/elaborate list of industries. Approved/elaborate structure of inventory database. Approved/elaborate inventory teams and job description. Final/approved design of inventory label. 	of the required services/activities from July- October particularly; Results of Induction Meeting inventory and progress and results of PCBs inventory
2	At least 600 samples (40%)	 Letter of Acceptance from PTL BPPT PLN/PLN PUSERTIF the followings: A total of 2,500 bottle samples; Reagents, chemicals, and consumables for screen test of 2,500 samples 	 Report of the 2nd Official Consultative Meeting; Compilation Report of ToT; and The 2nd Quarterly Report, covering progress and results of the required services/activities from April – June, particularly progress and results of PCBs inventory.
3	At least 1200 samples (80%)	 Proposed GIS for PCBs inventory results, covering results of the 1st inventory; Report of FGD events for PCBs Management Plan; Draft of elaborated PCBs Management Plan, covering: Latest results of national inventory, policy and regulations, technology development, etc. 	 Report of the 3rd Official Consultative Meeting; and The 3rd Quarterly Report, covering progress and results of the required services/activities in the 3rd quarter of project implementation, particularly progress and results of PCBs inventory
4	At least 1,500 (100%), with at least 75 (5%) tested using GC- ECD)	 Production and distribution of at least 4,000 inventory labels, as follows: At least 1,500 labels for Industrial Inventory; At least 2,500 labels for PLN Inventory Final/approved elaborated PCBs Management Plan; Disposal of samples and hazardous wastes generated 	 Report of the 4th Official Consultative Meeting; and Final Report, covering progress and results of the required services/activities since January, particularly; Final results of PCBs inventory; Results of GC analysis; and

Quarter	Minimum Samples Collected or Tested	Deliverables Documentation	Reporting
		 during PLN and Industrial Inventory; and 4. Final GIS for PCBs inventory results, covering results of the 1st inventory. 	 Calculation, statistical analysis and trends of the final inventory results

Source: Project Terms of Reference (TOR)

2. PROJECT IMPLEMENTATION AND RESULTS

This chapter elaborated how the project was implemented, the outputs and the activities which had been carried out in each quarter. This chapter then described the implementation issues that occurred during project implementation and the coping strategies to meet the contract requirements.

2.1. Project Implementation

The flow of the project was arranged by the required deliverables and activities/events in each quarter as described in the TOR. These deliverables were designed as a step-by-step process to reach the final outputs in the last (4th) quarter. However, the implementation of the project did not run as smooth as initially planned, as the project encountered situations which caused delays and re-arrangement of activities. Some of these situations that significantly impacted project schedule were the forest fire incidents in Sumatera island on October-December 2020, and the COVID-19 pandemic that occurred since March 2020.

The following sub-chapters provided an overview of how the project implementation progressed from quarter to quarter.

2.1.1. Project Implementation in the 1st Quarter (15 July 2019 – 26 June 2020)

Some highlights of the project implementation and progress during the 1st quarter were as follow:

- 1. The Project Kick-off and Planning Workshop was held at Hotel GranDhika Iskandarsyah, Jakarta on September 19th, 2019. The participants of the event were PLN, UNIDO, MoEF, and representative from BPPT (Agency for The Assessment and Application of Technology) and Ministry of ESDM (Energy and Mineral Resources). The total participant was 29 persons. This event successfully produced an approved workplan for the 2nd phase of PCBs Inventory project.
- The 1st Official Consultative Meeting was held at MoEF office, Jakarta on November 1st, 2019. The participants of the meeting were UNIDO, MoEF, and Petrolab. This consultative meeting discussed the preparation of Training of Trainer (ToT) for PLN and Induction Meeting for targeted industries.
- 3. Induction Meeting for targeted industries in Java Region was successfully conducted at Hotel Santika Premiere, Jogjakarta on November 25th-26th, 2019. This is followed by Induction meeting for Sumatera Region at Hotel Grand Aston City Hall, Medan on December 2nd-3rd, 2019. The participants of the events were UNIDO, MoEF, and targeted industries for Java and Sumatera region. This event gathered commitment from all participants to participate in the project, and arranged a schedule for the sampling activities. The induction meeting for Java Region was attended by 47 persons, and the induction meeting for Sumatera Region was attended by 30 persons.

- 4. Due to the *force majeure* of forest fire incident in Sumatera in October and November 2019, the project delayed the implementation of several activities, which included sampling activities and induction meetings. However, the project also managed to expedite the execution of several 2nd quarter activities during the 1st quarter, which included:
 - a. Training of Trainers (TOT) for PLN in 4 regions of Java, Bali-Nustra, Sulselrabar-Kalimantan, and Sumatera
 - b. Procurement and distribution of sampling equipment to PLN

2.1.2. Project Implementation in the 2nd Quarter (27 June 2020 – 16 October 2020)

Some highlights of the project implementation and progress during the 2nd quarter were as follow:

- As agreed by MoEF, UNIDO, and Petrolab, the PCBs inventory sampling activity was rescheduled to the end of December 2019 due to forest fire incidents in Sumatera. The inventory activity started on 20 December 2019. The 1st batch of sampling activity was implemented until February 2020 and successfully tested 1254 samples.
- 2. As per 5 February 2020, the project had managed to achieve all required KPIs for the 2^{nd} quarter, which were:
 - a. Carried out sampling and screen test using Dexsil analyzer for at least 600 samples.
 - b. Developed statistical database of transformers by combining the samples from the 1st phase and the 2nd phase of PCBs inventory phase.
 - c. Organized four (4) Training of Trainer (ToT) for PLN.
 - d. Delivered a total 2,500 bottle samples to PLN along with equipment.
 - e. Delivered reagents, and consumables for screen test using Dexsil Analyzer of 2,500 samples to PLN
 - f. Organized the 2nd official consultative meeting.
- 3. In addition, the project also managed to conduct the GC-ECD testing for 238 samples (15,58% of total target sample number) within this quarter, which was initially a part of KPIs for the 3rd quarter. The initial plan was to have 5% of the total sample (or 75 samples) to be tested with GC-ECD instrument.

2.1.3. Project Implementation in the 3rd Quarter (17 October 2020 – 18 December 2020)

Some highlights of the project implementation and progress during the 3rd quarter were as follow:

- To meet the target of collecting at least 1500 samples, Petrolab conducted the 2nd batch of sampling activity on 20 July 2020 31 August 2020. This batch managed to collect 255 remaining samples from seven (7) companies in three (3) provinces (Banten, West Java and Riau). The companies sampled were not new companies and were part of the 62 companies that was sampled in the previous batch.
- 2. With the 255 samples collected in the last batch of sampling added to the 1254 samples acquired in the previous batch of sampling, in total the project has managed to collect 1509 samples. The PCBs inventory database has been updated with the new data, and has exceeded the project target of 1500 samples.

- 3. Regarding one of the KPIs for the 3rd quarter, which was to "Procure and deliver to PTL BPPT reagents, chemicals, and consumables for sample preparation and analysis of 125 PLN samples by GC-ECD", after coordinating with PTL BPPT it was found out that PTL BPPT already had the reagents, chemicals and consumables required for testing the samples. The items were leftovers/surplus from PTL BPPT previous project with UNIDO. Thus, UNIDO and Petrolab agreed to replace this KPI by implementing four (4) events of Focus Group Discussion (FGD) to gather inputs for the arrangement of PCBs Management Plan, particularly in achieving the target of PCBs phasing out in 2028. All of the four (4) FGDs were successfully implemented virtually using Zoom for online meeting platform due to the COVID-19 pandemic situation. Specifically, the arrangement of the FGDs were as follow:
 - a. The first FGD was held on 18 August 2020, to learn about the challenges and the capacity of local governments (especially Local Environment Agencies) related to PCBs phasing out
 - b. The second FGD was held on 24 September 2020, to get the perspective from private sectors/companies and industries
 - c. The third FGD was held on 20 October 2020, aimed to acquire information on the mechanisms and challenges faced by companies in the sectors of hazardous and toxic waste transportation, hazardous and toxic waste processing, and laboratory, related to the efforts of achieving the target of PCBs phasing out in 2028.
 - d. The fourth FGD was held on 18 November 2020, aimed to acquire inputs and perspectives from the National Electricity Company (*PT. Perusahaan Listrik Negara*/PLN).
- 4. The 3rd Official Consultative Meeting was successfully held on 2 November 2020 by using Zoom platform for online meeting. The meeting was held as a monitoring and evaluation mechanism to the project. The participants of the meeting were UNIDO, MoEF and Petrolab.
- 5. As part of the project, Petrolab was tasked to elaborate the existing PCBs Management Plan. This document was expected to act a basis for PCBs phasing-out program in the country. In the 3rd quarter, Petrolab managed to arrange the first draft of PCBs management plan. The three (3) FGD events and the 3rd Official Consultative Meeting mentioned earlier were part of the project's effort to gather inputs and recommendations for the draft.
- 6. Petrolab started to map the GIS data of the sampled transformers into the web-based PCBs inventory database management. This was done for all samples from phase 1 and phase 2 of the PCBs inventory projects. As requested by UNIDO, the plotting of GIS data was done using GIS data processing platform to enable compatibility across various GIS data processing platforms. For this purpose, the project used QGIS platform.

2.1.4. Project Implementation in the 4th Quarter (19 December 2020 – 5 October 2021)

The 4th quarter is the last quarter of the project implementation. Following the process in the previous quarters, the highlights from this quarter were as follow:

- The project had managed to collect 1509 samples in the 3rd quarter. Therefore, there were no more activities related sampling and screen test in the 4th quarter. All of the sample data has been added to update the PCBs Inventory Database and statistical analysis also during the 3rd quarter.
- 2. GC-ECD analysis was applied to 238 samples or 15,8% of the total samples, and all were conducted during the 2nd and 3rd quarter of the project. This has exceeded the project's requirement of applying GC-ECD analysis to 5% of the sample (75 samples).
- 3. The inventory labels design was approved by the MoEF in early December 2020, and Petrolab has completed producing and delivering the labels, along with the testing results report for industries and PLN by 20 June 2021.
- 4. The 4th Official Consultative Meeting was successfully held on 22 December 2020 by using Zoom platform for online meeting. The meeting was held as a monitoring and evaluation mechanism to the project. The participants of the meeting were UNIDO, MoEF and Petrolab.
- 5. The project had mapped all GIS data of the samples from phase 1 and phase 2 inventory into the web-based PCBs inventory database management. Plotting of GIS data was done by using QGIS platform to enable compatibility across various GIS data processing platforms. All of samples data were able to be plotted using QGIS platform.
- 6. In the 4th quarter, the project managed to finish the final draft of PCBs Management Plan. This document is provided in a separate report.
- 7. Petrolab managed an environmentally-sound disposal of samples and wastes generated during the activity (oil samples, solvent, used-equipments possibly contaminated with PCBs, etc.) as hazardous waste, in compliance with national policy and regulations, including those produced during PLN Inventory. However, in 2021 the only company that has a permit to process PCBs wastes was PT. Prasadha Pamunah Limbah Industri (PPLI). PPLI was able to process the liquid wastes of PCBs, but the waste processing facility was not ready yet to process solid wastes.
- 8. As per 30 June 2021, Petrolab had managed to achieve all required KPIs for the 4th quarter, which were:
 - a. Finished carried out sampling and testing of 1509 in-services and offline industrial transformers in Sumatera and Java (all sampling activities were already done by the 3rd quarter). This number exceeded the initial sampling target of 1500 samples.
 - b. Carried out GC analysis to 238 samples (exceeded the initial target of 5% of the samples 75 samples), particularly to those equal or above (≥) 50 ppm contamination. All GC analysis were already done in the 3rd quarter;
 - c. Produced 4,009 inventory labels (labels design can be found in <u>Annex 3</u>) according to the results of screen test using Dexsil Analyzer or as suggested by the existing policy and regulation, as follows:
 - i. At least 1,509 labels for Industrial Inventory
 - ii. At least 2,500 labels for PLN Inventory

This also exceeded the initial target number of 4000 labels;

- d. Updated the PCBs Inventory Database (statistics analysis is reported in separate document);
- e. Finalized GIS according to final results of inventory (<u>Annex 2</u>);
- f. Finalize PCBs Management Plan (draft is reported in separate document);

- g. Managed an environmentally-sound disposal of samples and wastes generated during the activity (oil samples, solvent, used-equipments possibly contaminated with PCBs, etc.)
- h. Organized Final Official Consultative Meeting as a monitoring and evaluation mechanism to the activity, drafted and submitted its report no later than two (2) weeks after the organization of the meeting;
- Taking into account all deliveries and achievements within the 4th quarter, according to Petrolab's calculation, the 2nd inventory project has successfully achieved 100% project progress (project progress chart attached in <u>Annex 1</u>).

2.2. Project Outputs and Achievements

This sub-chapter elaborated overall outputs and achievements, not only focusing on the final outputs achieved in the 4th quarter, but also mentioned the process in the previous quarters.

2.2.1. Official Consultative Meetings

The Official Consultative Meetings were carried out as a monitoring and evaluation mechanism to the project, and were held once in each quarter. The participants of official consultative meetings were MoEF, the United Nations Industrial Development Organization (UNIDO), and Petrolab Services (Petrolab).

The 1st Official Consultative Meeting was held on 1 november 2019 at MoEF Office, Jakarta, to discuss preparation of ToT for PLN and induction meetings for targeted industries. The number of industries and samples has been identified precisely to ensure that the sampling process will meet the contract requirement. The meeting also discussed strategies to expedite the process of importing Dexsil equipment with its reagents and consumables. The 1st Official Consultative Meeting was attended by 11 persons.

The 2nd Official Consultative Meeting was conducted at the Ministry of Environment and Forestry (MoEF) office in Jakarta on 5 February 2020. The meeting discussed project progress report from Petrolab, report of events held during the 1st and 2nd quarter of the project, and current obstacles in project implementation which included overall delay in sampling activities and technical issues during sampling. During this meeting, Petrolab also presented the potential statistical methods that can be used for data processing/analysis and the initial statistical assessment. The 2nd Official Consultative Meeting was attended by 13 persons.

The 3rd Official Consultative Meeting was successfully held on 2 November 2020 by using Zoom platform for online meeting due to the COVID-19 pandemic situation. During this meeting, Petrolab presented the project progress, mainly regarding the sampling progress that have achieved the target of 1509 samples, and also presented the updated descriptive statistical analysis result from the data. Petrolab also presented the initial results of GIS data mapping from the web-based PCBs inventory database management. In relation to the arrangement of PCBs Management Plan, Petrolab also presented the results of the FGD events and the draft structure for the PCBs Management Plan. The 3rd Official Consultative Meeting was attended by 14 persons.

The 4th Official Consultative Meeting was held on 22 December 2020 by using Zoom platform for online meeting due to the COVID-19 pandemic situation. The 4th Official Consultative Meeting was attended by 14 persons. This last official consultative meeting discussed about:

- 1. the overall project progress up to the 4th quarter of implementation
- 2. Progress of developing GIS data mapping
- 3. Format for the Testing Result Report (Laporan Hasil Uji/LHU)
- 4. Format for transformers labeling
- 5. Progress of PCBs Management Plan arrangement

Detail information of the 4th Official Consultative meeting is provided in a separate report.

2.2.2. Training of Trainers (ToT) for PLN

The Training of Trainers (ToT) were designed for PT. Perusahaan Listrik Negara (PLN) inventory team, based on the recommendation from the project's Kick-off Meeting which was held on 17 September 2019 at Gran Dhika Iskandarsyah Hotel, Jakarta. As agreed by Ministry of Environment and Forestry (MoEF), United Nations Industrial Development Organization (UNIDO), PT. Petrolab Services, and PT. PLN during the meeting, a ToT targeted for PLN inventory team was needed.

The ToT was organized into 4 (four) batches in 4 (four) cities: Bogor, Bali, Makassar, and Medan, covering 40 PLN units across the archipelago. The objective of the ToT is to refresh PLN staffs' knowledge about the proper transformer oil sampling method and to introduce the PCBs screening test using Dexsil kit and most importantly to develop standard methodology for PCBs identification and inventory, in particular sampling.

In general, all four events were successfully organized with a total number of 160 participants (38 participants in Java region ToT, 33 participants in Bali Nustra region ToT, 38 in Sulselrabar and Kalimantan region ToT, and 51 in Sumatera region ToT). The major technical issues raised during the discussions were distribution of sampling tools and samples delivery to PLN PUSERTIF for analysis. It relates to the range of geographical locations this inventory has to cover. In the training session, all participants were facilitated to practice proper sampling of dielectric oil from transformer according to standardized sampling method ISO/IEC 60475.

2.2.3. Focus Group Discussion (FGD) Events

As a replacement for one of the KPIs of the 3rd quarter, which was to "Procure and deliver to PTL BPPT reagents, chemicals, and consumables for sample preparation and analysis of 125 PLN samples by GC-ECD", MoEF, UNIDO and Petrolab agreed to held four (4) FGD events to discuss and generate inputs for updating the current PCBs Management Plan. The following are the summaries of each FGD.

a. Focus Group Discussion 1

The first FGD was held on 18 August 2020 using the Zoom online meeting platform due to COVID-19 pandemic situation. The participants of this FGD were MoEF, UNIDO, Local Environment Agency from seven (7) Local Governments, and Petrolab. The FGD was

attended by 24 persons and was held to discuss about the PCBs elimination and phasing out program in 2028, in relation to the PCBs Management Plan. In particular, the objectives of the FGD were:

- 1. To have a common understanding regarding the importance of PCBs Management Plan for Indonesia
- 2. To acquire data and information regarding the capacity and challenges faced by the Government in implementing phasing out of PCBs, particularly Local Governments
- 3. To generate support and commitment in acquiring data for the arrangement of PCBs Management Plan.

In regards to these objectives, the group discussions during the event were focused around the following topics:

- 1. The resources that government agencies can utilize for an environmentallyfriendly PCBs management
- 2. The challenges that government agencies may face in PCBs management
- 3. Policies/regulatory instruments related to PCBs management
- 4. Data and information required to develop the National PCBs Management Plan and how to acquire them.

From the discussions in this FGD, information from participants was acquired regarding the challenges and the capacity of local governments (especially Local Environment Agencies) related to PCBs phasing out. This insight served as one of the inputs in drafting the PCBs Management Plan, particularly in the draft action plan. The draft action plan elaborated the needs for dissemination and specific trainings/capacity building strategies for local governments for an environmentally-friendly PCBs management.

b. Focus Group Discussion 2

The second FGD was held on 24 September 2020 using Zoom online meeting platform. The objectives of this FGD were similar with the first FGD, however the context is different. The first FGD was directed more towards local government environmental agencies, while the second FGD was directed to get the perspective from private sectors/companies and industries. The participants of the second FGD were MoEF, UNIDO, private sectors and Petrolab. The private sectors that attended the FGD were 17 companies (consisted of state-owned enterprises/BUMN, pulp & paper companies, and various other types of industries) plus 2 associations (association of oil and gas drilling companies/APMI and association of pulp & paper companies/APKI). This FGD in total was attended by 32 persons.

The group discussions during the event were focused around the following topics:

- 1. Private sector's point of view on the policies for hazardous and toxic waste management to accommodate an environmentally-friendly PCBs management
- 2. The resources that companies have related to PCBs management
- 3. The challenges that companies may face in implementing environmentallyfriendly PCBs management

- 4. Practices of asset removal related to PCBs management (in accordance to the State-Owned Enterprises Ministerial Decree)
- 5. The data and information needed from private sectors for the arrangement of the National PCBs Management Plan

From the discussions in this FGD, perspectives and insights were acquired from industries and private sectors related to government policies on hazardous and toxic waste management. The capacity and challenges faced by private sectors related to PCBs phasing out were also identified. This information was important in drafting the PCBs Management Plan, particularly to enable some elaboration in the draft action plan regarding dissemination and trainings for companies/private sectors. The acquired insights were also important to lay out the responsibilities of companies (owners of transformers contaminated by PCBs) for an environmentally-friendly PCBs management practices.

c. Focus Group Discussion 3

The third FGD was held on 20 October 2020 using Zoom online meeting platform. The objective of this FGD was to acquire information on the mechanisms and challenges that were faced by companies in the sectors of hazardous and toxic waste transportation, hazardous and toxic waste processing, and laboratory, related to the efforts of achieving the target of PCBs phasing out in 2028. The expected outputs from this FGD were:

- 1. To identify the financial cost of PCBs removal process and what are the components that contribute to the cost, in order to arrange an effective and efficient strategy for PCBs removal
- 2. To acquire information on the laboratory analysis methods, samples chain of custody, and capacity of laboratories in Indonesia, in order to arrange a database and tracking system
- 3. To identify the existing mechanism of PCBs (or hazardous waste) transportation for both inside-island and inter-island transport, and the challenges in the implementation
- 4. To identify the companies and locations that are ready to provide space for temporary collection points after PCBs retraction is implemented across Indonesia
- 5. To identify the capacity, installation and investment required to perform PCBs phasing out in 2028.

The participants of this FGD were from MoEF, UNIDO, private sectors/companies (35 companies coming from business sectors of hazardous and toxic waste transportation, hazardous and toxic waste processing, and laboratory), and Petrolab. In total, this FGD was attended by 32 persons. To have a more effective discussion, the participants were divided into three (3) groups as following:

- 1. Group 1: companies providing hazardous and toxic waste transport service
- 2. Group 2: companies providing hazardous and toxic waste processing service
- 3. Group 3: companies providing laboratory analysis service.

The discussions in this FGD generated information from companies regarding components of cost for hazardous and toxic waste processing in general, capacity of laboratories and

the infrastructures needed for PCBs phasing out. This information was needed as input for drafting the PCBs Management Plan, particularly to elaborate the cost components taken into account in managing PCBs contaminated waste, capacity of laboratories that are able to test transformers for PCBs contamination, the urgency for developing facilities to process PCBs waste on a non-thermal basis, and the need for investment and policies to support an environmentally-friendly PCBs management.

d. Focus Group Discussion 4

The fourth FGD was held on 18 November 2020 using Zoom online meeting platform. The objective of this FGD was to acquire inputs and perspectives from the National Electricity Company (*PT. Perusahaan Listrik Negara*/PLN) related to the efforts of achieving the target of PCBs phasing out in 2028. The participants of this FGD were from PLN (PLN Central Office, PLN Certification Center, and local PLN offices), MoEF, UNIDO, and Petrolab Services. In total, this FGD was attended by 76 persons. The expected outputs from this FGD were information and inputs from PLN that can be used for drafting PCBs Management Plan in terms of:

- 1. The resources that PLN have for PCBs phasing out 2028
- 2. The challenges faced by PLN for PCBs phasing out 2028
- 3. Preparations that would be needed by PLN for PCBs phasing out 2028

From this FGD with PLN, information and insights were acquired from PLN regarding their capacity and challenges in PCBs phasing out. This information is critical in developing the action plan for the draft PCBs Management Plan. The information allowed the draft to elaborate the steps required by PLN and State-owned Enterprises (BUMN) in general for PCBs contaminated assets management related to PCBS phasing out in 2028.

2.2.4. Sampling Activity and Update of Inventory Database

a. Sampling Activity

Petrolab conducted the first batch of sampling on 20 December 2019 - 20 February 2020, and the second batch on 20 July 2020 - 31 August 2020. The first batch sampling activity collected 1254 samples from 62 companies in 12 provinces by four (4) inventory teams consisted of two (2) persons each.

The second batch of sampling activity was done by four (4) inventory teams consisted of two (2) persons each, and collected 255 new samples from seven (7) companies in three (3) provinces (Banten, West Java and Riau). The companies sampled were not new companies and were part of the 62 companies that was sampled in the previous batch.

Although most of the sampling period was implemented during the COVID-19 pandemic situation, the project managed to collect 1509 samples in total, or exceeded the project target of 1500 samples. All of these 1509 samples were delivered and analyzed for their PCBs content using Dexsil L2000DX. The data derived from the 1509 was also used to

update the PCBs Inventory Database, combined with the database from the 1st phase of PCBs inventory project.

b. Safety Procedures during Sampling Activities

Sampling and Identification must consider safety aspects and ensure the data taken are traceable. The inventory team employed the following steps and methods for the collection of transformers oil:

- Risks assessments and reductions
- Recording data and information from transformers name plates.
- Preparation of the working area.
- Preparation of equipment and materials.
- Sampling of dielectric oil
- Chain-of-Custody and transport

The sampling activity implied following strict rules regarding the potentially contaminated areas. This included using protective equipment and the proper tools. Delineation of potentially contaminated areas also implied following strict rules inside the workspace as well as when leaving the work area.

The SOP for sampling activity was as follow:

- a. Identification of the electrical equipment (transformer).
- b. Photograph the identified equipment and its id plate.
- c. Work area delimitation by using marking tape.
- d. Grounding of electrical equipment performed by the owner's specialist.
- e. Protection of the workspace floor by using polyethylene membrane.
- f. Unlocking the oil drain tap of the transformer.
- g. Connecting the flanged device for sampling to the oil drain tap.
- h. Connecting the vacuum device for sampling to the previously mounted flanged device.
- i. Opening the oil drain tap, operation performed by the owner's specialist.
- j. Washing the oil extraction circuit by discharging a volume of 50 100 ml oil in a separate vessel.
- k. Washing of the collection vessel with a volume of oil equal to 1/3 from its volume.
- I. Taking the actual oil sample.
- m. Closing the transformer oil drain tap, operation performed by the owner's specialist.
- n. Locking the transformer oil drain tap.
- o. Labelling the sample; placing the sample inside the box.
- p. Filling in the sampling form.
- q. Delivery of sample, the sampling sheet and the photos for identification of the electrical equipment, completing and delivery of custody sample sheet.

Safety Procedure of sampling was developed to minimize the following risks during the sampling process:

Potential Risks During Sampling Process						
Risks for Technicians	Risks for Equipment	Risk for the Environment				
Electrical shock	Power failure	 Land contamination 				
• Exposure to PCBs	Transformers breakdown	by PCBs spillage				
Poisonous animals	• Short circuit electricity					
attack	(may cause fire hazard)					

Table 3	
Potential Risks During Sampling	Process

As part of the Safety Procedure of sampling a Risk Assessment (RA) needed to be done. Risk assessment (RA) is a term used to describe the overall process or method to:

- Identify hazards and risk factors that have the potential to cause harm (hazard identification).
- Analyze and evaluate the risk associated with that hazard (risk analysis, and risk evaluation).
- Determine appropriate ways to eliminate the hazard, or control the risk when the hazard cannot be eliminated (risk control).

A qualitative Risk Assessment has been implemented within this project. Risk Assessment consisted of desk study (Risk Assessment), Job Safety Analysis (JSA) and Permit to Work (PTW) where the targets of transformers are located. All RA, JSA and PTW were agreed between the transformer owner and PCBs Inventory Technician. As a result of an agreed Risk Assessment, technicians must follow safety instructions such as Fit to work (health check) and wearing special Personnel Protective Equipment (PPE) to reduce the associated risks. Some of the protective equipment and tools used during the sampling process were single use materials.

Protective Equipment	Sampling Tools
 Protection suit 	• Clear PET Bottle 250 ml complete with inner plug and cap
 Safety boots 	 Single use polyethylene vacuum device
 Protective helmet 	 Different size connectors and flanges
 Protective goggles 	Self-adhesive labels
 Shoe protection 	• Toolbox kit
 Coverall 	Bucket
 Latex/ Nitrile gloves 	• Funnel
	 Absorbent material
	 Funnel and Jerican
	 Stainless steel tray
	• Plastic sheet
	Barricade tape

Table 4 Protective Equipment and Sampling Tools

Prior to the sampling activity, Technicians were given a safety induction from transformer owner/company to explain about the safety aspects, rules and responsibility for both of the technicians and the company. Sampling schedules were agreed by both parties, as a Person in Charge (PIC) from the transformer owner must accompany PCBs Inventory Technician during the sampling activity. Technicians must follow the company procedures and must ensure all of safety requirement such as PPE usage and tools (standard tool and spill kits) comply to the company's safety regulations.

Sampling activities were carried out in such a way to avoid environmental pollution at each stage. Any waste generated during sampling waas collected as hazardous waste and disposed of according to national and international regulations on hazardous waste. The inventory team brought spill kits for handling small leakage or small splash, including PET sheet, plastic bags, absorbent mop and absorbent material (bleaching earth). The final disposal was sent to PT. PPLI, while the collected samples were packaged properly to avoid leaks or spills during transportation.

There were five (5) important rules in the workplace for sampling technician:

- 1. Follow all of the company's Work Health and Safety (*Keselamatan dan Kesehatan Kerja*/K3 regulation and policies.
- 2. Follow all methodologies, instructions and other dispositions in the workplace.
- 3. Prioritize health and safety at the workplace.
- 4. Participate and communicate in a positive way with the coordinator and all teams.
- 5. Must be able to understand and demonstrate every information and guidelines given during the safety induction.

c. Sample Distribution

The samples taken originated from 62 companies in 12 different provinces and eight (8) types of industries. The sample distribution based on provinces, type of Industries and manufacture year are shown by the chart and table below.

No.	Province	Number of	Percentage (%)	Sampling Period
		samples		
1.	Riau	465	30.82%	20/12/2019 – 28/02/2020 and
				20/07/2020 - 31/08/2020
2.	Banten	277	18.36%	20/12/2019 – 28/02/2020 and
				20/07/2020 - 31/08/2020
3.	East Java	192	12.72%	20/12/2019 – 28/02/2020
4.	West Java	162	10.74%	20/12/2019 – 28/02/2020 and
				20/07/2020 - 31/08/2020
5.	Central Java	110	7.29%	20/12/2019 – 28/02/2020
6.	North Sumatera	100	6.63%	20/12/2019 – 28/02/2020
7.	South Sumatera	91	6.03%	20/12/2019 – 28/02/2020
8.	Jambi	73	4.84%	20/12/2019 - 28/02/2020

Table 5 Number and Percentage of Samples by Province

No.	Province	Number of samples	Percentage (%)	Sampling Period
9.	DKI Jakarta	18	1.19%	20/12/2019 – 28/02/2020
10.	Aceh	12	0.80%	20/12/2019 – 28/02/2020
11.	Kep. Riau	7	0.46%	20/12/2019 – 28/02/2020
12.	Kep. Bangka Belitung	2	0.13%	20/12/2019 – 28/02/2020
	TOTAL	1509	100.00%	



Figure 1 Proportion of Samples by Province

Table 6	
Number and Percentage of Samples by Industry Ty	уре

No.	Industry type	Number of Samples	Percentage (%)	Sampling Period
1	Pulp & paper	593	39.30%	20/12/2019 – 28/02/2020 and
				20/07/2020 – 31/08/2020
2	Oil refinery	246	16.30%	20/12/2019 – 28/02/2020
3	Iron and steel	141	9.34%	20/12/2019 – 28/02/2020 and
				20/07/2020 – 31/08/2020
4	Mining	137	9.08%	20/12/2019 – 28/02/2020 and
				20/07/2020 – 31/08/2020
5	Petrochemical/fertilizer	137	9.08%	20/12/2019 – 28/02/2020
6	Oil & Gas	108	7.16%	20/12/2019 – 28/02/2020
7	Smelter	93	6.16%	20/12/2019 – 28/02/2020 and
				20/07/2020 – 31/08/2020
8	Power Plant	34	2.25%	20/12/2019 – 28/02/2020
9	Oleochemical	20	1.33%	20/12/2019 – 28/02/2020
	TOTAL	1,509	100.00%	





1,509

100.00%

TOTAL



d. Analysis and Results

The testing and analysis of collected samples were performed by using Dexsil L2000DX portable analyzers with Askarel A method. This method was used in consistency with the previous method used in the 1st phase of PCBs inventory and considering the origin of the PCBs in transformer oil. A part of the sample (237 samples or 15,8% of the total samples) was then re-tested by using Gas Chromatography (GC-ECD) at PTL BPPT to confirm the results obtained by using the Dexsil analyzer.

The testing at PTL BPPT used the IEC 61619 method. This method was used to determine PCBs concentration in insulating oil with high resolution capillary column gas chromatography using an electron capture detector (ECD). The method provided the total PCBs content and was particularly useful to produce detailed analysis of PCB congeners. This method was applicable to unused, reclaimed (including dechlorinated and chemically and/or physically treated) or used insulating liquids contaminated by PCBs.

The result of the analysis using the Dexsil analyzer and GC-ECD are shown in the table below.

PCBs Contamination Status	Number of Samples	Percentage (%)
PCBs < 50 ppm	1,251	82.90%
50 ppm ≤ PCBs < 10000 ppm	258	17.10%
PCBs ≥ 10000 ppm	0	0.00%
Total	1,509	100.00%

Table 8

Result of Devsil Test According to Ranges of PCRs Contamination Status

Re	Result of GC-ECD Test According to Ranges of PCBs Contamination Status									
	PCBs Contamination Status	Number of Samples	Percentage (%)							
	PCBs < 50 ppm	212	89.45%							
	50 ppm ≤ PCBs < 10000 ppm	25	10.55%							
	PCBs ≥ 10000 ppm	0	0.00%							
	Total	237	100.00%							

Table 9

The analysis result from dexsil test showed that 82.9% of total analyzed samples contain PCBs concentration less than 50 ppm and 17.1% is considered as contaminated by PCBs or contain equal to or more than (≥) 50 ppm of PCBs. The analysis result from GC-ECD shows different result with 10.55% is categorized as contaminated by PCBs.

The results of testing using Dexsil for samples from the 2nd phase PCBs inventory showed that 17.1% of samples in total were contaminated. This was significantly different with the test results of samples from the 1st phase PCBs inventory which showed that only 5.48% samples in total were contaminated by PCBs. This deviation occured because sampling for the 2nd phase inventory was more focused to the types of industry that were predicted to have more PCBs contamination, while the sampling for the 1st phase was more random and involved broader and more diversed economic sectors.

The analysis of dexsil results by province, types of industry and manufacture year are shown under the tables below.

	PCBs Contamination Status												
Province		Number of Sa	mples		Percentage								
	PCBs < 50 ppm	50 ppm ≤ PCBs < 10000 ppm	PCBs ≥ 10000 ppm	Total	PCBs < 50 ppm	50 ppm ≤ PCBs < 10000 ppm	PCBs ≥ 10000 ppm	Total					
Riau	378	87	0	465	81.29%	18.71%	0%	100%					
Banten	148	129	0	277	53.43%	46.57%	0%	100%					
East Java	179	13	0	192	93.23%	6.77%	0%	100%					
West Java	156	6	0	162	96.30%	3.70%	0%	100%					
Central Java	109	1	0	110	99.09%	0.91%	0%	100%					
North Sumatera	99	1	0	100	99.00%	1.00%	0%	100%					
South Sumatera	88	3	0	91	96.70%	3.30%	0%	100%					
Jambi	72	1	0	73	98.63%	1.37%	0%	100%					
DKI Jakarta	1	17	0	18	5.56%	94.44%	0%	100%					
Aceh	12	0	0	12	100%	0%	0%	100%					
Kep. Riau	7	0	0	7	100%	0%	0%	100%					
Kep. Bangka Belitung	2	0	0	2	100%	0%	0%	100%					
TOTAL	1,251	258	0	1,509	82.90%	17.10%	0%	100%					

Table 10 PCBs Contamination Status per Province

	PCBs containination status per industry Types												
	PCBs Contamination Status												
Industry type		Number of Sa	mples	Percentage									
	PCBs < 50 ppm	50 ppm ≤ PCBs < 10000 ppm	PCBs ≥ 10000 ppm	Total	PCBs < 50 ppm	50 ppm ≤ PCBs < 10000 ppm	PCBs ≥ 10000 ppm	Total					
Pulp & paper	487	106	0	593	82.12%	17.88%	0%	100%					
Oil refinery	226	20	0	246	91.87%	8.13%	0%	100%					
Iron and steel	93	48	0	141	65.96%	34.04%	0%	100%					
Mining	128	9	0	137	93.43%	6.57%	0%	100%					
Petrochemical/ fertilizer	66	71	0	137	48.18%	51.82%	0%	100%					
Oil & Gas	105	3	0	108	97.22%	2.78%	0%	100%					
Smelter	92	1	0	93	98.92%	1.08%	0%	100%					
Power Plant	34	0	0	34	100.00%	0%	0%	100%					
Oleochemical	20	0	0	20	100.00%	0%	0%	100%					
TOTAL	1,251	258	0	1,509	82.90%	17.10%	0%	100%					

Table 11 PCBs Contamination Status per Industry Types

	PCBs Contamination Status											
Manufacture Vear		Number of Sa	mples	Percentage								
Tear	PCBs < 50 ppm	50 ppm ≤ PCBs < 10000 ppm	PCBs ≥ 10000 ppm	Total	PCBs < 50 ppm	50 ppm ≤ PCBs < 10000 ppm	PCBs ≥ 10000 ppm	Total				
< 1983	387	103	0	490	78.98%	21.02%	0%	100%				
1983 - 1992	293	57	0	350	83.71%	16.29%	0%	100%				
1993 - 2002	542	96	0	638	84.95%	15.05%	0%	100%				
2003 - 2012	19	1	0	20	95.00%	5.00%	0%	100%				
N/A	10	1	0	11	90.91%	9.09%	0%	100%				
TOTAL	1251	258	0	1,509	82.90%	17.10%	0%	100%				

Table 12 PCBs Contamination Status per Manufacture Year

2.2.5. PCBs Management Plan

The national PCBs management plan was formulated to assist Indonesian government and its stakeholder to implement Indonesia's commitment to the Stockholm Convention, particularly in eliminating and phasing out of the use of transformers and dielectric oil containing PCBs more than 50ppm.

The draft PCBs Management Plan were finalized in the 4th quarter. The draft incorporated the latest development on national priorities, policy, regulations, strategies and disposal technologies. The draft also incorporated the statistical analysis conducted in this project, in order to produce a feasible implementation plan that is accurate in terms of estimated work volume.

The structure of the draft PCBs Management Plan had been discussed with the MOEF and UNIDO. The summary of each chapter was as follows:

- Chapter I: Introduction. This chapter describes Indonesian government's commitment for the phasing out of PCBs and also the scope of this document (e.g. focus on the phasing out of PCBs > 50ppm in transformers and PCBs > 50ppm in dielectric oil).
- Chapter II: Methodology. This chapter covers methodology for data collections, the result of inventory, and data extrapolation from the inventories.
- Chapter III: Profile of the PCBs contaminated stockpile in Indonesia. This chapter discusses the profile of the PCBs contaminated stockpiles and their distributions in Indonesia. In this regard, the equipment/contaminated materials (porous and nonporous materials, dielectric oils) will be calculated.
- Chapter IV: Regulatory framework on environmentally sound management of PCBs. The chapter elaborates analysis on the current regulatory framework and the challenges towards environmentally sound management of PCBs will be discussed.
- Chapter V: Action plan. This chapter is intended to assist Indonesian government and stakeholders to determine what kind of planning and activities to eliminate and phase out the PCBs in transformers and dielectric oils that are identified from inventory activities.

• Chapter VI: Annexes. The annexes consist of documents that provides guideline towards ESM PCB such as: code of practices for ESM PCB management, statistical information, and timeline of PCBs ESM.

2.2.6. GIS Data Mapping

GIS data of the samples was plotted in a base map to visualize the locations of the sampled transformers. The mapping was integrated in the web-based PCBs inventory database management, and GIS data plotting was done per Province. Petrolab developed the GIS data mapping using QGIS software, to enable compatibility across various GIS data processing platforms.

The web-based/online PCBs database management system main page shows visualization for country-scale. Users can choose which data to use: data from 1st phase PCBs inventory, from the 2nd phase PCBs inventory, or combined (all) data. Users can then customize the visualization by selecting which province to highlight, and can have a better view by zooming the map using the scroll bar. The location points in the maps were color-coded to provide information about the PCBs contamination status of the transformer that is located in each point. Users can also select which PCBs contamination status data to visualize. For example, users can choose to visualize only samples with PCBs contamination status <50ppm or \geq 50ppm resulted from testing using Dexsil or from testing using GC-ECD.

As part of project completion, all offline version mapping in form of raw data would be exported to an external storage device (external hard drive or flash disk), and would be submitted to MoEF. This raw data can be extracted using QGIS software or other GIS data processing software by the user. For the online version, Petrolab would hand-over the username and password to MoEF and UNIDO to access the online PCBs database management system.

Screenshots of maps from the web-based PCBs inventory database management for phase 1 and phase 2 inventory can be found in <u>Annex 2</u>.

2.3. Implementation Issues and Coping Strategy

During its implementation, there were some notable issues that influenced the project. The issues encountered and the strategies taken to cope with them were as follow:

 During the 1st quarter, particularly in project planning phase, the project did not have a solid reference or overview of industries in Indonesia due to limited database of industries in Indonesia. This was initially planned to be used as the population data for sampling purposes. The lack of database also contributed to difficulties in determining which (and how many) companies can be targeted to get the required number of samples.

In resolving this issue, MoEF contributed significantly by providing additional companies data from their own resources. Petrolab also used their customer database to complete the required numbers of companies, and also liaised with Local Environmental Agencies (DLH) to expand the industries database.

2. One of the main issues during the 1st quarter that caused delay in project implementation was the forest fire disaster that occurred between October and November 2019 in Sumatera island.

Due to this circumstance, The Project Committee (MOEF, UNIDO and Petrolab) then decided to reschedule all events and sampling activities in Sumatera region that were initially planned to take place during this period, and in the same time speed up all project activities in Java region. Hence, some activities required for the 1st quarter were delayed and replaced by activities from the 2nd quarter. The 2nd quarter activities that were shifted to this period included:

- Four (4) sessions of Training of Trainer (TOT) for PLN in 4 regions of Java, Bali-Nustra, Sulselrabar-Kalimantan and Sumatera
- Procurement and distribution of all required bottles and tools for sampling to selected units of PLN
- 3. There was also a delay in releasing Dexsil equipment along with its reagents and consumables from the local customs authority for almost 2 months (15 October to 15 December 2019) in the 1st quarter. This was due to delayed process and administrative requirements in the customs office and the Ministry of Health (MoH). In order to release the items, the customs authority needed a permission letter from MoH to clarify that the items (particularly the reagents) are not dangerous goods.

To resolve the issue, Petrolab facilitated MoEF in sending a request to MoH to issue the permission required by the customs office for the releasing process. The items were then released by the customs office by 15 December 2019.

4. In the 2nd quarter, there were technical difficulties for PLN regional offices in sending the sampling kit and bottles to remote areas, particularly due to geographical conditions. PLN offices discussed this matter internally to find the most effective way in sending the sampling kit. Petrolab proceeded to send the sampling kit and bottles to PLN regional offices as planned.

In relation with the sampling kit, the number of sampling kit and bottles needed by PLN regional offices were unclear and it was difficult to get the exact number for sampling kit delivery. To cope with this issue, it was agreed between PLN, UNIDO and Petrolab that the number of sampling kit sent by Petrolab to PLN will be based on the initial plan, and the additional number of sampling kit will be requested by PLN directly to UNIDO outside the project's scope of work.

5. There was another delay in the process of importing dexsil and its consumables, and this time it was due to early impact of COVID-19 pandemic in China. In addition, Indonesia's customs office started the policy of avoiding direct (face to face) approach in their service, and switched to mainly web/apps-based service. As the policy was just rolled out, some of the procedures and arrangements were not yet clear and were causing some delays in the release of dexsil and its consumables from the customs. To cope with this issue and considering the circumstances, Petrolab decided to follow the

customs procedure. Overall, these factors caused approximately 3 (three) weeks of delay in acquiring the items.

- 6. Another issue that was due to the COVID-19 pandemic situation was related with the 2nd batch of sampling activity. The pandemic situation lead to several additional procedures required when implementing the last batch of sampling activity. Sampled companies asked for the sampling team to take COVID-19 rapid test on their referral clinics. Scheduling was also more complicated due to some of the industries were not operating at their full scale, or were not yet open/operational at all, or were affected by the local lockdown policy in the area. This situation impacted the time and costs of sampling. However, considering the importance of these procedures during the pandemic, Petrolab decided to follow the required procedures and managed to finish the sampling activity by 30 August 2020. Therefore, despite being implemented during the pandemic situation, the sampling activities were able to keep running (with some adjustments from the initial plan) and managed to exceed the stated sampling target.
- 7. Regarding the PCBs Management Plan, MoEF raised an issue about the positioning of the document and how it relates to the National Implementation Plan and the Ministerial Decree. It was then agreed between MoEF, UNIDO and Petrolab that the PCBs Management Plan should be a separate report from the NIP and the Ministerial Decree, and was intended as a five (5) yearly monitoring report which is a form of Indonesia's commitment to the Stockholm Convention.
- 8. On the labels and delivery, there were some revisions in the label design and hence the approval for the design was acquired in late November 2020. Petrolab was able to produce the labels and deliver the labels to the industries and PLN Office. However, there were difficulties in getting the receipt from the industries due to the persons in charge of the companies were already taking leave or that the companies were still closed due to the pandemic situation. Petrolab managed to complete all of the delivery and acquired all receipts by 20 June 2021.
- 9. For disposing the samples and wastes generated during the activity, in 2021 there in only one company in Indonesia that owned the permit to process PCBs wastes, which was PT. Prasadha Pamunah Limbah Industri (PPLI). The waste processing facility in PPLI was able to process the liquid wastes of PCBs, but it was not ready yet to process solid wastes. Hence, PPLI was not able to provide price offering for processing the solid wastes.

3. CONCLUSIONS AND RECOMMENDATIONS

There were eight (8) main deliveries (KPIs) to be delivered under the 4th quarter of this project, which most of them were continuation of KPIs from the previous quarters. The achievement and progress made in relation to these KPIs are as follow:

- a. A total of 1509 samples were collected and tested during the 1st 3rd quarter of the project. This number has fulfilled the project requirements, and therefore there were no activities related to sampling and testing needed in the 4th quarter.
- b. A total of 238 samples or 15,8% of the total samples were tested using GC-ECD during the 2nd and 3rd quarter of the project. This has exceeded the project's requirement of applying GC-ECD analysis to 5% of the sample (75 samples). Therefore, there were no activities related to GC-ECD testing needed in the 4th quarter;
- c. Petrolab designed the inventory labels (labels design can be found in Annex 3), and after approval from MoEF produced and delivered 4,009 inventory labels to be delivered to industries and PLN offices. The labels were sent along with the testing results report.
- d. PCBs Inventory Database was updated during the 3rd quarter by incorporating all 1509 sample data. The updated database can be found in the project's 3rd quarter progress report;
- e. A GIS database was developed in the web-based PCBs inventory database management from the 1st and 2nd inventory samples data. The samples locations were shown in maps per province and were color-coded to provide general overview of their PCBs contamination status.
- f. The draft PCBs Management Plan were finalized and has incorporated the latest development on national priorities, policy, regulations, strategies and statistical analysis. The main structure and framework had been agreed by MoEF, UNIDO and Petrolab during the 3rd Consultative Meeting.
- g. The project managed to dispose the liquid wastes generated during this project. However, the existing waste processing facility in PPLI was not yet ready to process PCBs contaminated solid wastes;
- h. The 4th official consultative meeting was successfully organized on 22 December 2020, and the report has been submitted to UNIDO/PMU;

With these outputs delivered, Petrolab calculated that 100% of project completion has been achieved.

ANNEXES

Annex 1: Workplan, Activities and Project Progress Chart

PCBs Inventory 4th Quarter Project Progress

Workplan and Activities of the 2nd PCBs Extended Inventory

					F	EB			N	1AR		APRIL				MAY				JUNE				JULY			
TASK	No	ACTIVITIES	MILESTONE	Feb20-Wk5	Feb20-Wk6	Feb20-Wk7	Feb20-Wk8	Mar20-Wk9	Mar20-Wk10	Mar20-Wk11	Mar20-Wk12	Apr20-Wk13	Apr20-Wk14	Apr20-Wk15	Apr20-Wk16	May20-Wk17	May20-Wk18	May20-Wk19	May20-Wk20	Jun20-Wk21	Jun20-Wk22	Jun20-Wk23	Jun20-Wk24	Jul20-Wk25	Jul20-Wk26	Jul20-Wk27	Jul20-Wk28
		Statistical Analysis for 600 Sample	first Draft Statistical Analysis Report																						\square		
		Inventory	1200 Sampel Tersampling																							1	
		Dexsil Testing	1200 Sampel Teruji dgn Dexsil																							1	
		Statistical Analysis for 1000 Sample	Second Draft Statistical Analysis Report																								
		GIS Development	Proposed GIS for PCB Inventory																								
PHASE C - PCB		GC-ECD Reagents Delivery to BPPT	Letter of Acceptance of GC-ECD Reagents BPPT																								
INVENTORY, DEXSIL		Development of PCB Management Plan	First Draft PCB Management Plan + Action Plan																								
TESTING, GC-ECD		Development of FGD Methodology	EGD BCR Management Plan 1																								
ANALYSIS, GIS, DRAFT	-	1st FGD Organize	FGD FCB Wallagement Flair 1																								
MANAGEMENT PLAN		Development of PCB Management Plan	Second Draft PCB Management Plan + Action Plan																								
(FEB- APR 2020)		2nd FGD Organize	FGD PCB Management Plan 2																								
		Statistical Workshop	Final Draft Statistical Analysis Report																							I	ĺ
		Development of PCB Management Plan	Third Draft PCB Management Plan + Action Plan																							I	ĺ
		Organize 3rd Consultative Meeting	3rd Official Consultative Meeting Organize																								ĺ
			Submission 3rd Consultative Meeting Report																								
			Submission 3rd Quarterly Report																								
		Inventory	1500 Sampel Tersampling																								
PHASE D. CC		Dexsil Testing	1500 Sampel Teruji dgn Dexsil																								
		Produce and Distribute Label to Industry & PLN	4000 Label Production and Distribution																								<u> </u>
GIS DCBS		GC-ECD Testing in BPPT	75 Sample Tested by GC-ECD																								1
MANAGEMENT		Disposal to Certified Third Party	Disposal of Samples and Wastages																								<u> </u>
		GIS Development	Final GIS for PCB Inventory																								1
		PCB Inventory Database Development	Final Dashboard for PCB Inventory Database																								1
CONSULTATIVE		Development of PCB Management Plan	Final Draft PCB Management Plan with Action Plan																								1
MEETING EINAL		Organize 4th Consultative Meeting	4th Official Consultative Meeting Organize																							I	[
PEPOPT			Submission 4th Consultative Meeting Report																								1
(MAY - ILLY 2020)			Submission Final Quarterly Report																								
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Annex 2: GIS Data Mapping

1. Riau Province (example)

Sample Code	Company Name	Region	Equipment GPS
R2 001	Pertamina RU 2 Dumai, PT	Riau	N 01°40.295' , E 101°27.869'
R2 002	Pertamina RU 2 Dumai, PT	Riau	N 01°40.295' , E 101°27.869'
R2 003	Pertamina RU 2 Dumai, PT	Riau	N 01°40.295' , E 101°27.869'
R2 004	Pertamina RU 2 Dumai, PT	Riau	N 01°40.295' , E 101°27.869'
R2 005	Pertamina RU 2 Dumai, PT	Riau	N 01°40.493' , E 101°28.521'
R2 006	Pertamina RU 2 Dumai, PT	Riau	N 01°40.493' , E 101°28.521'
R2 007	Pertamina RU 2 Dumai, PT	Riau	N 01°40.493' , E 101°28.521'
R2 008	Pertamina RU 2 Dumai, PT	Riau	N 01°40.492' , E 101°28.533'
R2 009	Pertamina RU 2 Dumai, PT	Riau	N 01°40.489' , E 101°28.542'
R2 010	Pertamina RU 2 Dumai, PT	Riau	N 01°39.751' , E 101°26.112'
R2 011	Pertamina RU 2 Dumai, PT	Riau	N 01°39.751' , E 101°26.112'
R2 012	Pertamina RU 2 Dumai, PT	Riau	N 01°40.482' , E 101°28.633'
R2 013	Pertamina RU 2 Dumai, PT	Riau	N 01°40.477' , E 101°27.635'
R2 014	Pertamina RU 2 Dumai, PT	Riau	N 01°40.678' , E 101°27.382'

R2 015	Pertamina RU 2 Dumai, PT	Riau	N 01°40.683' , E 101°28.381'
R2 016	Pertamina RU 2 Dumai, PT	Riau	N 01°40.696' , E 101°28.355'
R2 017	Pertamina RU 2 Dumai, PT	Riau	N 01°40.693' , E 101°28.351'
R2 018	Pertamina RU 2 Dumai, PT	Riau	N 01°40.692' , E 101°28.359'
R2 019	Pertamina RU 2 Dumai, PT	Riau	N 01°40.406' , E 101°28.473'
R2 020	Pertamina RU 2 Dumai, PT	Riau	N 01°40.404' , E 101°28.468'
R2 021	Pertamina RU 2 Dumai, PT	Riau	N 01°40.398' , E 101°28.457'
R2 022	Pertamina RU 2 Dumai, PT	Riau	N 01°40.397' , E 101°28.448'
R2 023	Pertamina RU 2 Dumai, PT	Riau	N 01°40.428' , E 101°20.466'
R2 024	Pertamina RU 2 Dumai, PT	Riau	N 01°40.647' , E 101°28.716'
R2 025	Pertamina RU 2 Dumai, PT	Riau	N 01°40.656' , E 101°28.710'
R2 026	Pertamina RU 2 Dumai, PT	Riau	N 01°40.677' , E 101°28.651'
R2 027	Pertamina RU 2 Dumai, PT	Riau	N 01°40.676' , E 101°28.689'
R2 028	Pertamina RU 2 Dumai, PT	Riau	N 01°40.694' , E 101°28.685'
R2 029	Pertamina RU 2 Dumai, PT	Riau	N 01°40.888' , E 101°28.767'
R2 030	Pertamina RU 2 Dumai, PT	Riau	N 01°40.889' , E 101°28.770'
R2 031	Pertamina RU 2 Dumai, PT	Riau	N 01°40.849' , E 101°28.740'
R2 032	Pertamina RU 2 Dumai, PT	Riau	N 01°40.878' , E 101°28.763'
R2 033	Pertamina RU 2 Dumai, PT	Riau	N 01°40.922' , E 101°28.559'
R2 034	Pertamina RU 2 Dumai, PT	Riau	N 01°40.931' , E 101°28.558'
R2 035	Pertamina RU 2 Dumai, PT	Riau	N 01°40.733' , E 101°28.207'
R2 036	Pertamina RU 2 Dumai, PT	Riau	N 01°40.779' , E 101°28.178'
R2 037	Pertamina RU 2 Dumai, PT	Riau	N 01°40.295' , E 101°27.869'
R2 038	Pertamina RU 2 Dumai, PT	Riau	N 01°40.477' , E 101°28.355'
R2 039	Pertamina RU 2 Dumai, PT	Riau	N 01°40.476' , E 101°28.356'
R2 040	Pertamina RU 2 Dumai, PT	Riau	N 01°40.443' , E 101°28.358'
R2 041	Pertamina RU 2 Dumai, PT	Riau	N 01°40.443' , E 101°28.362'
R2 042	Pertamina RU 2 Dumai, PT	Riau	N 01°38.623' , E 101°24.108'
R2 043	Pertamina RU 2 Dumai, PT	Riau	N 01°38.623' , E 101°24.108'
R2 044	Pertamina RU 2 Dumai, PT	Riau	N 01°38.623' , E 101°24.108'
R2 045	Pertamina RU 2 Dumai, PT	Riau	N 01°39.253' , E 101°25.249'
R2 046	Pertamina RU 2 Dumai, PT	Riau	N 01°39.182' , E 101°25.044'
R2 047	Pertamina RU 2 Dumai, PT	Riau	N 01°39.219' , E 101°24.928'
R2 048	Pertamina RU 2 Dumai, PT	Riau	N 01°39.105' , E 101°24.788'
R2 049	Pertamina RU 2 Dumai, PT	Riau	N 01°39.282' , E 101°24.334'
R2 050	Pertamina RU 2 Dumai, PT	Riau	N 01°39.132' , E 101°24.354'
R2 051	Pertamina RU 2 Dumai, PT	Riau	N 01°39.057' , E 101°24.150'
R2 052	Pertamina RU 2 Dumai, PT	Riau	N 01°38.477' , E 101°25.110'
R2 053	Pertamina RU 2 Dumai, PT	Riau	N 01°38.398' , E 101°25.085'
R2 054	Pertamina RU 2 Dumai, PT	Riau	N 01°38.228' , E 101°25.093'
R2 055	Pertamina RU 2 Dumai, PT	Riau	N 01°38.058' , E 101°24.696'
R2 056	Pertamina RU 2 Dumai, PT	Riau	N 01°38.138' , E 101°24.822'
R2 057	Pertamina RU 2 Dumai, PT	Riau	N 01°38.243' , E 101°24.806'

R2 058	Pertamina RU 2 Dumai, PT	Riau	N 01°38.330' , E 101°24.712'
R2 059	Pertamina RU 2 Dumai, PT	Riau	N 01°38.341' , E 101°24.533'
R2 060	Pertamina RU 2 Dumai, PT	Riau	N 01°38.172' , E 101°24.486'
R2 061	Pertamina RU 2 Dumai, PT	Riau	N 01°38.108' , E 101°24.234'
R2 062	Pertamina RU 2 Dumai, PT	Riau	N 01°39.065' , E 101°25.503'
R2 063	Pertamina RU 2 Dumai, PT	Riau	N 01°39.001' , E 101°25.458'
R2 064	Pertamina RU 2 Dumai, PT	Riau	N 01°39.279' , E 101°25.506'
R2 065	Pertamina RU 2 Dumai, PT	Riau	N 01°38.702' , E 101°24.596'
R2 066	Pertamina RU 2 Dumai, PT	Riau	N 01°40.477' , E 101°27.759'
R2 067	Pertamina RU 2 Dumai, PT	Riau	N 01°40.542' , E 101°27.755'
R2 068	Pertamina RU 2 Dumai, PT	Riau	N 01°40.620' , E 101°27.727'
R2 069	Pertamina RU 2 Dumai, PT	Riau	N 01°40.924' , E 101°27.786'
R2 070	Pertamina RU 2 Dumai, PT	Riau	N 01°40.925' , E 101°27.789'
R2 071	Pertamina RU 2 Dumai, PT	Riau	N 01°40.750' , E 101°27.643'
R2 073	Pertamina RU 2 Dumai, PT	Riau	N 01°40.348', E 101°27.873'
R2 074	Pertamina RU 2 Dumai, PT	Riau	N 01°40.348', E 101°27.873'
R2 077	Wilmar Nabati Indonesia, PT	Riau	N 01°41.050' , E 101°27.315'
R2 079	Wilmar Nabati Indonesia, PT	Riau	N 01°41.043' , E 101°27.307'
R2 082	Riau Andalan Pupl & Paper, PT	Riau	S 02°55.508' E 104°42.549'
R2 083	Riau Andalan Pulp & Paper	Riau	N 00°26.581' E 101°53.823'
R2 084	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.488' E 101°53.757'
R2 085	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.448' E 101°53.757'
R2 086	Riau Andalan Pulp & Paper, PT	Riau	N oo°26.488' E 101°53.752'
R2 087	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.487' E 101°53.746'
R2 088	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.486' E 101°53.748'
R2 091	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.373' E 101°53.463'
R2 092	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.396' E 101°53.442'
R2 093	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.396' E 101°53.442'
R2 094	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.412' E 101°53.468'
R2 095	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.376' E 101°53.484'
R2 096	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.391' E 101°53.448'
R2 097	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.475' E 101°53.394'
R2 098	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.475' E 101°53.391'
R2 099	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.460' E 101°53.390'
R2 100	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.463' E 101°53.395'
R2 101	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.481' E 101°53.390'
R2 102	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.451' E 101°53.378'
R2 104	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.487' E 101°53.365'
R2 105	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.487' E 101°53.365'
R2 106	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.484' E 101°53.368'
R2 107	Riau Anfalan Pulp & Paper, PT	Riau	N 00°26.524' E 101°53.338'
R2 108	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.426' E 101°53.344'
R2 109	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.426' E 101°53.344'

R2 110	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.407' E 101°53.373'
R2 111	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.400' E 101°53.508'
R2 112	Riaun Andalan Pulp & Paper, PT	Riau	N 00°26.400' E 101°53.508'
R2 113	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.400' E 101°53.508
R2 114	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.400' E 101°53.508'
R2 115	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.400' E 101°53.508'
R2 116	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.400' E 101°53.508'
R2 118	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.382' E 101°53.467'
R2 119	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.382' E 101°53.467'
R2 120	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.426' E 101°53.426'
R2 121	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.426' E 101°53.416'
R2 122	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.426' E 101°53.416'
R2 123	Riau Andalan Pulp & Paper, PT	Riau	N 0°26.31.4016' E 101°53.0421'
R2 124	Riau Andalan Pulp & Paper, PT	Riau	N 0°26'32.0712' E 101°53'17.3940'
R2 126	Riau Andalan Pulp & Paper, PT	Riau	N 0°26.31.6644' E 101°53'18.3372'
R2 127	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.426' E 101°53.416'
R2 128	Riau Andalan Pulp & Paper, PT	Riau	N 0°26.28.068' E 101°53'17.34'
R2 129	Riau Andalan Pulp & Paper, PT	Riau	N 0°26'28.068' E 101°53'17.34'
R2 130	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.431' E 101°53.422'
R2 131	Riau Andalan Pulp & Paper, PT	Riau	N 0°26'26.9016' E 101°53'17.0556'
R2 133	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.425' E 101°53.413'
R2 134	Riau Andalan Pulp & Paper, PT	Riau	N o°26'29.2596'' E 101°53'16.1664''
R2 135	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.429' E 101°53.421'
R2 136	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.429' E 101°53.421'
R2 137	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.429' E 101°53.421'
R2 138	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.429' E 101°53.421'
R2 139	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.429' E 101°53.421'
R2 140	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.429' E 101°53.421'
R2 141	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.429' E 101°53.421'
R2 142	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.430' E 101°53.423'
R2 143	Riau Andalan Pulp & Paper, PT	Riau	N 0°25'43.7196'' E 101°52'46.9272''
R2 144	Riau Andalan Pulp & Paper, PT	Riau	N 0°25'34.0788" E 101°52'30.1512"
R2 145	Riau Andalan Pulp & Paper, PT	Riau	N 0°24'41.9124'' E 101°52'23.5992''
R2 146	Riau Andalan Pulp & Paper, PT	Riau	N 0°26'29.364'' E 101°53'45.9636''
R2 147	Riau Andalan Pulp & Paper, PT	Riau	N 0°26'25.17'' E 101°53'28.0284''
R2 148	Riau Andalan Pulp & Paper, PT	Riau	N 0°25'59.2572'' E 101°53'7.9404'
R2 149	Riau Andalan Pulp & Paper, PT	Riau	N 0°26'23.1684" E 101°53'35.4912"
R2 150	Riau Andalan Pulp & Paper, PT	Riau	N 0°26'23.1684' E 101°53'35.4912''
R2 151	Riau Andalan Pulp & Paper, PT	Riau	N 0°26.54184 E 101°53.3201'
R2 152	Riau Andalan Pulp & Paper, PT	Riau	N 0°26.24216' E 101°53.2792'
R2 153	Riau Andalan Pulp & Paper, PT	Riau	N 0°26.31272' E 101°53.0536'
R2 154	Riau Andalan Pulp & Paper, PT	Riau	N 0°26.392388' E 101°53.5102'
R2 155	Riau Andalan Pulp & Paper, PT	Riau	N 0°26.47684 E 101°53.5132'

R2 156	Riau Andalan Pulp & Paper, PT	Riau	N 0°26.37852' F 101°53.2328'
R2 157	Riau Andalan Pulp & Paper, PT	Riau	N 0°26.40624 E 101°53.1254
R2 158	Riau Andalan Pulp & Paper, PT	Riau	N 0°26.40376 E 101°53.2360'
R2 159	Riau Andalan Pulp & Pape, PT	Riau	N 00°26.404' E 101°53.586'
R2 160	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.457' E 101°53.569'
R2 161	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.423' E 101°53.545'
R2 162	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.221' E 101°53.351'
R2 163	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.437' E 101°53.401'
R2 164	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.562' E 101°53.332'
R2 165	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.562' E 101°53.332'
R2 166	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.221' E 101°53.675'
R2 167	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.697' E 101°53.232'
R2 168	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.347' E 101°53.431'
R2 169	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.350' E 101°53.443'
R2 170	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.348' E 101°53.442
R2 171	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.666' E 101°53.030'
R2 172	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.666' E 101°53.030'
R2 173	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.666' E 101°53.030'
R2 174	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.666' E 101°53.030'
R2 175	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.667' E 101°53.013'
R2 176	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.674' E 101°52.953'
R2 177	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.67' E 101°52.953'
R2 178	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.693' E 101°53.119'
R2 179	Riau Andalan Pulp & Paper, PT	Riau	N 00°25.453' E 101°52.689'
R2 180	Riau Andalan Pulp & Paper, PT	Riau	N 00°25.285' E 101°52.785'
R2 181	Riau Andalan Pulp & Paper, PT	Riau	N 00°25.285' E 101°52.785'
R2 182	Riau Andalan Pulp & Paper, PT	Riau	N 00°25.621' E 101°52.928'
R2 234	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 235	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 236	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 237	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 238	Chevron Pasific Indonesia,. PT	Riau	N 00°44.619 E 101°27.617'
R2 239	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 240	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617
R2 241	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 243	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 244	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 245	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 246	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 247	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 125	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.426' E 101°53.423'
R2 132	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.425' E 101°53.413'
R2 183	Chevron Pacific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'

R2 184	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 185	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 186	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 187	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 188	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610 E 101° 27.624'
R2 189	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 190	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 191	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 192	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 193	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 194	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 195	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 196	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 197	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 198	Chevron Pasific Indonesia, PT	Riau	N 00° 44.610' E 101° 27.624'
R2 248	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 249	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 250	Chevron Pasific Indonesia, PT	Riau	N 01°15.848' E 101°13.124'
R2 251	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 252	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 253	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 254	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 255	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 256	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 257	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 258	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 259	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 260	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 261	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 262	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 263	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 264	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 265	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 199	Chevron Pasisific Indonesia, PT	Riau	N 01° 16.093' E101° 13.034'
R2 200	Chevron Pasific Indonesia, PT	Riau	N 01° 16.093' E 101° 13.034'
R2 201	Chevron Pasific Indonesia, PT	Riau	N 01° 16.093' E 101° 13.034'
R2 202	Chevron Pasific Indonesia, PT	Riau	N 01° 16.093' E 101° 13.034'
R2 203	Chevron Pasific Indonesia, PT	Riau	N 01° 16.093 E 101° 13.034'
R2 204	Chevron Pasific Indonesia, PT	Riau	N 01° 16.093' E 101° 13.034'
R2 205	Chevron Pasific Indonesia, PT	Riau	N 01° 16.093' E 101° 13.034'
R2 206	Chevron Pasific Indonesia, PT	Riau	N 01° 16.093' E 101° 13.034'
R2 207	Chevron Pasific Indonesia, PT	Riau	N 01° 16.093' E 101° 13.034'
R2 208	Chevron Pasific Indonesia, PT	Riau	N 01° 16.075' E 101° 13.031'

R2 209	Chevron Pasific Indonesia, PT	Riau	N 01° 16.093' E 101° 13.034'
R2 210	Chevron Pasific Indonesia, PT	Riau	N 01° 16.075' E 101° 13.031'
R2 211	Chevron Pasific Indonesia, PT	Riau	N 01° 18.075' E 101° 13.031'
R2 212	Chevron Pasific Indonesia, PT	Riau	N 01° 16.075' E 101° 13.031'
R2 213	Chevron Pasific Indonesia, PT	Riau	N 01° 16.075 E 101° 13.031'
R2 214	Chevron Pasific Indonesia, PT	Riau	N 01° 16.075' E 101° 13.03==1'
R2 266	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 267	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 268	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 269	Chevron Pasific Indonesia, PT	Riau	N 01°15.849' E 101°13.123'
R2 270	Chevron Pasific Indonesia, PT	Riau	N 01°16.065' E 101°13.033'
R2 271	Chevron Pasific Indonesia, PT	Riau	N 01°16.065' E 101°13.033'
R2 272	Chevron Pasific Indonesia, PT	Riau	N 01°16.065' E 101°13.033'
R2 273	Chevron Pasific Indonesia, PT	Riau	N 01°16.065' E 101°13.033'
R2 274	Chevron Pasific Indonesia, PT	Riau	N 01°16.065' E 101°13.033'
R2 275	Chevron Pasific Indonesia, PT	Riau	N 01°16.065' E 101°13.033'
R2 276	Chevron Pasific Indonesia, PT	Riau	N 01°16.065' E 101°13.032'
R2 277	Chevron Pasific Indonesia, PT	Riau	N 01°16.065' E 101°13.033'
R2 278	Chevron Pasific Indonesia, PT	Riau	N 01°16.077' E 101°13.020'
R2 279	Chevron Pasific Indonesia, PT	Riau	N 01°16.077' E 101°13.020'
R2 280	Chevron Pasific Indonesia, PT	Riau	N 01°16.098' E 101°13.015'
R2 281	Chevron Pasific Indonesia, PT	Riau	N 01°16.099' E 101°13.016'
R2 282	Chevron Pasific Indonesia, PT	Riau	N 01°16.093' E 101°13.016'
R2 283	Chevron Pasific Indonesia, PT	Riau	N 01°16.093' E 101°13.016'
R2 284	Chevron Pasific Indonesia, PT	Riau	N 01°16.066' E 101°13.021'
R2 285	Chevron Pasific Indonesia, PT	Riau	N 01°16.094' E 101°13.077'
R2 215	Chevron Pasific Indonesia, PT	Riau	N 01° 16.075' E 101° 13.031'
R2 216	Chevron Pasific Indonesia, PT	Riau	N 01° 16.075' E 101° 13.031'
R2 217	Chevron Pasific Indonesia, PT	Riau	N 01° 16.075' E 101° 13.031'
R2 218	Chevron Pasific Indonesia, PT	Riau	N 01° 16.075' E 101° 13.031'
R2 219	Chevron Pasific Indonesia, PT	Riau	N 01° 16.075' E 101° 13.031'
R2 220	Chevron Pasific Indonesia, PT	Riau	N 01° 16.075' E 101° 13.031'
R2 221	Chevron Pasific Indonesia, PT	Riau	N 01° 16.075' E 101° 13.031'
R2 222	Chevron Pasific Indonesia, PT	Riau	N 01° 16.077' E 101° 13.015'
R2 223	Chevron Pasific Indonesia, PT	Riau	N 01° 16.077' E 101° 13.015'
R2 224	Chevron Pasific Indonesia, PT	Riau	N 01° 16.077' E 101° 13.015'
R2 225	Chevron Pasific Indonesia, PT	Riau	N 01° 16.077' E 101° 13.015'
R2 226	Chevron Pasific Indonesia, PT	Riau	N 01° 16.077' E 101° 13.015'
R2 227	Chevron Pasific Indonesia, PT	Riau	N 01° 16.077' E 101° 13.015'
R2 228	Chevron Pasific Indonesia, PT	Riau	N 01° 16.077' E 101° 13.015'
R2 229	Chevron Pasific Indonesia, PT	Riau	N 01° 16.077' E 101° 13.015'
R2 230	Chevron Pasific Indonesia, PT	Riau	N 01° 16.077' E 101° 13.015'
R2 231	Chevron Pasific Indonesia, PT	Riau	N 01° 16.077' E 101° 13.015'

R2 232	Chevron Pasific Indonesia, PT	Riau	N 01° 16.077' E 101° 13.015'
R2 233	Chevron Pasific Indonesia, PT	Riau	N 01° 16.087' E 101° 13.008'
R2 089	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.486' E 101°53.748'
R2 103	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.487' E 101°53. 365'
R2 117	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.382' E 101°53.467'
R2 242	Chevron Pasific Indonesia, PT	Riau	N 00°44.619' E 101°27.617'
R2 090	Riau Andalan Pulp & Paper, PT	Riau	N 00°26.484' E 101°53.750'
R2 286	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 288	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.138'
R2 289	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.138'
R2 290	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.138'
R2 291	IKPP Perawang, PT	Riau	N 00°40.977' E 101°37.278'
R2 292	IKPP Perawang, PT	Riau	N 00°40.972' E 101°37.278'
R2 293	IKPP Perawang, PT	Riau	N 00°40.977' E 101°37.278'
R2 294	IKPP Perawang, PT	Riau	N 00°40.972' E 101°37.278'
R2 295	IKPP Perawang, PT	Riau	N 00°41.114' E 101°37.167'
R2 296	IKPP Perawang, PT	Riau	N 00°41.114' E 101°37.167'
R2 297	IKPP Perawang, PT	Riau	N 00°41.114' E 101°37.167'
R2 298	IKPP Perawang, PT	Riau	N 00°41.114' E 101°37.167'
R2 299	IKPP Perawang, PT	Riau	N 00°41.114' E 101°37.167'
R2 300	IKPP Perawang, PT	Riau	N 00°41.114' E 101°37.167'
R2 301	IKPP Perawang, PT	Riau	N 00°41.464' E 101°37.417'
R2 302	IKPP Perawang, PT	Riau	N 00°41.464' E 101° 37.417'
R2 303	IKPP Perawang, PT	Riau	N 00°41.464 E 101°37.417'
R2 304	IKPP Perawang, PT	Riau	N 00°41.464' E 101°37.417'
R2 305	IKPP Perawang, PT	Riau	N 00°41.464' E 101°37.417'
R2 306	IKPP Perawang, PT	Riau	N 00°41.464' E 101°37.417'
R2 307	IKPP Perawang, PT	Riau	N 00°41.464' E 101°37.417'
R2 308	IKPP Perawang, PT	Riau	N 00°41.464' E 101°37.417'
R2 309	IKPP Perawang, PT	Riau	N 00°41.464' E 101°37.417'
R2 310	IKPP Perawang, PT	Riau	N 00°41.464' E 101°37.417'
R2 311	IKPP Perawang, PT	Riau	N 00°41.438' E 101°37.377'
R2 312	IKPP Perawang, PT	Riau	N 00°41.438' E 101°37.377'
R2 313	IKPP Perawang, PT	Riau	N 00°41.351' E 101°37.488'
R2 314	IKPP Perawang, PT	Riau	N 00°41.351' E 101°37.488'
R2 315	IKPP Perawang, PT	Riau	N 00°41.351' E 101°37.488'
R2 316	IKPP Perawang, PT	Riau	N 00°41.351' E 101°37.488'
R2 317	IKPP Perawang, PT	Riau	N 00°41.351' E 101°37.488'
R2 318	IKPP Perawang, PT	Riau	N 00°41.351' E 101°37.488'
R2 319	IKPP Perawang, PT	Riau	N 00°41.351' E 101°37.488'
R2 320	IKPP Perawang, PT	Riau	N 00°41.351' E 101°37.488'
R2 321	IKPP Perawang, PT	Riau	N 00°41.351' E 101°37.488'
R2 322	IKPP Perawang, PT	Riau	N 00°41.351' E 101°37.488'

R2 323	IKPP Perawang, PT	Riau	N 00°41.351' E 101°37.488'
R2 324	IKPP Perawang, PT	Riau	N 00°41.351' E 101°37.488'
R2 325	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 326	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 327	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 328	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 329	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 330	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 331	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 332	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 333	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 334	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 335	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 336	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 337	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 338	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 339	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 340	IKPP Perawang, PT	Riau	N 00°31.346' E 101°37.508'
R2 341	IKPP Perawang, PT	Riau	N 00°41.346' E 101°37.508'
R2 342	IKPP Perawang, PT	Riau	N 00°41.346' E 101°37.508'
R2 343	IKPP Perawang, PT	Riau	N 00°41.346' E 101°37.508'
R2 344	IKPP Perawang, PT	Riau	N 00°41.346' E 101°37.508'
R2 345	IKPP Perawang, PT	Riau	N 00°41.281' E 101°37.599'
R2 346	IKPP Perawang, PT	Riau	N 00°41.303' E 101°37.561'
R2 347	IKPP Perawang, PT	Riau	N 00°41.303' E 101°37.561'
R2 348	IKPP Perawang, PT	Riau	N 00°41.303' E 101°37.561'
R2 349	IKPP Perawang, PT	Riau	N 00°41.303' E 101°37.561'
R2 350	IKPP Perawang, PT	Riau	N 00°41.303' E 101°37.561'
R2 351	IKPP Perawang, PT	Riau	N 00°41.232' E 101°37.462'
R2 352	IKPP Perawang, PT	Riau	N 00°41.226' E 101°37.469'
R2 353	IKPP Perawang, PT	Riau	N 00°41.226' E 101°37.469'
R2 354	IKPP Perawang, PT	Riau	N 00°40.589' E 101°36.920'
R2 355	IKPP Perawang, PT	Riau	N 00°40.589' E 101°36.920'
R2 356	IKPP Perawang, PT	Riau	N 00°40.589' E 101°36.920'
R2 357	IKPP Perawang, PT	Riau	N 00°40.550' E 101°36.913'
R2 358	IKPP Perawang, PT	Riau	N 00°40.550' E 101°36.913'
R2 359	IKPP Perawang, PT	Riau	N 00°40.550' E 101°36.913'
R2 360	IKPP Perawang, PT	Riau	N 00°40.550' E 101°36.913'
R2 361	IKPP Perawang, PT	Riau	N 00°40.550' E 101°36.913'
R2 362	IKPP Perawang, PT	Riau	N 00°40.550' E 101°36.913'
R2 363	IKPP Perawang, PT	Riau	N 00°40.550' E 101°36.913'
R2 364	IKPP Perawang, PT	Riau	N 00°40.550' E 101°36.913'
R2 365	IKPP Perawang, PT	Riau	N 00°40.550' E 101°36.913'

R2 366	IKPP Perawang, PT	Riau	N 00°40.516' E 101°36.935'
R2 367	IKPP Perawang, PT	Riau	N 00°41.208' E 101°37.610'
R2 368	IKPP Perawang, PT	Riau	N 00°41.208' E 101°37.610'
R2 369	IKPP Perawang, PT	Riau	N 00°41.208' E 101°37.610'
R2 370	IKPP Perawang, PT	Riau	N 00°40.959' E 101°37.095'
R2 371	IKPP Perawang, PT	Riau	N 00°41.114' E 101°37.167'
R2 372	IKPP Perawang, PT	Riau	N 00°41.077' E 101°37.074'
R2 373	IKPP Perawang, PT	Riau	N 00°41.077' E 101°37.074'
R2 374	IKPP Perawang, PT	Riau	N 00°41.077' E 101°37.074'
R2 375	IKPP Perawang, PT	Riau	N 00°41.169' E 101°37.118'
R2 376	IKPP Perawang, PT	Riau	N 00°41.169' E 101°37.118'
R2 377	IKPP Perawang, PT	Riau	N 00°41.169' E 101°37.118'
R2 378	IKPP Perawang, PT	Riau	N 00°41.130' E 101°37.116'
R2 379	IKPP Perawang, PT	Riau	N 00°41.130' E 101°37.116'
R2 380	IKPP Perawang, PT	Riau	N 00°41.130' E 101°37.116'
R2 381	IKPP Perawang, PT	Riau	N 00°41.130' E 101°37.116'
R2 382	IKPP Perawang, PT	Riau	N 00°41.130' E 101°37.116'
R2 383	IKPP Perawang, PT	Riau	N 00°41.130' E 101°37.116'
R2 384	IKPP Perawang, PT	Riau	N 00°41.140' E 101°37.238'
R2 385	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 386	IKPP Perawang, PT	Riau	N 00°41.140' E 101°37.238'
R2 387	IKPP Perawang, PT	Riau	N 00°41.140' E 101°37.238'
R2 388	IKPP Perawang, PT	Riau	N 00°41.140' E 101°37.238'
R2 389	IKPP Perawang, PT	Riau	N 00°41.189' E 101°37.212'
R2 390	IKPP Perawang, PT	Riau	N 00°41.189' E 101°37.212'
R2 391	IKPP Perawang, PT	Riau	N 00°41.189' E 101°37.212'
R2 392	IKPP Perawang, PT	Riau	N 00°41.189' E 101°37.212'
R2 393	IKPP Perawang, PT	Riau	N 00°41.221' E 101°37.137'
R2 394	IKPP Perawang, PT	Riau	N 00°41.221' E 101°37.137'
R2 395	IKPP Perawang, PT	Riau	N 00°41.221' E 101°37.137'
R2 396	IKPP Perawang, PT	Riau	N 00°41.221' E 101°37.137'
R2 397	IKPP Perawang, PT	Riau	N 00°40.003' E 101°37.003'
R2 398	IKPP Perawang, PT	Riau	N 00°40.640' E 101°37.003'
R2 399	IKPP Perawang, PT	Riau	N 00°40.640' E 101°37.003'
R2 400	IKPP Perawang, PT	Riau	N 00°40.640' E 101°37.003'
R2 401	IKPP Perawang, PT	Riau	N 00°40.842' E 101°36.884'
R2 402	IKPP Perawang, PT	Riau	N 00°40.842' E 101°36.884'
R2 403	IKPP Perawang, PT	Riau	N 00°40.842' E 101°36.884'
R2 404	IKPP Perawang, PT	Riau	N 00°40.959' E 101°37.095'
R2 405	IKPP Perawang, PT	Riau	N 00°40.959' E 101°37.095'
R2 406	IKPP Perawang, PT	Riau	N 00°40.959' E 101°37.095'
R2 407	IKPP Perawang, PT	Riau	N 00°40.959' E 101°37.095'
R2 408	IKPP Perawang, PT	Riau	N 00°40.959' E 101°37.095'

R2 409	IKPP Perawang, PT	Riau	N 00°40.959' E 101°37.095'
R2 410	IKPP Perawang, PT	Riau	N 00°40.959' E 101°37.095'
R2 411	IKPP Perawang, PT	Riau	N 00°40.959' E 101°37.095'
R2 412	IKPP Perawang, PT	Riau	N 00°40.959' E 101°37.095'
R2 413	IKPP Perawang, PT	Riau	N 00°40.959' E 101°37.095'
R2 414	IKPP Perawang, PT	Riau	N 00°40.801' E 101°36.846'
R2 415	IKPP Perawang, PT	Riau	N 00°40.801' E 101°36.846'
R2 416	IKPP Perawang, PT	Riau	N 00°40.801' E 101°36.846'
R2 417	IKPP Perawang, PT	Riau	N 00°40.801' E 101°36.846'
R2 418	IKPP Perawang, PT	Riau	N 00°40.801' E 101°36.846'
R2 419	IKPP Perawang, PT	Riau	N 00°40.801' E 101°36.846'
R2 420	IKPP Perawang, PT	Riau	N 00°40.801' E 101°36.846'
R2 421	IKPP Perawang, PT	Riau	N 00°40.801' E 101°36.846'
R2 422	IKPP Perawang, PT	Riau	N 00°40.634' E 101°36.911'
R2 423	IKPP Perawang, PT	Riau	N 00°40.634' E 101°36.911'
R2 424	IKPP Perawang, PT	Riau	N 00°40.616' E 101°36.961'
R2 425	IKPP Perawang, PT	Riau	N 00°40.634' E 101°36.911'
R2 426	IKPP Perawang, PT	Riau	N 00°40.616' E 101°36.961'
R2 427	IKPP Perawang, PT	Riau	N 00°40.616' E 101°36.961'
R2 428	IKPP Perawang, PT	Riau	N 00°40.616' E 101°36.961'
R2 429	IKPP Perawang, PT	Riau	N 00°40.616' E 101°36.961'
R2 430	IKPP Perawang, PT	Riau	N 00°40.616' E 101°36.961'
R2 431	IKPP Perawang, PT	Riau	N 00°40.616' E 101°36.987
R2 432	IKPP Perawang, PT	Riau	N 00°40.616' E 101°36.950'
R2 433	IKPP Perawang, PT	Riau	N 00°40.700' E 101°36.999'
R2 434	IKPP Perawang, PT	Riau	N 00°40.700' E 101°36.999'
R2 435	IKPP Perawang, PT	Riau	N 00°40.700' E 101°36.999'
R2 436	IKPP Perawang, PT	Riau	N 00°40.700' E 101°36.999'
R2 437	IKPP Perawang, PT	Riau	N 00°40.701' E 101°37.002'
R2 438	IKPP Perawang, PT	Riau	N 00°40.839' E 101°36.825'
R2 439	IKPP Perawang, PT	Riau	N 00°40.839' E 101°36.825'
R2 440	IKPP Perawang, PT	Riau	N 00°40.839' E 101°36.825'
R2 441	IKPP Perawang, PT	Riau	N 00°40.839' E 101°36.825'
R2 442	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 443	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 444	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 445	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 446	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 447	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 448	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 449	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 450	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 451	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'

R2 452	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 453	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 454	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 455	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 456	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 457	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 458	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 459	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 460	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 461	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 462	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 463	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 464	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'
R2 465	IKPP Perawang, PT	Riau	N 00°40.964' E 101°37.094'

Riau Province Visualization in the Online PCBs Database Management System

Annex 3: Inventory Labels Design

1. Inventory label design for PCBs contaminated equipment

AWAS ALAT INI MENGANDUNG ≥ 50 ppm PCBs Polychlorinated Biphenyls							
PCBs yang berada dalam peralatan ini berbahaya bagi lingkungan dan kesehatan manusia. Bersifat karsinogenik, teratogenik dan mutagenik. Apabila ada kebocoran, kebakaran atau kondisi darurat lain, hubungi :							
Nama :							
Nomor Kontak :							
(adalah penanggung jawab pengelola B3/limbah B3)							
 Nilai konsentrasi PCBs Nomor seri peralatan Tanggal pemasangan label : 	M'						

2. Inventory label design for equipment not contaminated by PCBs

ALAT IN	MENGANDUNG
< 50	oppm PCBs

Polychlorinated Biphenyls

PCBs yang berada dalam peralatan ini berbahaya bagi lingkungan dan kesehatan manusia. Bersifat karsinogenik, teratogenik dan mutagenik. Apabila ada kebocoran, kebakaran atau kondisi darurat lain, hubungi :

Nama				
Nomor Kontal	k :			
(adalah penanggun	g jaw	ab pengelola	n Bi	3/limbah B3)
 Nilai konsen 	trasi	PCBs	A.	PPM
 Nomor seri 	oeral	atan		
 Tanggal per 	nasai	ngan label		

Annex 4: Delivery Receipt of Inventory Labels and Testing Result Reports

No.	Delivery Service Vendor	Receipt Number	Receiving Company	Contact Person	Address	Delivery Date	Received Date
1	ТІКІ	030213668086-0	PT Jakarta Cakratunggal Steel Mills	Bu Sulastri	Jl. Raya Bekasi KM 21-22, Cakung Barat,Cakung, Jakarta Timur	25-May-21	26-May-21
2	тікі	030213668087-0	PT Emdeki Utama	Pak Astwin Arief Wibowo	Jl. Krikilan No.294 Driyorejo-Gresik Jawa Timur	25-May-21	27-May-21
3	ТІКІ	030213668088-0	PT Indo Kordsa	Pak R Pradipta Nugroho	Jl. Pahlawan, Desa Karang Asem Timur, Citeureup, Bogor	25-May-21	26-May-21
4	тікі	030213668089-0	PT Sopanusa Tissue and Packaging	Bu Dian Lestari	Jl. Raya Ngoro No.100, KM.6, Desa Manduro Manggunggajah, Kec. Ngoro, kab. Mojokerto, Jawa Timur 61385	25-May-21	27-May-21
5	тікі	030213668077-0	PT Pelita Cengkareng Paper	Pak Ringgono	Jl. Daan Mogot KM. 18, Batu Ceper, Tangerang 15122, Banten	25-May-21	26-May-21
6	ТІКІ	030213668078-0	PT The Mastel Steel MF 2	Pak Syaiful Syaimsir	Jl. Alpha Maspion Kav.M, Kawasan Industri Maspion V, Tenger, Roomo, Manyar, Gresik Regency, Jawa Timur 61151	25-May-21	27-May-21
7	ТІКІ	030213668073-0	PT Surya Zigzag	Bu Nita Liestyowati	Jl. Raya Kediri Kertosono KM. 7, Desa Ngebrak, Kec. Gampengrejo, Kab. Kediri, Jawa Timur 64182	25-May-21	27-May-21
8	ТІКІ	030213668053-0	PT Suparma	Bapak Wahyudi/Yustiohadi	Jl. Mastrip No.856 Surabaya. Telp. 0317666666	25-May-21	26-May-21
9	тікі	030213668071-0	PT Tumbak Mas Inti Mulia	Pak Agus Priyono	Jl. Kaliabang, Desa Pejuang KM 27, Bekasi 17131	25-May-21	26-May-21
10	JNE	015910014876521	PT Pupuk Iskandar Muda	Pak Fachrian	Jl. Medan-Banda Aceh, Krueng Geukuh, Kec. Dewantara, Aceh Utara	28-May-21	4-Jun-21

No.	Delivery Service Vendor	Receipt Number	Receiving Company	Contact Person	Address	Delivery Date	Received Date
11	ТІКІ	30213668051-0	PT Indo Bharat Rayon	Bu Navita Fajrina	Jl. Raya Industri KM 10, Desa Cilangkap, Kec. Babakan Cikao, Kab. Purwakarta, Jawa Barat.	25-May-21	27-May-21
12	ТІКІ	030213668080-0	PT Adiprima Suraprinta	Pak Gunawan Widodo	Jl. Raya Wringinanom KM 30,5, Desa Sumengko, Kec. Wringinanom, Kab. Gresik, Prov. Jawa Timur 61176	25-May-21	27-May-21
13	ТІКІ	030213668072-0	PT Petrokimia Gresik	Pak Azhim Agni Prasetya	Jl. Jendral Ahmad Yani - Gresik 61119 (pos satpam pabrik)	25-May-21	27-May-21
14	тікі	030213668063-0	PT Jatim Taman Steel	Pak Agung Adji Nugroho	Jl. Raya Taman No. 1, Taman Siodarjo	25-May-21	27-May-21
15	ТІКІ	030213668079-0	PT Kalimantan Steel	Bu Yeni Armida	Jl. Rungkut Industri Raya No.17 (Rungkut Kidul, Kec. Rungkut, Surabaya) 60298	25-May-21	26-May-21
16	ТІКІ	030213668059-0	PT Mega Surya Eratama	Pak Tiyok	Jl. Raya Jasem No. 112, Desa Jasem, Kec. Ngoro, Kab. Mojokerto	25-May-21	27-May-21
17	тікі	030213668081-0	PT Surabaya Mekabox	Pak Widodo	Jl. Raya Bambe KM 18, Driyorejo, Gresik, Jawa Timur	25-May-21	27-May-21
18	ТІКІ	030213668082-0	PT Ekamas Fortuna	Bu Reyvanes E. Rachman	Public Relations Ekamas Fortuna Jalan Bromo 62 Malang, Jawa Timur 65101	25-May-21	27-May-21
19	ТІКІ	030213668083-0	PT Java Pacific	Pak Yayan Purwanto	Jl. Raya Surabaya-Krian KM 24-25, Desa Keboharan, Krian Sidoarjo, Jawa Timur	25-May-21	27-May-21
20	ТІКІ	030213668084-0	PT Betonjaya Manunggal	Pak Agung Nuryanto	Jl. Raya Krikilan No.434 KM 28,5, Krikilan Driyorejo, Gresik	25-May-21	27-May-21
21	ТІКІ	030213668085-0	PT Priscolin	Pak Ridzki Aditya	Jl. Pondok Ungu, Kel. Pejuang, Kec. Medan Satria, Kota Bekasi, Jawa Barat 17131	25-May-21	26-May-21

No.	Delivery Service Vendor	Receipt Number	Receiving Company	Contact Person	Address	Delivery Date	Received Date
22	JNE	015910014799921	PT Bukit Asam	Manager Pengelolaan Lingkungan	Jl. Parigi No.1, Kec. Lawang Kidul, Tanjung Enim, Kab. Muara Enim, Prov. Sumatera Selatan (Kantor PTBA)	27-May-21	31-May-21
23	ТІКІ	030213668060-0	PT Raksa Indo Steel	Bu Febby Cici	Jl. Raya Sumengko KM 30 Wringinanom-Gresik Jawa Timur 61176	25-May-21	27-May-21
24	ТІКІ	030213668061-0	PT Barata Indonesia	Pak Barahmanto Anggoro Laksono	Jl. Veteran No.241 Gresik 61123	25-May-21	27-May-21
25	ТІКІ	030213668062-0	PT Pura Nusa Persada	Pak Hari Muryanto	Jl. Raya Kudus - Pati KM 12, Kec. Jekulo, Kab. Kudus, Jawa Tengah, Telp. 0291-431312	25-May-21	26-May-21
26	ТІКІ	030213668075-0	PT Megah Putih Raya Soda Sumatera	Pak Shen Muliadi	Jl. Mangkubumi No.10A, Medan 20151, Sumatera Utara	25-May-21	27-May-21
27	ТІКІ	030213668076-0	PT Timah	Pak Thomson Harisanto Purba	Jl. Hang Tuah No.4, Prayun Kundur, Kab. Karimun, Kepulauan Riau 29662	25-May-21	27-May-21
28	тікі	030213668056-0	PT Sulfindo Adiusaha	Pak Septian Labertta	Jl. Raya Salira, Mangunreja, Serang, Banten 42455	25-May-21	27-May-21
29	ТІКІ	030213668058-0	PT Spindo II	Pak Dimas Satria Dwitama	Jl. Rungkut Industri II No.10, Tenggilis Mejoyo, Surabaya, Jawa Timur	25-May-21	26-May-21
30	ТІКІ	030213668057-0	PT Styrindo Mono Indonesia/PT Chandra Asri Petrochemical	Pak Willy Yuswardi	Merak Plant, Desa Mangunreja, Mangunreja, Serang, Banten 42455	25-May-21	27-May-21
31	тікі	030213668055-0	PT Bakrie Autopart	Pak Suharjak	Jl. Raya Bekasi KM 27, Medan Satria, Bekasi	25-May-21	26-May-21
32	тікі	030213668054-0	PT Pupuk Sriwidjaja	Pak Ongki A. Aziz	Jl. Mayor Zen, Kel. Sei Selayur, Kec. Kalidoni, Palembang 30118	25-May-21	27-May-21

No.	Delivery Service Vendor	Receipt Number	Receiving Company	Contact Person	Address	Delivery Date	Received Date
33	тікі	030213668074-0	PT Pindad Persero	Pak Nur Ali Ritaudin	Jl. Jendral Gatot Subroto No.517, Bandung	25-May-21	26-May-21
34	ТІКІ	030213668112-0	PT Surya Pamenang	Pak Brian Respati/Pak Ferdy	Jl. Raya Kediri - Kertosono KM. 7, Desa Ngebrak, Gampengrejo, Kediri, Turus, Jawa Timur 64182	28-May-21	31-May-21
35	тікі	030213668109-0	PT Krakatau Wajatama	Pak Yudhie Haditama	Jl. Industri No.5, Cilegon, Banten, 42435	28-May-21	29-May-21
36	ТІКІ	030213668108-0	PT Pertamina RU-II Dumai	Pak Suroto	Main Office Lt.2, Jl. Putri Tujuh Dumai, 28815, Dumai Timur, Kota Dumai, Riau. Telp. 0765-442300	28-May-21	31-May-21
37	ТІКІ	030213668110-0	PT Dian Swastatika Sentosa	Pak Lili Sugeng Diko Nugroho	Jl. Raya Serang - Jakarta KM 76, Ciujung - Kragilan, Serang, Banten, 42184	28-May-21	31-May-21
38	ТІКІ	030213668111-0	PT Solusi Bangun Indonesia Cilacap	Pak Hendro Susyanto	Jl. Ir Juanda, Karang talun, Cilacap Utara, Jawa Tengah 53234, Indonesia	28-May-21	29-May-21
39	ТІКІ	030213668113-0	PT Indah Kiat Pulp and Paper Perawang	Pak Adi Hartono	Jl. Raya Minas - Perawang KM 26, Desa Pinang Sebatang, Kec. Tualang, Kab. Siak 28772 Riau- Indonesia	28-May-21	31-May-21
40	ТІКІ	030214217911-0	PT Multimas Nabati Asahan	Bu Margaretha	Jl. Raya Bojonegara KM 5 Kav. 162, Kec. Kramatwatu, Kab. Serang	16-Jun-21	17-Jun-21
41	ТІКІ	030214217912-0	PT TJB Power Services PLTU Tanjung Jati B Unit 1 & 2	Bu Tiara Farina	Desa Tubanan, Kec. Kembang, Kab. Jepara 59453	16-Jun-21	18-Jun-21
42	тікі	030214217908-0	PT Pertamina RU IV Cilacap	Bu Vanny Restisha	Komperta Gunung Simping 118 Kel. Tegalkamulyan, Kec. Cilacap Tengah, Kab. Cilacap 53224 Jawa Tengah	16-Jun-21	17-Jun-21
43	тікі	030214217910-0	PT Antam Pongkor UPBE Pongkor	Pak Anwar Bin Asinan	Desa Bantar Karet, Kec. Nanggung, Kab. Bogor, Jawa Barat 16650	16-Jun-21	18-Jun-21

No.	Delivery Service Vendor	Receipt Number	Receiving Company	Contact Person	Address	Delivery Date	Received Date
44	ТІКІ	030214217909-0	PT Pertamina RU VI Balongan	Pak Rahmat Ibnas	Jl. Balongan KM 9, Sukareja, Kec. Indramayu, Kab. Indramayu, Jawa Barat 45218	16-Jun-21	17-Jun-21
45	ТІКІ	030214549364-0	PT Pertamina RU III Plaju	Bu Maharani	Jl. Beringin No.1, Komperta, Plaju, Kota Palembang, Sumatera Selatan 30268	22-Jun-21	23-Jun-21
46	JNE	015910017036521	PT Lontar Papyrus Pulp and Paper	Pak Putra Hadi	Kel. Simpang III Mayang, Kec. Kota Baru, Jl. Ir. H. Juanda no.14, Jambi 36126	22-Jun-21	24-Jun-21
47	ТІКІ	030214549368-0	PT Tifico Fiber Indonesia	Pak Chris Widjaja	Jl. M. H.Thamrin, Kel. Panunggangan, Kec. Pinang, Kota Tangerang, Banten 15143	22-Jun-21	23-Jun-21
48	ТІКІ	030214549365-0	PT Semen Indonesia Plant Tuban	Pak Mirza Imesya	Gd. Dormitory Lt. 1, Ds. Sumberarum, Kec. Kerek, Kab. Tuban	22-Jun-21	24-Jun-21
49	ТІКІ	030214549366-0	PT Riau Andalan Pulp and Paper	Pak Dady	Jl. Lintas Timur, Kec. Pangkalalan Kerinci, CO 2nd Floor, Kab. Pelalawan, Riau 28300	22-Jun-21	26-Jun-21
50	ТІКІ	030214549367-0	PT Indah Kiat Pulp and Paper	Bu Indrayani	Jl. Raya Serang KM 76, Kec. Kragilan, Serang - Banten 42184	22-Jun-21	23-Jun-21
51	ТІКІ	030214549501-0	PT Gunung Raja Paksi	Pak Ryan Anggriawan	Jl. Perjuangan No.8, Kampung Tangsi, Desa Sukadanau, Kec. Cikarang Barat, Kab. Bekasi	8-Jul-21	9-Jul-21
52	тікі	030214549500-0	PT Tjiwi Kimia	Pak Andhika D. H	Jl. Raya Surabaya - Mojokerto KM 44, Sidoarjo	8-Jul-21	10-Jul-21
53	ТІКІ	030214549502-0	PT Wilmar Nabati Indonesia	Pak Rinyono	Jl. Pulau Sumatra, Kawasan Industri Dumai, Pelintung, Medang Kampai 28825, Dumai-Riau	8-Jul-21	10-Jul-21
54	ТІКІ	030214549503-0	ConocoPhillips (Grissik) Ltd	Pak Jeff Dani	Jalan Medan No. 131-133 Kompleks Mega Cinere, Depok 16514	8-Jul-21	9-Jul-21

No.	Delivery Service Vendor	Receipt Number	Receiving Company	Contact Person	Address	Delivery Date	Received Date
55	ТІКІ	030214549504-0	PT Sumberaya Kendimasindo	Pak Herri Soesanto	Jl. Raya Pandan Landung 208A, Kecamatan Wagir, Kabupaten Malang 65158	8-Jul-21	12-Jul-21
56	ТІКІ	030214549505-0	PT Ispat Bukit Baja	Pak Mustofa (Dikirimkan ke Pak Aprian)	Kedung Turi, Kecamatan Taman Sidoarjo, Jawa timur	8-Jul-21	12-Jul-21
57	ТІКІ	030214549499-0	PT Chevron Pacific Indonesia	Pak Fardiansyah	Chevron Rumbai Camp, Kantor Soka Lt.2 room 12, Rumbai Pesisir, Kota Pekanbaru - Riau	8-Jul-21	
58	ТІКІ	030214549574-0	PT SBI Holcim Narogong	Pak Yayan Susanto	Jl. Raya Narogong KM.7 Desa Kembang Kuning - Kelapa Nunggal - Bogor 16820	14-Jul-21	15-Jul-21
59	ТІКІ	030214549575-0	PT Bakrie Metal Industri	Bu Tika	Jl. Raya Kaliabang Bungur No.86, Kel. Harapan Jaya, Kec. Bekasi Utara, Kota Bekasi	14-Jul-21	15-Jul-21
60	ТІКІ	030214549576-0	PT Pura Barutama (Unit PM 569)	Pak Suparwei	Jl. AKBP. Agil Kusumadya 203 KM.4, Desa Jati Kencing, Kudus	14-Jul-21	15-Jul-21
61	ТІКІ	030214549577-0	PT Timah Tbk Unit Metalurgi Muntok	Pak Yuono	Jl. Raya Timah No. 1 , Kec. Muntok, Kab Bangka Barat, Prop Bangka Belitung	14-Jul-21	16-Jul-21
62	тікі	030214549573-0	PT Bakrie Pipe Industries	Bu Fianisa Anggraini	Jl. Raya Pejuang, Medan Satria, Kota Bekasi 17131	14-Jul-21	15-Jul-21
63	JNE	015910019219021	PT Indonesia Asahan Aluminium (Persero)	Pak Chandra	Kantor Peleburan Kuala Tanjung, Kab. Batubara, Sumatera Utara.	15-Jul-21	19-Jul-21

PETROLAB SERVICES independent laboratory

TRAFO III