

# INDUSTRIAL TRAINING FIELD REPORT

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## ACKNOWLEDGEMENT

Assalamualaikum w.b.t, in the name of Allah SWT, I must show my deepest gratitude to the almighty Allah SWT for giving me the ability and unique chances to complete the industrial training despite the current pandemic which is COVID-19 in order to finish my diploma programme.

First and foremost, I am sincerely wanting to express my respect and special thanks to my supervisors, Mr. Abdul Rahman, Mr Aizuddin and Mr. Norzaidi for their invaluable guidance, consideration and thoughtfulness in assisting me to learn a new experience in working condition. Despite of the inconvenient of new working regulation in pandemic situation, they trying their best and maximize the opportunity to teach me the knowledge in working situation.

Furthermore, I would like to thank Pengurusan Air Pahang Berhad (PAIP) staff especially District Manager, Mr. Harwin who has giving the chance to had internship here. The other staffs also have taught and brought a memorable experience as working a company as I am adapting myself in industrial environment. For instance, a lot of a new knowledge about management and technician's skills has been obtained during my internship-training period. From the supports and advices, an improvement for myself that will play a huge role in preparing myself for future industrial attachment. Next, not to forget to my family, fellow friends and the coordinator, Ms Hidayu and Mr Haikal for keep giving me continuous moral support and blessing in facing all the COVID-19's challenges until the end of my training period.

In the nutshell, I would like to wish best of luck to Pengurusan Air Pahang Berhad (PAIP) and hoping that it will achieve the vision that being the world-class water supplier provider.

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## **1.0 INTRODUCTION**

As a 3<sup>rd</sup> Year/Semester 6 student of Diploma in Chemical Engineering at Universiti Teknologi MARA Johor, Pasir Gudang Campus, in order to receive the diploma scroll, it was obligate for each student to undergo industrial training for minimum 17 weeks. The course code for 17 weeks industrial training is CHE353 with 7 credit hours. The main objective of the industrial training is to prepare the final year student to the real working environment by applying all the theories and skill that have learnt throughout the whole program into the technical skills. The expected outcomes from this training are students are able to identify the types of work that chemical engineers do in real engineering world and appreciate the theoretical knowledge learnt. The student should also competent in performing basic engineering practices, including technical writing report, communication with colleagues, handling project and generating proposa for betterment of the industries. Other than that, from the training it was also expected that the student can improve their level of integrity, ethical and accountability in practicing engineering.

Generally, from the proposed and offered internship training the company that been accepted by the student Nur Hasanah binti Mohd Zubaidi (2018431592) was Pengurusan Air Pahang Berhad (PAIP) Maran District. The reason why the company was chosen because it was the most close industry with the one that have been learn from the past 5 semester especially from CHE332 (Introduction to Environmental Engineering). For the past 4 months (2 months' work from office and 2 months' work from home) starting from March 22, 2021 to July 16, 2021 as suggested by Ministry of Works preferable to work from home. A lot of things had been learned in the real working environment such as the process water treatment for a huge scale, preparation of the company in facing the unexpected pandemic and practicing the new standard of procedure (SOP) of working as per advised from Ministry of Health.

As for mini project, there was 8 module were assigned but unfortunately only 6 of it have been done because of RMO and starting to work from home. The task was unable fully finished it as it was a must to learn from the plant itself.

In this report, there are the details about the internship, which includes the organization chart and history of the company, process flow, briefing about weekly activity and the mini project during my internship period.

## **2.0 CONTENT**

### **2.1 COMPANY BACKGROUND**

Pengurusan Air Pahang Berhad (PAIP) was officially established on 1 February 2012 through the corporatisation of the Pahang Water Supply Department (JBAP) and one of subsidiary Kerajaan Negeri Pahang. With the corporatization of JBAP, the State Government has officially handed over the operation of treating, supplying, cleaning and collecting water revenue from the sale of clean water which has been handled by JBAP to PAIP. The new logo of PAIP is as in Fig. 1. The focus of the company are zero blackspot. quick to act, planned spending, avoid wastage, increased yield, pleasant user experience.

PAIP is a huge company who has 11 branches in each district in Pahang. The main branch and headquarters is in Bandar Indera Mahkota, Kuantan while the other branch such as PAIP Pekan, PAIP Rompin, PAIP Bera and the branch that was interned PAIP Maran. PAIP Maran was officially operate since 2002 launched by Tuan Haji Ismail bin Mat Nor, Director of Jabatan Bekalan Air Pahang. In PAIP Maran, there are 8 water treatment plant operate for the whole district and one booster plant. The plants are Treatment Water Plant Outlet (TPO) Pekan Tajau, TPO Simpang Jengka, TPO Kertau, TPO Chenor, TPO Jengka Utama, TPO Batu Sawar, TPO Jengka 3-7 and lastly TPO Ulu Jempul. Subsequently, in each district there is one District Manager that will lead the branch and for PAIP Maran the manager is Mr. Harwin bin Ismail.



***Fig. 1 Company's logo***

## 2.1.2 Location of Company

Fig. 2 shows the location of PAIP Maran which is located at Maran District in the city with address Pengurusan Air Pahang Berhad Daerah Maran, 26500, Maran Pahang Darul Makmur.



**Fig. 2** Company's location

## 2.1.3 Vision of company

- Become a world -class water supply service provider.

## 2.1.4 Mission of company

- Focus on customer needs.
- Manage the Water Supply System using best practices.
- Develop human capital based on innovation and creativity.
- Being ICT as a driver to organizational excellence.
- Manage NRW reduction effectively and continuously.

## 2.1.4 Organization Chart

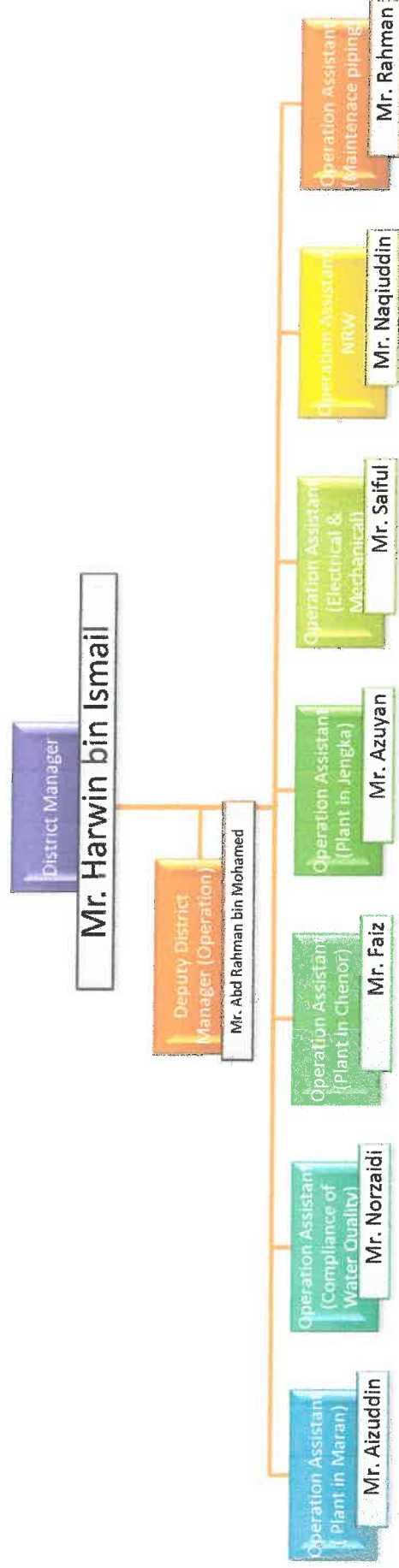
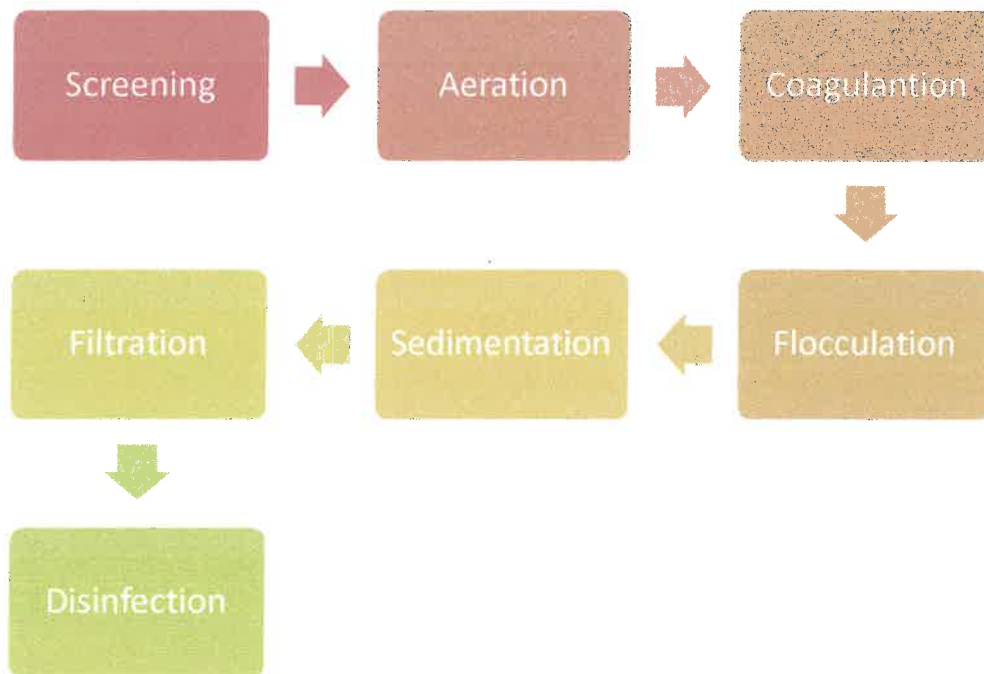


Fig. 3 shows the organization chart in Operation Department PAIP Maran.

## 2.2 Process Flow



*Fig. 4 Process water treatment*

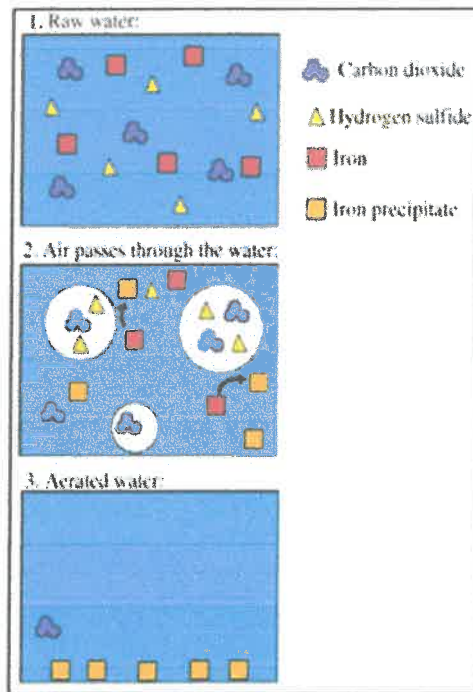
### 2.2.1 Screening

Screening is the process that to prevent huge floated things flow into the plant with water. For example are branches, plastics, rubbish and fish. It is also to remove suspended solids from water.

### 2.2.2 Aeration

Aeration as the treatment process whereby water is brought into intimate contact with air for removing undesirable gases dissolved in water such as  $\text{CO}_2$  and  $\text{H}_2\text{S}$ . Other than that, it is also to oxidizing dissolved metals likes iron and manganese. The existence of metals with more than 1 may effect to human health. The other function of aeration are increasing the oxygen content using bubble and remove methane with various volatile organic compounds responsible for bad taste and odour.

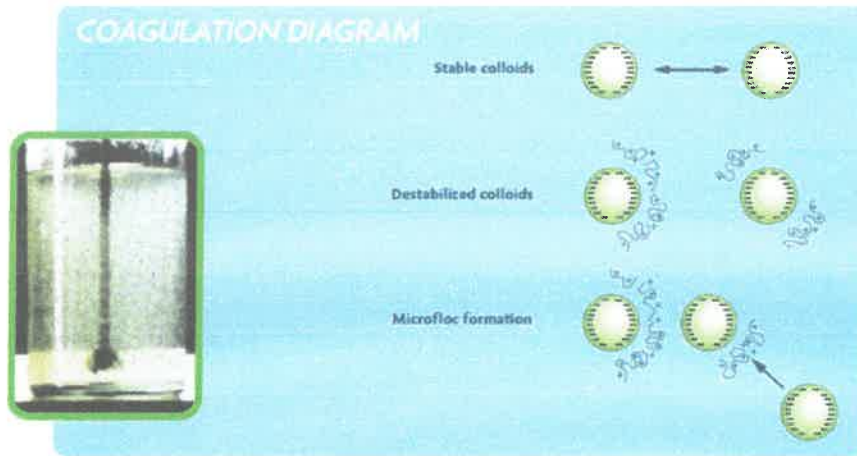




**Fig. 5 Aeration process**

### 2.2.3 Coagulation

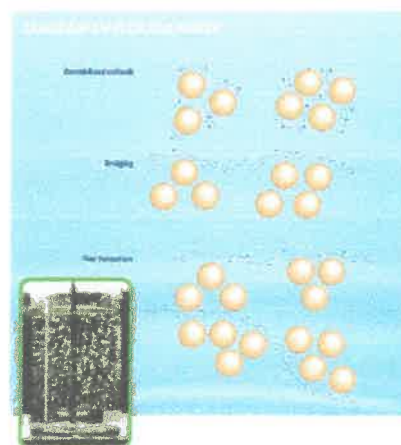
Coagulation will occurs when coagulant such as aluminium sulphate, CK-1000 and more is added to water to destabilize colloidal suspension. Coagulant will destabilize the ion of water to become neutral. The opposite charge from the coagulant to those suspended solids will neutralize the negative charges on dispersed non-settable solids such as clay. Once the charge is neutralized, the small-suspended particles are capable of sticking together that called as macroflocs. This process using s high-energy, rapid mix to properly disperse the coagulatory and promote particle collosions is needed to achive good coagulant and formation of the microflocs.



**Fig. 6 Coagulation process**

#### 2.2.4 Flocculation

Flocculation is where the addition of polymers involved that clump the small, destabilized particles together into larger aggregates so that they can be more easily separated from the water. Flocculation is where a gentle mixing stage, increases the particle size from submicroscope microfloc to visible suspended solids. The microflocs are brought into contact with each other through the process of slow mixing. Collisions of the microfloc particles cause them to bond to produce larger, visible flocs. The floc size continues to build through additional collisions and interaction with inorganic polymers formed by the coagulant or with organic polymers added. Macroflocs are formed. High molecular weight polymers, called coagulant aids, may be added during this step to help bridge, bind, and strengthen the floc, add weight, and increase settling rate. Once the floc has reached its optimum size and strength, the water is ready for the separation process (sedimentation, floatation or filtration). Design contact times for flocculation range from 15 or 20 minutes to an hour or more.



**Fig. 7 Flocculation process**

### 2.2.5 Sedimentation

Sedimentation process is important in water treatment process because it is a physical water treatment process using gravity to remove suspended solids from water. The purpose of sedimentation are to enhance the filtration process by removing the particulates, To minimize the need of coagulation & flocculation and to settle the sludge.

### 2.2.6 Filtration

Filtration is a process involving the removal of suspended matter by passing the water through a porous medium to enhance the effectiveness of disinfection. Filter medium usually used are sand, gravel, crushed anthracite or activated carbon. The flow of this process are water passes through a bed of granular material due to gravity. Then, the suspended solids are retained on the surface of granular material. Next, the filter medium is backwashed and lastly, the filtered materials are then removed from the medium.

### 2.2.7 Disinfection

Disinfection is where a process to remove, deactivate or kill pathogenic micro-organisms which can cause human diseases if not removed. This is important procedure as the treated water need to have at least 1 dose chlorine content kg/hr. this is to prevent virus, E,coli and other bacteria and make sure the water safe to drink as suggested rule from KKM.

## 2.3 Weekly Activity

### ➤ Scope of Job

- Preparing module report for each water treatment process.
- Do jar test for dosing chemical.
- Check water quality test for sampling purpose with KKM.



**Fig. 8** Water quality test

### Week 1

#### **Day 1: 22<sup>nd</sup> of March 2021**

On the first day of internship, I arrived around 8 a.m at Pengurusan Air Pahang Berhad (PAIP) Daerah Maran and waited for Mrs Aziah, from Human Resources Department. The tradition here that every practical studentd must meet District Manager for the scheduling and briefing about rules and regulations but the officer was not available at that day because of meeting in Cameron Highland. Mrs Aziah asked me to meet Mr Abd Rahman which is my main supervisor. At 9 a.m I was assigned by Mr Abd Rahman to Compliance Water Quality Unit and meet Mr Norzaidi who was head of the unit. I followed Mr Shamsul and Mr Mustafa to Treatment Plant Outlet (TPO) to sampling session with Helath Inspector from Ministry of Health Malaysia.

Mr Shamsul brief me about scope of job for the unit and background of water treatment in the company. In PAIP Daerah Maran there are eight TPO, four of them under Mr Shamsul and Mr Mustafa while the other four handled by Mr Rosli and Mr Al-Hafiz. For today, sampling water quality was in TPO Kertau, RSO Bukit kertau, TPO Chenor, SRO Kening and SRO Bukit

Pancur. Sampling water test for physical test such as pH, temperature and turbidity only while biological test will be handle with Department of Chemistry Malaysia in Kuantan. I have a tour in TPO Kertau and learnt about water treatment process there explained by Mr Mustafa.

After completing sampling for all places, I go back to the office and submitting the results to Mr Norzaidi.



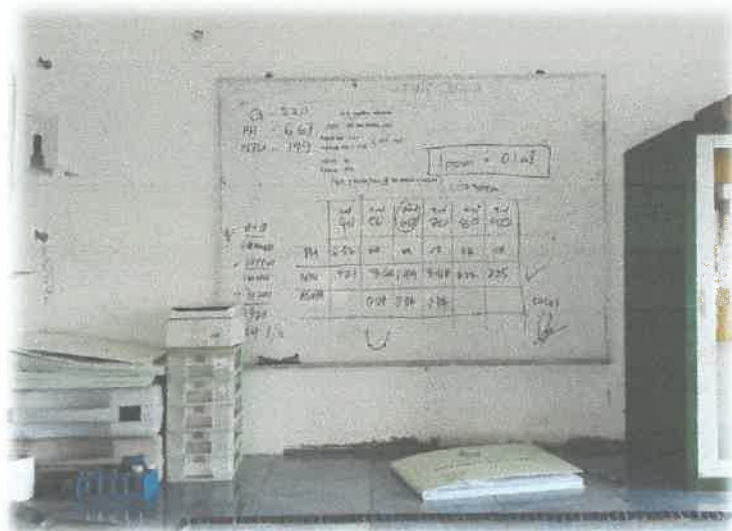
**Fig. 9 PAIP Maran Office**



**Fig. 10 TPO Kertau**

## Day 2: 23<sup>rd</sup> of March 2021

On the second day of internship, at 9.30 a.m I was assigned by Mr Abd Rahman to follow Mr Rosli and Mr Al-Hafis for sampling water quality. There was the other practical student joined us who was Haikal. For today, starting from TPO Simpang Jengka to TPO Jengka 3-7 and lastly TPO Ulu Jempul. Heavy raining for all day affected the result of turbidity that makes the NTU was higher than usual value.



**Fig. 11** TPO Simpang Jengka



**Fig. 12** TPO Jengka 3-7





**Fig. 13 TPO Ulu Jempul**

**Day 3 : 24<sup>th</sup> of March 2021**

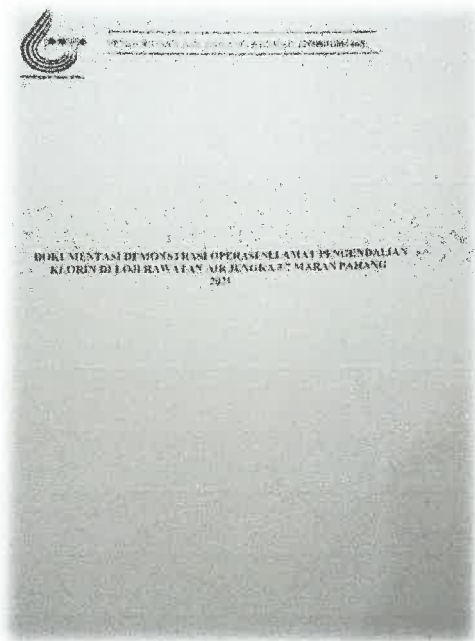
On the third day, there were no sampling as only visit RSO Jengka 19 and RSO Jengka 21 sampling cabinet for knowledge with Mr. Shamsul and Mr. Mustafa. After it, I went to office to study about company background such as vision, mission and organization chart brief by Mrs Liza and Mrs. Aziah from Human Resources Department.



**Fig.14 PAIP background from website**

## Day 4 : 25<sup>th</sup> of March 2021

On the fourth day of internship, I met District Manager Mr Harwin for the schedule of internship and briefing. The discussion is about outcome expected from this internship. Starting from April, I will follow Mr. Aizuddin for Outlet Unit specifically focusing for TPO Pekan Tajau and TPO Simpang Jangka. The outcome from the discussion was focusing on the dosing of chemical such as aluminium sulphate and chlorine for water treatment process. When the meeting was ended I help to filling documents in Customer Service Unit as for all day I not going out for sampling. In the noon I start studying about documents given which was Safety Demonstration Of Handling Chlorine TPO Jengka 3-7.



*Fig. 15 Activities for the fourth day*



## Day 5 : 26<sup>th</sup> of March 2021

On the fifth day of internship, I studied about dosing aluminum sulphate as it was my biggest task for internship period. I also analyze flushing and scouring record file from Mr. Norzaidi to study reasons it been done. Jar test procedure and explanation also being studied as one of the main component in dosing aluminium sulphate. I also read the documents given about Safety Operation of Handling Chlorine in TPO Batu Sawar and some background of the TPO.



## Dosing systems for chemical dosing in industrial wastewater treatment

16 December, 2015

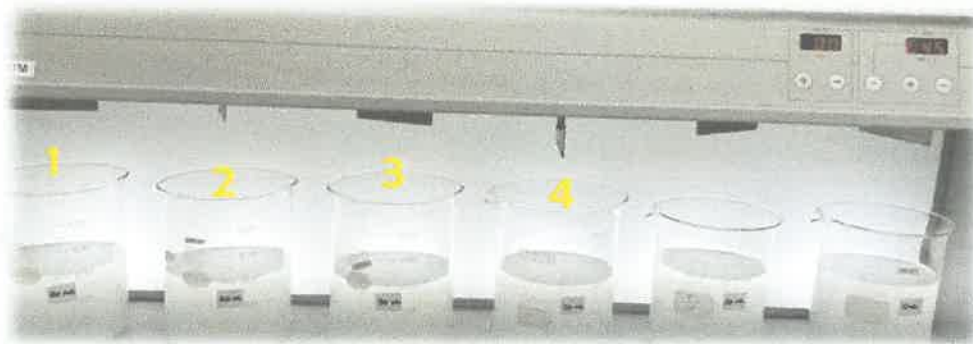
- ▶ Sludge Screening
- ▶ Sludge Thickening
- ▶ Sludge Dewatering
- ▶ Sludge Drying

**HUBER**  
TECHNOLOGY  
WASTE WATER Solutions

www.huber.co.uk  
Telephone: 01249 765000  
Email: rotamat@huber.co.uk

The accurate and consistent dosing of chemicals in wastewater treatment requires a pump technology that delivers the chemicals in a manner that optimises their usage and effectiveness. A chemical dosing skid employing either peristaltic or metering pumps attached to pipework built into a cabinet containing a dedicated control system provides the most effective solution for this process, explains pumps specialist Verder explains.

The effectiveness of the dosing system is all-important, for when wastewater is being discharged from a plant it must comply with all relevant environmental regulations and standards. The Water Industry Act of 1991 states that any liquid produced wholly or in

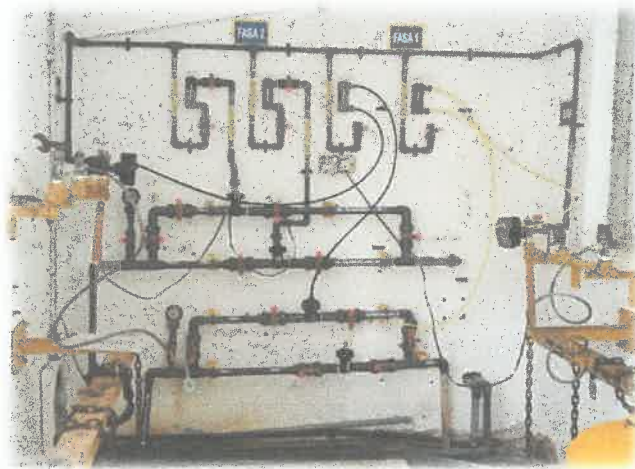


*Fig. 16 Activity for the fifth day*

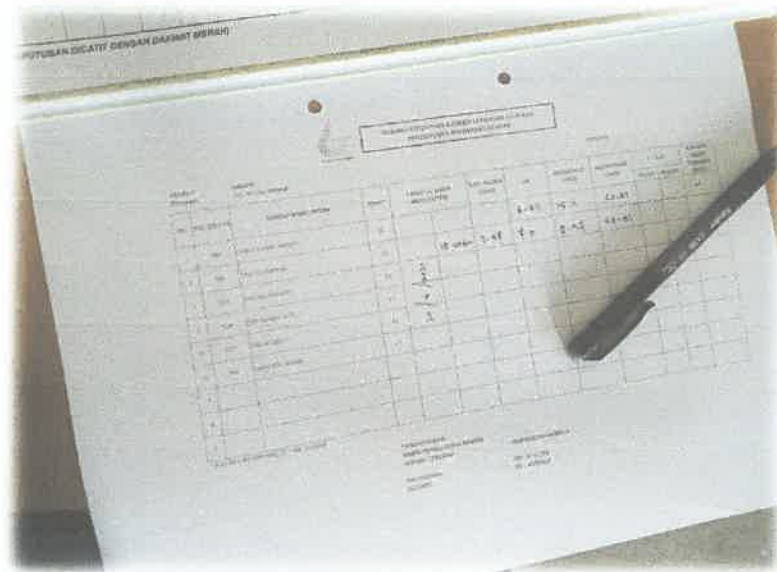
## Week 2

### **Day 6: 29<sup>th</sup> of March 2021**

On the sixth day of internship, I follow Mr Rosli and Mr Al-Hafis for water quality testing in TPO Jengka 3-7, TPO Ulu Jempul, TPO Pekan Tajau and TPO Simpang Jengka. The testing was contained for pH, turbidity and chlorine testing. In the meantime, I have some tour in TPO Jengka 3-7, TPO Simpang Jengka assist by operator of TPO. As the sampling were finished I go back to office. In the noon, there was a meeting handling by District Manager to brief for all practical students about module for our internship. In the internship period we need to complete eight module of Water treatment in eight TPO Maran. Some applications suggested by the officer such as Timestamp and Site reporter for our module. The module started with Module 1: TPO Pekan Tajau.



**Fig. 17 TPO Jengka 3-7**



**Fig. 18 TPO Ulu Jempul**



**Fig. 19 TPO Simpang Jengka**

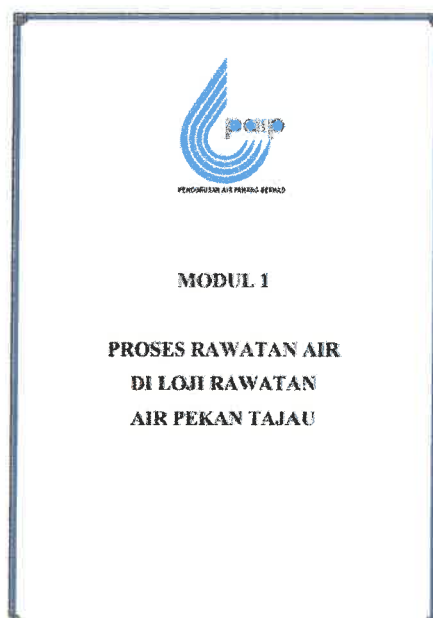




*Fig. 20 TPO Pekan Tajau*

### **Day 7: 30<sup>th</sup> of March 2021**

On the seventh day of internship, I done filling the water quality result for Mr. Norzaidi and study past water quality test from eight TPO. Next, I discuss with other practical students, which are Arif, Haikal and Nahit about structure of our module and distribute the task. I was given the part of dosing aluminium sulphate and chlorine species of jar Test experiment. We study together about the experiment as it will conducted at the next day. For the whole day, we start writing the Module 1: TPO Pekan Tajau advised by Mr Aizuddin. We start writing the background of TPO and attach the picture taken about the water treatment process from aerator until to balancing tank.

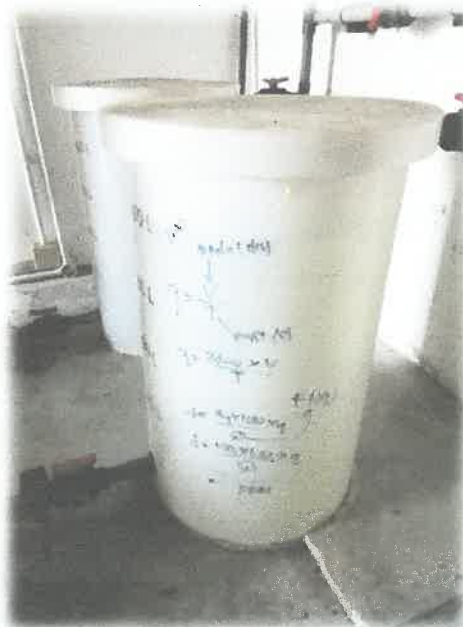


*Fig. 21 Module TPO Pekan Tajau*

## Day 8: 31<sup>st</sup> of March 2021

On the morning of eighth day of internship, I follow Mr Shamsul and Mr. Mustafa for sampling physical test with Helath Inspector Mr Hazli at TPO Kertau, RSO Bukit Kertau, TPO Chenor, RSO Kening and RSO Bukit Pancur for chlorine, turbidity and pH test.

On the noon, I continue writing Module 1: TPO Pekan Tajau for the explanation of each equipment and process. At 3 p.m we go to TPO Pekan Tajau for conducting Jar Test for ourselves obsevent by Mr Azhan Operator of TPO Pekan Tajau. In the meantime, I also have a short tour in TPO Pekan Tajau.



**Fig. 22 TPO Kertau**



**Fig. 23 TPO Chenor**

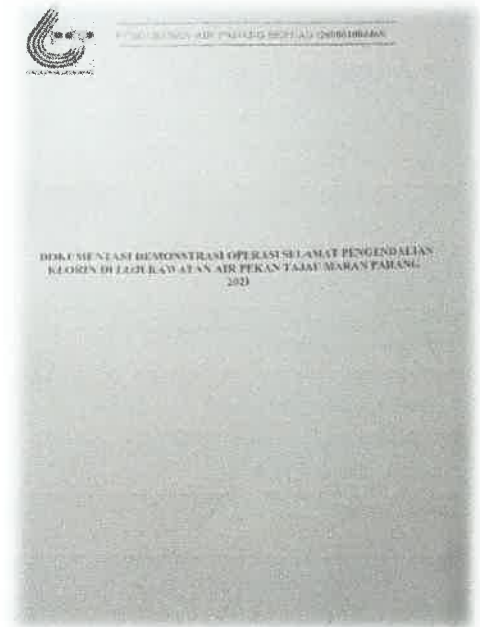


**Fig. 24 Jar Test by Nur Hasanah**

## **Day 9: 1<sup>st</sup> of April 2021**

On the ninth day of internship, I start my days with checking the facts of TPO Pekan Tajau and background for our module. The module was checked by all practical students and Mr Aizuddin before submit to Mr Harwin. At 3 p.m the first draft of module was submitted via whatsapp. I do filling for Mr Faizal for his documents and organized the shelf.





*Fig. 25 Activities for the ninth day*

### **Day 10: 2<sup>nd</sup> of April 2021**

On the tenth day of internship, I start the day with having a meeting with Mr Harwin and other practical students for reviewing and improvement of the module at 10 a.m. Some suggestion and advised by Mr Harwin to improve the module being a complete module than the draft.

On the noon, the module was amended as suggested especially for the things that need accuracy.



*Fig. 26 Meeting with District Manager*

## Week 3

### **Day 11: 5<sup>th</sup> of April 2021**

On the eleventh day of internship, I was instructed to join Mr Mustafa and Mrs Suriani to buy dates for event's club and other stationary for office. At 10 a.m we arrived at Pasar Kurma, Kuantan to take dates that previously order by Mrs Suriani. After that we go to Eco Shop for the stationary needed. While at 12 p.m I go to to Cowboy for the packaging of dates such as plastics bag and food container. The last step for the day was taking stickers ordered in New Zealand.

In the evening, I started packing the dates before distribute to other staffs. This was a yearly event in PAIP Maran District as preparation of Ramadhan month.



**Fig. 27** Activities for eleventh day



## Day 12: 6<sup>th</sup> of April 2021

On the twelfth day of internship, I continue packing the dates with Mrs Ayu and Mrs Suriani. We also tagging the dates with the names of staffs here. After finish the packaging, I go to TPO Jengka Utama, TPO Batu Sawar, TPO Ulu Jempul and PAIP Maran District Jengka branch office to distribute the dates. I also delivery the banner from HQ to the office. There also short tour in TPO Jengka Utama. That is all activity for the day as the place is quite far from office.



*Fig. 28 Activities on twelfth day*

### Day 13: 7<sup>th</sup> of April 2021

On the thirteenth of internship, for during the day, I help Revenue Unit for glue the stamp with envelope and prepared cutwater letter for the residents. More than 500 letters with envelope prepares for the day.



**Fig. 29** Activities at April 7, 2021

### Day 14: 8<sup>th</sup> of April 2021

On the fourth tenth day of internship, in the morning I do the filling for Revenue Unit and prepare all the stationary bought before in the case. This was also change the file shelf to the new one.

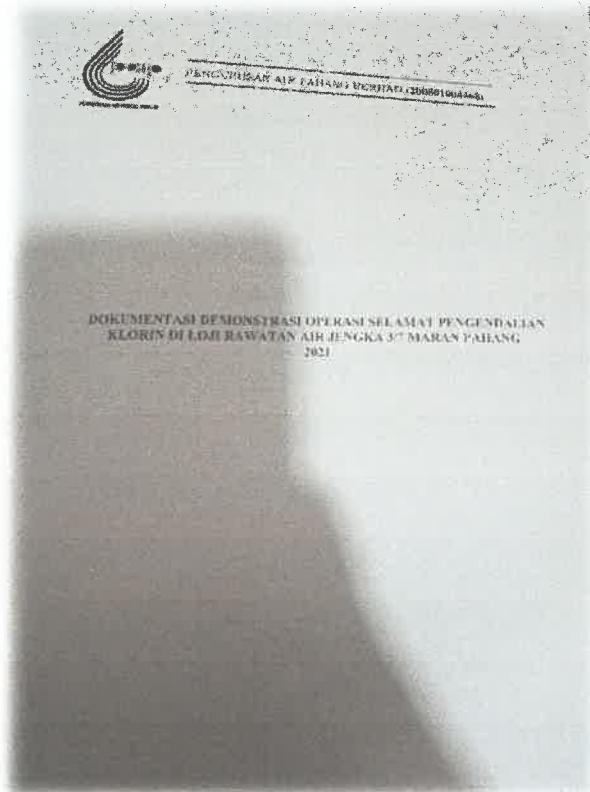
In the noon, I go to balancing tank in Bukit Kebuk to measure the diameter, height and capacity for the module. After it we also went to TPO Pekan Tajau to measure flocculation tank, sedimentation tank and filtration tank.



**Fig. 30** Activities at April 8, 2021

## Day 15: 9<sup>th</sup> of April 2021

On the fifteenth day of internship, I just done office works and read Safety demonstration of handling chlorine operation in TPO Jengka 3-7.



*Fig. 31* Activities at April 9, 2021

## Week 4

### Day 16: 12<sup>th</sup> of April 2021

On the morning sixteenth day of internship, I prepare the potluck place arrangement. Every staffs bring their own food. This potluck is for celebration of Ramadhan Mubarak. After the potluck session end, I continue to write the module 1. For the day I sent the final draft of Module 1: TPO Pekan Tajau and the module was already approved by Mr Harwin.

In the noon, I go to Pejabat Tanah dan Daerah Maran for learning procedure of new connecting water to house in Maran District and submit the proceeding as task given. Next, I go to TPO Jengka 3-7 and TPO Simpang Jengka preparation for the next module.

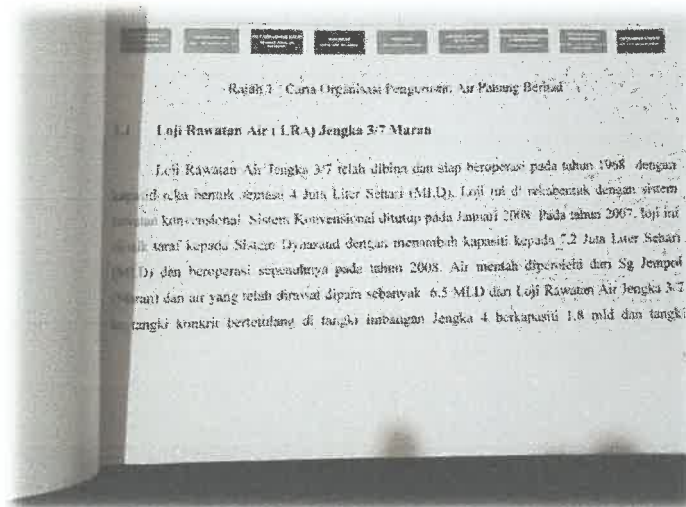


**Fig. 32** Activities at April 12, 2021

### **Day 17: 13<sup>rd</sup> of April 2021**

On the seventeenth day of internship, I start writing Module 2: TPO Jengka 3-7 starting from introduction, abstract and explanation of each process. Next I continue to do the produce add water metre in Maran. One of the procedure is to get approved form FELDA manager but the task was cancelled as there were some technical problem before proceed it. At the noon, I do the office works as usual.

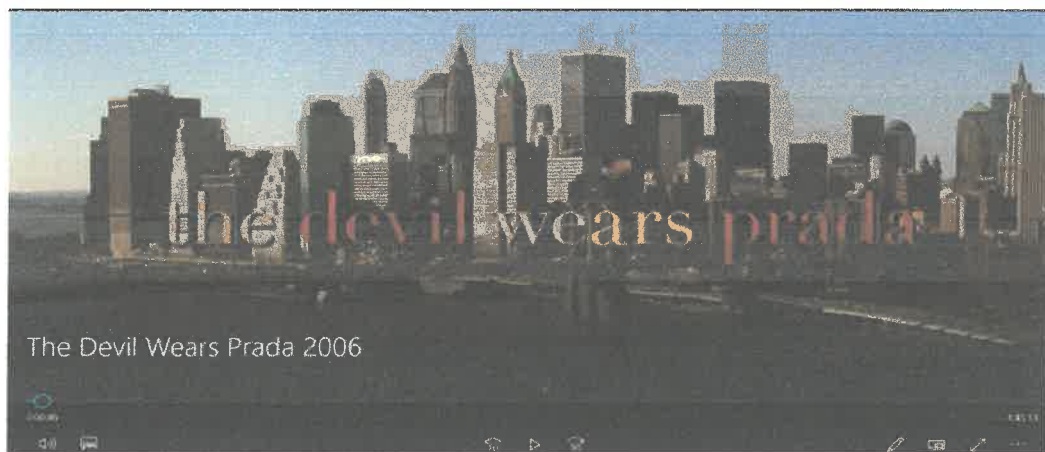




**Fig. 33** Activities at April 13, 2021

### Day 18: 14<sup>th</sup> of April 2021

On the eighteenth day of internship, I was watching *The Devil Wears Prada*, a movie suggested by District Manager and the task is to make a synopsis of the movie. The movie was about a new employee, Andrea that never interest in fashion but suddenly need to work as personal assistant of a popular fashion journalist, Miranda Priestly. The struggle of Andrea to meet the requirement and taste of her boss to be impress with her became main plot of the story. She need to change her personality, fashion sense, and satisfy the strict boss need. With the help from Emily and Alex, Andrea successfully take the heart of her boss that makes she was her favorite. As in the noon I just do some office works assigned.



**Fig. 34** Movie *The Devil Wears Prada*

### Day 19: 15<sup>th</sup> April 2021

On the nineteenth day of internship, I continue to glue stamp to envelope for Revenue Management Unit. More than 500 envelopes have been glued in the day. At the afternoon, I start construct frame wreath of Module 2: TPO Jengka 3-7 with my teammates.



**Fig. 35** Activities at April 15,2021

### Day 20: 16<sup>th</sup> of April 2021

On the twentieth day of internship, I start my day with continue writing module 2. Module 2 it was quite different from module 1 since in TPO Jengka 3-7 have 2 type of water treatment system which are conventional and Dynasand. I also join the meeting with Mr Harwin Mr Roslan, and Mr Kamaruddin from PAIP, Mr Zulkifli from Jabatan Kebajikan Malaysia (JKM) for solving the problem a customer who had unpaid water bills almost RM8000.00 The meeting also including boss of the debtor to help for ease the process of conversation.

At the afternoon, I continue to glue stamp with the envelope for more than 100.

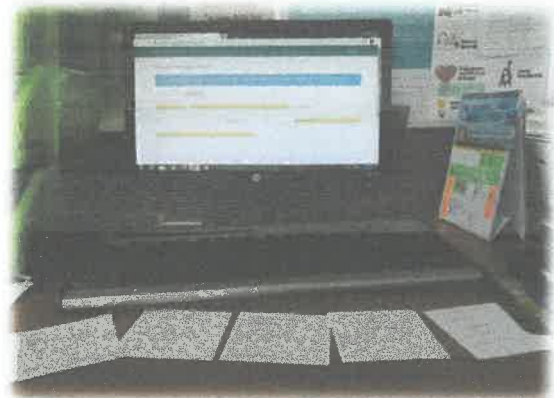


**Fig. 36** Activities at April 16,2021

## Week 5

### **Day 21: 19<sup>th</sup> of April 2021**

On the twenty first day of internship, I was train to be an operator of the company. I was in charge to answer any calls from the customer and connect to the person in charge. This training has improved my soft skills and attitude with customer. I was help the customer to do online report in the PAIP website for any consequences.



**Fig. 37** Activities at April 19 ,2021

### **Day 22: 20<sup>th</sup> of April 2021**

On the twenty second day of internship, I go to TPO Jengka 3-7 to finish the unfinish task to complete the module. I also went to balancing tank in Jengka 4 for the measuring and knowledge about the system. At the afternoon, I continue to write the module as the data collected in the morning.

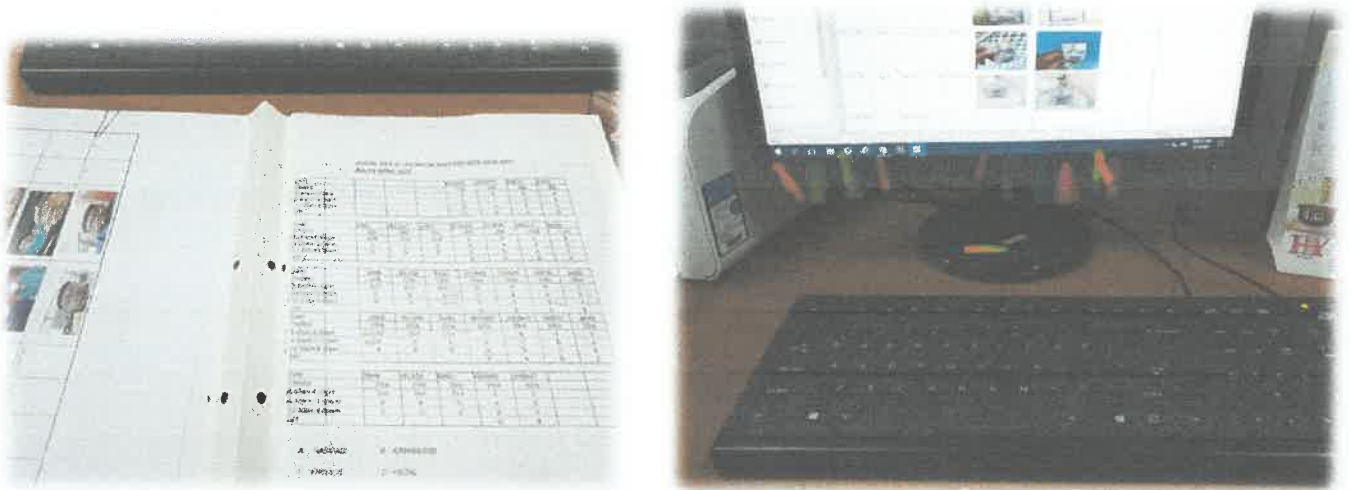


**Fig. 38** Activities at April 20,2021



## Day 23: 21<sup>st</sup> of April 2021

On the twenty third day of internship, I update the attendance of TPO New Zealand. The timestamp camera application was used to make sure all operator come on time to work. For the day, I also update and continue writing my module 2: TPO Jengka 3-7.

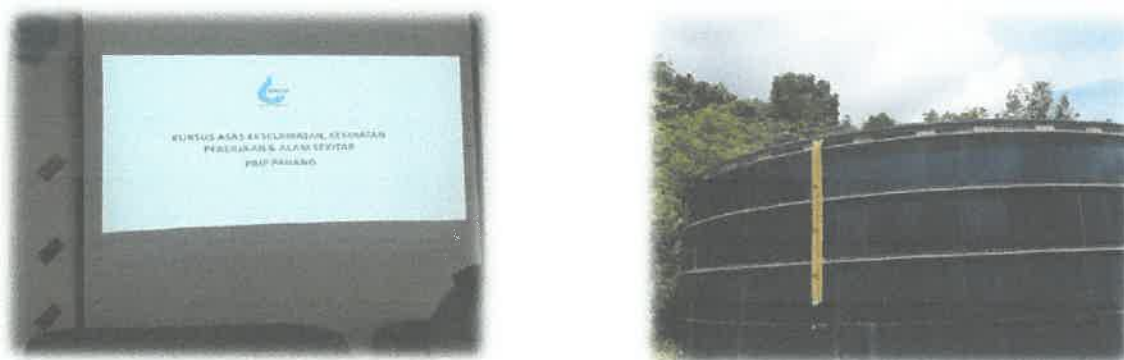


**Fig. 39** Activities at April 23, 2021

## Day 24: 22<sup>nd</sup> of April 2021

On April 24, 2021 I join a course about Basic Safety, Health Work and Environment PAIP Pahang delivered by Mr Aizuddin, Chief Health, Safety and Environment Officer in PAIP Pahang. The course shows accident that likelihood in PAIP especially in TPO. There also a first aid demonstration. From the course each participants received a certificate.

On the evening, I go to balancing tank for TPO Jengka 3-7 in Jengka 4. The purpose is to acknowledge it and measuring for module 2.

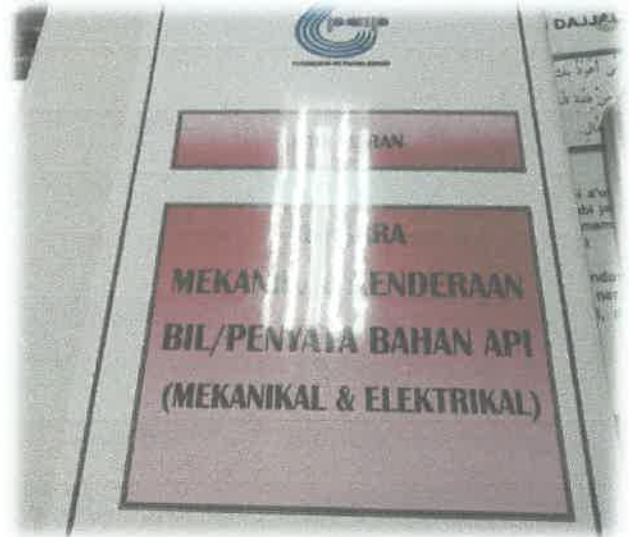


**Fig. 40** Activities at April 22,2021



**Day 25: 23<sup>rd</sup> of April 2021**

On the twenty fifth day of internship, I do summary fuel for CDN 9025 that instruct by PAIP HQ in Kuantan. This task is to make summary table fuel from 2016 to 2020. Next, I redo the schedule for TPO Jengka 3-7, TPO Pekan Tajau, TPO Simpang Jengka and TPO Booster New Zealand. At the evening I update the attendance operator in TPO Jengka 3-7.



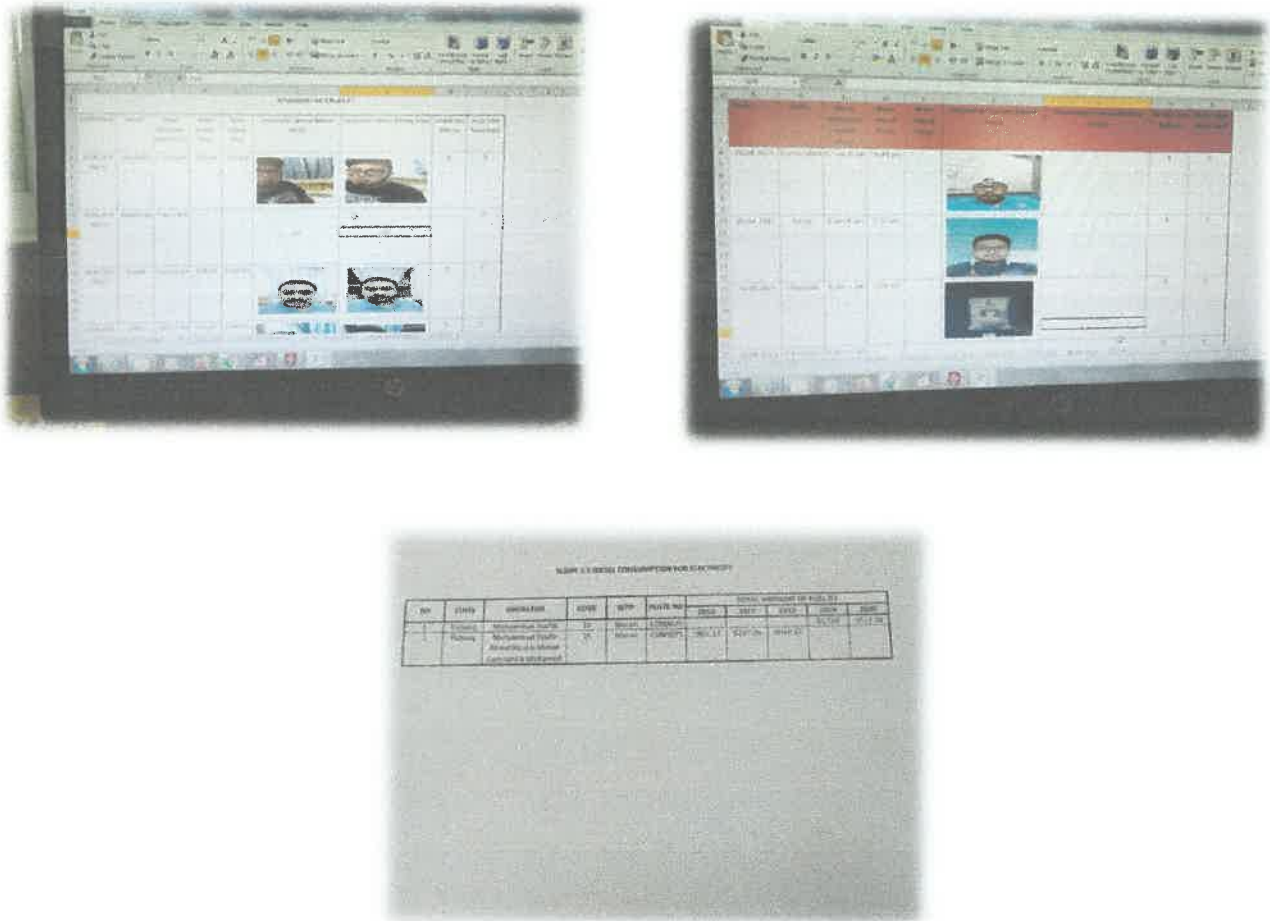
TARIKH	LOKASI	WAKTU	SAAT	AMBIK	1	2	3	4	5	6	7	8	9	10
2004/2021	Melan	7 am-9 pm	2.71 km	3.89 pm										
01/04/2021	MS	7 pm-8 pm	2.78 km	3.90 pm										
02/04/2021	PINDANG	9 pm-11 pm	3.81 km	11.00 pm										
14/03/21	Cheroh	8 pm-11 pm	2.16 km	11.00 pm										
2021	PAIP/MBR	11 pm-7 am	21.00 pm	7.00 am										

**Fig. 41** Activities at April 23, 2021

## Week 6

### **Day 26: 26<sup>th</sup> of April 2021**

On the twenty sixth day of internship, I am being phone operator for the whole day. In the day also help customer to do online report in PAIP website. I update the operator attendance for TPO Jengka 3-7 and TPO Booster New Zealand in excel. I also amend the summary fuel from the other day.



**Fig. 42** Activities at April 26,2021

## Day 27: 27<sup>th</sup> of April 2021

On my twenty seventh day of internship, I was being the telephone operator to answer calls from customer and helping them for any inquires. I also done some office works such as scanning and copy documents. I analyses the minute meeting for the last Operation Department meeting in April , 2021 preparation for Eid Celebration. In the evening, I construct operator TPO schedule for TPO Simpang Jangka and TPO Pekan Tajau.

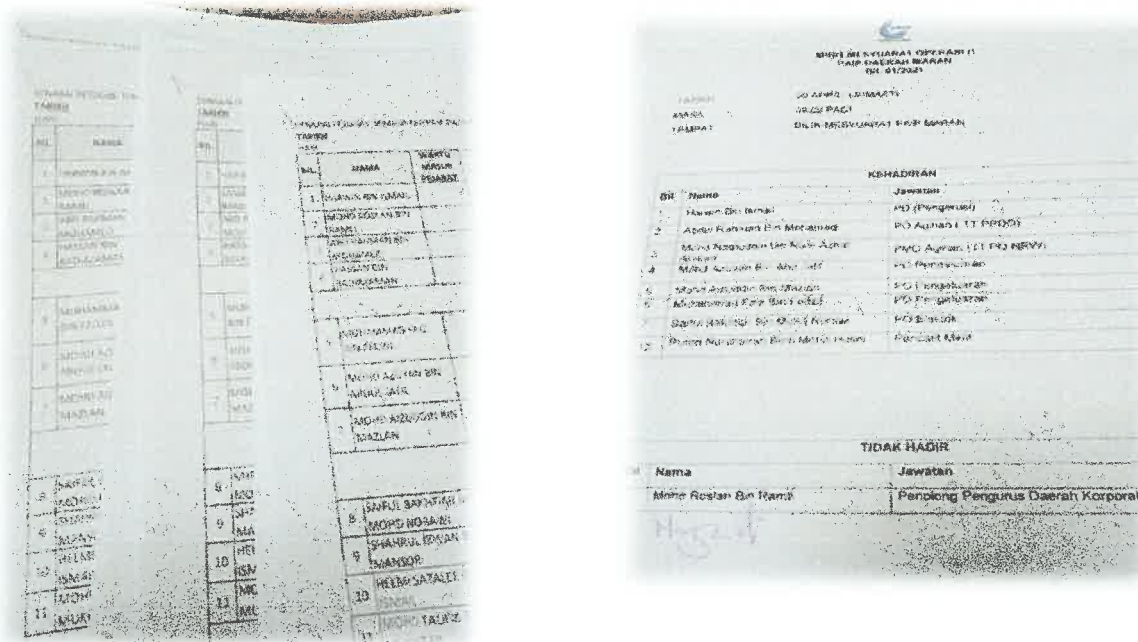
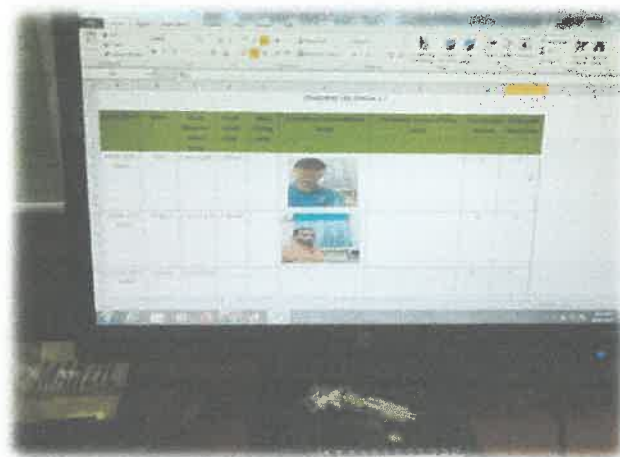


Fig. 43 Activities at April 27, 2021

## Day 28: 28<sup>th</sup> of April 2021

On the twenty eighth day of internship, I start my day with collect the attendance from TPO Booster New Zealand and TPO Jengka 3-7The picture will the attach in excel. Next, I join Revenue Management Unit to meet the customer who rarely pay their water bills and bills more than RM100. We also gave cutting water memo for the last warning in Kampung Luit. If the customer choose to cut the water therefore the solution is to clamp their meter until they pay it at least half of the bills. At the evening, I do the update phone book for the staffs.



**Fig. 44** Activities at April 28, 2021



## Day 29: 29<sup>th</sup> of April 2021

Off day, Nuzul Quran day.

## Day 30: 30<sup>th</sup> of April 2021

After a month of internship, on the thirtieth day of internship as the same with other Friday the time quite short than the other day hence i follow Revenue Management Unit to meet customer who have a lot of unpaid water bills in Chenor. The warning memo also been given with hope to pay in 2-3 days. In the afternoon, I update the attendance of TPO Jengka 3-7 and continue writing phone books staffs.

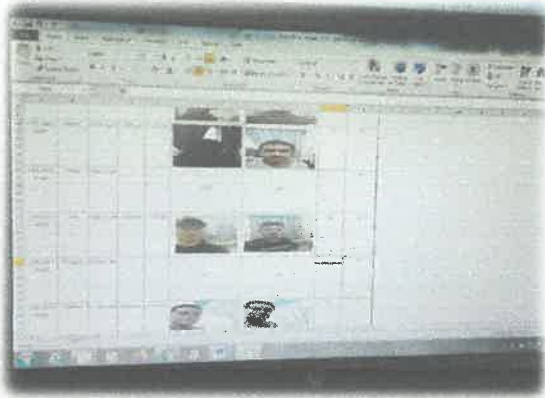


**Fig. 45** Activities at April 30, 2021

## Week 7

## Day 31: 3<sup>rd</sup> of May 2021

In the thirty-first day of internship, there were site visit at TPO Ulu Jempul. The other activities here were observe the water treatment process as it is one of the oldest TPO in Malaysia. TPO Ulu Jempul have been build since 1960s. The explanation of the treatment was done by Mr Halim as Leader of TPO Operator in TPO Ulu Jempul. This was also for competing our module and report. At the evening I start to update the attendance operator of TPO Jengka 3-7.

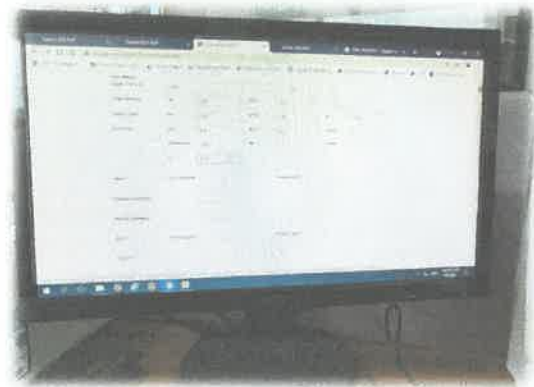


**Fig. 46** Activities at May 3, 2021

### **Day 32: 4<sup>th</sup> of May 2021**

In the morning of thirty second day of internship, I start my day with discussion with group members about our report and module for TPO Ulu Jempul and distributing the task. In the day I also being telephone operator and helping the customer to make online report.

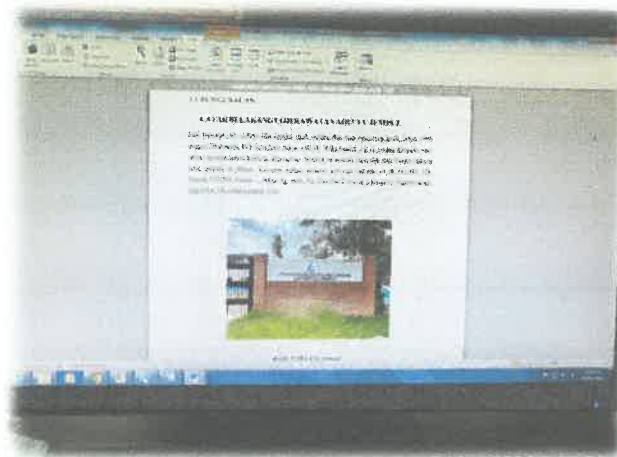
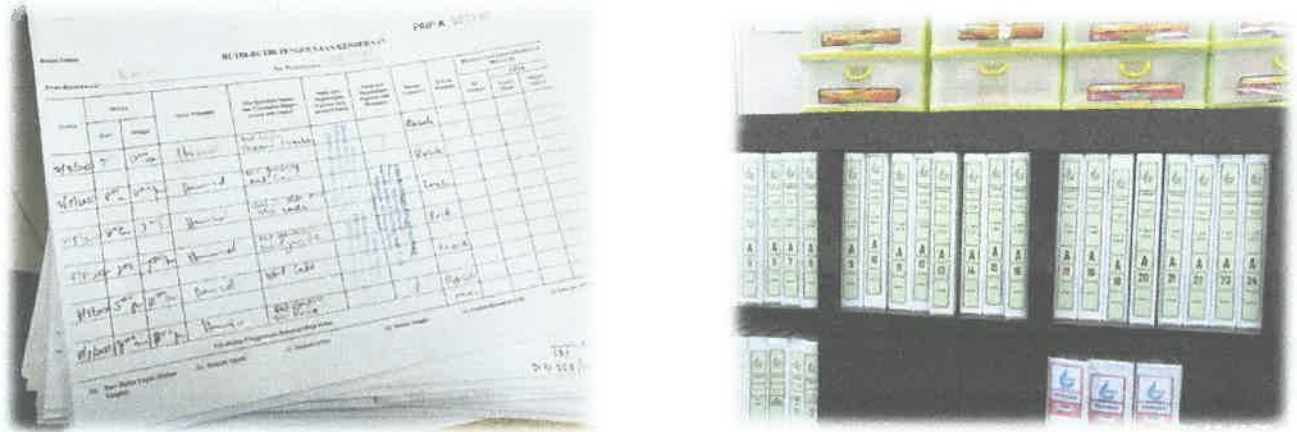
In the vening I submit the data from spila table to online PAIP website for TPO Simpang Jengka and TPO Pekan Tajau.



**Fig. 47** Activities at May 4, 2021

### Day 33: 5<sup>th</sup> of May 2021

In the thirty third day of internship, I start writing my part in the module for TPO Ulu Jempul and filling some documents for official vehicles of PAIP daerah Maran. I also updating the new staff phone book.



**Fig. 48** Activities at May 5, 2021

### Day 34: 6<sup>th</sup> of May 2021

In the thirty fourth day of internship, in the morning I do the distributing for Eid money envelope given by headquartes Kuantan to all the staffs here. After that I spend the whole day in TPO Kertau and TPO Chenor for module purposes. We take pictures and learn the process treatment here as TPO Kertau will be given to contractor to manage it after this.

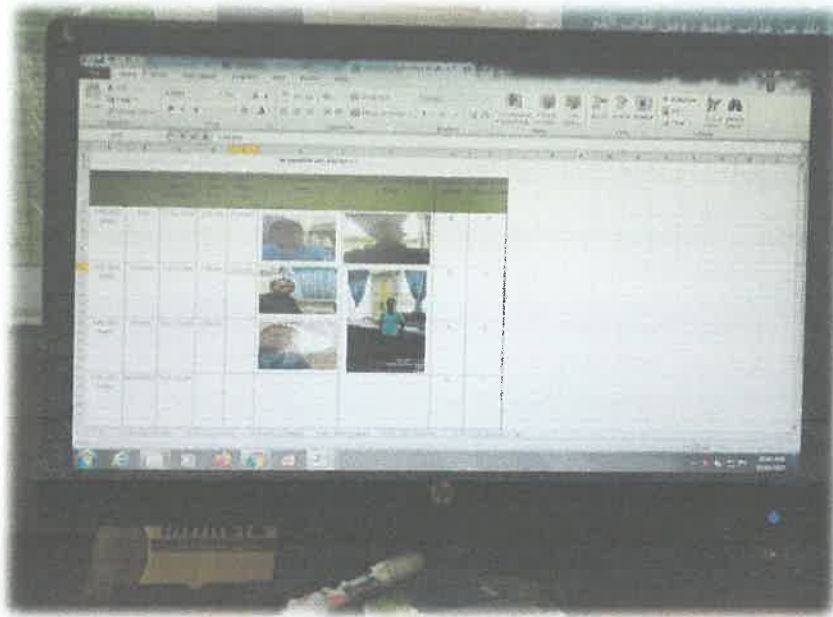


**Fig. 49** Activities at May 6, 2021

### **Day 35: 7<sup>th</sup> of May 2021**

In the thirty fifth day of internship I update the operator attendance for TPO Jengka 3-7 in the Microsoft Excel. The attendance was done using timestamp as the thumbprint there were broken.





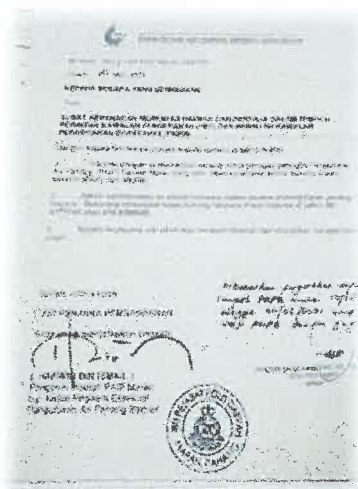
**Fig. 50** Activities at May 7, 2021

**Week 8**

**Day 36: 10<sup>th</sup> of May 2021**

As MCO was announced at May 8, 2021, the start of thirty sixth day of internship with get the approval letter to work in MCO condition from HR Department. There were also site visit by YB Shahaniza in TPO Ulu Jempul and TPO Jengka 3-7 as preparation of Eid celebration.

In the evening I update the data from spila table to online website. The data was based on dosing chemical in each TPO every 4 hours. Dosing chemical including alumm and chlorine.





**Fig. 51** Activities at May 10, 2021

### Day 37: 11<sup>th</sup> of May 2021

In the thirty- seventh day of internship, I start writing module for TPO Kertau and TPO Chenor. TPO Chenor system almost the same with other TPO which using conventional system, but there are two different places and phase the first one is for Kening and the other one is Panchor. While TPO Kertau is one and only system in PAIP Maran that use different method that unique. We were inform by HR Department that internship students not preferable to come to office and works during the MCO situation. We are instructed to work from home starting May 12, 2021 until the MCO end.



**Fig. 52** Activities at May 11, 2021

### Day 38: 12<sup>th</sup> of May 2021

As the starting day work from home, I just done the light work such as update the attendance for operator TPO Jengka 3-7 and sorting the data of attendance and temperature staffs for pandemic purposes starting from January until April.

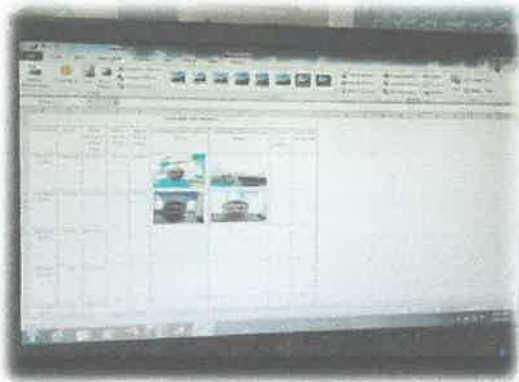


Fig. 53 Activities at May 12, 2021

### Day 39: 13<sup>th</sup> of May 2021

Off day Eid Celebration

### Day 40: 14<sup>th</sup> of May 2021

Off day Eid Celebration

### Week 9

### Day 41-45: (May 17, 2021- May 21, 2021)

From May 17 to May 21 and starting to work home, I amend the module for TPO Simpang Jengka in terms of the data given. The process from aerator to clear water tank being updated for the module.

### Week 10

### Day 46-50: (May 24, 2021- May 28, 2021)

For the tenth week of internship, I amend the module for TPO Simpang Jengka make my discussion with team members.

## Week 11

### **Day 51-55: (May 31, 2021- June 4, 2021)**

For the eleventh week of internship, I update the module for TPO Ulu Jempul and make my discussion with team members.

## Week 12

### **Day 56-60: (June 7, 2021- June 11, 2021)**

For the twelveth week of internship, I amend the module for TPO Ulu Jempul as suggested by team members.

## Week 13

### **Day 61-65: (June 14, 2021- June 18, 2021)**

From June 14 to June 18, I update the module for TPO Jengka 3-7 and make my discussion with team members.

## Week 14

### **Day 66-70: (June 21, 2021- June 25, 2021)**

For the fourteenth week of internship, I amend the module for TPO Jengka 3-7 as suggested by team members.

## Week 15

### **Day 71-75: (June 28, 2021- July 2, 2021)**

For the fifteenth week of internship, I update the module for TPO Chenor and make my discussion with team members.

## Week 16

### **Day 81-85: (July 5, 2021- July 9, 2021)**

For the sixteenth week of internship, I update the module for TPO Kertau and make my discussion with team members.

### Week 17

#### **Day 86-90: (July 12, 2021- July 16, 2021)**

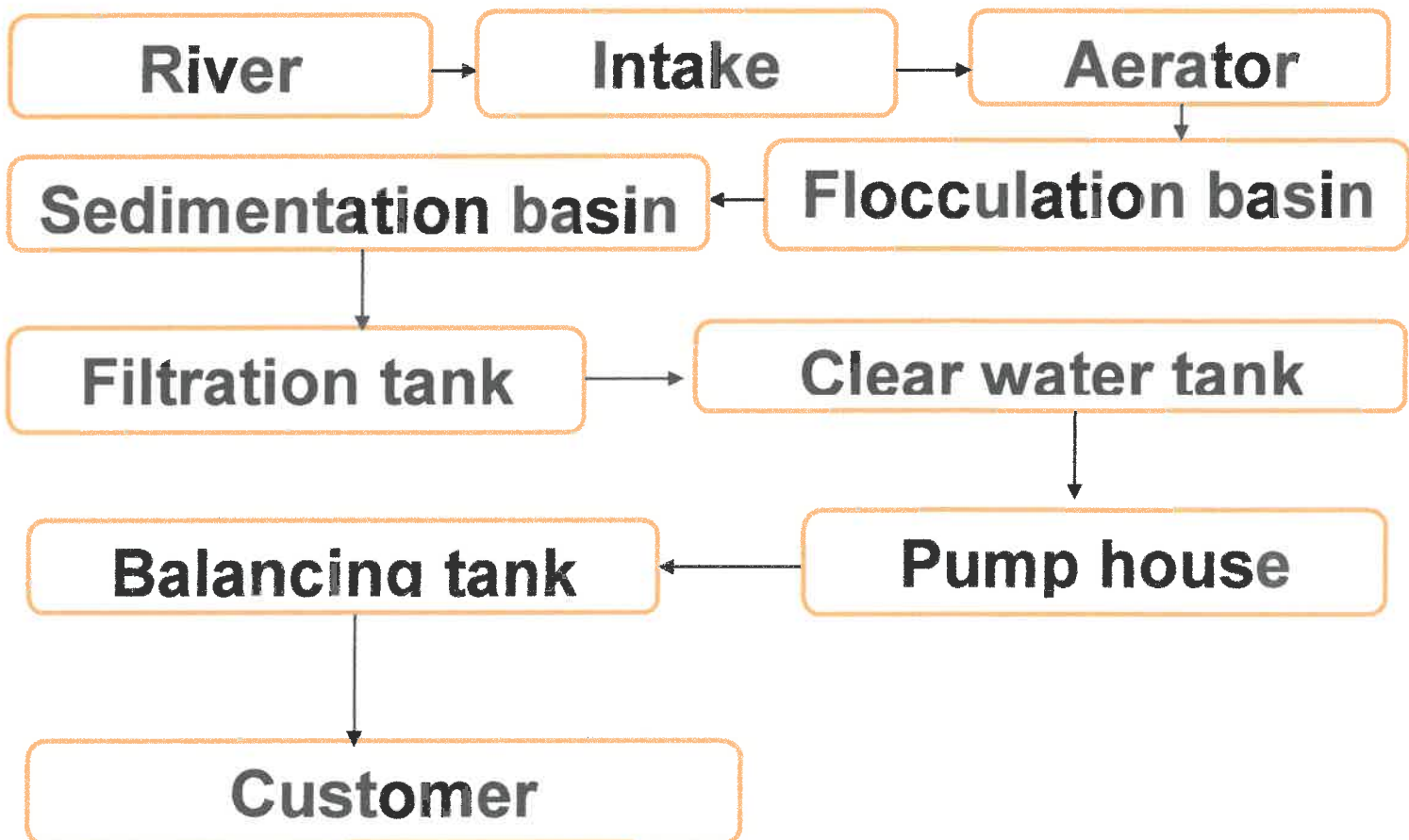
For the final week of internship, I amend the module for TPO Kertau as suggested by team members. Finish submit all the reports.

## 2.4 Mini Project

As I was assigned in Plant Unit, District Manager instructs all the internship students to prepare a module report for process water treatment system in all plant. As a summary, there are three different systems for treat water done by PAIP Maran, which are conventional, dynasand and compact system.

### a. Conventional system

Starting with conventional system which the most well-known system in process water treatment in Malaysia. It is also the most used system in plant in PAIP Maran which are TPO Pekan Tajau, TPO Simpang Jengka and TPO Chenor. The system as below:



*Fig.54 Flowchart conventional system*



## River

River is the main source of water in Pahang especially Pahang river. Pahang River is the biggest and longest in Peninsular Malaysia. Most of the treatment plants use the Pahang River in the process.

### ii. Intake

Intake is where the screening process occur. The intake have band screen that will screening the water and prevent huge floating things such as branch, garbage, plastics and suspended solid from flow to the plant. It is also had pumps that will pumping the water to the plant.

### iii. Aerator

Aerator is where aeration process occurred that will remove undesirable gases such as carbon dioxide ( $\text{CO}_2$ ), increasing desire oxygen content and oxidized dissolved metals such as iron (Fe) and manganese (Mn). The process used with water to air method which produce small drops of water that fall through the air. Types of aerator used here are cone aerators and cascade aerator. Process of dosing chemical such as aluminium sulphate was also done beside aerator for coagulation process. Quantity of aluminium sulphate dosed is based on the result of jar test which done once in 4 hours.

### iv. Flocculation tank

Coagulation-flocculation is a chemical water treatment technique typically applied to enhance the ability of treatment process to remove particles. Coagulation is when coagulant added and blend to water to destabilize colloidal suspension while flocculation involves the addition of polymers that clump the small, destabilized particles together into larger aggregates so that they can be more easily separates from the water. The approaches from PAIP Maran is using baffle plate as to reduce the flowrates of water to bring more time for the flocs to become a clump. Usually there are three phase of flocculation, the first one is where the distance of baffle plates are the smallest, the second one is the medium while the third one is the largest distance between the baffle plates.



**Fig. 55** Flocculation tank

v. Sedimentation tank

This stage is to settling the flocs by gravity to the bottom of the water. Sedimentation basins used for the process in PAIP Maran are rectangular basins. It is because the design is the simplest design that allow water to flow horizontally through a long tank. Furthermore, in terms of cost it is cost effective which low maintenance and predictable.



**Fig. 56** Sedimentation tank

vi. Filtration tank

Filtration tank works as to filter the treated water and remove the suspended matter by passing the water through a porous medium to enhance the effectiveness of disinfection. The process is starting with water passing through a bed of granular material due to gravity. Next, the suspended solids are retained on the surface of granular material. The filter medium will backwashed the water and filtered materials are then removed from the medium. The filter used

must clean gradually as the dirty filter may effects the turbidity of treated water. If the filter was not cleaned the turbidity of water may be higher than usual.

vii. Clear water tank

Clear water tank is to store the treated water before distribute to customer. In this tank there will occur a process called disinfection using chlorination. The disinfection is to prevent from the present of E.coli, bacteria and more. It is to make sure that the drink is safe to drink as suggested by Ministry of Health Malaysia.

viii. Pump House

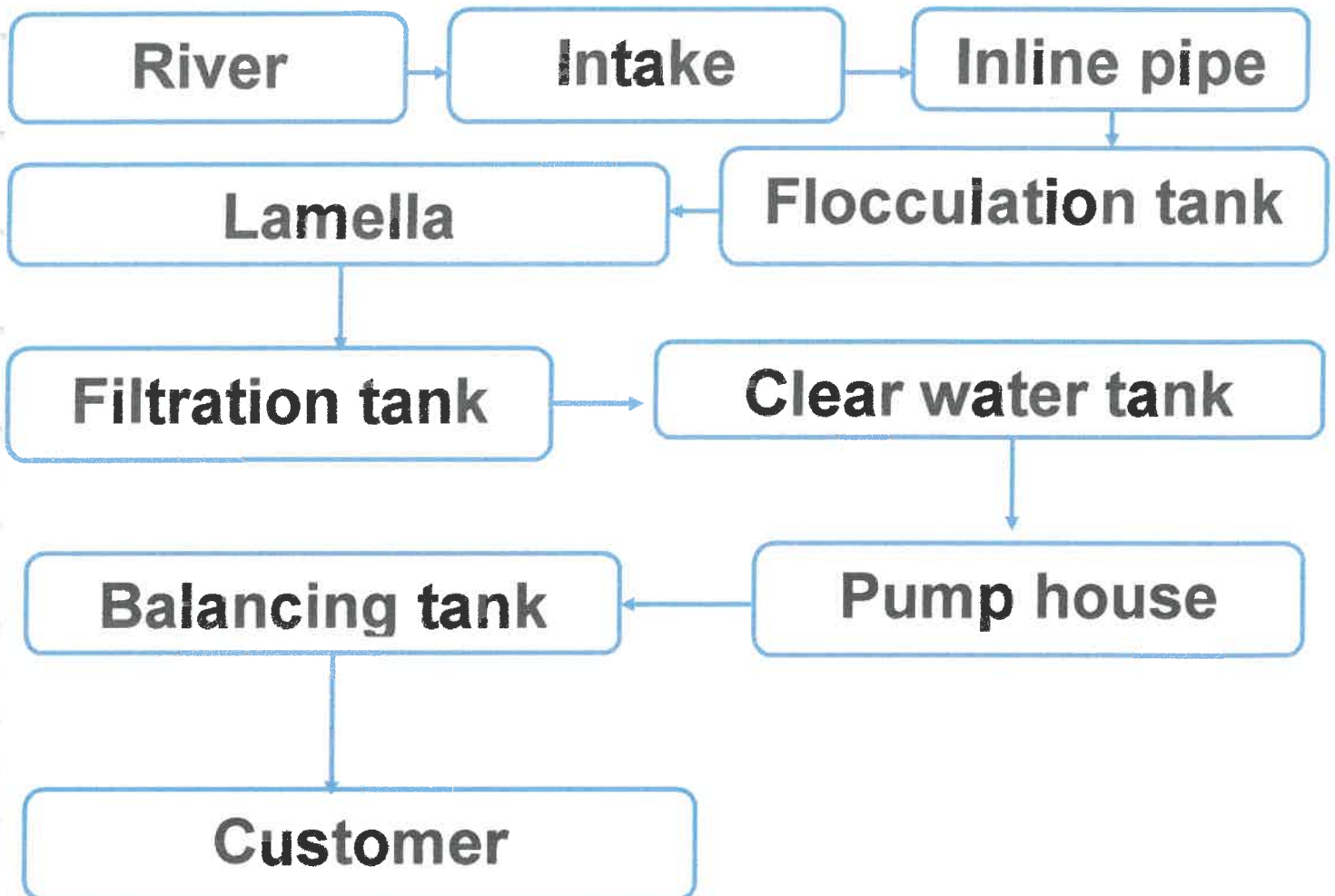
Pump house is where all the pump located to pump the treated water to balancing tank. The common pump used process water pump, highlift pump and booster pump.

ix. Balancing tank

It is a must for balancing tank to located in high places such as hills. It is because to make sure the water pressure is enough to flow to customer's house.

**b. Dynasand system**

This system called as Dynasand as because it using tall cylindrical tank for the flocculation and filtration tank. It is also the most used system in plant in PAIP Maran which are TPO Jengka 3-7 and TPO Ulu Jempul.



*Fig. 57 Dynasand system*

i. River

River is the main source of water in Pahang especially Pahang river. Pahang river is the biggest and longest in Peninsular Malaysia. Most of the treatment plants use the Pahang river in the process.

ii. Intake

Intake is where the screening process occur. The intake have band screen that will screening the water and prevent huge floating things such as branch, garbage, plastics and suspended solid from flow to the plant. It is also had pumps that will pumping the water to the plant.

iii. Inline pipe mixer

Inline pipe mixer is place the coagulant dosed and mix with the water preparation for coagulation process. The usual type of coagulant is alum kibble.



#### iv. Flocculation tank

This type of flocculation tank is different than the one in conventional system. This type is cylindrical shape and usually around 4-6 tank in each plant. The function is still the same to produce flocculation process for treating the water.



**Fig. 58** Flocculation tank

#### v. Lamella

The function of lamella is almost the same with sedimentation tank. It located beside the flocculation tank.



**Fig. 59** Lamella

#### vi. Filtration tank

This system that using Dynasand for the filtration is called as rapid sand filter. This was proven more efficient in filtering the treated water than the one in conventional system. Otherwise, it is quite pricey.

x. Clear water tank

Clear water tank is to store the treated water before distribute to customer. In this tank there will occur a process called disinfection using chlorination. The disinfection is to prevent from the present of E.coli, bacteria and more. It is to make sure that the drink is safe to drink as suggested by Ministry of Health Malaysia.

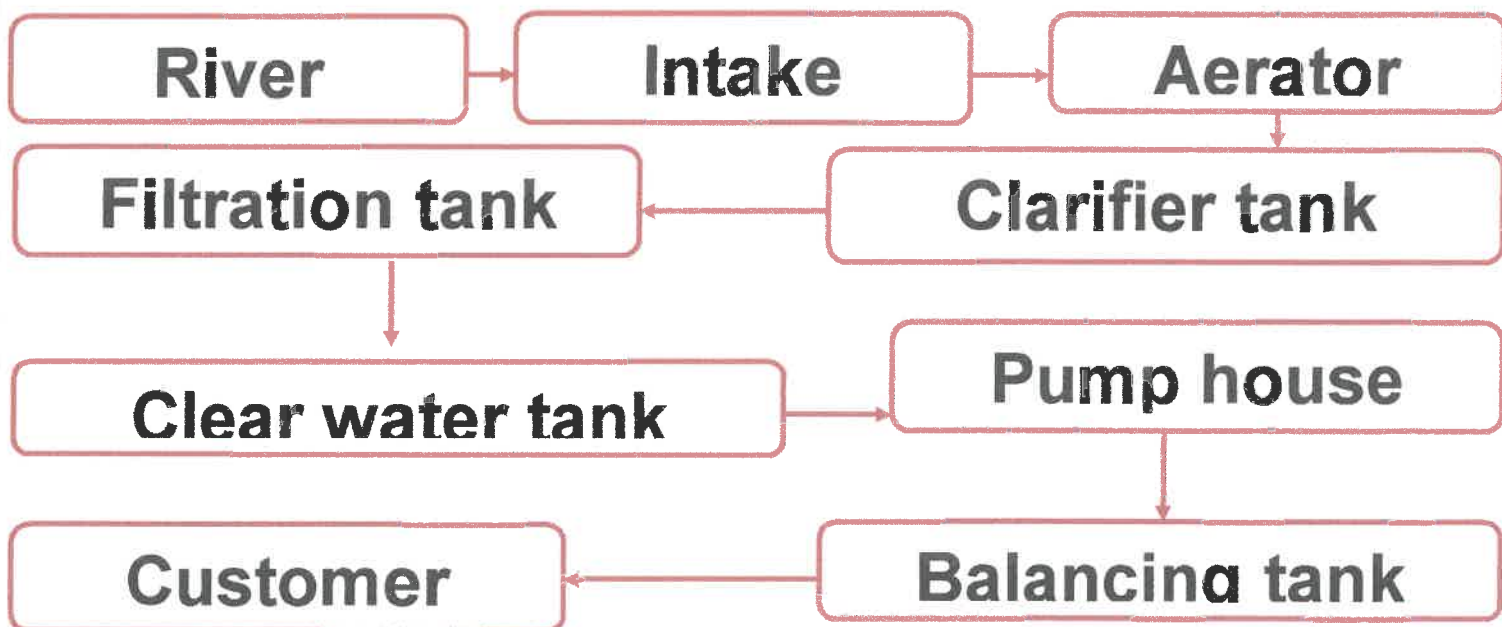
xi. Pump House

Pump house is where all the pump located to pump the treated water to balancing tank. The common pump used process water pump, highlift pump and booster pump.

xii. Balancing tank

It is a must for balancing tank to located in high places such as hills. It is because to make sure the water pressure is enough to flow to customer's house.

**c. Compact system**



**Fig.60** Flow chart for compact system

### i. River

River is the main source of water in Pahang especially Pahang river. Pahang river is the biggest and longest in Peninsular Malaysia. Most of the treatment plants use the Pahang river in the process.

### ii. Intake

Intake is where the screening process occur. The intake have band screen that will screening the water and prevent huge floating things such as branch, garbage, plastics and suspended solid from flow to the plant. It is also had pumps that will pumping the water to the plant.

### iii. Aerator

Aerator is where aeration process occurred that will remove undesirable gases such as carbon dioxide ( $\text{CO}_2$ ), increasing desire oxygen content and oxidized dissolved metals such as iron (Fe) and manganese (Mn). The process used with water to air method which produce small drops of water that fall through the air. Types of aerator used here are cone aerators and cascade aerator. Process of dosing chemical such as aluminium sulphate was also done beside aerator for coagulation process. Quantity of aluminium sulphate dosed is based on the result of jar test which done once in 4 hours.

### iv. Clarifier tank

Clarifier tank is basically the combination of flocculation tank and sedimentation tank where the process occur are flocculation and sedimentation.



**Fig. 61** Clarifier tank

v. Clear water tank

Clear water tank is to store the treated water before distribute to customer. In this tank there will occur a process called disinfection using chlorination. The disinfection is to prevent from the present of E.coli, bacteria and more. It is to make sure that the drink is safe to drink as suggested by Ministry of Health Malaysia.

vi. Pump House

Pump house is where all the pump located to pump the treated water to balancing tank. The common pump used process water pump, highlift pump and booster pump.

vii. Balancing tank

It is a must for balancing tank to located in high places such as hills. It is because to make sure the water pressure is enough to flow to customer's house.



### **3.0 CONCLUSION & RECOMMENDATION**

- **Conclusion**

In conclusion, there are many things that have learned throughout internship days at Pengurusan Air Pahang Berhad Daerah Maran for the past 4 months (included 2 months of MCO). A lot of unexpected things happened that have experienced and faced in order to complete the diploma, it is such a bitter-sweet memories. The real working industry is not as easy as a piece of cake thing to deal with it where any little wrong step, will definitely turn it into a mess. This course thought to always have backup plan and always think outside the box. Expect the unexpected, prepare for any circumstances that may happen in the future. It was so grateful for having this opportunity in experiencing both industrial working and work from-home style of working, it was completely different experience with other batch for have done internship before that not experience work from home style. Although work from home style is quite similar with open distance learning in university, it faced the real process and condition in real working that need wide problem solution. It such a good process of learning for preparing in the future. If there are another opportunity of industrial training, it is a better choice for choosing 'hands-on' industrial training because it gives more exposure and practice of the real working life of engineer on reality of chemical engineering. However, it was a great experience overall. Last but not least, environmental issues are very important to be taken care of and have to be taken seriously. All the industries that produce wastewater have to treat their waste in a proper way to sustain the environment for the future generation.

- **Recommendation**

- a. Company**

1. Prepare a new machine that can automatically to determine the suitable dose for dosing chemical in the water. The other good recommendation.
2. Make sure the planning of water treatment system are more strategic and systematic as much profit already waste because of improperly planning of the system.

- b. University**

1. The briefing for preparation and updated condition in the pandemic situation should be held at least twice as some of the students still clueless with their training and how to write the report and logbook.