INDUSTRIAL TRAINING FIELD REPORT

Name : **AISYAH FADZLIN SYAKIREEN BINTI AHMAD YANI**

Programme: **DIPLOMA IN CHEMICAL ENGINEERING**

ID : **2018231348**

LI Duration: **13th SEPTEMBER 2021 – 7th JANUARY 2022**

Supervisor : **KHAIRUL BIN KAMALUDIN**

MAZALINDA BINTI JAMALUDIN

Company : **PENGURUSAN AIR PAHANG BERHAD**

Address : **JALAN MOHD NOR ZABIDIN, KAMPUNG BARU, 28700, BENTONG, PAHANG**

ACKNOWLEDGEMENT

Assalamualaikum w.b.t, in the name of Allah SWT, I would like to thank Almighty Allah for permitting me to accomplish my industrial training and completing this industrial technical field report on Pengurusan Air Pahang (PAIP) Berhad for Bentong district.

First and foremost, I would like to express my heartfelt gratitude to Mr Khairul Bin Kamaludin and Mrs Mazalinda Binti Jamaludin for all of their assistance and new knowledge during my industrial training period. Additionally, special thanks to Mrs Kursiah Binti Ibrahim, Human Resources Executive, and Mr Mohd Najmin Bin Alias, District Officer, for accepting me into the company.

Secondly, I would like to thank PAIP Berhad's employees for assisting me in gaining of experience and skills. Their opinions and guidance were extremely helpful in completing my internship especially when I was facing difficulties.

Last but not least, I wish PAIP Berhad Bentong every success in the future. I will never forget the knowledge and experience I gained throughout my industrial training.

TABLE OF CONTENTS

1.0 INTRODUCTION

PENGURUSAN AIR PAHANG BERHAD

Figure 1. Logo of PAIP Berhad

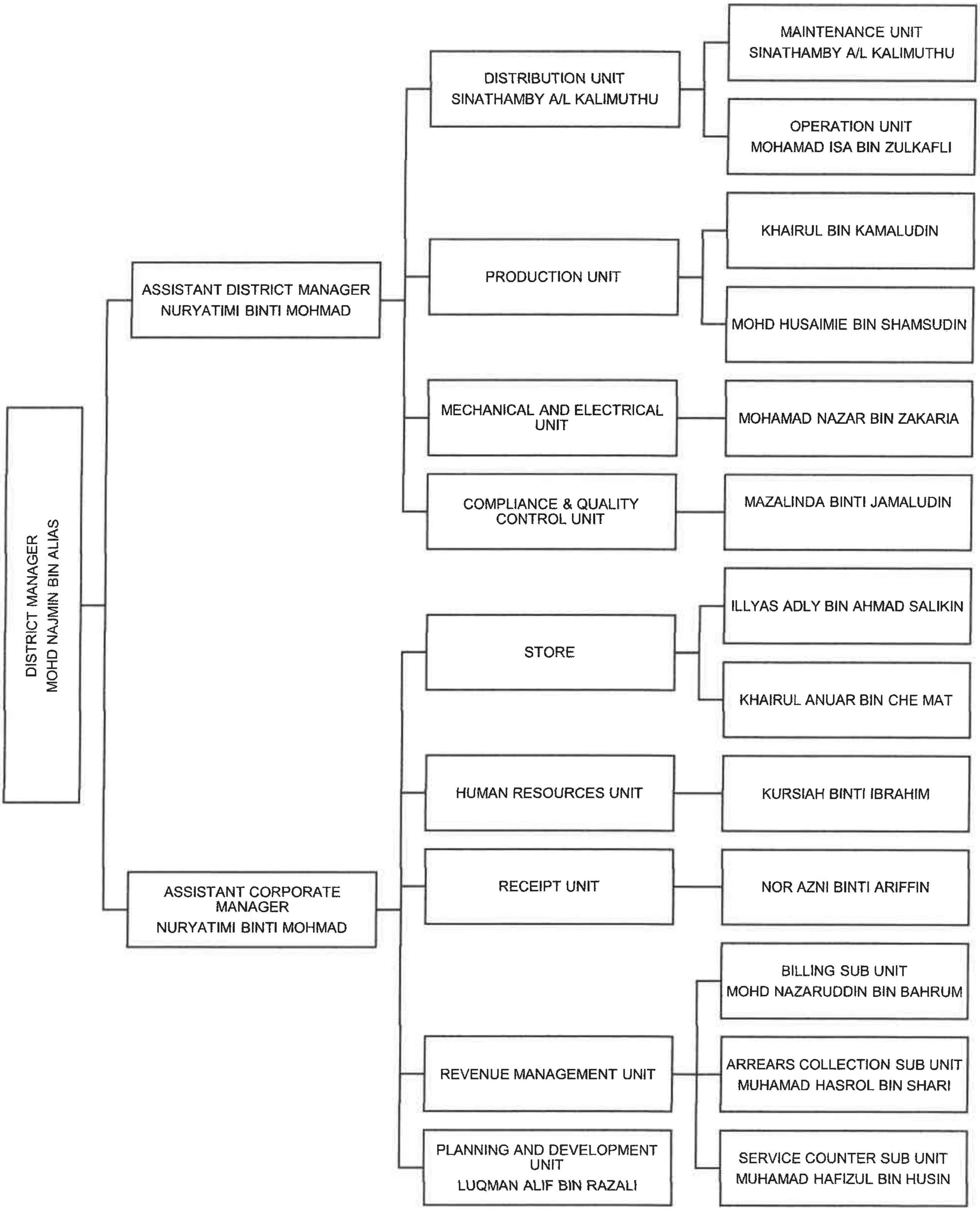
Pengurusan Air pahang Berhad (PAIP) is a company of water supply services which supplying water to the residents of Pahang. PAIP was formerly known as the Department of Water Resources or Jabatan Bekalan Air Pahang (JBAP). Pengurusan Air Pahang Berhad (PAIP) was officially established on 1 February 2012 through the corporatisation of the Pahang Water Supply Department (JBAP) and is a wholly owned subsidiary of the Pahang State Government. With the corporatisation 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 main headquarters of PAIP is in Kuantan which every district has to follow their orders to ensure efficient service.

PAIP has been licensed by the National Water Services Commission (NWSC) as a water supply operator for the State of Pahang in accordance with the provisions of Act 655 (Water Services Industry Act 2006). Thus, PAIP is responsible to provide clean water supply services that are satisfactory in terms of quantity and quality to consumers in the most economical way to meet the needs of social and economic development of Pahang Darul Makmur.

Apart from that, PAIP is also responsible for the planning, development and management of the Pahang Darul Makmur State Water Supply System in addition to billing and collecting water supply revenue on behalf of the Pahang State Government. PAIP also acts as an advisor or consultant to the Pahang State Government on matters involving the water supply industry.

2.0 CONTENT

2.1 ORGANISATION CHART



2.2 PROCESS FLOW

Pengurusan Air Pahang Berhad (PAIP) is a water supply company that treating, supplying, cleaning and collecting water revenue from the sale of clean water. During my internship, I worked in the production unit and compliance and quality control unit. In the production unit, I was placed at Water Treatment Plant Fasa II at Taman Bukit Indah, Bentong for three months and learned about water treatment process. Meanwhile, in the compliance and quality control unit, I learned about water main flushing and collecting water samples. I worked in the compliance and quality control unit for one month.

2.2.1 WATER TREATMENT PROCESS

Water treatment process is a process for enhancing the quality of water in order to make it suitable for a certain end-use. The end-use may be drinking water, industrial water supply, irrigation, river flow maintenance, water recreation and a variety of other applications are possible, as well as being returned to environment safely. Water treatment eliminates or decreases the concentration of pollutants and unwanted components in order to make the water suitable for its intended usage. This treatment is critical for human health since it allows humans to gain benefit from drinking and irrigation.

The purpose of water treatment process is to remove color, dissolved gases, turbidity, water hardness, taste and odor. Besides that, it is also used to remove disease causing microorganisms which is bacteria such as Shigella, Eschericia coli, Vibrio and Salmonella, viruses such as Norwalk virus and rotaviruses, protozoans such as Entamoeba, Giardia and Cryptosporidium so that water is safe for drinking. Other than that, water treatment proces is also suitable for a wide variety of industrial purposes such as steam generation.

There are seven steps of water treatment process. The first step is screening with its function is to remove larger floating and suspended solid. The second step is aeration which is to remove undesirable gases such as carbon dioxide to increase dissolved oxygen nutrients and oxidizes dissolved metals such as iron and hydrogen sulfide. The next step is coagulation. Coagulant such as aluminium sulphate (alum) or ferric chloride are mixed into the water to make particles of dirt and dissolved substances clump together so that they can be removed.

Flocculation process comes in after coagulation process. Flocculation process is a process of formation of large flocs by forming bridges between the particles. The next step is sedimentation. Sedimentation process is a process of settling of flocs by gravity to the bottom of the water. Next, the water went through filtration process which its purpose is to remove fine particles that was not settled during sedimentation process. Finally, the final process is disinfection. Disinfection is a process where the chlorine was added to kill or reduce pathogens.

Aeration Process

Aeration is the treatment process whereby water is brought into intimate contact with air for the purpose of removing undesirable gases dissolved in water such as carbon dioxide and hydrogen sulfide. Other than that, the purpose of aeration is also to oxidizing dissolved metals such as iron and manganese. It is also helps increasing the oxygen content through oxidation process and remove methane and various volatile organic compounds responsible for bad taste and odour such as benzene and trichloroethylene.

There are two types af aerator which is water to air method and air to water method. Water to air method was designed to produce small drops of water that fall through the air. Some of water to air method aerators are cascade aerators, cone aerators, coke tray aerators, spray aerators and draft aerators. Meanwhile, air to water method creates small bubbles of air that are injected into the water systemthrough a series of nozzle submerged in water. Air to water method was commonly used for aeration of activated sludge in wastewater treatment. Some of air to water method aerators are diffuser and draft tube.

Figure 3. Example of water to air method aerator

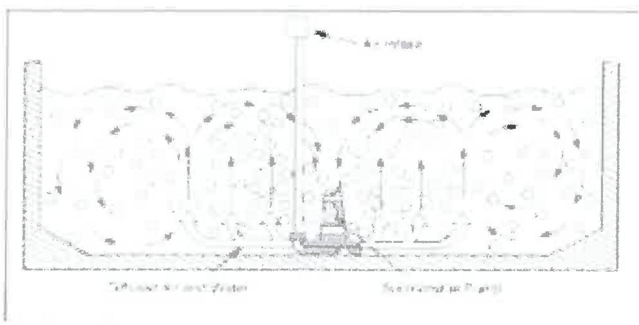


Figure 4. Example of air to water method aerator

Inorganic coagulants are the cheapest per pound, are generally accessible, and are effective at removing most suspended solids when used properly. They can also remove some of the organic precursors that could mix with chlorine to generate disinfection by-products. Large amounts of floc are produced by inorganic coagulants, which can entrap bacteria when they settle.

Following coagulation, flocculation occurs, which is a gentle mixing stage that transforms submicroscopic microfloc into visible suspended particles. The microflocs are brought into contact with one another by a slow mixing process. When the microfloc particles collide, they bond together to form larger and more visible flocs. Additional collisions and interactions with inorganic polymers generated by the coagulant or organic polymers added continue to increase the floc size. The macroflocs were formed after that. Coagulant aids, or high molecular weight polymers, can be added at this step to help bridge, bind, and reinforce the floc, as well as add weight and speed up the settling process. The water is ready for the separation process, which involves sedimentation and filtration, once the floc has attained its optimal size and strength. Design flocculation contact times range from 15 to 20 minutes to an hour or more.

Sedimentation Process

Sedimentation process is when particles suspended in water are allowed to settle out of suspension due to gravity. The particles that settle out of the suspension form sediment, which is referred as sludge in the water treatment industry. Most solids separation processes are dependent on the density difference between the water and the particles. In short, particles whose density is higher than that of the solvent sink and particles that are lighter float to the top.

Sedimentation can be used in water treatment to lower particle concentrations in suspension before coagulation, to reduce the amount of coagulating chemicals required. When sedimentation is used after coagulation, the goal is usually to lower the concentration of solids in suspension so that filtering can work as efficiently as possible. Other than that, the purpose of sedimentation is to settle the sludge.

There are two types of sedimentation basin which is rectangular basin and circular basin. The most basic design is a rectangular basin, which allows water to flow horizontally through a long tank. Large-scale water treatment plants frequently use this sort of basin.

Predictability, cost-effectiveness, and easy maintenance are just a few of the benefits of rectangular basins. Rectangular basins are also the least prone to short-circuit, especially if the length is at least twice as long as the width. Rectangular basins have the problem of requiring a big amount of land.

Circular basin are preferable for continuous vertical flow sedimentation tanks. In this situation, the influent flows is sent through the contral pipe and radial flows takes place. Sludge is gathered by mechanical sludge scrappers, and the sludge is then sent to the bottom via a sludge pipe. However, when compared to rectangular tanks, circular tanks are more expensive, but they have a higher clarification efficiency.

Figure 5. Rectangular basin in water treatment industry

Figure 6. Circular basin in water treatment industry

Filtration Process

Filtration is a process that removes suspended matter from water by passing it through a porous material to improve disinfection efficiency. Sand, gravel, crushed anthracite, or activated carbon were commonly employed as filter medium. Filtration proces starts with water passes through a bed of granular material due to gravity. After that, the suspended solids are retained on the surface of granular material. Then, the filter medium is backwashed and finally being removed from the medium. There are two types of filtration process which is rapid sand filtration and slow sand filtration.

Rapid sand filtration is a purely physical way of purifying drinking water. Rapid sand filters (RSF) remove relatively large suspended particles quickly and effectively. Rapid gravity and rapid pressure sand filters are the most common RSFs. RSFs require proper pre-treatment (typically coagulation-flocculation) and post-treatment to provide safe drinking water (usually disinfection with chlorine). Construction and operation are both cost-intensive. It's a relatively complex process that normally requires the use of power-operated pumps, regular backwashing or cleaning, and filter outlet flow control. Rapid sand filtration is widely used in developed countries to filter huge amounts of water where land is a major constraint and materials, skilled labour, and a constant supply of electricity are readily available.

The major parts of a gravity rapid sand filter are chamber, filter media, gravel support, under drain system and wash water troughs. The filter chamber is usually made of reinforced concrete and filled to a height of 1.5-2 metres with sand and gravel. Water is sent to the top of the sand-bed, where it is filtered as it passes through the layers of graded sand and gravel. The chamber is drained through a series of perforated pipes on the bottom. Open tanks (quick gravity filters) or closed tanks (pressure filters) can be used to construct the filter chamber.

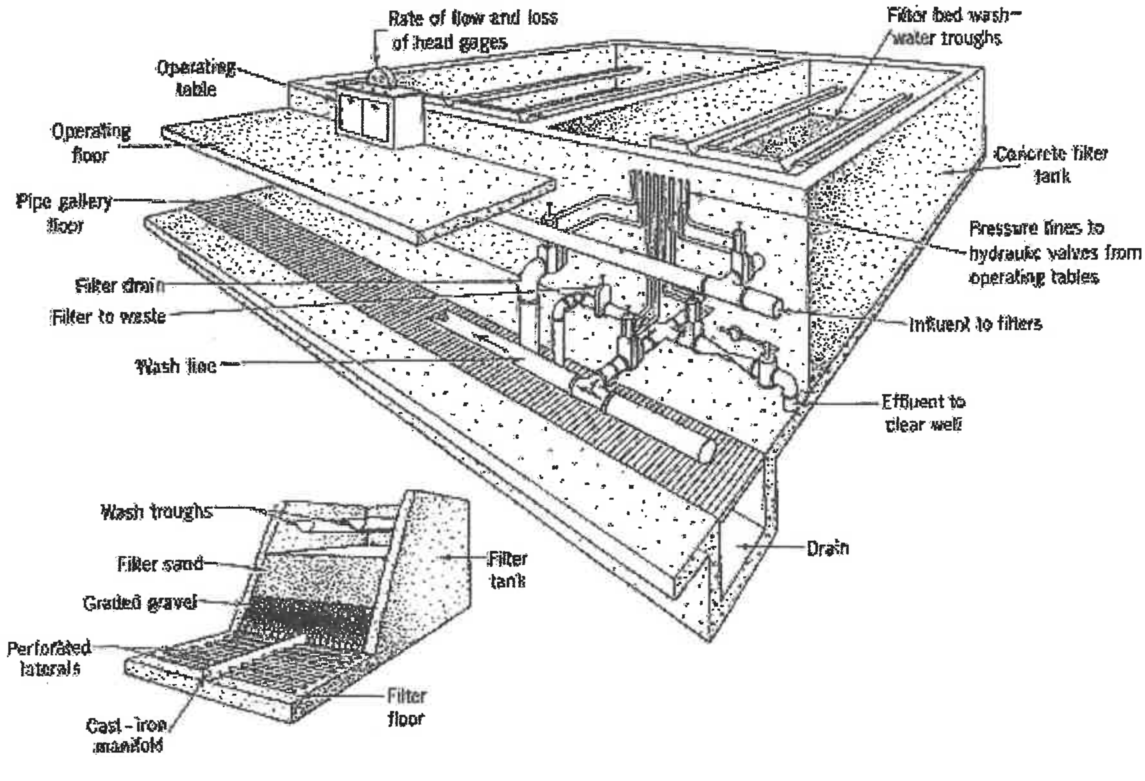


Figure 7. Components of an open (gravity) rapid sand filter

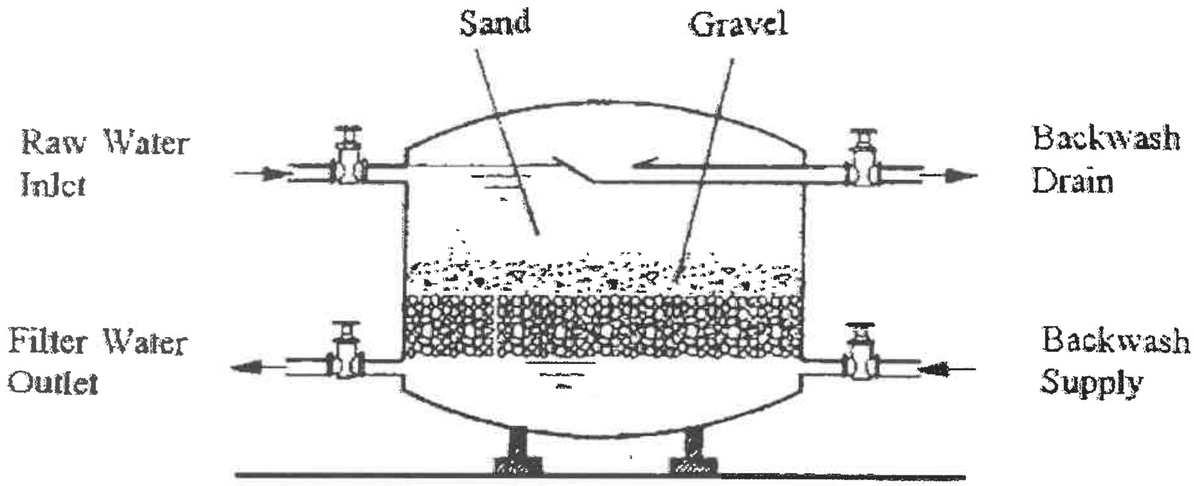


Figure 8. Closed rapid sand filter (pressure filter)

Slow sand filtration is a sort of water purification system that is either centrally or semi-centrally located. Through a combination of biological, physical, and chemical processes, a well-designed and well-maintained slow sand filter (SSF) successfully removes turbidity and harmful organisms in a single treatment step. Pre-treatment techniques such as sedimentation are only required when there is a large amount of turbidity or algae pollution. Slow sand filtering systems have a high level of dependability and relatively moderate lifecycle costs. Furthermore, neither construction nor operation and maintenance require more than basic grasp. As a result, slow sand filtration is a potential filtering method for small to medium-sized rural settlements with good starting surface water quality.

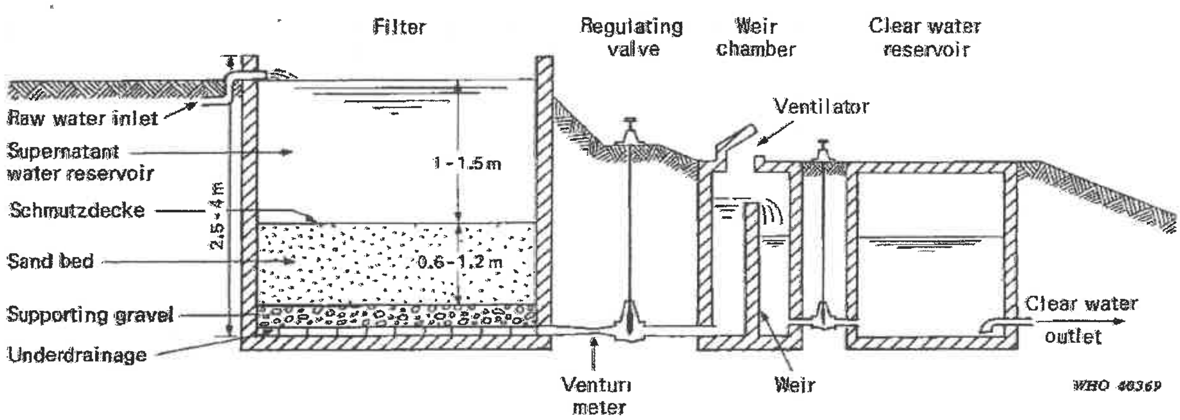


Figure 9. Slow sand filter

Disinfection Process

Disinfection process is a process to remove, deactivate or kill pathogenic microorganisms which can cause human diseases if not removed. Some of techniques of disinfection are chlorination, ozonation, ultraviolet radiation and ultrafiltration.

Chlorination is a technique where a solution of chlorine or hypochlorite is added to the water. Chlorination is also a common and relatively inexpensive method of disinfecting water. Water can be chlorinated in two ways which is shock chlorination and continuous chlorination. Shock chlorination is when a strong chlorine solution is added into a well through the plumbing system to destroy microorganisms on a one-time basis. On the other hand, continuous chlorination is a process where chlorine is added continuously to the household water through a chemical feed pump.

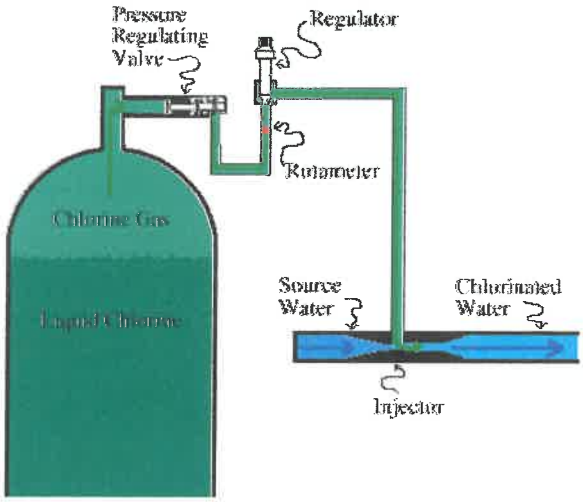


Figure 10. Chlorination method

Ozonation is a chemical water treatment method that involves injecting ozone into the water. Ozone is a gas composed of three oxygen atoms (O3), which is one of the most powerful oxidants. Ozonation is a sort of advanced oxidation that produces highly reactive oxygen species that can destroy a wide spectrum of organic compounds as well as all microorganisms. The treatment of water with ozone has a wide range of applications, as it is efficient for disinfection as well as for the degradation of organic and inorganic pollutants. Ozone is produced with the use of energy by subjecting oxygen (O2) to high electric voltage or to UV radiation.

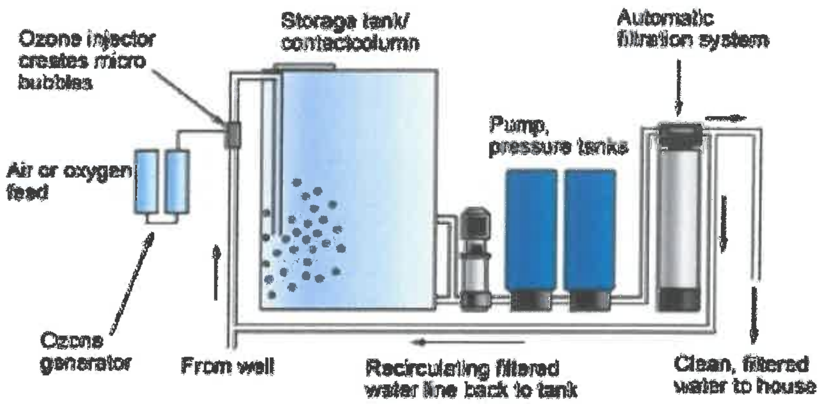


Figure 11. Ozonation method

An ultraviolet (UV) disinfection system delivers electromagnetic energy from a mercury arc light lamp to the genetic material of an organism. When UV light enters an organism's cell wall, the cell's capacity to reproduce is destroyed. The effectiveness of a UV disinfection system is determined by the wastewater's properties, UV radiation intensity, the amount of time microorganisms are exposed to the radiation, and reactor configuration. There are two types of UV disinfection reactor configurations which is contact and non-contact UV disinfection reactors. Wastewater can flow perpendicular or parallel to the lamps in both contact and noncontact types. A series of mercury lamps are wrapped in quartz sleeves in the contact reactor to reduce the cooling effects of the effluent.

Figure 12. Ultraviolet radiation method

Ultrafiltration is a water treatment method that uses a hollow fibers or sheet membrane to mechanically filter water with very small particles. This ultrafine membrane technology is used in an ultrafiltration drinking water system to filter particulate down to 0.025 microns. To help you get an idea just how small that is, the diameter of a human hair is typically about 75-80 microns. This means that an ultrafiltration system removes all suspended particles from the water on a micro scale. There are two main types of ultrafiltration systems which is point-of-use where these types are typically used for under-the-counter water systems and point-of –entry where these types are typically used to run water for applications that do not require water filtered as fine.

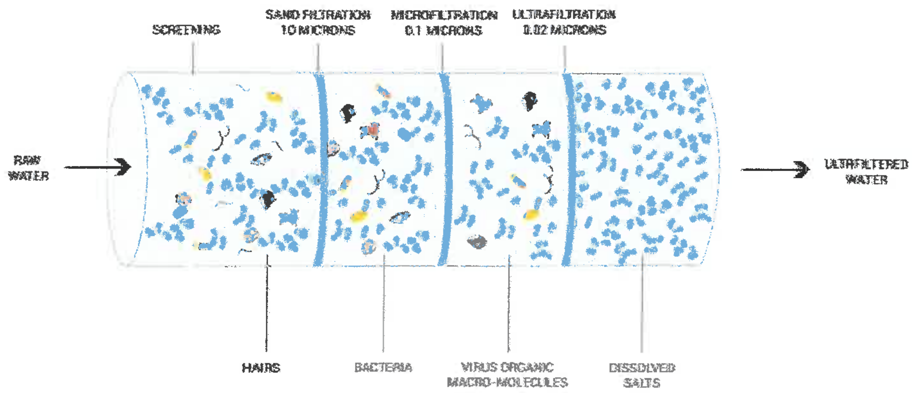
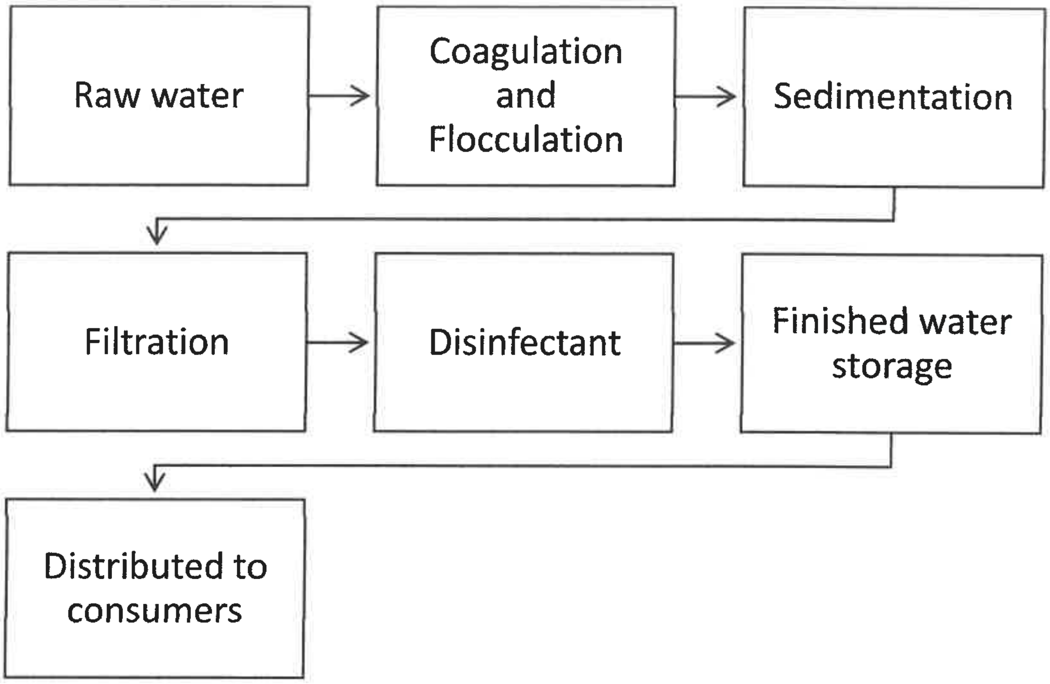


Figure 13. Ultrafiltration method

2.2.2 PROCESS FLOW CHART OF WATER TREATMENT PROCESS



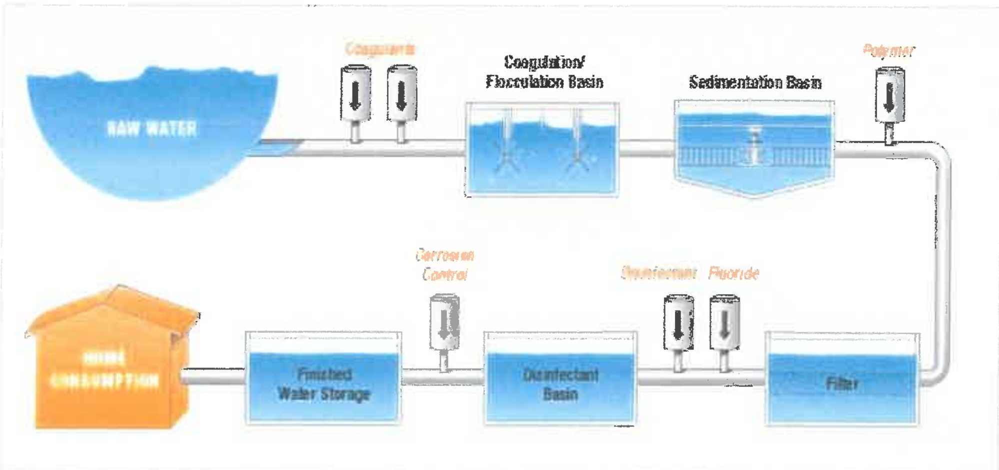


Figure 14. Water treatment process flow chart

2.3 WEEKLY ACTIVITY

Working hours at the company in first three months where I was allocated at Water Treatment Plant Fasa II in production unit, it begins at 8.00 a.m and end at 1.00 p.m. For the rest of the month, where I was allocated at the main office in compliance and quality control unit, working hours starts at 8.00 a.m and ends at 5 .00 pm. The lunch hour is at 1.00 p.m until 2.00 p.m.

Table 1: Working hour for Pengurusan Air Pahang Berhad

<table>
<tr><th></th><th>Entering shift</th><th>Lunch hour</th><th>Exiting shift</th></tr>
<tr><td>Production Unit</td><td rowspan="2">8.00 a.m</td><td></td><td>1.00 p.m</td></tr>
<tr><td>Compliance and Quality Control Unit</td><td>1.00 p.m – 2.00 p.m</td><td>5.00 p.m</td></tr>
</table>

Week 1- 2 (13th September 2021 – 24th September 2021)

The internship training starts on 13th September 2021. On the first day I was briefed by our district manager about the organization chart of the company. Under district manager, there are two assistant managers which is assistant district manager and assistant corporate manager. Under assistant district manager there are 4 units which is distribution unit, production unit, mechanical and electrical unit and compliance and quality control unit. Under distribution unit there are other two subunits which is maintenance unit and operation unit. Meanwhile, under assistant corporate manager, there are 5 units which is the one who manages water storage, human resources unit, receipt unit, revenue management unit and planning and development unit. Under revenue management unit there are other three subunits which is billing sub unit, arrears collection sub unit and service counter sub unit.

On the second day, I was given office-related tasks such as stamping letters and so on. It was just a temporary task while I was waiting for my supervisor to come fetch me. I was allocated in the Production unit for three months and for the rest of the months I was allocated in the Compliance and Quality Control Unit until I finish my internship period. While I was at the main office, I was also briefed about how water was supplied to the residential area if there is a pipe leakage.

On third day, I was fetched by my supervisor to visit the water treatment plant and I was allocated in the water testing section. I also was briefed about water treatment operation process in water treatment plant Fasa II, which is located at Taman Bukit Indah, Bentong, Pahang. I also was taught the step and procedure of testing water. Water testing is a daily routine and the water should be tested once every 4 hours. The water that was tested are raw water, sedimentation tank water, after filtration water and clean water. The parameter that was tested are turbidity, pH, residual alum and residual chlorine for clean water only.

The following week, I learned about how to conduct jar test according to the current dosage on that day. Eventhough I already learned about jar test in environmental engineering subject, I can enhance my skills and knowledge on conducting jar test. The next day, I watched one of the operators cleaned the filtration tank. The filtration tank has a blower system which the operator can control through the control system. I also learned about the filtration process in details.

Week 3 – 5 (28th September 2021 – 15th October 2021)

On the third week, I went to visit the raw water reservoir, raw water tank and clear water tank at Sungai Perting. The water source is from Sungai Perting which has a water catchment area of 118km^2 with the ability to supply raw water needs over 65 L/h.

The next week, my supervisor asked me to key in data for flowrate of each water treatment plant into the National Water Service Commission (SPAN) system. I was also given task to write the procedure to check the liquid alum flowrate dosing. On the next day, I was given task to write method of how to calculate dosing liquid alum. I was also asked to write the procedure of testing water quality that I did every day.

On the following week, my supervisor gave me task to label the components and parts in pH meter, turbidimeter and photometer. I also went to visit Water Treatment Plant Lurah Bilut. I also gain knowledge about water treatment plant has two systems which is conventional and compact. Water Treatment Plant Lurah Bilut is operating in compact system where it requires smaller area. The next day, I was given task to write the procedure for testing residual chlorine in clean water. I cleaned the sedimentation tank the next day.

Week 6 – 12 (18th October 2021 – 3rd November 2021)

I continue my following week with testing water and do jar test since it is my daily routine until the end of November. I was told to move to another unit which is Compliance and Quality Control Unit. I bid farewell and thanks all the staffs at Water Treatment Plant Fasa II.

Week 12 - 14 (1st December 2021-17th December 2021)

It is my first day in Compliance and Quality Unit. I was told to meet the head of Human Resources unit and she asked me to meet my supervisor at her office. My supervisor said I will go do water main flushing on that day. Water main flushing is a method of cleaning a drinking water distribution system by systematically moving water through sections of the system to create a scouring action. The team will go to each fire hydrant to do water main flushing according to which location the team will go on that day. After do water main flushing, the water will be collected to be tested. The turbidity that were tested are pH, turbidity, residual alum and residual chlorine.

I also collected water sample on the same week. The team will go to each clean water collecting box and collect water from there. The water that were collected were tested according to the same turbidity like how water main flushing water was tested.

Week 15 – 17 (20th December 2021 – 7th January 2021)

The main office was affected in the flood. Therefore all transport was badly affected as well and cannot function properly. I help cleaned the office on that week. Most staffs from my unit were affected in the flood as well so they were absent on that whole week.

On the last week I was given chance to do my report and completed my logbook. On the last day, PAIP staffs thanks me and do a small feast for me. I also got a certificate and Assistant District Manager, Miss Nuryatimi also thanked me because I willing to do my internship in their company.

2.4 MINI PROJECT

2.4.1 PROCEDURE FOR CALCULATING CHEMICAL FLOWRATE

I was given task to do the procedure for calculating chemical flowrate and procedure for testing water quality. The chemical that were used as the coagulant at Water Treatment Plant Fasa II is aluminium sulfate or known as liquid alum. Liquid alum is a common coagulant for water treatment plants. The procedure to calculate chemical flowrate are as follow:

Figure 15. Chemical flowrate dosing

1. Fill the calibration tube to full level.
2. Next, close V2.
3. Set up a stopwatch and set the volume to check the chemical flow rate.
4. Close V1 and open V2 and start taking readings.
5. Make sure the viewing level is parallel to the calibration tube to get the correct volume.
6. When the liquid alum level in the calibration tube is at the 1000ml reading scale, start the time reading until the liquid alum drops by 100ml. Then, record the time reading.
7. Repeat the step with the same volume five times the reading.
8. After getting five readings, close V2 and open V1.
9. From the reading record obtained, calculate the flow rate of liquid alum.
10. Here is how to calculate the flow rate of liquid alum:

$$q = \frac{V\ (volume), ml}{t\ (time)\ , s}$$

Tadahan	Volume	time, s
1	100ml	t1
2	100ml	t2
3	100ml	t3
4	100ml	t4
5	100ml	t5

Calculate the average time, t = t = $\frac{t1 + t2 + t3 + t4 + t5}{5}$

Example: t = $\frac{9.18 + 9.17 + 9.02 + 9.13 + 9.28}{5}$

= 9.16s

q= $\frac{100\ ml}{9.16\ s}$

= 10.92 ml/s

Convert the unit to L /h,

= 10.92 $\frac{ml}{s}$ x 3600s ÷ 1000ml

= 39.3 L/h

In the calculation of the flow rate we can find out the current dosing.

$$q = \frac{d \times Q}{sg \times 1000}$$

where q = chemical flowrate

d = dosing

Q = raw water flowrate

sg (berdasarkan COA (Certificate of Analysis)) = 1.3

Arrange formula to get the dosing formula. Example: d = $\frac{q \times sg \times 1000}{Q}$

= $\frac{39.3 \times 1.3 \times 1000}{2200 m^3}$

= 23.22 $\approx \mathbf{23\ ppm}$

2.4.2 PROCEDURE FOR TESTING WATER QUALITY

Water that were tested are raw water, sedimentation tank water, after filtration water and clean water. The parameter that were tested are pH, turbidity, residual alum and residual chlorine for clean water. The water must be tested once every four hours every day. Below are the procedure for testing water quality:

Procedure for testing pH water sample

1. Take sample water i.e. raw water, clean water, sedimentation tank water and after filtration water

2. Turn on the meter pH device then rinse the probe pH meter with distilled water.

3. Wipe the probe pH meter with tissue until dry.

4. Set pH meter to AR mode (auto reading)

5. Dip the probe pH meter into a beaker containing sample water.

6. Press the enter button then wait until the AR stops and record the reading.

7. Rinse the probe pH meter with distilled water and wipe using tissue until dry.

8. Then, repeat the next step by testing clean water, sedimentation tank water and after filtration water.

9. Once completed, the pH meter shall be soaked in liquid potassium hydroxide (KCl) so that the probe is not damaged.

Figure 16. pH meter WJW pH 330i

Procedure for testing turbidity water sample

1. Take sample water i.e. raw water, clean water, sedimentation tank water and after filtration water.

2. Turn on the turbidity meter of the WTW 430 IR model.

3. Fill raw water into the cell sample provided using the syringe up to the specified level.

4. Wipe cell samples using soft tissue to remove traces or dirt on cell samples.

5. Enter the sample of the cell into the turbidity meter and press the ENTER button. Record the readings displayed on the display screen.

6. Repeat the next step by testing clean water, sedimentation tank water and after filtration water.

Figure 17. Turbidity meter WTW 430 IR

Procedure for testing residual aluminium in water sample

1. Take sample water i.e. raw water, clean water, sedimentation tank water and water after filtration water.

2. Turn on the photometer of the Lovibond PC Multidirect model.

3. Take 10ml of raw water using a syringe.

4. Insert the sample water into the sample cell 10ml.

5. Wipe cell samples using soft tissue to remove traces or dirt on cell samples.

6. Various of numbers will be displayed on the display screen. To identify the remaining aluminum, the code is 40. Then insert the sample cell into the sample cell place. Next, press the ZERO button.

7. Upon completion of the zeroing process, remove the cell sample from the cell sample holder and insert aluminum number 1 and crush the tablet using a crusher.

8. Make sure the number 1 aluminum tablet is completely dissolved before starting the next step.

9. After tablet no 1 dissolves, insert aluminum tablet number two and crush the tablet using a crusher until dissolved.

10. Wipe the cell sample with a soft tissue to remove traces or dirt on the cell sample.

11. Then, insert the cell sample into the photometer and press the TEST button.

12. The display screen will show the test time for 5 minutes. Wait until the waiting time finished and the reading will be display on the display screen. The reading was recorded.

13. Repeat the following steps by testing clean water, setdimentation tank water and after filtration water.

Procedure for testing residual chlorine in water sample

1. Take sample water i.e. clean water.

2. Turn on the photometer model lovibond pc multidirect.

3. Take 10ml of raw water using a syringe.

4. Insert the sample water into the sample cell 10ml.

5. Wipe cell samples using soft tissue to remove traces or dirt on cell samples.

6. Various of numbers will be displayed on the display screen. To identify the remaining chlorine, the code is 100. Then, insert the sample cell into the sample cell place. Next, press the ZERO button.

7. Upon completion of the zeroing process, remove the cell sample from the cell sample place and enter the N,N-diethyl-p-phenylenediamine (DPD)tablet. It is a tablet reagent to test residual chlorine in water.

8. Destroy the tablet using a crusher.

9. Make sure the DPD tablet is fully dissolved before starting the next step.

10. Wipe cell samples using soft tissue to remove traces or dirt on cell samples.

11. Then, insert the sample cell into the photometer and press the TEST button.

12. The display screen will show the test time of 3 minutes. Wait until the waiting time ends and the reading is displayed. Reading was recorded.

Figure 18. Photometer Lovibond PC Multidirect

3.0 CONCLUSION

In a nutshell, this internship was a wonderful and great learning opportunity. I can confidently state that my work at PAIP Berhad has taught me a lot. During my internship, I was able to gain a better understanding of the concept of a water supply company and its services, as well as prepare myself to be a responsible and resourceful individual in the future.

This internship programme also helps me in identifying my strengths and weaknesses. This allowed me to discover out which talents and knowledge I needed to work on in the future. When I made mistakes during my training, the employees offered me advice and guidance. Apart from that, when working in this industry, the most important aspect is safety. Employees are protected from injury and disease in a safe and secure environment, which can also decrease costs, improve performance and efficiency, and promote morale.

Throughout my industrial training, I discovered that it is not easy to work in a water supply company and services hence that it involves supplying water to consumers. The water should be safe and clean to be distributed to consumers. Several test were conduct to ensure that the water is confirmed to be safe and clean. This company also responsible to answer all the complaints and find the best way to solve all the problems especially if there is water shortage. They also have to find the best way possible so that all consumers satisfied and can use the water for daily usage.

To summarise, my industrial training provided me with a lot of new knowledge that I did not receive in class. Perhaps, in the future, when I work in industry, I will be able to apply this knowledge.

4.0 REFERENCES

1. https://www.paip.com.my/korporat/latar-belakang/
2. *Water treatment*. (2003, June 4). Wikipedia, the free encyclopedia. Retrieved January 26, 2022, from https://en.wikipedia.org/wiki/Water_treatment
3. Lingireddy, S. (2002). *Control of Microorganisms in Drinking Water*. 320. https://books.google.com/books?id=yOEuU7-z_4sC
4. Sedimentation processes. (n.d.). International Water Association Publications | IWA Publishing. https://www.iwapublishing.com/news/sedimentation-processes#:~:text=Sedimentation%20is%20the%20process%20of,treatment%
5. Sedimentation basin. (n.d.). Water/Wastewater Distance Learning at Mountain Empire Community College. https://water.mecc.edu/concepts/basin.htm
6. Anupoju, S. (2016, December 4). *Different types of sedimentation tanks used in water treatment*. The Constructor. https://theconstructor.org/environmental-engg/types-of-sedimentation-tank/14711/
7. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww.mrwa.com%2FWaterWorksMnl%2FChapter%252012%2520Coagulation.pdf&clen=940301&chunk=true
8. Rapid sand filtration. (2010, October 25). SSWM - Find tools for sustainable sanitation and water management!. https://sswm.info/sswm-university-course/module-6-disaster-situations-planning-and-preparedness/further-resources-0/rapid-sand-filtration
9. Slow sand filtration. (2010, October 25). SSWM - Find tools for sustainable sanitation and water management!. https://sswm.info/sswm-university-course/module-6-disaster-situations-planning-and-preparedness/further-resources-0/slow-sand-filtration
10. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww3.epa.gov%2Fnpdes%2Fpubs%2Fuv.pdf&clen=1939340&chunk=true
11. https://www.freshwatersystems.com/blogs/blog/how-an-ultrafiltration-membrane-works