# CHAPLEAU DRINKING WATER SYSTEM

# 2021 ANNUAL COMPLIANCE AND SUMMARY REPORT

Ontario Clean Water Agency
Agence Ontarienne Des Eaux

Prepared by the Ontario Clean Water Agency
on behalf of the Township of Chapleau

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## INTRODUCTION

Municipalities throughout Ontario are required to comply with Ontario Regulation 170/03 made under the *Safe Drinking Water Act*, 2002. The Act was passed following recommendations made by Commissioner O'Conner after the Walkerton Inquiry. The Act's purpose is to protect human health through the control and regulation of drinking-water systems. O. Reg. 170/03 regulates drinking water testing, use of licensed laboratories, treatment requirements and reporting requirements.

O. Reg. 170/03 requires the owner to produce an Annual Report, under Section 11. This report must include the following:

1. Description of system and chemical(s) used
2. Summary of any adverse water quality reports and corrective actions
3. Summary of all required testing
4. Description of any major expenses incurred to install, repair or replace equipment

This Annual Report must be completed by February 28 of each year.

The regulation also requires a Summary Report which must be presented and accepted by Council by March 31 of each year for the preceding calendar year reporting period.

The report must list the requirements of the Act, its regulations, the system's Drinking Water Works Permit (DWWP), Municipal Drinking Water Licence (MDWL), Certificate of Approval (if applicable), and any Provincial Officer Order the system failed to meet during the reporting period. The report must also specify the duration of the failure, and for each failure referred to, describe the measures that were taken to correct the failure.

The *Safe Drinking Water Act*, 2002 and the drinking water regulations can be viewed at the following website: http://www.e-laws.gov.on.ca.

To enable the Owner to assess the rated capacity of their system to meet existing and future planned water uses, the following information is also required in the report.

1. A summary of the quantities and flow rates of water supplied during the reporting period, including the monthly average and the maximum daily flows.
2. A comparison of the summary to the rated capacity and flow rates approved in the systems approval, drinking water works permit or municipal drinking water licence or a written agreement if the system is receiving all its water from another system under an agreement.

The two reports have been combined and presented to council as the Annual Compliance and Summary Report.

## SECTION 11 ANNUAL REPORT

### SYSTEM INFORMATION

| | |
|---|---|
| Drinking-Water System Name | CHAPLEAU DRINKING WATER SYSTEM |
| Drinking-Water System Number | 220003494 |
| Drinking-Water System Owner | The Corporation of the Township of Chapleau |
| Drinking-Water System Category | Large Municipal, Residential System |
| Population: | 1,964 |
| Reporting Period | January 1 to December 31, 2021 |

### REPORT AVAILABILITY

| | |
|---|---|
| Hard Copy Available at: | Township of Chapleau Municipal Office;<br>20 Pine Street, P.O. Box 129; Chapleau, ON P0M 1K0 |
| Electronic Copy Available: | http://www.chapleau.ca |
| Public Notification via: | Public access/notice |

### DESCRIPTION OF THE DRINKING WATER SYSTEM

The Chapleau Drinking Water System is owned by the Corporation of the Township of Chapleau. The treatment system is operated by the Ontario Clean Water Agency and the distribution system is operated by the Township of Chapleau Public Works Department. This subject system is not interconnected to any other drinking-water systems owned by different owners.

The Chapleau Water Treatment Plant, built in 1975, draws raw water for the municipal system from the Kebsquasheshing River (Chapleau River). Water passes through a concrete screening chamber and then through one of three 500 Imp. Gal. /min low lift pumps in the raw water well. There are no critical upstream or downstream processes relied upon to ensure the provision of safe drinking water.

The raw water is directed to a pre-contact tank where aluminum sulphate (alum) is added as a coagulant, polyelectrolyte (polymer) is added as a coagulant aid and sodium carbonate (soda ash) is added for pH and alkalinity adjustment. The pre-contact tank is also equipped with a chlorine injection line for pre-chlorination if required. After a short residence time, water flows by gravity to one of two clarifier tanks, which are equipped with 30-degree tube settlers and sludge scrapers. Clarified water passes through the upflow settlers and directed into two dual media filters, each comprised of silicate sand and anthracite coal. The filters backwash automatically based on filter runtime or head pressure.

The filtered water is then chlorinated and directed to a series of three reservoirs and three clearwells to provide adequate contact time. The combined storage volume is 1 818 400 litres.

Water levels in the clearwells are used to control the plant's production. Two 20 hp high lift pumps and four 60 hp high lift pumps are utilized in clearwell 1 and 2 to direct treated water to the distribution system. Before entering the distribution system the treated water is dosed with soda ash for pH adjustment and ammonium sulphate to provide secondary disinfection through chloramination.

A diesel generator is connected to allow the treatment plant to remain in operation should a power failure occur. The water treatment process is controlled by a dedicated PLC and monitored through the SCADA computer system.

The distribution system is constructed primarily of ductile iron, and provides fire protection to the Township of Chapleau as well as drinking water. There are no water storage facilities in the distribution system, as storage is incorporated within the treatment plant. Based on the number of service connections, the system is classified as a Large Municipal Drinking Water System.

#### WATER TREATMENT CHEMICALS USED

The following chemicals were used in the Chapleau Drinking Water System treatment process:

Aluminum Sulphate (Alum) – Coagulation/Flocculation
Ammonium Sulfate – Secondary Disinfection
Chlorine Gas – Primary Disinfection
Polyelectrolyte (Polymer) - Coagulant Aid
Sodium Carbonate (Soda Ash) – pH and Alkalinity Adjustment

All treatment chemicals are NSF/ANSI approved.

#### SIGNIFICANT EXPENSES INCURRED TO THE DRINKING WATER SYSTEM

The following work was completed in 2021:

- Chemical costs
- DWQMS third party audit
- Chemical drum pump for filter wash
- Pallet jack
- Chlorine analyzer membranes
- Header replacement (Township project)
- Backflow preventer calibrations
- Genset servicing
- Sommer's genset repair

### REPORTED ADVERSE TEST RESULTS AND OTHER PROBLEMS

| Sample Date | Details (Parameter, Limit, Result, Corrective Action, Date, etc.) |
|---|---|
| MAY 19 | AWQI 154086<br>Turbidity analyzer failed after calibration and the plant continued to run, incorrectly reading from 13:52 to 19:52. There was no indication of a process upset.<br>Please refer to the original Notices of Adverse Test Results and Issue Resolution (Schedule 16) for full details |
| OCTOBER 26 | AWQI 156214<br>PLC crash caused a loss of pressure in the distribution system for approximately 10 minutes (10:17 to 10:27). MOH issued a DWA which was then lifted on October 29 |
| DECEMBER 13 | AWQI 157401<br>Distribution sample result was NDOGN, MOH issued a system wide BWA, which was lifted December 17 |

*Please refer to the original Notices of Adverse Test Results and Issue Resolution (Schedule 16) for full details*

### SCHEDULE 7 – OPERATIONAL TESTING

**Continuous Flow Analyzers in Treatment Process**

| Parameter | Number of Samples | Range of Results (min to max) | Unit of Measure |
|---|---|---|---|
| Turbidity (Filter 1) | 8760 | 0 to 2.0 | NTU |
| Turbidity (Filter 2) | 8760 | 0 to 2.0 | NTU |
| Free Chorine | 8760 | 0.34 to 2.88 | mg/L |

Note: For continuous monitors use 8760 as the number samples for one year.
Effective backwash procedures are in place to ensure that the effluent turbidity requirements are met all times.

**Combined Chlorine Residual in the Distribution System**

| Number of Samples | Combined Chlorine (min to max) | Unit of Measure | Standard |
|---|---|---|---|
| 365 | 0.30 to 2.38 | mg/L | $\geq$ 0.25 and <3.0 |

Note: Combined chlorine residuals are collected and tested daily.

### SCHEDULE 10 – MICROBIOLOGICAL TESTING

| Sample Type | Number of Samples | *E.coli* Results (min to max) | Total Coliform Results (min to max) | Number of HPC Samples | Range of HPC Results (min to max) |
|---|---|---|---|---|---|
| Raw | 52 | 0 – 30 | 6 – 930 | N/A | N/A |
| Treated | 52 | 0 – 0 | 0 – 0 | 52 | <10 – 30 |

| Sample Type | Number of Samples | *E.coli* Results (min to max) | Total Coliform Results (min to max) | Number of HPC Samples | Range of HPC Results (min to max) |
|---|---|---|---|---|---|
| Distribution | 165 | 0 – NDOGN | 0 – NDOGN | 104 | <10 – 90 |
| MAC | - | 0 | 0 | - | - |

Maximum Acceptable Concentration (MAC) applies only to treated or distribution samples
NDOGN – No data overgrown with non-target organisms

**SCHEDULE 13 - NITRATE AND NITRITE AT THE WATER TREATMENT PLANT**

| Date of Sample | Nitrate Result (mg/L) | Nitrite Result (mg/L) | Exceedance |
|---|---|---|---|
| January 4, 2021 | <0.05 | <0.05 | No |
| April 7, 2021 | 0.16 | <0.05 | No |
| July 13, 2021 | <0.05 | <0.05 | No |
| October 4, 2021 | <0.05 | <0.05 | No |
| *MAC* | *10* | *1* | - |

**SCHEDULE 13 – TOTAL TRIHALOMETHANES IN THE DISTRIBUTION SYSTEM**

| Date of Sample | THM Result (ug/L) | Four Quarter Running Average | Exceedance |
|---|---|---|---|
| January 4, 2021 | 57.2 | 69.3 | No |
| April 7, 2021 | 45.6 | 69.9 | No |
| July 13, 2021 | 97.6 | 64.6 | No |
| October 4, 2021 | 52.0 | 63.1 | No |

MAC for Trihalomethanes = 100 ug/L (Four Quarter Running Average)

**SCHEDULE 13 – HALOACETIC ACIDS (HAA) IN THE DISTRIBUTION SYSTEM**

| Date of Sample | HAA Result (ug/L) | Four Quarter Running Average | Exceedance |
|---|---|---|---|
| January 4, 2021 | <8 | 45.0 | No |
| April 7, 2021 | 52 | 52.8 | No |
| July 13, 2021 | 97 | 51.5 | No |
| October 4, 2021 | 62 | 54.8 | No |

MAC for Haloacetic acids = 80 ug/L (Four Quarter Running Average)

**SCHEDULE 13 – SODIUM AT THE WATER TREATMENT PLANT**

| Date of Sample | Number of Samples | Result Value (mg/L) | MAC | Exceedance |
|---|---|---|---|---|
| October 9, 2018 | 1 | 26.7 | 20 | Yes (AWQI 143653) |

| Date of Sample | Number of Samples | Result Value (mg/L) | MAC | Exceedance |
|---|---|---|---|---|
| October 22, 2018 | 1 | 23.5 | 20 | N/A Re-sample |

Note: Sample required every 60 months.
Sodium exceedances are reported if there has not been an adverse reported in the previous 57 months.

### SCHEDULE 13 – FLUORIDE AT THE WATER TREATMENT PLANT

| Date of Sample | Number of Samples | Result Value (mg/L) | MAC | Exceedance |
|---|---|---|---|---|
| October 9, 2018 | 1 | <0.025 | 1.5 | No |

Note: Sample required every 60 months.

### SCHEDULE 15.1 – LEAD IN THE DISTRIBUTION

The Chapleau Drinking Water System qualified for the 'Exemption from Plumbing Sampling' as described in section 15.1-5 (9-10) of Ontario Regulation 170/03.

As such, the system is required to test for total alkalinity and pH in two distribution samples collected during the periods of December 15 to April 15 and June 15 to October 15. This testing is required in every 12-month period with lead testing in every third 12-month period.

| Sampling Dates | Number of Samples | Range of Results (min to max) | | |
|---|---|---|---|---|
| | | Lead (ug/L) | pH | Alkalinity (mg/L) |
| **Winter Period** | | | | |
| April 8, 2020 | 2 | 0.1 – 0.1 | - | - |
| April 7, 2021 | 2 | - | 7.41 – 7.58 | 52 – 53 |
| **Summer Period** | | | | |
| October 5, 2020 | 2 | <0.1 – 0.1 | - | - |
| September 27, 2021 | 2 | - | 7.04 – 7.09 | 59 – 64 |

MAC for lead is 10 ug/L

### SCHEDULE 23 – INORGANIC PARAMETERS AT THE WATER TREATMENT PLANT

Sample Date: October 5, 2021

| Parameter | Result (ug/L) | MAC | MAC Exceedance | 1/2 MAC Exceedance |
|---|---|---|---|---|
| Antimony | <0.5 | 6 | No | No |
| Arsenic | <1 | 25 | No | No |
| Barium | 15 | 1000 | No | No |
| Boron | 5 | 5000 | No | No |
| Cadmium | <0.1 | 5 | No | No |

| Parameter | Result (ug/L) | MAC | MAC Exceedance | 1/2 MAC Exceedance |
|---|---|---|---|---|
| Chromium | <1 | 50 | No | No |
| Mercury | <0.1 | 1 | No | No |
| Selenium | 0.4 | 10 | No | No |
| Uranium | <1 | 20 | No | No |

MAC – Maximum Acceptable Concentration

No inorganic parameter(s) exceeded half the standard found in Schedule 2 of the Ontario Drinking Water Standards (ODWS) during the reporting period

**SCHEDULE 24 – ORGANIC PARAMETERS AT THE WATER TREATMENT PLANT**

Sample Date: October 5, 2021

| Parameter | Result (ug/L) | MAC | MAC Exceedance | 1/2 MAC Exceedance |
|---|---|---|---|---|
| 1,1-Dichloroethylene | <0.5 | 14 | No | No |
| 1,2-Dichlorobenzene | <0.5 | 200 | No | No |
| 1,2-Dichloroethane | <0.5 | 5 | No | No |
| 1,4-Dichlorobenzene | <0.5 | 5 | No | No |
| 2,3,4,6-Tetrachlorophenol | <0.3 | 100 | No | No |
| 2,4,6-Trichlorophenol | <0.3 | 5 | No | No |
| 2,4-Dichlorophenol | <0.393 | 900 | No | No |
| 2,4-Dichlorophenoxy acetic acid (2,4-D) | <0.3 | 100 | No | No |
| Alachlor | <0.246 | 5 | No | No |
| Atrazine + N-dealkylated metabolites | <0.5 | 5 | No | No |
| Azinphos-methyl | <0.184 | 20 | No | No |
| Benzene | <0.2 | 1 | No | No |
| Benzo(a)pyrene | <0.01 | 0.01 | No | No* |
| Bromoxynil | <0.105 | 5 | No | No |
| Carbaryl | <3 | 90 | No | No |
| Carbofuran | <4 | 90 | No | No |
| Carbon Tetrachloride | <0.2 | 2 | No | No |
| Chlorobenzene (Monochlorobenzene) | <0.5 | 80 | No | No |
| Chlorpyrifos | <0.184 | 90 | No | No |
| Diazinon | <0.184 | 20 | No | No |
| Dicamba | <0.0917 | 120 | No | No |
| Dichloromethane (Methylene Chloride) | <5 | 50 | No | No |
| Diclofop-methyl | <0.131 | 9 | No | No |

| Parameter | Result (ug/L) | MAC | MAC Exceedance | 1/2 MAC Exceedance |
|---|---|---|---|---|
| Dimethoate | <0.184 | 20 | No | No |
| Diquat | <0.2 | 70 | No | No |
| Diuron | <10 | 150 | No | No |
| Glyphosate | <20 | 280 | No | No |
| Malathion | <0.184 | 190 | No | No |
| MCPA (2-methyl-4-chlorophenoxyacetic acid) | <6.55 | 100 | No | No |
| Metolachlor | <0.123 | 50 | No | No |
| Metribuzin | <0.123 | 80 | No | No |
| Paraquat | <0.3 | 10 | No | No |
| Pentachlorophenol | <0.4 | 60 | No | No |
| Phorate | <0.123 | 2 | No | No |
| Picloram | <0.0917 | 190 | No | No |
| Prometryne | <0.0614 | 1 | No | No |
| Simazine | <0.184 | 10 | No | No |
| Terbufos | <0.123 | 1 | No | No |
| Tetrachloroethylene | <0.5 | 10 | No | No |
| Total PCB | <0.06 | 3 | No | No |
| Triallate | <0.123 | 230 | No | No |
| Trichloroethylene | <0.5 | 5 | No | No |
| Trifluralin | <0.123 | 45 | No | No |
| Vinyl Chloride | <0.1 | 1 | No | No |

Note*: Benzo(a)pyrene – Schedule 13-5 of O. Reg. 170/03 requires increased frequency of sampling if an analytical result obtained for any of the parameters listed in Schedule 24 exceeds one half of the MAC. The Ministry has set the reporting detection limit (RDL) for Benzo[a]pyrene at 50 per cent or more of the MAC, due to the limitations of the current analytical methods to achieve lower detection limits. The RDL for benzo[a]pyrene is 0.01 ug/L. For this parameter, a licenced laboratory must be able to achieve a method detection limit (MDL) at least equal to the RDL. A positive result above their MDL would trigger increased frequency of sampling, but a result equal to their MDL would not

No organic parameter(s) listed in 24 of Ontario Regulation 170/03 exceeded half the standard found in Schedule 2 of the Ontario Drinking Water Standard (O. Reg. 169/03) during the reporting period.

#### ADDITIONAL TESTING AND SAMPLING

No additional sampling and testing was required during the reporting year.

## SCHEDULE 22 – SUMMARY REPORTS FOR MUNICIPALITIES

This report is a summary of water quality information for the Chapleau Water Treatment System. It is published in accordance with Schedule 22 of Ontario's Drinking Water Systems Regulation 170/03 for the reporting period of January 1 to December 31, 2021 and must be submitted to members of council.

The report must list the requirements of the Safe Drinking Water Act (2002) and the drinking water regulations which can be viewed at the following website: http://www.e-laws.gov.on.ca.

## PERMITS AND LICENCES

| | |
|---|---|
| Municipal Drinking Water Licence (MDWL) | 222-101 (issued March 3, 2021) |
| Drinking Water Works Permit (DWWP) | 222-201 (issued March 3, 2021) |
| Permit to Take Water (PTTW) | 3048-B74SEA Issued December 5, 2018 |

## REQUIREMENTS THE SYSTEM FAILED TO MEET

The following table lists the requirements of the Safe Drinking Water Act (2002), the drinking water regulations, the system's approval, drinking water works permit, municipal drinking water works licence, and any other orders applicable to the system that were not met at any time during the reporting period. This table is based on documentation available to the Ontario Clean Water Agency. The duration of the failure and details of the actions that were taken to correct the failure must be described.

| Legislation | Requirement(s) the System Failed to Meet, Corrective Actions and Status |
|---|---|
| **MDWL** | May 31 – treated flows were not recorded from 02:15 to 15:05 when the flow meter failed. Instrumentation technician came on-site to install a temporary flow meter |
| | June 2 – treated flows were not recorded from 04:15 to 07:28 when the temporary flow meter failed. The unit was discovered powered off at 05:20 and again at 19:28. The cord was discovered to be faulty and was replaced. |
| | October 29 – treated flows were not recorded from 08:00 to 10:20 during header upgrades. Portable flow meter was moved from the bypass line to the new line which had to be abandoned due to a significant leak. The leak was repaired and flow was recorded when normal operations resumed |
| **O. Reg. 170/03** | October 26 – no on-line monitoring from 10:17 to 10:48 for flows, chlorine residuals, filter turbidity, etc. PLC crash caused the system to need to be restarted. The initial focus was on restoring pressure to the system. |
| **O. Reg. 170/03 (1-2(2))** | From the MECP report following the inspection on September 27, 2021: Records did not indicate that the treatment equipment was operated in a |

| Legislation | Requirement(s) the System Failed to Meet, Corrective Actions and Status |
|---|---|
| | manner that achieved the design capabilities required under Ontario Regulation 170/03 or a Drinking Water Works Permit and/or Municipal Drinking Water Licence issued under Part V of the SDWA at all times that water was being supplied to consumers.<br>On October 26, 2021 a loss of pressure event occurred due to a programmable logic controller failure. The operators where fortunately on-site at the time and where quickly able to restore pressure to the system, however the system was depressurized for approximately 10 minutes |

### SUMMARY OF QUANTITIES AND FLOW RATES

For the purpose of enabling the owner of the system to assess the rated capacity of their system to meet existing and future planned water uses, the following information is also required in the report. Under schedule 22-2(3) of Ontario Regulation 170/03, the Summary Report must include the following:

1. A summary of the quantities and flow rates of water supplied, including the monthly average and the maximum daily flows

2. A comparison of both the average and maximum flow rate summary to the rated capacity approved in the systems approval, drinking water works permit or municipal drinking water licence

The following tables and graphs indicate the quantities and flow rates of water taken and produced during the reporting period, including monthly average flows, maximum daily flows and the total monthly volumes. A comparison of the water data is made to the rated capacity and flow rates specified in the system's Municipal Drinking Water Licence.

### MONTHLY SUMMARY OF WATER TAKINGS FROM THE KEBSQUASHESHING RIVER

| | Maximum (L/min) | Maximum ($m^3$/d) | Average ($m^3$/d) | Total Usage ($m^3$) |
|---|---|---|---|---|
| January | 2,121 | 1,792 | 1,306 | 40,476 |
| February | 2,219 | 1,736 | 1,323 | 37,051 |
| March | 2,198 | 1,527 | 1,241 | 38,460 |
| April | 2,162 | 1,209 | 1,121 | 33,624 |
| May | 2,303 | 1,205 | 1,082 | 33,549 |
| June | 2,355 | 1,545 | 1,178 | 35,346 |
| July | 1,993 | 1,481 | 1,200 | 37,213 |
| August | 2,098 | 1,638 | 1,352 | 41,906 |
| September | 2,258 | 1,327 | 1,201 | 36,041 |
| October | 2,120 | 1,558 | 1,232 | 38,179 |

| | Maximum (L/min) | Maximum ($m^3$/d) | Average ($m^3$/d) | Total Usage ($m^3$) |
|---|---|---|---|---|
| November | 1,990 | 2,101 | 1,258 | 37,745 |
| December | 2,256 | 1,307 | 1,168 | 36,200 |

**MONTHLY SUMMARY OF TREATED WATER SUPPLIED TO THE DISTRIBUTION SYSTEM**

| | Total Usage ($m^3$) | Average ($m^3$/d) | Maximum ($m^3$/d) | % Rated Capacity |
|---|---|---|---|---|
| January | 20,340 | 656 | 705 | 10.4 |
| February | 21,918 | 783 | 994 | 12.4 |
| March | 24,594 | 793 | 1,006 | 12.5 |
| April | 20,342 | 678 | 734 | 10.7 |
| May | 19,725 | 636 | 719 | 10.0 |
| June | 23,273 | 776 | 1,033 | 12.2 |
| July | 23,708 | 765 | 937 | 12.1 |
| August | 29,472 | 951 | 1,177 | 15.0 |
| September | 23,846 | 795 | 919 | 12.6 |
| October | 26,079 | 841 | 1,199 | 13.3 |
| November | 30,757 | 1,025 | 1,181 | 16.2 |
| December | 31,423 | 1,014 | 1,075 | 16.0 |

**FLOW MONITORING**

Municipal Drinking Water Licence (MDWL) requires the owner to install a sufficient number of flow measuring devices to permit the continuous measurement and recording of:

- the flow rate and daily volume of water conveyed from the treatment system to the distribution system, and
- the flow rate and daily volume of water conveyed into the treatment system.

The Chapleau drinking water system has two flow meters as listed in the MDWL; one installed to monitor raw water entering the treatment plant and one installed to monitor treated water entering the distribution system. Flow metering devices were calibrated in accordance to manufacturers' specifications on an annual basis and are operating as required.

**SUMMARY OF FLOW COMPARISON**

**COMPARISON OF RAW FLOWS TO SYSTEM'S PERMIT TO TAKE WATER**

| **Permit to Take Water Limits (PTTW) - maximum** | **4,400 $m^3$/day** | **4,419 L/min** |
|---|---|---|
| Average Daily Flow for 2021 | 1,222 $m^3$/day | 875 L/min |
| Maximum Daily Flow for 2021 | 2,101 $m^3$/day | 2,355 L/min |
| Total Raw Water Used in 2021 | 445,789 $m^3$ | - |

**COMPARISON OF TREATED FLOWS TO SYSTEM'S MUNICIPAL DRINKING WATER LICENCE**

| **Rated Capacity of the Plant (MDWL)** | **6,333 $m^3$/day** | |
|---|---|---|
| Average Daily Flow for 2021 | 809 $m^3$/day | 12.8 % of the rated capacity |
| Maximum Daily Flow for 2021 | 1,199 $m^3$/day | 18.9 % of the rated capacity |
| Total Treated Water Produced in 2021 | 295,476 $m^3$ | |

Based on the information above, the plant is able to meet the demands of the consumers.