SAULT STE. MARIE DRINKING WATER SYSTEM WATERWORKS # 260006685

ANNUAL & SUMMARY REPORTS 2020

Introduction

This Annual and Summary Report has been prepared in accordance with both section 11 and Schedule 22 of Ontario Regulation 170/03. The requirements of the regulation for each report have been consolidated into a single document. This Report is intended to brief the owner and consumers of the Sault Ste. Marie Drinking Water System (DWS) on the system's performance over the past calendar year January 1 to December 31, 2020.

This report encompasses all elements as required by O. Reg. 170/03. Each section explains what is required for the category Large Municipal Residential DWS (as it pertains to the Sault Ste. Marie DWS) and how limits were met, or if shortfalls were revealed. The last section contains a list of tables and definition of terms identified in this report.

System Description

PUC Services Inc. operates, maintains and manages the Sault Ste. Marie drinking water system on behalf of the City's Public Utilities Commission. The PUC Services Inc. business office is located at 500 Second Line East. Regular business hours are 09:00 to 16:30, Monday to Friday. The telephone number is (705) 759-6500.

PUC's certified operators monitor and control all aspects of water production and quality, using a computerized control system.

Water for Sault Ste. Marie is obtained from two principal sources: surface water from Lake Superior and ground water from six deep wells. Raw water from the intake at Gros Cap is pumped to the water treatment plant where a process of filtration and chlorination to disinfect the water prior to distribution. Water from the deep wells is also disinfected prior to being pumped to the distribution system. On a typical day our customers use approximately 30,000,000 litres of water. Three water storage reservoirs located in the distribution system hold up to 52,000,000 litres of water (or 1-2 days-average consumption).

Chemicals

Chemicals utilized in the Sault Ste. Marie Drinking Water Treatment facilities during 2020 include:

- SSM WTP:
  - Aluminum sulfate for coagulation
  - Chlorine gas for disinfection
  - Blended phosphates for corrosion control
  - Soda ash for pH stabilization
- Goulais Pump Station:
  - Chlorine gas for disinfection
  - Blended phosphates for corrosion control
- Steelton Pump Station:
  - Chlorine gas for disinfection
  - Blended phosphates for corrosion control
- Shannon Pump Station:
  - Chlorine gas for disinfection
  - Blended phosphates for corrosion control
  - Carbon dioxide gas for pH stabilization
- Lorna Pump Station:
  - Chlorine gas for disinfection
  - Blended phosphates for corrosion control
  - Carbon dioxide gas for pH stabilization

2020 Expenditures

During the year of 2020, expenses were incurred to maintain and replace various treatment and distribution assets:

Gros Cap Pump Station:

- Generator repairs, generator gauge panel, interior lighting and heaters replaced, fuel tank design for construction in 2021.

SSM WTP:

- Flash mixers, floc mixers, UPS batteries, interior lighting, filter spray wash nozzles, back-up diesel pump clutch, chlorine tonner piping replaced, and scales refurbished.

Goulais Pump Station:

- Chlorine cylinder heads, Motor Control Center, flow meters, piping, replaced the hydraulic control valves with check valves and replaced isolation valves.

Steelton Pump Station:

- Building masonry repairs, chlorine cylinder heads

Shannon Pump Station:

- SCADA computer, turbidimeter, chlorine cylinder heads

Zone 2 Booster:

- New pump, motor, valves and piping, header isolation valves, surge valves

Distribution System:

- Repairs - 60 water main breaks

Drinking Water System Changes

Form 1 – Record of Watermains Authorized as a Future Alteration

- Sixth Avenue reconstruction
- Watermain lining on Lewis Rd, Kerr Drive and Clement Street
- 166 Frontenac Street - looped watermain
- Turner Avenue – pilot watermain relining (SIPP) Sprayed in place pipe.

Form 2 – Record of Minor Modification or Replacements

- WTP – rapid mixers (3) installed at low lift pumps.
- Goulais Well – Motor Control Center, flow meters, piping, replaced the hydraulic control valves with check valves and replaced isolation valves
- Shannon Well – turbidity analyzer
- Zone 2 Booster Station – replaced pump #2, motor, valves and piping, header isolations and surge valves.
- Gate valves (3) replaced within the distribution system

Form 3 – Record of addition, modification or replacement of equipment discharging a contaminant of concern to the atmosphere

- n/a

Water Quality

Microbiological Sampling and Testing

Sampling is conducted weekly for the DWS at the frequencies and locations identified by Schedule 10 of O. Reg. 170/03 for Large Municipal Residential Systems.

Table 1: Microbiological sampling requirements

Location	Sample Analysis	# samples	Frequency
Raw	EC, TC	each source	Weekly
Treated	EC, TC, HPC	each source	Weekly
Distribution	EC, TC, HPC (25%)	83 samples	monthly

The raw and treated samples in Sault Ste. Marie are collected from each of the wells in production (Goulais 1 & 2, Steelton, and Shannon) and the WTP surface water source. Lorna Wells are not used for regular production but available in the event demand requires higher source water flow. Distribution samples are collected from 23 locations throughout the system. In total 1,720 microbiological samples were collected in the DWS. No exceedances were reported in treated samples.

Table 1a: Microbiological Sample Results

Production Site or Distribution	Raw, Treated or Distribution	# samples	EC (range)	TC (range)	# HPC	HPC (range)
WTP	Raw	53	0 - 2	0 - 84	-	-
	Treated	53	0	0	51	0 - 1
Goulais #1	Raw	41	0	0 - 4	-	-
	Treated	41	0	0	41	0 – 10
Goulais #2	Raw	52	0	0	-	-
	Treated	52	0	0	50	0 – 310
Steelton	Raw	53	0	0	-	-
	Treated	53	0	0	51	0 – 30
Shannon	Raw	53	0	0	-	-
	Treated	53	0	0	51	0 - 1
Lorna #1 *	Raw	17	0	0	-	-
	Treated	-	-	-	-	-
Lorna #2 *	Raw	9	0	0	-	-
	Treated	-	-	-	-	-
Various Locations	Distribution	1190	0	0	400	0 - 30

Lorna wells flushed and sampled to be available for production if required but not operated to the system in 2020.

Operational Checks and Testing

Operational testing is completed as per Schedule 7 of O. Reg. 170/03 for Large Municipal Residential Systems. These checks and testing are completed on site at the water treatment facility by licensed operators. Continuous monitoring analyzers are utilized for measurement of filter turbidity and chlorine residuals. Data summaries for turbidity and chlorine are summarized in Tables 2 and 3.

Table 2: Monthly Filter Turbidity Results (SSM WTP)

Month	Filter #1		Filter #2		Filter #3		Filter #4		Monthly Compliance
	Average NTU	Range NTU	Average NTU	Range NTU	Average NTU	Range NTU	Average NTU	Range NTU	%
Jan	0.03	0.02 - 0.09	0.03	0.02 - 0.09	0.02	0.02 - 0.08	0.02	0.02 - 0.08	100
Feb	0.03	0.02 - 0.08	0.03	0.02 - 0.09	0.02	0.02 - 0.04	0.02	0.02 - 0.08	100
Mar	0.03	0.02 - 0.08	0.03	0.02 - 0.07	0.02	0.02 - 0.05	0.02	0.02 - 0.05	100
Apr	0.03	0.02 - 0.08	0.03	0.02 - 0.11	0.02	0.02 - 0.06	0.02	0.02 - 0.14	100
May	0.03	0.02 - 0.13	0.04	0.02 - 0.20	0.03	0.02 - 0.13	0.03	0.02 - 0.17	100
Jun	0.03	0.02 - 0.10	0.03	0.02 - 0.14	0.03	0.02 - 0.10	0.03	0.02 - 0.12	100
Jul	0.05	0.03 - 0.22	0.03	0.02 - 0.09	0.03	0.02 - 0.08	0.03	0.02 - 0.08	100
Aug	0.05	0.03 - 0.13	0.04	0.02 - 0.12	0.05	0.03 - 0.14	0.06	0.02 - 0.35	99.8
Sep	0.04	0.03 - 0.11	0.04	0.03 - 0.11	0.03	0.02 - 0.11	0.04	0.03 - 0.11	100
Oct	0.04	0.03 - 0.10	0.05	0.03 - 0.13	0.03	0.02 - 0.08	0.05	0.03 - 0.10	100
Nov	0.04	0.03 - 0.12	0.04	0.03 - 0.13	0.03	0.02 - 0.10	0.04	0.03 - 0.11	100
Dec	0.04	0.03 - 0.12	0.03	0.03 - 0.11	0.03	0.02 - 0.11	0.04	0.03 - 0.11	100

Filter turbidity is monitored on SCADA in real time. Filter efficiency is calculated by tracking the readings in five-minute intervals above and below 0.30 NTU during filter run time. ***Sault Ste. Marie maintained filter compliance each month above 95%***, the required limit for dual media filtration to achieve necessary filtration credits for primary disinfection.

Table 3: Chlorine Residuals (Production Sites)

Production Site	WTP		Goulais Well		Steelton Well		Shannon Well	
Month	Average (mg/L)	Range (mg/L)	Average (mg/L)	Range (mg/L)	Average (mg/L)	Range (mg/L)	Average (mg/L)	Range (mg/L)
Jan	1.24	0.86 - 1.35	1.08	0.79 - 1.38	1.07	0.86 - 1.24	0.95	0.53 - 1.12
Feb	1.27	1.03 - 1.39	1.02	0.70 - 1.44	1.05	0.91 - 1.17	0.89	0.52 - 1.12
Mar	1.22	1.11 - 1.38	0.93	0.77 - 1.01	1.01	0.86 - 1.10	0.87	0.57 - 0.96
Apr	1.21	1.13 - 1.32	0.95	0.82 - 1.52	1.01	0.86 - 1.16	0.88	0.61 - 1.25
May	1.22	1.11 - 1.40	0.97	0.72 - 1.26	1.04	0.64 - 1.14	0.89	0.59 - 1.26
Jun	1.24	1.13 - 1.34	1.08	0.77 - 1.35	1.07	0.94 - 1.25	0.92	0.51 - 1.17
Jul	1.25	0.98 - 1.47	1.14	0.76 - 1.30	1.04	0.28 - 1.18	0.89	0.57 - 1.03
Aug	1.22	1.11 - 1.31	1.15	0.91 - 1.13	1.05	0.64 - 1.13	0.97	0.67 - 1.12
Sep	1.22	1.11 - 1.40	1.20	0.83 - 1.50	1.02	0.94 -1.16	0.90	0.47 - 1.54
Oct	1.22	0.88 - 1.33	1.15	0.93 - 1.69	1.03	0.91 - 1.23	0.89	0.50 - 0.99
Nov	1.21	1.12 - 1.29	1.13	0.93 - 1.38	1.01	0.84 - 1.16	0.85	0.53 - 1.11
Dec	1.24	1.09 - 1.64	1.08	0.82 - 1.39	1.05	0.81 - 1.14	0.92	0.57 - 1.20

Chlorine residuals are continuously monitored and tracked in real time in SCADA. Minimum residuals were maintained at all times consistent with primary disinfection requirements.

Chemical Sampling and Testing

Schedule 13 of O. Reg. 170/03 outlines chemical sampling requirements for Large Municipal Residential systems. Sample collection for Schedule 23 (inorganics) and 24 (organics) is required every 12 months and quarterly sampling for Nitrites/Nitrates, THM's and HAA's. Sodium and fluoride are required to be sampled every 60 months. Lorna Wells were not sampled as they were not operated for production of water to distribution system in year 2020.

Table 4: Schedule 23 - Inorganics (ug/L)

Parameter	WTP	Goulais #1	Goulais #2	Steelton	Shannon	MAC
Antimony	<0.60	<0.5	<0.5	<0.5	<0.5	**6**
Arsenic	<1.0	2	<1	<1	3	**25**
Barium	<10	34	32	36	56	**1000**
Boron	<50	16	17	18	187	**5000**
Cadmium	<0.10	<0.1	<0.1	<0.1	<0.1	**5**
Chromium	<1.0	1	1	<1	<1	**50**
Mercury	<0.10	<0.1	0.1	<0.1	<0.1	**1**
Selenium	<1.0	<0.2	0.5	<0.2	1.5	**10**
Uranium	<2.0	1	1	2	9	**20**

Results are reported in µg/L.

All results for inorganic parameters are within the maximum acceptable concentrations (MAC) of the Ontario Drinking Water Quality Standards as defined in O. Reg. 169/03

Table 5: Fluoride and Sodium Results (mg/L)

Parameter	WTP	Goulais #1	Goulais #2	Steelton	Shannon	MAC
Fluoride	<0.05	<0.05	0.035	0.046	0.208	**1.5**
*Sodium	3.46	10.2	11.9	9.72	34.4	**20**

Results are reported in mg/L.

***Sodium has an aesthetic objective (AO) of 200 mg/L but has a limit of 20 mg/L for medical reasons and would require notifications if exceeded.**

Table 6: Nitrate/Nitrite Results (mg/L)

Q	Nitrite Nitrate	WTP	Goulais #1	Goulais #2	Steelton	Shannon	MAC (mg/L)
Q1	NO_2	<0.01	<0.010	<0.020	<0.010	<0.010	**1.0**
	NO_3	0.303	0.903	0.973	0.87	<0.020	**10**
Q2	NO_2	<0.05	<0.05	<0.05	<0.05	<0.05	**1.0**
	NO_3	0.31	1.00	0.98	0.94	<0.05	**10**
Q3	NO_2	<0.05	<0.05	<0.05	<0.05	<0.05	**1.0**
	NO_3	0.33	0.99	0.99	1.02	<0.05	**10**
Q4	NO_2	<0.05	<0.05	<0.05	<0.05	<0.05	**1.0**
	NO_3	0.26	0.81	0.96	0.95	<0.05	**10**

Results are reported in mg/L. **All quarterly results are well below ODWS MAC.**

Table 7: Disinfection Byproducts THM/HAA Results (ug/L)

THM	Q1	Q2	Q3	Q4	MAC
Sub 4	8.5	7.1	11.2	11.2	**100**
Sub 15	<4	<4	9.6	<4	**100**
Q Average	6.3	5.6	10.4	7.6	**100**
RAA	Running Annual Average (ug/L)			7.5	**100**
HAA	**Q1**	**Q2**	**Q3**	**Q4**	**MAC**
Sub 4	8.2	6.3	10.2	9.4	**80**
Sub 15	5.4	4.0	7.3	<2.2	**80**
Q Average	6.8	5.2	8.8	5.8	**80**
RAA	Running Annual Average (ug/L)			6.7	**80**

Sub 4 (MacDonald Ave.) Sub 15 (Spring St.) Running annual average (RAA) is calculated by using the average results tested each quarter.

All quarterly results for THMs and HAAs are well below ODWS MAC.

Table 8: Schedule 24 Organics – WTP

Parameter	Date	Result	Unit	MAC
Alachlor	14-Jan-20	<0.1	µg/L	5
Atrazine + N-dealkylated metabolites	14-Jan-20	<0.20	µg/L	5
Azinphos-methyl	14-Jan-20	<0.1	µg/L	20
Benzene	14-Jan-20	<0.50	µg/L	5
Benzo(a)pyrene	14-Jan-20	<0.005	µg/L	0.01
Bromoxynil	14-Jan-20	<0.20	µg/L	5
Carbaryl	14-Jan-20	<0.20	µg/L	90
Carbofuran	14-Jan-20	<0.20	µg/L	90
Carbon Tetrachloride	14-Jan-20	<0.20	µg/L	5
Chlorpyrifos	14-Jan-20	<0.1	µg/L	90
Diazinon	14-Jan-20	<0.1	µg/L	20
Dicamba	14-Jan-20	<0.20	µg/L	120
1,2-Dichlorobenzene	14-Jan-20	<0.50	µg/L	200
1,4-Dichlorobenzene	14-Jan-20	<0.50	µg/L	5
1,2-Dichloroethane	14-Jan-20	<0.50	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	14-Jan-20	<0.50	µg/L	14
Dichloromethane	14-Jan-20	<5.0	µg/L	50
2-4 Dichlorophenol	14-Jan-20	<5.0	µg/L	900
2,4-Dichlorophenoxy acetic acid	14-Jan-20	<0.30	µg/L	100
Diclofop-methyl	14-Jan-20	<0.20	µg/L	9
Dimethoate	14-Jan-20	<0.20	µg/L	20
Diquat	14-Jan-20	<0.10	µg/L	70
Diuron	14-Jan-20	<1.0	µg/L	150
Glyphosate	14-Jan-20	<5.0	µg/L	280
Malathion	14-Jan-20	<0.10	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	14-Jan-20	<0.20	µg/L	100
Metolachlor	14-Jan-20	<0.10	µg/L	50
Metribuzin	14-Jan-20	<0.10	µg/L	80
Monochlorobenzene	14-Jan-20	<0.50	µg/L	80
Paraquat	14-Jan-20	<1.0	µg/L	10
Pentachlorophenol	14-Jan-20	<0.50	µg/L	60
Phorate	14-Jan-20	<0.10	µg/L	2
Picloram	14-Jan-20	<0.20	µg/L	190
Polychlorinated Byphenols (PCB)	14-Jan-20	<0.035	µg/L	3
Prometryne	14-Jan-20	<0.10	µg/L	1
Simazine	14-Jan-20	<0.10	µg/L	10
Terbufos	14-Jan-20	<0.20	µg/L	1
Tetrachloroethylene	14-Jan-20	<0.50	µg/L	30
2,3,4,6-Tetrachlorophenol	14-Jan-20	<0.50	µg/L	100
Triallate	14-Jan-20	<0.10	µg/L	230
Trichloroethylene	14-Jan-20	<0.50	µg/L	5
2,4,6-Trichlorophenol	14-Jan-20	<0.50	µg/L	5
Trifluralin	14-Jan-20	<0.10	µg/L	45
Vinyl Chloride	14-Jan-20	<0.20	µg/L	2

All results are below the ODWS MAC and half MAC as per O. Reg. 169/03.

Table 9: Schedule 24 Organics – Goulais Wells

Parameter	Goulais 1	Goulais 2	Unit	MAC
Alachlor	<0.23	<0.23	µg/L	5
Atrazine + N-dealkylated metabolites	<0.5	<0.5	µg/L	5
Azinphos-methyl	<0.172	<0.175	µg/L	20
Benzene	<0.1	<0.1	µg/L	5
Benzo(a)pyrene	<0.009	<0.009	µg/L	0.01
Bromoxynil	<0.0937	<0.113	µg/L	5
Carbaryl	<1	<2	µg/L	90
Carbofuran	<2	<3	µg/L	90
Carbon Tetrachloride	<0.2	<0.2	µg/L	5
Chlorpyrifos	<0.172	<0.175	µg/L	90
Diazinon	<0.172	<0.175	µg/L	20
Dicamba	<0.082	<0.0991	µg/L	120
1,2-Dichlorobenzene	<0.3	<0.3	µg/L	200
1,4-Dichlorobenzene	<0.3	<0.3	µg/L	5
1,2-Dichloroethane	<0.3	<0.3	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	<0.3	<0.3	µg/L	14
Dichloromethane	<1	<2	µg/L	50
2-4 Dichlorophenol	<0.2	<0.2	µg/L	900
2,4-Dichlorophenoxy acetic acid	<0.351	<0.425	µg/L	100
Diclofop-methyl	<0.117	<0.142	µg/L	9
Dimethoate	<0.172	<0.175	µg/L	20
Diquat	<0.2	<0.2	µg/L	70
Diuron	<6	<8	µg/L	150
Glyphosate	<20	<20	µg/L	280
Malathion	<0.172	<0.175	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	<5.86	<7.08	µg/L	100
Metolachlor	<0.115	<0.116	µg/L	50
Metribuzin	<0.115	<0.116	µg/L	80
Monochlorobenzene	<0.5	<0.5	µg/L	80
Paraquat	<0.2	<0.1	µg/L	10
Pentachlorophenol	<0.3	<0.3	µg/L	60
Phorate	<0.115	<0.116	µg/L	2
Picloram	<0.082	<0.0991	µg/L	190
Polychlorinated Byphenols (PCB)	<0.06	<0.06	µg/L	3
Prometryne	<0.0574	<0.0582	µg/L	1
Simazine	<0.172	<0.175	µg/L	10
Terbufos	<0.115	<0.116	µg/L	1
Tetrachloroethylene	<0.3	<0.3	µg/L	30
2,3,4,6-Tetrachlorophenol	<0.3	<0.3	µg/L	100
Triallate	<0.115	<0.116	µg/L	230
Trichloroethylene	<0.2	<0.2	µg/L	5
2,4,6-Trichlorophenol	<0.2	<0.2	µg/L	5
Trifluralin	<0.115	<0.116	µg/L	45
Vinyl Chloride	<0.1	<0.1	µg/L	2

Dates Sampled: Goulais Wells 1 and 2 – April 28, 2020

All results are below the ODWS MAC and half MAC as per O. Reg. 169/03.

Table 10: Schedule 24 Organics – Shannon & Steelton Wells

Parameter	Steelton	Shannon	Unit	MAC
Alachlor	<0.227	<0.234	µg/L	5
Atrazine + N-dealkylated metabolites	<0.5	<0.5	µg/L	5
Azinphos-methyl	<0.17	<0.175	µg/L	20
Benzene	<0.1	<0.1	µg/L	5
Benzo(a)pyrene	<0.01	<0.01	µg/L	0.01
Bromoxynil	<0.0918	<0.0926	µg/L	5
Carbaryl	<1	<1	µg/L	90
Carbofuran	<2	<2	µg/L	90
Carbon Tetrachloride	<0.2	<0.2	µg/L	5
Chlorpyrifos	<0.17	<0.175	µg/L	90
Diazinon	<0.17	<0.175	µg/L	20
Dicamba	<0.0803	<0.081	µg/L	120
1,2-Dichlorobenzene	<0.3	<0.3	µg/L	200
1,4-Dichlorobenzene	<0.3	<0.3	µg/L	5
1,2-Dichloroethane	<0.3	<0.3	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	<0.3	<0.3	µg/L	14
Dichloromethane	<1	<1	µg/L	50
2-4 Dichlorophenol	<0.344	<0.347	µg/L	900
2,4-Dichlorophenoxy acetic acid	<0.2	<0.2	µg/L	100
Diclofop-methyl	<0.115	<0.116	µg/L	9
Dimethoate	<0.17	<0.175	µg/L	20
Diquat	<0.2	<0.2	µg/L	70
Diuron	<6	<6	µg/L	150
Glyphosate	<20	<20	µg/L	280
Malathion	<0.17	<0.175	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	<5.74	<5.79	µg/L	100
Metolachlor	<0.113	<0.117	µg/L	50
Metribuzin	<0.113	<0.117	µg/L	80
Monochlorobenzene	<0.5	<0.5	µg/L	80
Paraquat	<0.1	<0.2	µg/L	10
Pentachlorophenol	<0.3	<0.3	µg/L	60
Phorate	<0.113	<0.117	µg/L	2
Picloram	<0.0803	<0.081	µg/L	190
Polychlorinated Byphenols (PCB)	<0.06	<0.06	µg/L	3
Prometryne	<0.0567	<0.0584	µg/L	1
Simazine	<0.17	<0.175	µg/L	10
Terbufos	<0.113	<0.117	µg/L	1
Tetrachloroethylene	<0.3	<0.3	µg/L	30
2,3,4,6-Tetrachlorophenol	<0.3	<0.3	µg/L	100
Triallate	<0.113	<0.117	µg/L	230
Trichloroethylene	<0.2	<0.2	µg/L	5
2,4,6-Trichlorophenol	<0.2	<0.2	µg/L	5
Trifluralin	<0.113	<0.117	µg/L	45
Vinyl Chloride	<0.1	<0.1	µg/L	2

Dates Sampled: Steelton and Shannon Wells – Sept 15, 2020

All results are below the ODWS MAC and half MAC as per O. Reg. 169/03.

Lead Sampling:

The Ontario Drinking Water Standard for lead is 10 µg/L. This applies to water at the point of consumption since lead is only present as a result of corrosion of lead solder, brass containing lead fittings or lead pipes which are found close to or in domestic plumbing and the service connection to buildings.

In July 2017, the required number of Lead samples was reduced to 22 Residential/Non-Residential plumbing and 8 distribution points as per Municipal Drinking Water License #216-101, Schedule C, 5.0, Table 1.

Table 11: Community Lead Sampling Results

Location Type	Number of Sample Locations	Range of Lead Results (min#) – (max #)	Number of Location Exceedances
Plumbing – Residential and Non-Residential	20	0 - 6.9	0
Distribution	5	0 - 2.0	0

In 2020, 0 of 20 plumbing locations or 0% of the tested homes exceeded the ODWS. Tests were done in homes with record of lead or suspected lead pipe – this is a small subset of homes in Sault Ste. Marie. Relief of sampling by MECP was granted during the pandemic.

As part of PUC's lead service line replacement program, 29 additional addresses were sampled with five locations exceeding the MAC. The five exceedance locations - service lines were replaced. A total of 38 service lines were replaced in 2020 – on the municipal side, private side or both.

Providing clean, safe and reliable drinking water is a responsibility that PUC takes very seriously. Unfortunately, the challenge of reducing the occurrence of lead in drinking water is something communities across North America are faced with. In Sault Ste. Marie, PUC employs a robust community water sampling program that monitors lead levels in drinking water.

For the program to function efficiently, PUC partnered with the SSM Innovation Centre and Algoma Public Health to develop a system that would focus lead testing on homes with suspected lead service pipes and that may have occupants that would be especially sensitive to lead exposure (ex. infants or expecting mothers). While it is beyond PUC's authority to replace lead services on a homeowner's property, if a home is found to have a lead service the PUC offers programs to consumers that will protect them from lead exposure.

The preferred option provided to homeowners is an interest-free loan to help them replace their lead service lines. When an owner replaces their lead service line, PUC will replace the public portion of the service at no charge to the owner. PUC will offer service pipe lining when pandemic restrictions are eased and as an affordable alternative to replacement. Another option the PUC provides to consumers is to issue tap-mounted water filters (certified for lead reduction) at no charge to the homeowner until the service can be replaced or changes to water treatment processes can be shown to satisfactorily reduce lead concentrations.

In accordance with drinking water regulations PUC implemented a Corrosion Control Plan (as part of the Water Quality Improvement Project) that is designed to reduce lead uptake in the drinking water. PUC continues to evaluate the long-term changes to the distribution system and water quality after implementing corrosion control plan.

Compliance

Adverse Water Quality Incidents

During 2020, the Sault Ste. Marie DWS reported one incident of adverse water quality.

Table 12: Adverse Water Quality Incidents

Date	Incident Reported
2020-10-20	Sodium exceedance (Shannon Well)

Oct 20, 2020 – sample collected and tested for sodium exceeded the health limit of 20mg/L (34.4 mg/L). A second sample collected Oct 27, 2020 to confirm the results. Notifications to Medical Officer of Health and MECP Spills Action Centre. Algoma Public Health communicated results to medical community and posted information of sodium in Drinking Water on the APH website.

PUC piloted spray in place pipe lining on one street in 2020. The lined pipe was returned to service the same day under a Boil Water Advisory in consultation with Algoma Public Health.

Annual Drinking Water System Inspection

The annual DWS inspection took place on February 20, 2020 by the Ministry of the Environment, Conservation and Parks (MECP). There were zero non-conformances, zero recommendations and best practices identified.

Ministry of the Environment, Conservation and Parks - Risk Assessment Process

Maximum Question Rating: 528

Table 13: MECP Risk Assessment Rating

Inspection Module	Non-Compliance Rating
Source	0/14
Capacity Assessment	0/30
Treatment Processes	0/89
Operations Manuals	0/28
Logbooks	0/14
Certification and Training	0/42
Water Quality Monitoring	0/112
Reporting and Corrective Actions	0/66
Treatment Process Monitoring	0/133
TOTAL	**0/528**

Inspection Risk Rating 0.00%

The DWS received a final inspection rating of 100%

Flows

Municipal Drinking Water Works Permit: 216-201 specifies maximum rated flows for the raw water supplies listed in Table 12.

Table 14: Permit to Take Water

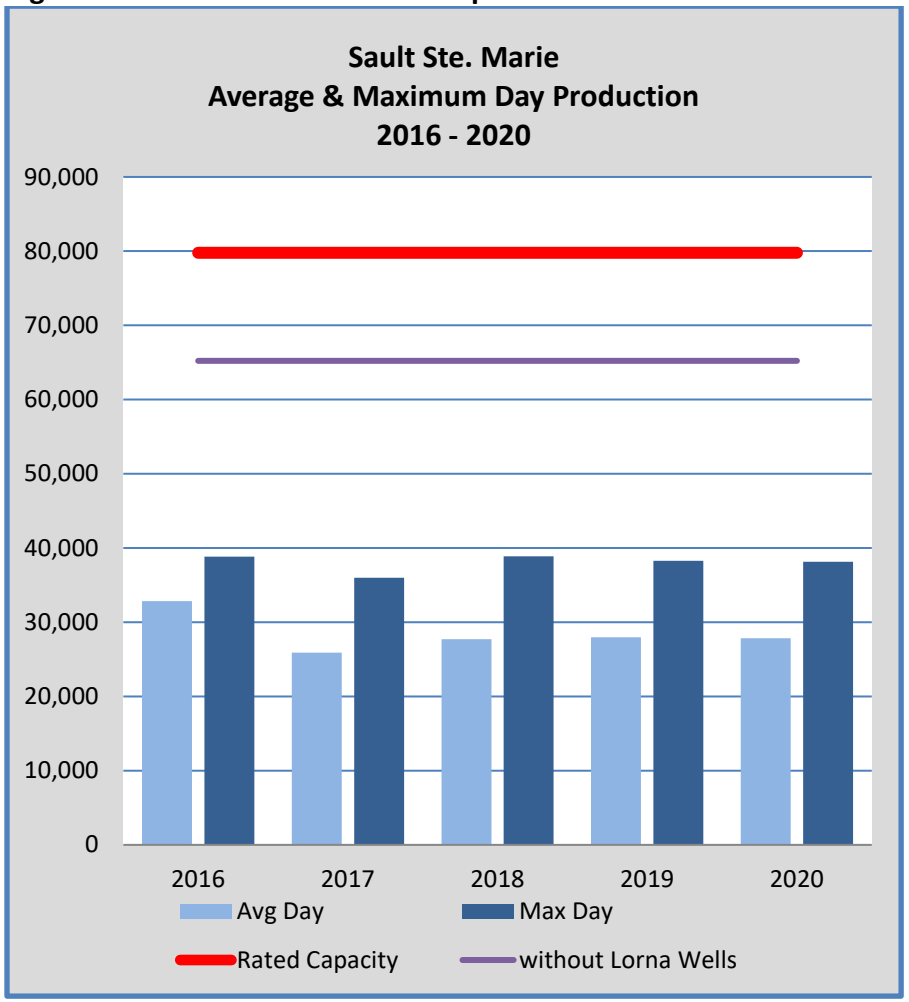
Facility	Permit to Take Water
Gros Cap Pump Station	75,000 m^3/d
Goulais Wells	10,013 m^3/d
Steelton Well	8,208 m^3/d
Shannon Well	7,000 m^3/d
Lorna Wells	14,558.4 m^3/d

$1m^3$ = 1,000 L

Water Treatment capacity is less than the available raw water supply. The Water Treatment Plant is currently rated at 40,000 m^3/d based on regulatory requirements for primary disinfection. The maximum capacity for the Sault Ste. Marie DWS is 79,779 m^3/d. Lorna Wells remains available for emergency demand if needed.

The Sault Ste. Marie WTP and production Wells treated a total of 10,236,114m^3 (10,236 ML)of water during the year of 2020.
The average daily treated flow was 27,968 m^3, and the maximum daily flow was 38,131 m^3 on August 7, 2020.

Figure 1: Five Year Production Comparison



Capacity available production without Lorna Wells – 65,221 m^3/d

Table 15: WTP Raw and Treated Water Production 2020

2020	Raw Water Production				Treated Water Production				
Month	Raw Water (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	Treated Water (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max. Flow Day of rated Capacity
January	407,348	9,137	14,891	13,140	405,680	7,065	16,218	13,086	40.5
February	408,814	10,105	16,283	14,097	403,131	8,424	16,550	13,901	41.4
March	390,125	11,361	14,280	12,585	378,820	8,585	14,667	12,220	36.7
April	378,900	11,827	13,988	12,630	368,670	8,091	16,550	12,289	41.4
May	429,721	12,068	20,433	13,862	419,600	9,464	21,112	13,535	52.8
June	446,573	12,127	19,770	14,886	440,300	9,926	19,795	14,677	49.5
July	508,496	15,745	16,353	19,897	500,238	12,022	19,873	16,137	49.7
August	503,727	12,289	21,081	16,249	491,018	10,081	22,460	15,839	56.2
September	407,658	12,174	16,196	13,589	392,353	9,819	16,128	13,078	40.3
October	383,513	4,595	15,075	12,371	364,467	3,949	14,998	11,757	37.5
November	402,117	12,140	15,985	12,957	388,720	9,593	15,985	12,957	40.0
December	424,330	12,200	15,405	13,688	412,416	10,233	17,655	13,304	44.1

Figure 2: Sault Ste. Marie WTP Production 2020

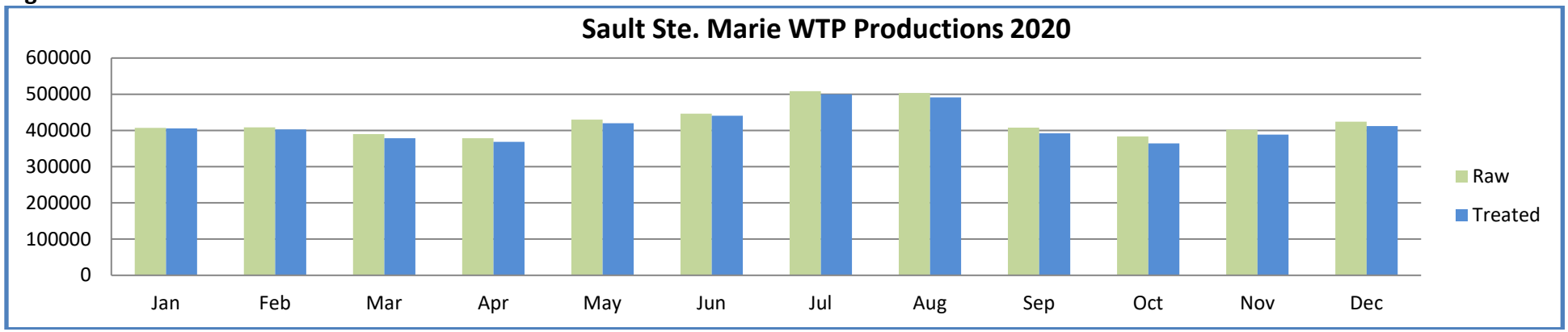


Table 16: Goulais Wells Production 2020

2020	Goulais Well #1 Production					Goulais Well #2 Production				
Month	Total Volume (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max Flow Day of PTTW	Total Volume (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max Flow Day Of PTTW
January	40,125	0	4,964	1,229	75.1	74,005	0	3,175	2,311	93.2
February	16,176	0	4,972	555	75.3	58,256	0	3,202	1,983	94.0
March	0	0	0	0	0.0	98,560	2,913	3,163	3,139	92.8
April	3,731	0	2,570	122	38.9	92,351	1,352	3,169	3,041	93.0
May	86,668	0	4,827	2,747	73.1	50,660	0	3,248	1,619	95.3
June	98,904	0	4,955	3,244	75.0	54,365	0	3,252	1,791	95.4
July	103,366	0	5,093	3,299	77.1	38,638	0	3,272	1,235	96.0
August	45,747	0	5,045	1,575	76.4	34,059	0	3,015	1,054	88.5
September	50,852	0	5,785	1,793	87.6	57,866	0	3,263	1,887	95.8
October	132,291	1864	5,492	4,179	83.1	10,318	0	3,007	3,29	88.3
November	61,609	0	4,895	2,030	74.1	47,407	0	2,964	1,547	87.0
December	11,687	0	3,326	368	50.3	85,705	948	2,968	2,696	87.1

Figure 3: Goulais Wells Production 2020

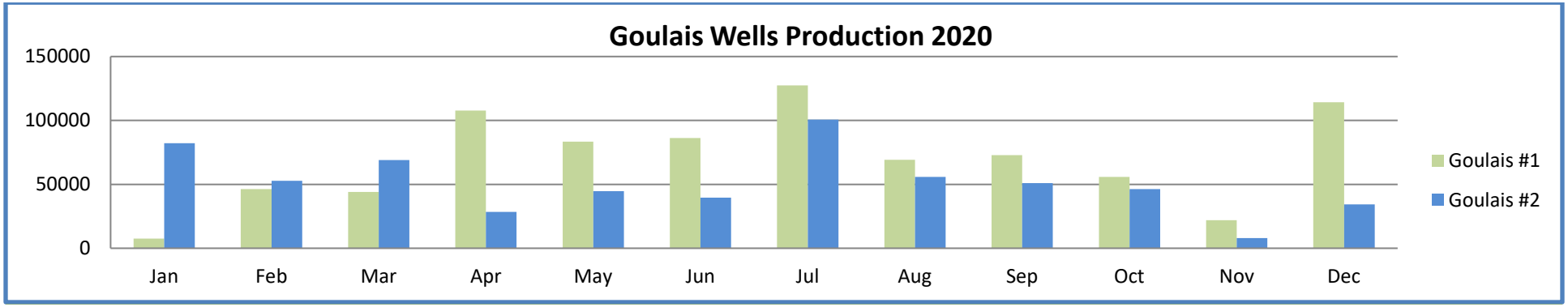
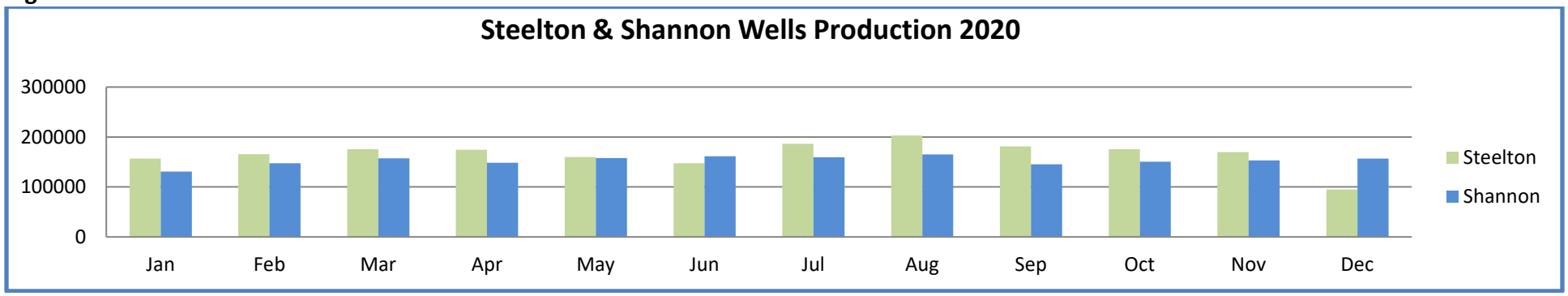


Table 17: Steelton & Shannon Wells Production 2020

2020	Steelton Well Production					Shannon Well Production				
Month	Total Volume (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max Flow Day of PTTW	Total Volume (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max Flow Day of PTTW
January	156,943	4,222	6,000	5,063	73.1	135,854	4,000	5,067	4,362	72.4
February	165,877	4,001	7,124	5,720	86.8	147,246	4,000	6,500	5,077	92.9
March	175,336	4,999	6,209	5,656	75.6	157,376	4,696	5,580	5,077	79.7
April	174,238	5,000	6,635	5,808	80.8	148,346	4,000	6,000	4,945	85.7
May	159,741	0	7,001	5,153	85.3	157,885	4,000	6,993	5,093	99.9
June	147,498	0	6,202	4,917	75.6	161,339	4,000	7,000	5,378	100.0
July	186,481	4,000	7,710	6,016	93.9	159,604	4,000	6,814	5,149	97.3
August	203,221	4,448	7,909	6,556	96.4	164,969	4,000	6,376	5,322	91.1
September	181,390	4,780	7,001	6,046	85.3	145,590	3,391	6,000	4,853	85.7
October	175,319	4,000	7,196	5,655	87.7	150,341	3,908	6,337	4,850	90.5
November	169,865	4,297	7,289	5,662	88.8	153,266	4,193	6,500	5,109	92.9
December	182,619	4,999	6,613	5,891	80.6	157,011	4,729	6,000	5,065	85.7

Figure 4: Steelton & Shannon Wells Production 2020



Report Availability

Annual Report

Section 11 of O. Reg. 170/03 defines that this Annual Report must be given, without charge, to every person who requests a copy. Effective steps must also be taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. This Annual Report shall be made available for inspection by the public at the PUC Services Office.

PUC Services Inc.
500 Second Line East
Sault Ste. Marie, ON
P6A 6P2

Summary Report

This Summary report for The Sault Ste. Marie Drinking Water System for the period of January 1st to December 31st, 2020 has been prepared in accordance to Schedule 22 of O. Reg. 170/03.

In accordance with Schedule 22 of O. Reg. 170/03, this Summary Report has been provided to the Public Utilities Commission of the City of Sault Ste. Marie.

Tables, Definition of Terms

Appendix A: List of Tables/ Charts

Appendix B: Definition of Terms

Acronym	Definition
AWQI	Adverse water quality incident
CT Value	Product of disinfectant concentration and contact time (mg-min/L)
DM	Dual Media
DWS	Drinking water system
EC	E. Coli
HAA	Haloacetic acids
HPC	Heterotrophic plate count
MAC	Maximum Acceptable Concentration
MECP	Ministry of the Environment, Conservation and Parks
m^3	Cubic metres (1,000 L)
m^3/d	Cubic metres per day
mg/L	Milligram per litre (part per million)
ML	Megalitre (1,000 m^3)
NTU	Nephelometric turbidity unit
ODWS	Ontario Drinking Water Standards
O. Reg. 170/03	Ontario Regulation 170/03
PLC	Programmable logic controller
PTTW	Permit to take water
SCADA	Supervisory control and data acquisition
SSM	Sault Ste. Marie
TC	Total coliforms
THM	Trihalomethane
µg/L	Microgram per litre (part per billion)
WD	Water distribution
WT	Water treatment
WTP	Water treatment plant