



SAULT STE. MARIE
DRINKING WATER SYSTEM
WATERWORKS # 260006685







ANNUAL & SUMMARY
REPORTS 2018



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 on the system's performance over the past calendar year January 1 to December 31, 2018.

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.

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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. The PUC Water Treatment Operations Control Centre is located at the A.S. Boniferro Water Filtration Plant, 2059 Second Line West.

The licensed operators at this facility monitor and control all aspects of water production and quality, through the use of a computer based control system.

Water for Sault Ste. Marie is obtained from two principle 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 prepares the water for consumption. Water from the deep wells is chlorinated prior to being pumped to the distribution system. On a typical day our customers consume about 30,000 cubic metres of water. Three water storage reservoirs located in the distribution system hold up to 52,000 cubic metres of water (or 1-2 days-average consumption).

Chemicals

Chemicals utilized in the Sault Ste. Marie Drinking Water Treatment facilities during 2018 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

2018 Expenditures

During the year of 2018, expenses were incurred to maintain treatment and distribution functions:

Gros Cap Pump Station:

- Electric heaters
- Replaced PLC and SCADA control

SSM WTP:

- Replaced PLC and SCADA control, low lift in-line mixers, filter spray wash system repairs, filter media replacement, turbidity analyzers, filter flow transmitters, hot water tank, filtrate valve, lighting, backup generator transfer switch, overhead crane maintenance

Goulais Pump Station:

- Replaced PLC and SCADA control, chlorine cylinder control valve

Steelton Pump Station:

- Replaced PLC and SCADA control

Shannon Pump Station:

- Replaced PLC and SCADA control, air conditioning

Lorna Pump Station:

- Replaced PLC and SCADA control

Distribution System:

- Repairs were made to 90 water main breaks

2018 Drinking Water System Changes

Form 1 – Record of Watermains Authorized as a Future Alteration

- Simpson St. (in between Queen St. and Wellington St.)
- Bruce St. (in between Queen St. and Wellington St.)

Form 2 – Record of Minor Modification or Replacements

- SCADA upgrade, filter media replacement, turbidity analyzer replacements, low lift mixer replacements

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 six production wells (Goulais 1&2, Steelton, Shannon and Lorna 1&2) and the WTP surface water source. Distribution samples are collected from approximately 17 locations throughout the system.

Table 1a: Microbiological Sample Results

SSM WTP	# samples	EC (range)	TC (range)	# HPC samples	HPC (range)
Raw	52	0-1	0 - 19	-	-
Treated	53	0	0	52	0 - 3
Distribution	1131	0	0 - 2	293	0 - 3

One extra treated sample was collected for an AWQI – no HPC tested

Well samples are collected only during weeks of production

Goulais 1	# samples	EC (range)	TC (range)	# HPC samples	HPC (range)
Raw	50	0	0	-	-
Treated	50	0	0	50	0 - 3

Goulais 2	# samples	EC (range)	TC (range)	# HPC samples	HPC (range)
Raw	38	0	0	-	-
Treated	38	0	0	38	0 - 1

Steelton	# samples	EC (range)	TC (range)	# HPC samples	HPC (range)
Raw	52	0	0 - 1	-	-
Treated	52	0	0	52	0 - 2

Shannon	# samples	EC (range)	TC (range)	# HPC samples	HPC (range)
Raw	52	0 - 1	0 - 4	-	-
Treated	52	0	0	52	0 - 1

Lorna 1	# samples	EC (range)	TC (range)	# HPC samples	HPC (range)
Raw	2	0	0	-	-
Treated	1*	0	0	1	0

Lorna 2	# samples	EC (range)	TC (range)	# HPC samples	HPC (range)
Raw	1	0	0	-	-
Treated	1	0	0	1	0 - 12

**Lorna well treated sample collected during new SCADA commissioning discharged through local hydrant – raw samples collected periodically while pumping to waste*

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.

Table 2: Monthly Filter Turbidity Results (SSM WTP)

Month	Turbidity Range (NTU)				Monthly Filter % Efficiency
	Filter #1	Filter #2	Filter #3	Filter #4	
Jan	0.03-0.47	0.03-0.27	0.03-0.24	off-line	100
Feb	0.03-0.29	0.03-0.27	0.03-0.16	0.03-0.34	100
Mar	0.05-0.27	0.03-0.25	0.02-0.77	0.03-0.43	99.1
Apr	0.03-0.41	0.04-0.17	0.02-0.23	0.03-0.28	99.8
May	0.03-0.28	off-line	0.02-0.23	0.03-0.33	99.8
Jun	0.04-0.52	0.02-0.51	0.03-0.25	0.03-0.23	98.8
Jul	0.03-0.20	0.02-0.14	0.03-0.15	0.03-0.26	100
Aug	0.02-0.08	0.03-0.21	0.02-0.10	0.02-0.19	100
Sep	0.03-0.10	0.02-0.09	0.02-0.11	0.03-0.09	100
Oct	0.02-0.13	0.02-0.13	0.02-0.15	0.03-0.19	100
Nov	0.01-0.08	0.02-0.12	0.02-0.08	0.04-0.12	100
Dec	0.02-0.11	0.02-0.10	0.02-0.11	0.03-0.10	100

Filter turbidity is monitored on SCADA in real time. Filter efficiency is calculated by tracking the readings on 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)

Month	WTP (mg/L)	Goulais (mg/L)	Steelton (mg/L)	Shannon (mg/L)
Jan	1.10-1.35	0.76-1.22	0.63-1.10	0.49-1.31
Feb	1.18-1.30	0.84-1.36	0.81-1.17	0.59-1.32
Mar	1.16-1.43	*0.12-1.64	0.73-1.36	0.42-1.32
Apr	1.22-1.39	0.82-1.62	0.70-1.27	0.67-1.06
May	1.12-1.38	0.86-1.74	0.92-1.24	0.69-1.05
Jun	1.09-1.40	0.86-1.38	0.87-1.48	0.63-1.15
Jul	1.10-1.38	0.75-1.51	0.81-1.47	0.53-1.34
Aug	1.14-1.36	0.85-1.50	0.96-1.32	0.43-1.31
Sep	1.10-1.38	0.60-1.37	0.86-1.25	0.60-1.38
Oct	1.16-1.44	0.60-1.53	0.66-1.32	0.54-1.15
Nov	1.13-1.39	0.63-1.54	0.74-1.23	0.40-1.44
Dec	1.13-1.48	0.77-1.36	0.81-1.11	0.41-1.25

Chlorine residuals are continuously monitored and tracked in real time in SCADA and recorded on five minute intervals for reporting purposes.

*AWQI reported (see page 12 for more information)

Chemical Sampling and Testing

Schedule 13 of O. Reg. 170/03 outlines chemical sampling requirements for Large Municipal Residential systems. Annual sampling of Schedules 23 (inorganics) and 24 (organics) is collected every 12 months as well as quarterly sampling for nitrites/nitrates and THM's. Sodium and fluoride are required every 60 months.

Table 4: Schedule 23 - Inorganics

Parameter	WTP	Goulais #1	Goulais #2	Steelton	Shannon	ODWS
Antimony	<0.60	<0.60	<0.60	<0.60	<0.60	6
Arsenic	<1.0	<1.0	<1.0	<1.0	2.2	25
Barium	<10	36	35	38	59	1000
Boron	<50	<50	<50	<50	182	5000
Cadmium	<0.10	<0.10	<0.10	<0.10	<0.10	5
Chromium	<1.0	1.7	1.6	1.5	<1.0	50
*Fluoride	0.024	0.035	0.035	0.046	0.208	1.5
Mercury	<0.10	<0.10	<0.10	<0.1	<0.1	1
Selenium	<1.0	<1.0	<1.0	<1.0	<1.0	10
*Sodium	3.64	11.8	11.9	9.72	35.2	20
Uranium	<2.0	<2.0	<2.0	<2.0	8.7	20

Table 4 results reported in µg/L except for *fluoride and sodium (mg/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 with the exception of sodium for the Shannon and Lorna wells.

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 5: Nitrate/Nitrite Results (mg/L)

	Nitrite Nitrate	WTP	Goulais #1	Goulais #2	Steelton	Shannon	ODWS
Q1	NO ₂	<0.010	<0.010	o/s	<0.010	<0.010	1.0
	NO ₃	0.357	0.971	o/s	0.902	<0.020	10
Q2	NO ₂	<0.010	<0.010	0.998	<0.010	<0.010	1.0
	NO ₃	0.357	0.948	<0.01	0.938	<0.020	10
Q3	NO ₂	<0.01	<0.01	<0.01	<0.01	<0.01	1.0
	NO ₃	0.357	1.01	0.998	0.915	<0.02	10
Q4	NO ₂	<0.01	<0.01	<0.01	<0.01	<0.01	1.0
	NO ₃	0.349	1.02	1.01	0.884	<0.02	10

Table 5a: THM/HAA Results (µg/L)

	Parameter	Sub 4	Sub 15	AVG	ODWS
Q1	THM	5.9	<4.0	4.9	100
	HAA	4.8	2.8	3.4	80
Q2	THM	5.7	4.6	5.2	100
	HAA	5.3	4.5	4.9	80
Q3	THM	15	<4.0	9.5	100
	HAA	12.5	3.1	7.8	80
Q4	THM	12.0	5.4	8.7	100
	HAA	9.5	6.3	7.9	80
RAA	THM	9.7	4.5	7.1	100
	HAA	8.0	4.2	6.0	80

Running annual average (RAA) is calculated by using the average results tested each quarter. **All quarterly results for THMs are well below ODWS.**

ODWS established a MAC of 80 for HAAs effective January 1, 2020. .

Table 6: Schedule 24 Organics – WTP

Parameter	Date	Result	Unit	ODWS
Alachlor	9-Jan-18	<0.10	µg/L	5
Atrazine + N-dealkylated metabolites	9-Jan-18	<0.20	µg/L	5
Azinphos-methyl	9-Jan-18	<0.10	µg/L	20
Benzene	9-Jan-18	<0.50	µg/L	5
Benzo(a)pyrene	9-Jan-18	<0.010	µg/L	0.01
Bromoxynil	9-Jan-18	<0.20	µg/L	5
Carbaryl	9-Jan-18	<0.20	µg/L	90
Carbofuran	9-Jan-18	<0.20	µg/L	90
Carbon Tetrachloride	9-Jan-18	<0.20	µg/L	5
Chlorpyrifos	9-Jan-18	<0.10	µg/L	90
Diazinon	9-Jan-18	<0.10	µg/L	20
Dicamba	9-Jan-18	<0.20	µg/L	120
1,2-Dichlorobenzene	9-Jan-18	<0.50	µg/L	200
1,4-Dichlorobenzene	9-Jan-18	<0.50	µg/L	5
1,2-Dichloroethane	9-Jan-18	<0.50	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	9-Jan-18	<0.50	µg/L	14
Dichloromethane	9-Jan-18	<5.0	µg/L	50
2-4 Dichlorophenol	9-Jan-18	<0.30	µg/L	900
2,4-Dichlorophenoxy acetic acid	9-Jan-18	<0.20	µg/L	100
Diclofop-methyl	9-Jan-18	<0.20	µg/L	9
Dimethoate	9-Jan-18	<0.10	µg/L	20
Diquat	9-Jan-18	<1.0	µg/L	70
Diuron	9-Jan-18	<1.0	µg/L	150

Parameter	Date	Result	Unit	ODWS
Glyphosate	9-Jan-18	<5.0	µg/L	280
Malathion	9-Jan-18	<0.10	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	9-Jan-18	<0.20	µg/L	100
Metolachlor	9-Jan-18	<0.10	µg/L	50
Metribuzin	9-Jan-18	<0.10	µg/L	80
Monochlorobenzene	9-Jan-18	<0.50	µg/L	80
Paraquat	9-Jan-18	<1.0	µg/L	10
Parathion	9-Jan-18	<0.50	µg/L	50
Pentachlorophenol	9-Jan-18	<0.10	µg/L	60
Phorate	9-Jan-18	<0.20	µg/L	2
Picloram	9-Jan-18	<0.035	µg/L	190
Polychlorinated Byphenols (PCB)	9-Jan-18	<0.10	µg/L	3
Prometryne	9-Jan-18	<0.10	µg/L	1
Simazine	9-Jan-18	<0.20	µg/L	10
Terbufos	9-Jan-18	<0.50	µg/L	1
Tetrachloroethylene	9-Jan-18	<0.50	µg/L	30
2,3,4,6-Tetrachlorophenol	9-Jan-18	<0.50	µg/L	100
Triallate	9-Jan-18	<0.10	µg/L	230
Trichloroethylene	9-Jan-18	<0.50	µg/L	5
2,4,6-Trichlorophenol	9-Jan-18	<0.50	µg/L	5
Trifluralin	9-Jan-18	<0.10	µg/L	45
Vinyl Chloride	9-Jan-18	<0.20	µg/L	2

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

Table 7: Schedule 24 Organics – Goulais Pump Station

Parameter	Goulais 1	Goulais 2	Unit	ODWS
Alachlor	<0.10	<0.10	µg/L	5
Atrazine + N-dealkylated metabolites	<0.10	<0.20	µg/L	5
Azinphos-methyl	<0.10	<0.10	µg/L	20
Benzene	<0.50	<0.50	µg/L	5
Benzo(a)pyrene	<0.010	<0.01	µg/L	0.01
Bromoxynil	<0.20	<0.20	µg/L	5
Carbaryl	<0.20	<0.20	µg/L	90
Carbofuran	<0.20	<0.20	µg/L	90
Carbon Tetrachloride	<0.20	<0.20	µg/L	5
Chlorpyrifos	<0.10	<0.10	µg/L	90
Diazinon	<0.10	<0.10	µg/L	20
Dicamba	<0.20	<0.20	µg/L	120
1,2-Dichlorobenzene	<0.50	<0.50	µg/L	200
1,4-Dichlorobenzene	<0.50	<0.50	µg/L	5
1,2-Dichloroethane	<0.50	<0.50	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	<0.50	<0.50	µg/L	14
Dichloromethane	<5.0	<5.0	µg/L	50
2-4 Dichlorophenol	<0.30	<0.30	µg/L	900
2,4-Dichlorophenoxy acetic acid	<0.20	<0.20	µg/L	100
Diclofop-methyl	<0.20	<0.20	µg/L	9
Dimethoate	<0.10	<0.10	µg/L	20
Diquat	<1.0	<1.0	µg/L	70
Diuron	<1.0	<1.0	µg/L	150

Parameter	Goulais 1	Goulais 2	Unit	ODWS
Glyphosate	<5.0	<5.0	µg/L	280
Malathion	<0.10	<0.10	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	<0.20	<0.20	µg/L	100
Metolachlor	<0.10	<0.10	µg/L	50
Metribuzin	<0.10	<0.10	µg/L	80
Monochlorobenzene	<0.50	<0.50	µg/L	80
Paraquat	<1.0	<1.0	µg/L	10
Pentachlorophenol	<0.50	<0.50	µg/L	60
Phorate	<0.10	<0.10	µg/L	2
Picloram	<0.20	<0.60	µg/L	190
Polychlorinated Byphenols (PCB)	<0.035	<0.035	µg/L	3
Prometryne	<0.10	<0.10	µg/L	1
Simazine	<0.10	<0.10	µg/L	10
Terbufos	<0.20	<0.20	µg/L	1
Tetrachloroethylene	<0.50	<0.50	µg/L	30
2,3,4,6-Tetrachlorophenol	<0.50	<0.50	µg/L	100
Triallate	<0.50	<0.50	µg/L	230
Trichloroethylene	<0.10	<0.10	µg/L	5
2,4,6-Trichlorophenol	<0.50	<0.50	µg/L	5
Trifluralin	<0.50	<0.50	µg/L	45
Vinyl Chloride	<0.10	<0.10	µg/L	2

All results are below the ODWS MAC and half MAC as per O. Reg. 169/03.
 Dates Sampled: Goulais 1 – January 9, 2018, Goulais 2 – April 10, 2018

Table 8: Schedule 24 Organics – Steelton & Shannon Pump Stations

Parameter	Steelton	Shannon	Unit	ODWS
Alachlor	<0.10	<0.10	µg/L	5
Atrazine + N-dealkylated metabolites	<0.20	<0.20	µg/L	5
Azinphos-methyl	<0.10	<0.10	µg/L	20
Benzene	<0.50	<0.50	µg/L	5
Benzo(a)pyrene	<0.010	<0.010	µg/L	0.01
Bromoxynil	<0.20	<0.20	µg/L	5
Carbaryl	<0.20	<0.20	µg/L	90
Carbofuran	<0.20	<0.20	µg/L	90
Carbon Tetrachloride	<0.20	<0.20	µg/L	5
Chlorpyrifos	<0.10	<0.10	µg/L	90
Diazinon	<0.10	<0.10	µg/L	20
Dicamba	<0.20	<0.20	µg/L	120
1,2-Dichlorobenzene	<0.50	<0.50	µg/L	200
1,4-Dichlorobenzene	<0.50	<.050	µg/L	5
1,2-Dichloroethane	<0.50	<0.50	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	<0.50	<0.50	µg/L	14
Dichloromethane	<5.0	<5.0	µg/L	50
2-4 Dichlorophenol	<0.30	<0.30	µg/L	900
2,4-Dichlorophenoxy acetic acid	<0.20	<0.20	µg/L	100
Diclofop-methyl	<0.20	<0.20	µg/L	9
Dimethoate	<0.10	<0.10	µg/L	20
Diquat	<1.0	<1.0	µg/L	70
Diuron	<1.0	<1.0	µg/L	150

Parameter	Steelton	Shannon	Unit	ODWS
Glyphosate	<5.0	<5.0	µg/L	280
Malathion	<0.10	<0.10	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	<0.20	<0.20	µg/L	100
Metolachlor	<0.10	<0.10	µg/L	50
Metribuzin	<0.10	<0.10	µg/L	80
Monochlorobenzene	<0.50	<0.50	µg/L	80
Paraquat	<1.0	<1.0	µg/L	10
Pentachlorophenol	<0.50	<0.50	µg/L	60
Phorate	<0.10	<0.10	µg/L	2
Picloram	<0.20	<0.20	µg/L	190
Polychlorinated Byphenols (PCB)	<0.035	<0.035	µg/L	3
Prometryne	<0.10	<0.10	µg/L	1
Simazine	<0.10	<0.10	µg/L	10
Terbufos	<0.20	<0.20	µg/L	1
Tetrachloroethylene	<0.50	<0.50	µg/L	30
2,3,4,6-Tetrachlorophenol	<0.50	<0.50	µg/L	100
Triallate	<0.50	<0.50	µg/L	230
Trichloroethylene	<0.10	<0.10	µg/L	5
2,4,6-Trichlorophenol	<0.50	<0.50	µg/L	5
Trifluralin	<0.50	<0.50	µg/L	45
Vinyl Chloride	<0.10	<0.10	µg/L	2

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

Dates Sampled: Steelton: August 8, 2018, Shannon: July 24, 2018.

Lorna Wells were not pumped to the system during 2018.

Lead Sampling:

The Ontario Drinking Water Standard for lead is 10µg/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 Licence #216-101, Schedule C, 5.0, Table 1.

Table 9: 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	79	0 - 33.1	6
Distribution	9	0	0

In 2018, 6 of 79 plumbing locations or 7.6% 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.

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 who 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. Another option 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 2018, the Sault Ste. Marie DWS reported five incidents of adverse water quality.

Table 10: Adverse Water Quality Incidents

Date	Incident Reported
2018-02-09	Presence of total coliform (Sub 4)
2018-03-18	Required CT value not met (Goulais Pump Station)
2018-04-20	Turbidity exceedance (WTP)
2018-05-25	Presence of total coliform (Sub 13)
2018-07-27	Presence of total coliform (Dryland Pump Station)

Feb 9, 2018 - resamples collected as per regulation, all results non-detect

Mar 18, 2018 – notification of CT not met due low chlorine, contact main flushed to residual of 1.14 mg/L, well restarted but failed again on low chlorine after 20 min. Analyzer determined to be reading in error, well remained off-line until mtce completed including probe change.

Apr 20, 2018 - higher than normal turbidity introduced into the clearwell/reservoir due to filtrate valve leaking during loading of new media, filter was not in service, residuals in reservoir remained unchanged during event. Precautionary sampling collected at storage sites all results non-detect.

May 25, 2018 – resamples collected as per regulation, all results non-detect

July 27, 2018 – resamples collected as per regulation, all results non-detect

Annual Drinking Water System Inspection

The annual Drinking Water System inspection took place on Jan 18, 2018 by the Ministry of the Environment, Conservation and Parks (MECP) Drinking Water inspector Stephen Rouleau. There were zero non-conformances, zero recommendations and best practices identified.

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

Maximum Question Rating: 519

Table 11: MECP Risk Assessment Rating

Inspection Module	Non-Compliance Rating
Source	0/14
Capacity Assessment	0/30
Treatment Processes	0/68
Operations Manuals	0/28
Logbooks	0/14
Certification and Training	0/42
Water Quality Monitoring	0/124
Reporting and Corrective Actions	0/66
Treatment Process Monitoring	0/133
TOTAL	0/519

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 following sites:

Table 12: Permit to Take Water

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

The Water Treatment Plant is currently rated at 40,000 m³/d based on CT values to meet requirements of primary disinfection. The available capacity for Sault Ste. Marie is rated at 79,779m³/d. Lorna pump station has been shut down for water quality reasons and is available for emergency demand if needed.

The Sault Ste. Marie WTP and production wells treated a total of 10,014 ML (10,013,714 m³) of water during the year of 2018. The average daily treated flow was 27,694 m³, and the maximum daily flow was 38,884 m³ on July 19th, 2018.

Chart 1: Five Year Flow Comparison

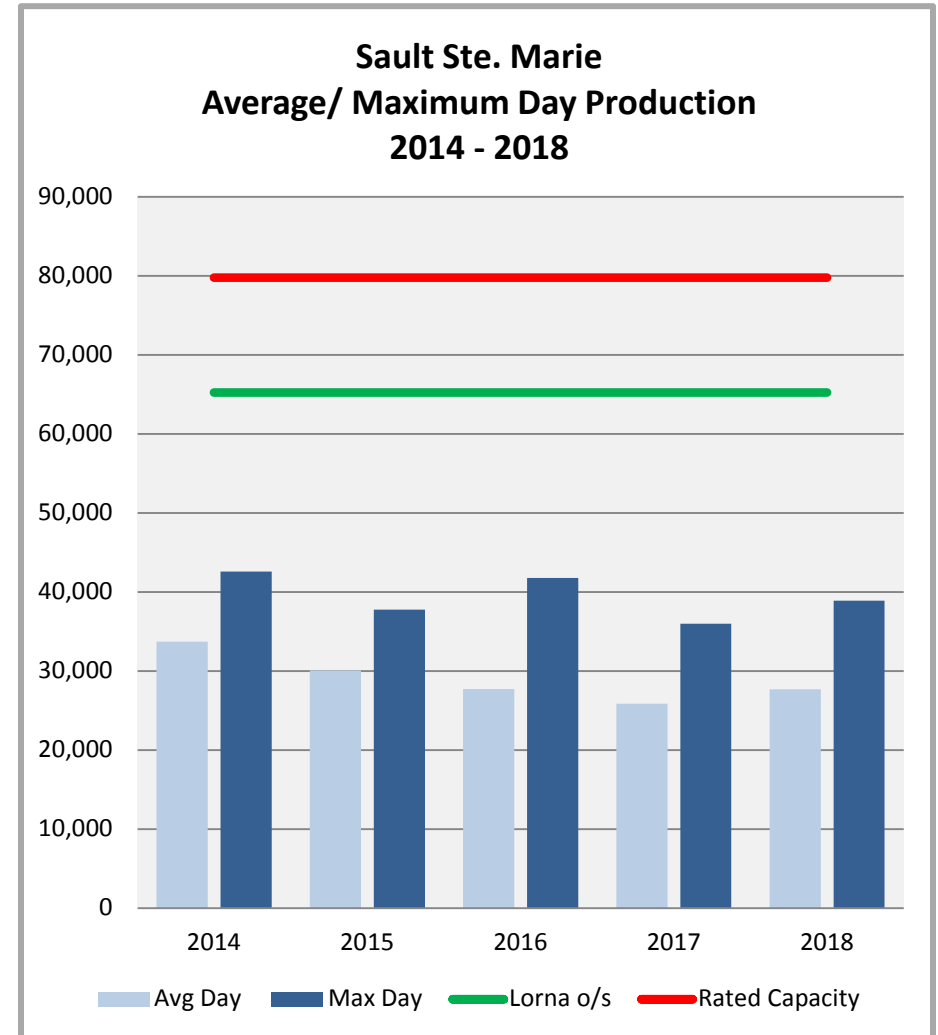


Table 13: WTP Raw and Treated Water Flows 2018

2018	Raw Water Flows				Treated Water Flows				
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	428,367	11,612	17,539	13,818	413,368	9,570	18,063	13,334	45.2
February	345,678	10,702	14,260	12,346	328,386	7,149	16,558	11,728	41.4
March	406,714	10,301	18,206	13,120	396,782	9,525	18,598	12,799	46.5
April	435,453	10,799	17,813	14,515	426,583	9,668	17,473	14,219	43.7
May	436,466	8,736	18,975	14,080	424,471	6,192	18,305	13,693	45.8
June	426,090	9,294	21,036	14,203	423,818	7,638	20,663	14,127	51.7
July	565,860	10,260	25,336	18,254	562,072	10,223	27,072	18,131	67.7
August	495,474	12,152	26,038	15,983	486,020	10,676	25,820	15,678	64.6
September	379,790	8,020	16,544	12,660	374,888	8,906	16,480	12,496	41.2
October	357,019	3,124	13,511	11,517	358,521	2,912	14,241	11,565	35.6
November	366,029	10,395	15,680	12,201	357,707	9,046	16,343	11,924	40.9
December	393,994	11,036	15,213	12,709	388,032	9,299	16,952	12,517	42.4

Chart 2: Sault Ste. Marie WTP Flows 2018

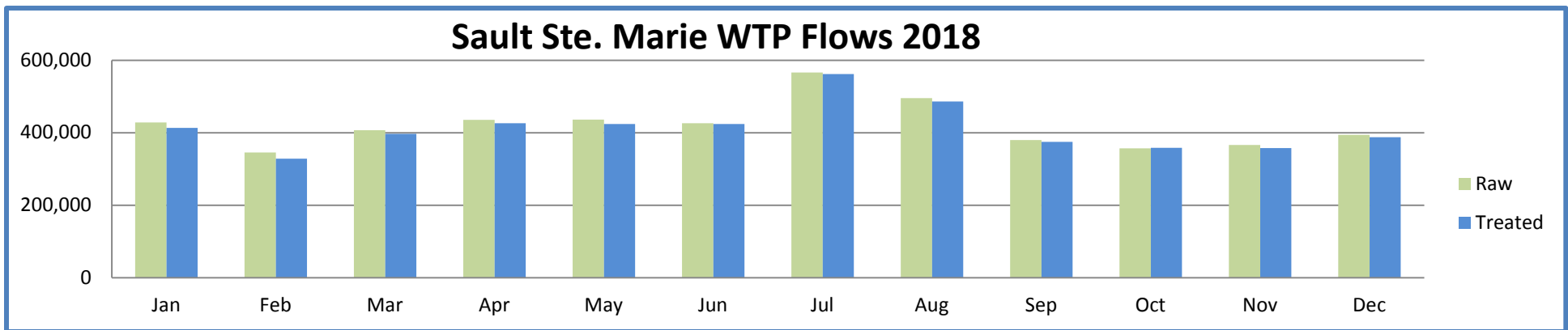


Table 14: Goulais Treated Water Flows 2018

2018	Goulais Well #1 Flows					Goulais Well #2 Flows				
	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)
January	149,482	4,363	5,870	4,822	88.9	0	0	0	0	0
February	163,701	5,829	5,859	5,846	88.7	0	0	0	0	0
March	175,474	2,834	5,850	5,660	88.6	0	0	0	0	0
April	37,064	0	5,873	1,235	88.9	63,349	0	2,974	2,112	87.3
May	175,324	2,266	5,973	5,656	90.4	2,875	0	1,875	93	55.0
June	174,500	5,368	6,125	5,817	92.7	12,753	0	3,000	425	88.1
July	133,794	0	5,976	4,316	90.5	4,022	0	1,375	130	40.4
August	113,455	0	4,869	3,660	75.9	14,688	0	2,935	474	90.5
September	91,585	0	4,866	3,053	75.1	31,752	0	3,008	1,058	90.9
October	111,404	0	4,909	3,594	75.3	22,298	0	2,971	719	91.0
November	68,677	0	5,073	2,289	78.5	45,885	0	2,955	1,529	91.0
December	53,629	0	4,964	1,730	75.4	61,309	0	3,152	1,978	91.9

Chart 3: Goulais Pump Station Flows 2018

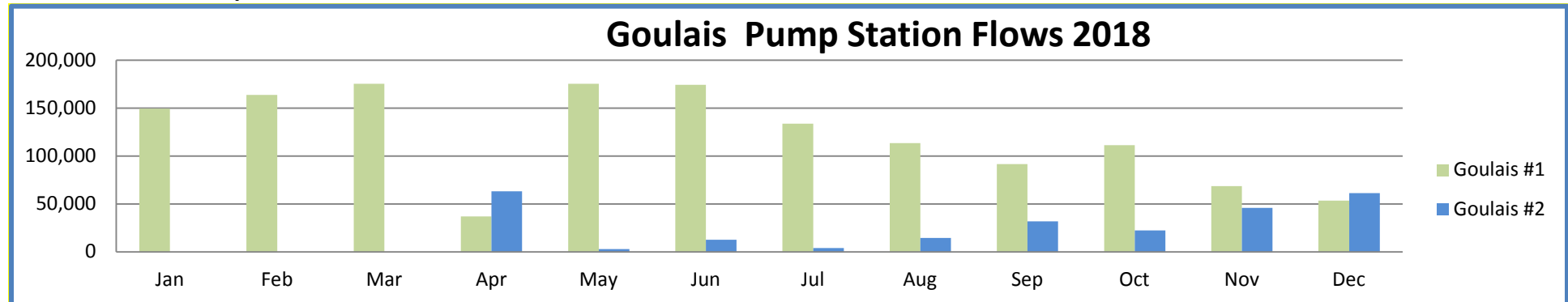
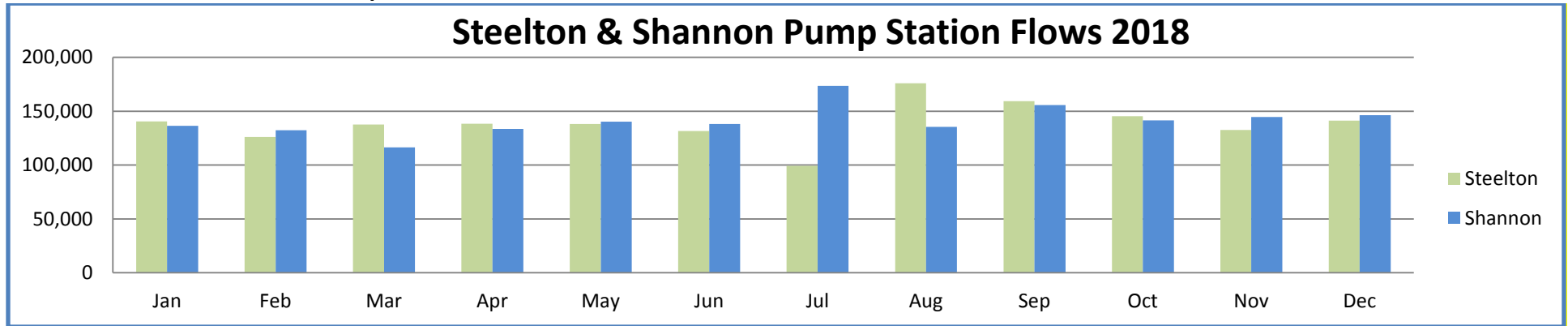


Table 15: Steelton & Shannon Water Flows 2018

2018	Steelton Well Flows					Shannon Well Flows				
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	144,793	465	4,750	4,536	57.9	137,796	0	5,056	4,405	72.2
February	125,993	4,313	4,681	4,500	57.0	132,395	3,818	5,009	4,728	71.6
March	137,621	4,283	4,594	4,439	56.0	116,428	0	4,823	3,756	68.9
April	138,275	4,447	4,701	4,609	57.3	133,680	4,267	4,566	4,456	65.2
May	138,175	4,235	4,577	4,457	55.8	140,226	4,398	4,585	4,523	65.5
June	131,702	4,147	4,547	4,390	55.4	138,035	4,194	5,882	4,601	84.0
July	99,245	0	5,225	3,308	63.7	173,682	1,810	5,942	5,603	84.9
August	176,001	4,078	6,998	5,677	85.3	135,387	0	6,000	4,367	85.7
September	159,303	4,207	6,300	5,310	76.8	155,735	4,338	6,000	5,191	85.7
October	145,252	3,928	7,139	4,686	87.0	141,414	3,258	6,588	4,562	94.1
November	132,534	4,000	5,001	4,418	60.9	144,733	1,990	5,206	4,824	74.4
December	141,336	4,000	6,153	4,559	75.0	146,305	4,000	6,000	4,720	85.7

Chart 4: Steelton & Shannon Pump Station Flows 2018



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, 2018 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

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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
m³	Cubic metres
m³/d	Cubic metres per day
mg/L	Milligram per litre (part per million)
ML	Megalitre (1000 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