

PUBLIC WATER SYSTEM ANNUAL REPORT

-2010-

Name of the Public Water System: Town of Souris Water Treatment Plant

Name of the legal owner: Town of Souris

Contact person: Charlotte Parham, Chief Administrative Officer

Phone: (204)483-5200

Email: tnsouris@mts.net

Website: www.sourismanitoba.com

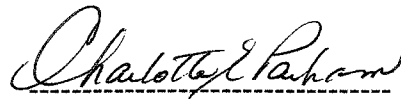
Water system's emergency number: (204)483-0705

Name of Operator: Don Bodin, Senior Plant Operator

Phone during business hours: (204) 483-5209

Emergency number: (204) 483-0705

Date prepared; March 08, 2011



Charlotte Parham
Chief Administrative Officer
Town of Souris

TABLE OF CONTENTS

Introduction:-----	3
1. Description of the Water System:-----	3
1.1 Water supply source:-----	3
1.2 Water treatment process:-----	3
1.3 Distribution system:-----	4
1.4 Storage reservoirs:-----	4
1.5 Number of connections, population served and types of water users:-----	4
1.6 Classification and Certification:-----	4
2. Disinfection System in Use:-----	5
2.1 Type of disinfection system used:-----	5
2.2 Equipment redundancy and monitoring requirement:-----	5
2.3 Disinfection residual overall performance/results:-----	5
3. List of Water Quality Standards:-----	6
4. Water System Incidents and Corrective Actions:-----	7
5. Additional Records Required:-----	7
6. Drinking Water Safety Orders on your System and Actions Taken in response:-----	7
7. Boil Water Advisories Issued and Actions Taken in Response:-----	7
8. Warnings Issued or Charges Laid on the System in Accordance with The Drinking Water Safety Act:-----	7
9. Major Expenses Incurred:-----	7
10. Future System Expansion and/or Increased Production:-----	7
11. Appendix: Appendix A-Raw Water Analysis-----	8&9
Appendix B-Treatment Process-----	10
Appendix C-Fluoridation Results-----	11

Introduction:

The 2010 Annual Report for the Town of Souris summarizes the Water Utility's ability to produce safe potable water and meet provincial regulations.

1. Description of the Water System:

The Town of Souris Public Water System provides potable drinking water to a population of 1772 residents. Treated water produced at the water treatment plant meets all health and aesthetic objectives as stated in the Guidelines for Canadian Drinking Water Quality.

1.1. Water supply source

The Souris Water Treatment Plant receives groundwater from two wells located 16 kilometers northeast of Souris. Both wells were drilled to a depth of approximately 130 feet with the pumps drawing at 80 feet. Raw water is pumped from the wells into a 200mm pipeline where it flows to the water treatment plant.

As water flows through the ground it dissolves metals and minerals. In the case of Souris's raw water, it has come into contact with a few metals with the major concerns being iron, manganese, calcium carbonate (hardness causing mineral) and a conventional parameter known as ammonia. All of these items do not pose health concerns, rather they are known as aesthetic water quality parameters, with the exception being ammonia as there is no upper detection limit in the Guidelines for Canadian Drinking Water Quality. (See Appendix A- Raw Water Analyses)

1.2. Water treatment process

Iron and manganese are metals that cause laundry and plumbing fixture staining problems. In addition, these materials can build up in the distribution pipes and cause reduced flow. Calcium carbonate causes hardness in water which diminishes the ability of the water to react with soap and form lather. Hardness also forms scale deposits in hot water devices reducing the life expectancy of these appliances.

Ammonia does not pose a health concern but rather it does cause other problems in the treatment process.

The current water treatment process is designed to remove iron, manganese and ammonia down to acceptable limits and soften the water down to a total hardness of 100 to 120 mg/L. With regards to hardness, individuals have their own preference with the ability to install their own water softeners.

The Souris water treatment process consists of iron and manganese removal followed by reverse osmosis, ph adjustment, disinfection and fluoridation. (See Appendix B-Treatment Process). The treatment process also contains the addition of approximately 20% of blended raw water. The town chose this as to make the water less aggressive before it enters the distribution system.

Iron and manganese is removed from the raw water by adding potassium permanganate. The water then flows into a contact tank with a retention time of approximately 90 minutes. Potassium permanganate is added to cause the iron and manganese to come out of solution (precipitate). The precipitated iron and manganese is then removed from the water by flowing through three manganese greensand filters. This treatment process is the blended water.

In addition to iron and manganese removal, hardness and ammonia is removed by reverse osmosis (R.O.). The R.O. consists of a two stage unit with 80 membranes. After R.O., the ph is then adjusted, followed by chlorination and fluoridation. Treated water is then stored in the treated water reservoir located beneath the plant.

1.3. Distribution system

Treated water from the reservoir is pumped throughout the towns distribution system via two duty pumps. The main pump is 15 h.p. with the backup pump being 25 h.p. The backup pump is set to start if pressure in the distribution drops below 70 p.s.i. Piping in the distribution consists of approximately 80% cast iron and 20% PVC.

1.4. Storage reservoirs

Name: Water Plant Reservoir	Capacity: 178,000 imp. gals
Name: North Reservoir	Capacity: 50,000 imp. gals
Name: Pumphouse Reservoir	Capacity: 130,000 imp. gals

1.5. Number of connections, population served and types of water users

The Souris distribution system is comprised of 809 service connections. All service connections are metered. Types of water users are domestic, commercial and agricultural. Agricultural water is provided by an automatic bulk water station located at the water treatment plant.

1.6. Classification and Certification

The Town of Souris Water Treatment Plant consists of two main operators, with one other relief operator being available when needed.

- Class 3 Water Treatment Facility Classification
- Certification level of operators:
 - Don Bodin, Level 3
 - Brent Fallis, Level 3
 - Brent Kirkup :Level 1

2. Disinfection System in Use

The final step in the treatment of safe potable water is disinfection. Disinfection is the destruction or inactivation of potential disease causing organisms in water. As per the Drinking Water Safety Act the Souris Public Water System must ensure that a disinfection residual of at least:

- 0.5 mg of free chlorine per litre of water is detectable at the point where water enters the distribution system, after a minimum contact time of 20 minutes.
- 0.1 mg of free chlorine per litre of water is detectable at all times in the distribution system.

Because the Souris raw water has elevated concentrations of ammonia, it has interfered in maintaining a 0.5 mg/l of free chlorine. After an increase in the feed rate of approximately 60 % we achieved breakpoint chlorination and were able to maintain the required residual of at least 0.50 mg/l , 100 % of the time.

2.1. Type of disinfection system used

The Town of Souris disinfects using chlorine gas by ejecting it into the treated water before it enters the reservoirs.

2.2. Equipment redundancy and monitoring requirements

As required by the Drinking Water Safety Act the Souris PWS ensures continuous disinfection is maintained at the plant by keeping in stock all spare parts required for the chlorinator. A complete spare chlorinator is also kept at the plant. Disinfectant residuals are monitored daily at the plant and bi-weekly in the distribution system and recorded on the appropriate monitoring forms. Monthly chlorination report forms are sent to the regional Drinking Water Officer at the end of each month.

2.3 Disinfection residual overall performance/ results

For 2010, the Souris Public Water System has met the regulatory requirements in regards to monitoring and reporting disinfection residuals leaving the water treatment plant 100% of the time. In the distribution system we met the standards 100% of the time when using the free chlorine method.

3. List of Water Quality Standards:

The Province of Manitoba has adopted a number of water quality standards from the Guidelines for Canadian Drinking Water Quality, developed by Health Canada. The parameters are health-based and they express the maximum acceptable concentrations for a groundwater source. Concentration values in excess require corrective actions. The 2010 results for the Souris Public Water System are summarized in the following table:

Source	Parameter	Standard	Performance Objectives	Frequency	Test Results	
Groundwater	TC & EC*	No TC or EC		Bi-weekly	100% passed	
	Report Submissions			Monthly	100%	
	Disinfectant (Free Chlorine)	WTP (>0.50 mg/L)			Daily	100%
		Distribution (>0.10 mg/L)			Bi-weekly	100%
	Total Dissolved Solids		500	Every three years. * * Results from 2008	286 mg/L	
	Iron		0.3		0.03 mg/L	
	Manganese		0.05		0.0033 mg/L	
	Arsenic	<= 0.01 mg/L			0.0012 mg/L	
	Benzene	<= 0.005 mg/L			-	
	Fluoride	<= 1.5 mg/L			See Appendix C	
	Lead	<= 0.01 mg/L			0.0003 mg/L	
	Nitrate	<= 45mg/L as nitrate, 10mg/L as nitrogen			0.01mg/L as N	
	Trichloroethylene	<= 0.005mg/L			-	
	Tetrachloroethylene	<= 0.03mg/L			-	
	Uranium	<= 0.02 mg/L		0.0002 mg/L		

Bacteriological Monitoring and Reporting.

	Regulatory Requirement	PWS Performance
Number of Raw/ incoming water samples	26	24
Number of treated water samples	26	24
Number of distribution water samples	26	48
Frequency of Testing	Bi-weekly	92%
Total Coliform present in samples	0 TC per 100ml	100%
E. Coli present on samples	0 EC per 100ml	100%

Treated water leaving the Souris Public Water System is below all aesthetic limits as established in the Guidelines for Canadian Drinking Water Quality and does not pose a health concern. * Bacterial testing: We test the raw water (untreated), the treated water and the water in the distribution system bi-weekly for the presence of Total Coliform (TC) and E. Coli (EC) bacteria. If these bacteria are present in the water it is an indication that disease causing organisms may also be present.

4. Water System Incidents and Corrective Actions

The Souris Public Water system was in compliance 100% of the time when using the free chlorine method of disinfection at the water treatment plant. The free chlorine residual was in compliance 100% of the time in the distribution system. We were in compliance 92% of the time in regards to the bi-weekly sample monitoring having missed sample dates Sept.6 and Dec.27.

5. Additional records required

The Souris Public Water System takes part in Manitoba Health's fluoridation program. Water samples are collected on a daily basis from the treated water reservoir and tested on site. Daily fluoride results are recorded and a 14 day composite sample is submitted bi-weekly to ALS Labs in Winnipeg for analysis. (See Appendix C – 2010 Fluoridation Results). The Souris Public Water System strives to maintain a 1.00 mg/L fluoride level. The operating range for fluoride, as identified by Manitoba Health, is 0.80-1.20 mg/L.

6. Drinking Water Safety Orders on your System and Actions Taken in Response

In 2010, no Drinking Water Safety Orders were issued for the Souris Public Water System.

7. Boil Water Advisories Issued and Actions Taken in Response

In 2010, no Boil Water Advisories were issued for the Souris Public Water System.

8. Warnings Issued or Charges Laid on the System in Accordance with The Drinking Water Safety Act

In 2010, no Warnings were Issued or Charges Laid against the Souris Public Water System.

9. Major Expenses Incurred

In 2010, all membranes were replaced at a cost of approximately \$67,000.

10. Future System Expansion and/or Increased Production

In 2011, the Town of Souris will be replacing the piping on the R.O. unit from PVC to stainless steel at a cost of approximately \$15,000. A second phase of this project will be done later this year or 2012, with price quotes still to come in.

Town of Souris Appendix A
Results of raw water Analyses

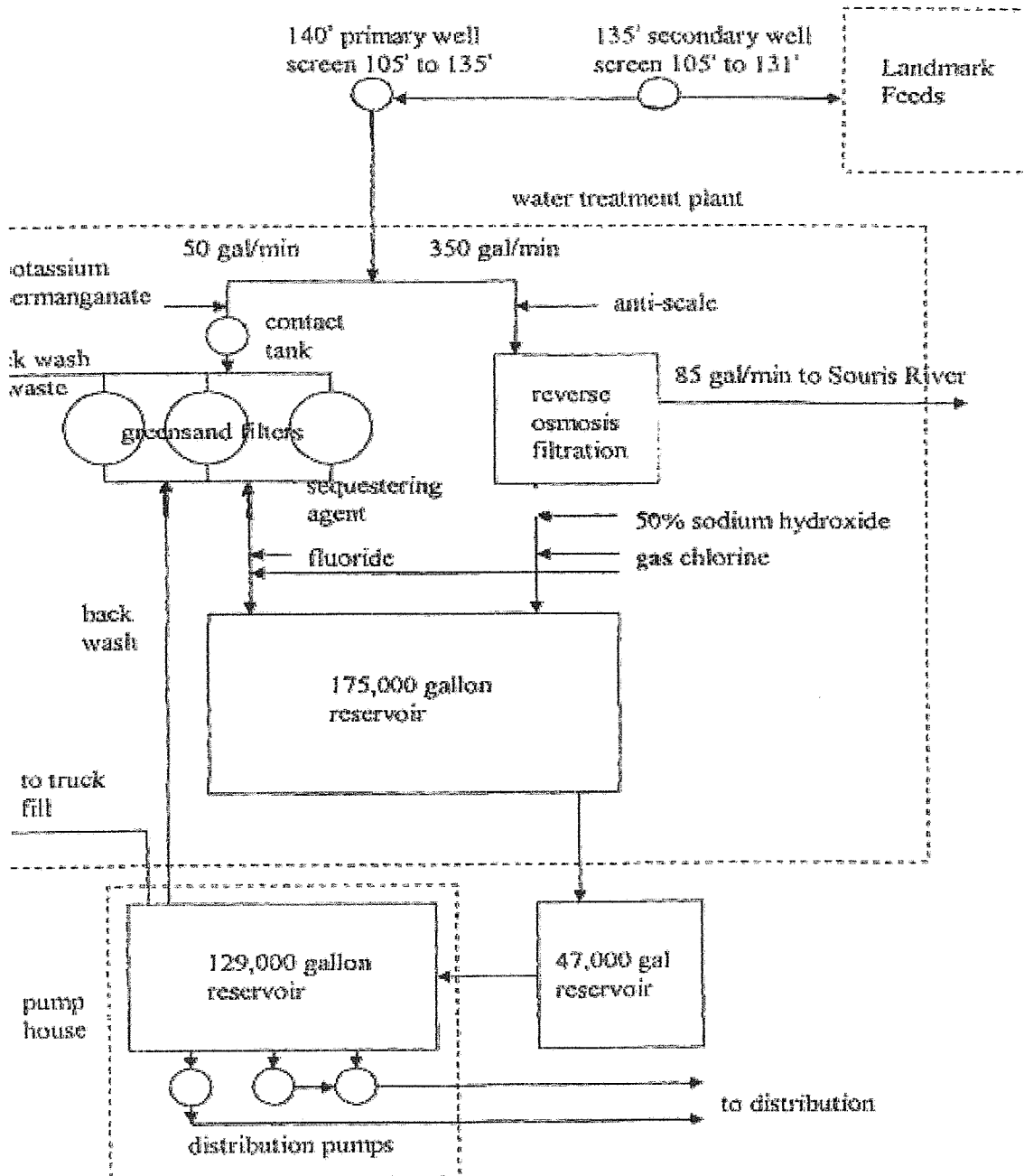
Sample ID		Souris - Raw
CANTEST ID		805280015
Date Sampled		5/28/2008
Parameter	Units	
Conventional Parameters		
Hardness (Total) CaCO ₃	mg/L	425
Total Dissolved Solids	mg/L	877
Dissolved Fluoride F	mg/L	0.27
Dissolved Chloride Cl	mg/L	22.4
Bromide Br	mg/L	<5
Nitrate and Nitrite N	mg/L	<0.01
Dissolved Sulphate SO ₄	mg/L	301
Total Organic Carbon C	mg/L	7.5
Total Inorganic Carbon C	mg/L	65
Total Carbon C	mg/L	93
Ammonia Nitrogen N	mg/L	1.2
Ammonia Nitrogen N	mg/L	-
Cation-Anion Balance	% Difference	-2.8
Metals Analysis		
Total Aluminum Al	mg/L	0.002
Total Antimony Sb	mg/L	0.0003
Total Arsenic As	mg/L	0.0028
Total Barium Ba	mg/L	0.025
Total Beryllium Be	mg/L	<0.0002
Total Bismuth Bi	mg/L	<0.0002
Total Boron B	mg/L	0.39
Total Cadmium Cd	mg/L	<0.00004
Total Calcium Ca	mg/L	105
Total Chromium Cr	mg/L	<0.0002
Total Cobalt Co	mg/L	<0.0002
Total Copper Cu	mg/L	0.0008
Total Iron Fe	mg/L	2.94
Total Lead Pb	mg/L	<0.0002
Total Lithium Li	mg/L	0.119
Total Magnesium Mg	mg/L	39.5
Total Manganese Mn	mg/L	0.134
Total Molybdenum Mo	mg/L	0.0023
Total Nickel Ni	mg/L	0.0005
Total Phosphorus P	mg/L	0.07
Total Potassium K	mg/L	6.8
Total Rubidium Rb	mg/L	0.003
Total Selenium Se	mg/L	0.0007
Total Silicon Si	mg/L	11.8
Total Silver Ag	mg/L	<0.00005
Total Sodium Na	mg/L	120
Total Strontium Sr	mg/L	0.95
Total Tellurium Te	mg/L	<0.0002

TABLE: Results of WATER Analyses

Total Thallium Tl	mg/L	<0.00002
Total Thorium Th	mg/L	<0.0001
Total Tin Sn	mg/L	<0.0002
Total Titanium Ti	mg/L	0.0006
Total Uranium U	mg/L	0.0005
Total Cesium Cs	mg/L	<0.0001
Total Vanadium V	mg/L	<0.0002
Total Zinc Zn	mg/L	<0.001
Total Zirconium Zr	mg/L	<0.002
Volatile Organic Compounds		
1,1-Dichloroethene	ug/L	<0.1
cis-1,2-Dichloroethene	ug/L	<0.1
trans-1,2-Dichloroethene	ug/L	<0.1
Methyl tert-Butyl Ether	ug/L	<0.5
Methylene Chloride	ug/L	<6
Tetrachloroethene	ug/L	<0.1
1,1,1-Trichloroethane	ug/L	<0.1
1,1,2-Trichloroethane	ug/L	<0.1
Trichloroethene	ug/L	<0.1
Conventional Parameters-Winnipeg Laboratory		
pH, Laboratory	pH units	7.43
Conductivity	uS/cm	1290
True Color	CU	6
Turbidity	NTU	35.7
Total Alkalinity CaCO ₃	mg/L	380
Bicarbonate Alkalinity HCO ₃	mg/L	464
Carbonate Alkalinity CO ₃	mg/L	<0.5
Hydroxide Alkalinity OH	mg/L	<0.5
Langelier Saturation Index		
Saturation Index at 4.4C	SI 4.4C	0.038
Saturation Index at 60C	SI 60C	1.08

Souris Water Treatment Plant

Appendix B



Fluoridation Results 2010 Appendix C

<i>Date</i>	<i>Readings</i>
1. Jan 02 – Jan 15	0.93 mg/l
2. Jan 16 - Jan 29	0.81mg/l
3. Jan 30 – Feb 12	0.74 mg/l
4. Feb 13 – Feb 26	0.98 mg/l
5. Feb 27 – March 12	1.08 mg/l
6. March 13 – March 26	0.69 mg/l
7. March 27 – April 09	0.88 mg/l
8. April 10 – April 23	0.83 mg/l
9. April 24 – May 07	1.02 mg/l
10. May 08 – May 21	0.79 mg/l
11. May 22 – June 04	0.90 mg/l
12. June 05 – June 18	0.86 mg/l
13. June 19 – July 02	1.20 mg/l
14. July 03 – July 16	0.82 mg/l
15. July 17 – July 30	0.89 mg/l
16. July 31 - Aug 13	0.84 mg/l
17. Aug 14 – Aug 27	0.99 mg/l
18. Aug 28 – Sept 10	0.74 mg/l
19. Sept 11 – Sept 24	0.64 mg/l
20. Sept 25 – Oct 08	0.67 mg/l
21. Oct 09 – Oct 22	0.66 mg/l
22. Oct 23 – Nov 05	0.71 mg/l
23. Nov 06 – Nov 19	0.91 mg/l
24. Nov 20 – Dec 03	0.83 mg/l
25. Dec 04 – Dec 17	0.73 mg/l
26. Dec 18- Dec 31	0.69 mg/l