

Public Water System Annual Report

Southwest Regional Water Treatment Plant & Southwest Regional Water Co-op
2019

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Introduction:

The 2019 Annual Report for the Melita Water Treatment Plant summarizes the water utility's ability to produce safe potable water and meet or exceed provincial regulations. We hope that the following report answers any and all questions regarding the water system. It is our belief that the public has a right to access information related to the drinking water they consume. To that end the following report has been prepared for the residents who are users of the system.

1. Description of the Water System

The Southwest Regional Water Co-op Public Water System (PWS) provides safe potable drinking water to the residents of Melita, Two Borders, Brenda, Napinka, Medora and Waskada through the distribution systems and to other rural residents by means of the Truck Fill System at the Water Treatment Plant (WTP). Treated water produced from the WTP meets or exceeds all health and aesthetic objectives as stated in the *Guidelines for Canadian Drinking Water Quality*.

The Melita Water Treatment Plant



1.1. Water Supply Source

The WTP receives groundwater from four wells located at 16 km North East of Melita @ NW23-5-27W. The wells draw groundwater from the Oak Lake Aquifer. The wells were drilled to a depth of 33 feet. Raw water pumped from the wells into a 200 mm (8 inch) pipeline where it flows directly into the WTP for processing and treatment.



Well Site 1

During 2007-2008, the Town of Melita developed a new Public Water System (PWS) which includes two groundwater wells, a Water Treatment Plant (WTP) in NW6-4-26W, and a raw water pipeline between the wells and the WTP. During the initial 6 months of operation it was determined the water supply wells have insufficient capacity due to the presence of impervious clay ridges which were not detected during the initial groundwater sourcing study. As a result, a new well field was developed on municipal right-of-way between SE24-5-27W and SW19-5-26W which is located 3.2kms east of the existing wells. This well field consists of two 760 mm (30 inch) wells, however, only the north well was mechanised and connected to the raw water supply line. This site will not be operational until spring 2010.

As water flows through the ground it dissolves metals and minerals. In the case of the Melita water supply, the water has come into contact with primarily iron and manganese. These items do not pose health concerns, rather they are known as aesthetic water quality parameters.

On September 23, 2010, the new well field was brought online. On December 16, 2010, it was decided to test the water coming from the new well field for Iron Bacteria due to production issues at the WTP. The tests came back positive and the decision was made to stop pumping and bring the original well field back online. The original well site was brought back online in early 2011 after it was swabbed and flushed to remove any iron bacteria from the raw water supply line to prevent contamination of the original well site. A plan is in place to treat the new well site and hopefully clear it of iron bacteria. At no time did iron bacteria enter the reservoir or any part of the distribution system. In the fall of 2017 two new wells were drilled at the East site replacing the one's that didn't work before, and a booster station was built halfway between the east well field and the WTP so that both RO units can be operated together.

1.2. Water Treatment Process

Raw water is pumped to the WTP where approximately 90% of the flow is directed through reverse osmosis membranes. The remaining 10% by-passes through a sand-filter with 3 new UV (ultraviolet) units prior to blending with membrane permeate. Blended flow is chlorinated with sodium hypochlorite and then stored in a 1,000,000-litre concrete reservoir for distribution. Since membranes remove most dissolved minerals, blending permeate with filter water allows the operation to produce treated water with a more desirable hardness and PH. Approximately 13% of membrane flow (11% of the raw water) is discharged as membrane concentrate to the Souris River. Treated water is distributed to the Co-op and a bulk water (truck) fill is available for rural usage. In the spring of 2014 the second RO unit and filter came online doubling the production capacity of the plant.

Truck Fill





The South RO (original unit)



The North RO (new)



The Original Sand Filter with UV upgrade

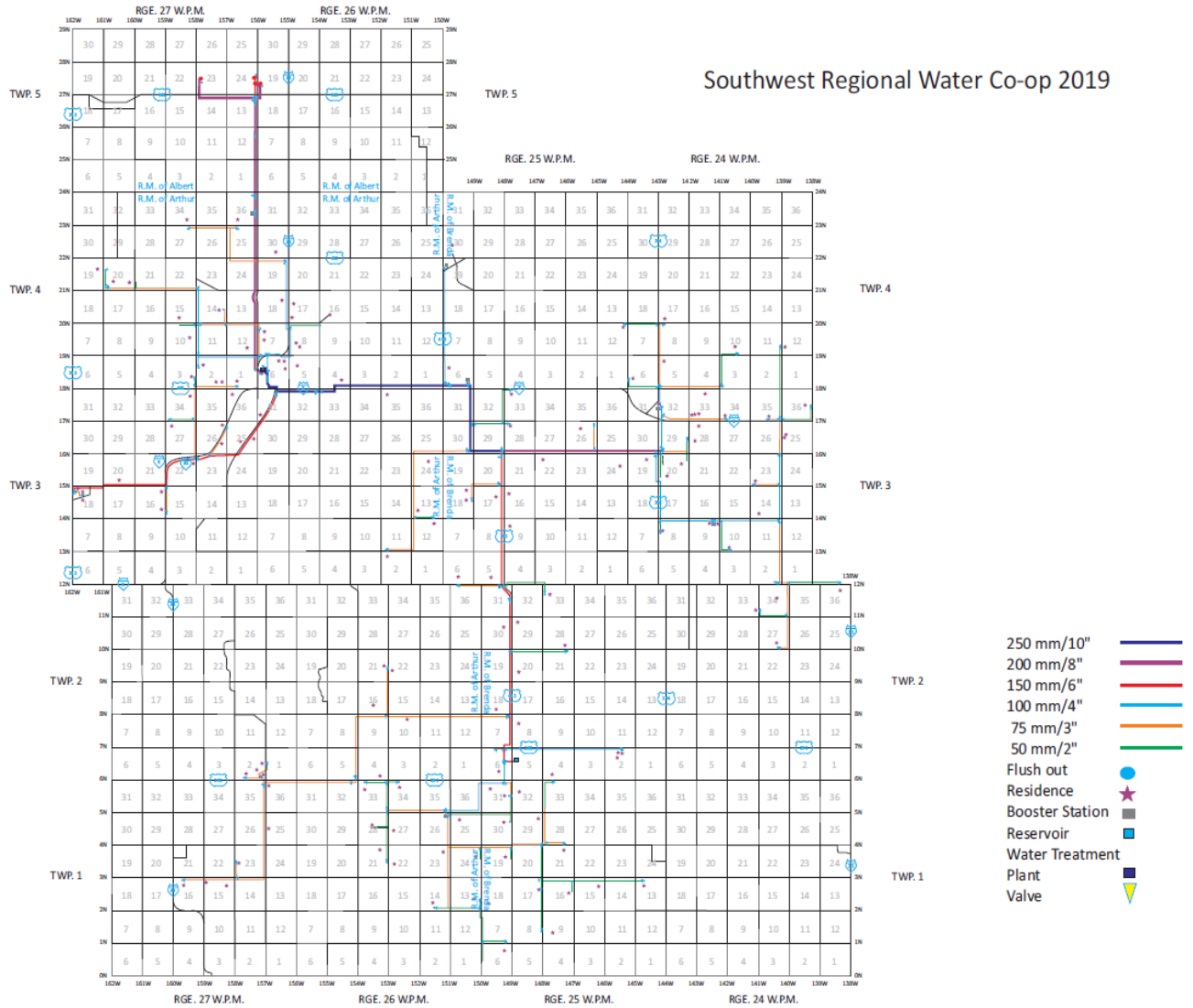


The New Sand Filter with UV

1.3. Distribution System

Treated water from the reservoir, located underneath the WTP, is pumped throughout the Melita distribution system via two 7.5 horsepower duty pumps, with one 30 horsepower emergency standby pump for firefighting purposes. The SWRWC has one 7.5 horsepower duty pump and a new 2 horsepower jockey pump which was installed in the spring of 2017. The SWRWC distribution system consists primarily of High Density Polyethylene Pipe. In 2017 the rural system was expanded to take in another 71 homes and another 150 km of pipe was installed, the raw, 10" and 8" didn't increase but the rest did. 12 miles of 8" raw water supply line, the distribution consists of the following 11 miles of 10", 5 miles of 8", 19 miles of 6", 30 miles of 4", 68 miles of 3", 49 miles of 2", for a total of 182 miles of pipe in the ground. A map of the distribution system pre-expansion is on the next page, a current map is not yet available. The Waskada Rural Water Co-op already had several miles of pipe in place but is now part of the overall distribution system. The WTP also has a natural gas powered generator located in the building that powers the distribution pumps during times of a power failure.

Southwest Regional Water Co-op 2019



The Distribution Pumps



The Generator

1.4. Storage Reservoir

The storage reservoir for the Co-op's drinking water has a capacity of 1,000,000 litres or 220,000 Imperial Gallons, which gives us an available storage time of 2 days without plant operation. Currently the plant runs daily keeping the reservoir full, the main reason for this is to have enough water on hand for firefighting and domestic use. It also helps to keep the water fresh and well circulated. Since the addition of the second RO and Filter the plant runs one RO and Filter on an alternating basis.

1.5. Number of Connections, Population Served and types of Water Users

The Melita distribution system is comprised of 592 service connections, with a population of 1056 (2006 Statistics Canada Census) approximately. The distribution system also services a few rural connections located directly around town in the RM of Two Borders.

In June of 2010 Phase 1 of the Rural Pipeline began construction and the South West Regional Water Co-op was formed which includes to date the Town of Melita, R.M. of Two Borders, R.M. of Brenda, Village of Waskada and the Waskada Rural Water Co-op.

In phase 1; Two Borders has 14 rural service connections, Brenda has 74 service connections 12 are rural connections 38 in Napinka and 24 in Medora. Connections to the Southeast of Melita were completed and came online in June, serving Brenda, Napinka, Medora and additional connections in Two Borders, completing phase 1 of the co-op pipeline. Waskada, the existing Waskada Rural Water Co-op and additional connections in Two Borders and Brenda came online in January 2012, when phase 2 was completed. Phase 3 was completed in the late fall of 2017 adding another 71 connections to the system, 38 in Two Borders and 33 in Brenda-Waskada.

1.6. Classification and Certification

- The Melita WTP is classified as a Class 2 Water Treatment Facility.
- Certification Level of Operators;
 - Brock Bolton, Level 2
 - Rob McCutcheon, Level 1.

1.7. Hydrological Investigations

In 2005, KGS Group conducted a groundwater sourcing study near the Broomhill truck loader station approximately 16 km north of Melita. The objective of the study was to carry out exploratory drilling and installation of a production well with sufficient capacity for the Town's water supply. KGS Group conducted an EM34 survey and drilled approximately 20 test-holes and installed 15 monitoring wells. A 96.5-hour pump test at a constant 15 L/s pump rate was completed and drawdown was monitored. In October 2005, a 200 mm (8 inch) production well was installed on the NW23-5-27W on the Broomhill Wildlife Management Area (WMA). The water level was recorded to be 1.8 meters below ground at the time of drilling. A second

production well was installed 15 meters south of the first in 2007 so that one well could act as a backup supply.

After commissioning the WTP in 2009, a monitoring well system was installed which showed a significant water table drop over the first 6 months of operation. Subsequent test drilling by KGS Group showed that the aquifer was not continuous as originally determined from the 2005 investigations. Newer test drilling at close intervals showed the presence of clay ridges that separated the larger aquifer into smaller basins. It was determined that these clay ridges result in an “egg carton” or “ice cube tray” effect such that once the water table dropped below the top of the ridges, the production wells, which are located into a much smaller basin, are unable to sustain withdrawals necessary to sustain Melita.

1.8. Artificial Recharge

Test drilling activities in 2009 revealed at least three separate basins in close proximity to the well field. The basins are referred to as the south, middle, and north basins whereby the production wells are located in the south basin. In addition, the Broomhill truck loader station is also located in the south basin. Due to the water table drop, the pump in the truck fill had to be lowered to maintain its operation. Recharge infrastructure include a 760 mm (30 inch) well was installed in both the middle and north basin. A 75-mm pipe line was installed from the middle basin well to the south production well. This would allow groundwater from the middle basin to be pumped to the production well site and artificially recharge the south basin. However, due to Manitoba Hydro power restrictions, this well can only be pumped while the production well is not in operation. The WTP generally requires water for about 13 hours a day on average for 2012, such that the middle basin is pumping only when needed. When recharging is required the pump is turned on and runs continually until water levels are back up to an acceptable level and then turned off until needed. Pumping groundwater from the middle basin to the south basin commenced on August 26th, 2009 on an as needed basis and wasn't used in 2010 and since then only as needed.

Since the middle basin could only be pumped intermittently, the north basin well was temporarily equipped with a pump, generator, and overland pipeline to speed up the water table recovery. Pumping from this basin occurred from September 3rd to September 21st until water levels significantly recovered and the north basin water table prevented further pumping. The water table in the north basin has since recovered. In 2012 the north basin was converted to a supplemental well to improve operating pressures and flows to the plant when it is in operation.

Currently, the middle basin well is intermittently pumped to the production well site in an attempt to maintain water levels until the new well field located on the SE24-5-27W can be put into operation. KGS Group determined that pumping from all three basins will not be sustainable to meet Melita demands and recommended developing the new well site. At this point the new east well field is still not in operation as all attempts to remove the iron bacteria from it have failed. More testing and engineering have come up with a plan to drill two new

smaller diameter wells in the same location, that will meet future demands and allow the operation of both RO units at the same time. At the end of 2017 both new wells were drilled and they should be operational February 2018.

The updated graph on page 11 shows ground water levels at various points at and around the new wells.

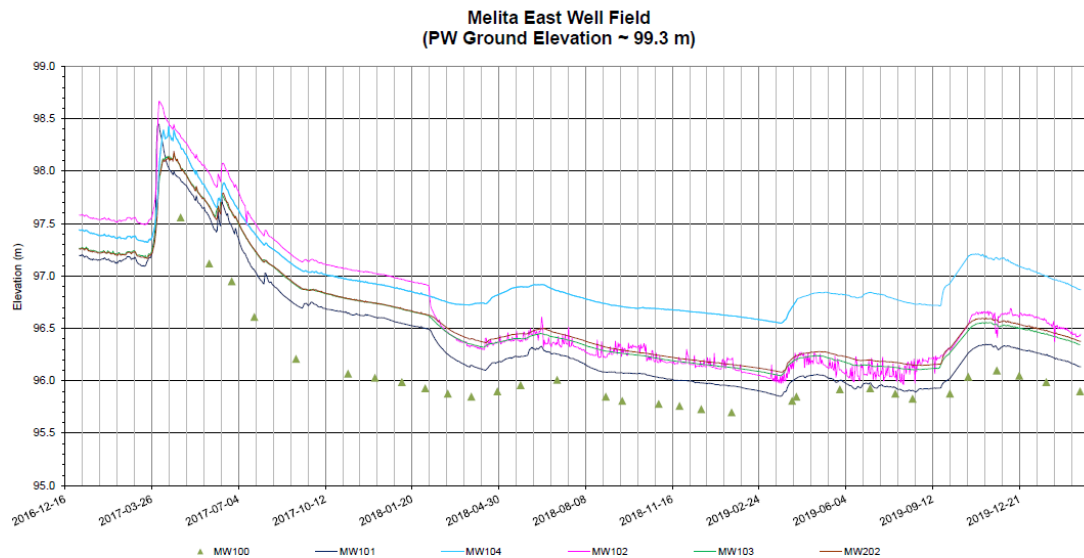


Recharge Wells

Since fall of 2017 we have not had to recharge the east site because we stopped pulling water from these wells and now only pull from the new ones at the East site.

1.9. Groundwater Levels and Monitoring

Groundwater monitoring commenced in July 2009. As many as four pressure transducers were initially set-up and currently three pressure transducers are continuous and manual readings. This graph uses a benchmark of 100.00 m in order to compare levels in each the three basins.



The locations of all monitoring wells are shown in the appendices. 5" MW represents the water table depth near the production well, while MWa and MWb represent the water table depth in the middle and north basins.

In 2007, the Manitoba Water Services Board (MWSB) developed a groundwater monitoring plan for the existing well field (site 1) as required in Environment Act License No. 2745 issued to the Town of Melita. On October 5, 2009, MWSB requested a minor alteration to this license to include the new well field (site 2) located on the SE24-5-27W. As a result, Manitoba Conservation requires a revised water level monitoring plan.

Once operational, site 2 will become the main supply for the SWRWC. Site 1 will remain as a backup supply. Therefore, the groundwater monitoring plan will include monitoring of both sites. The following groundwater monitoring plan is proposed for a period of two years

commencing site 2 operation. After two years, the location and frequency of groundwater monitoring is proposed to be re-evaluated.

Site 1 – NW23-5-27W

In 2009, three new monitoring wells were installed at site 1. A 125-mm monitoring well (MW-21) was installed 15 m east of the production wells in the south basin, a 50-mm monitoring well (MW-22) located 110 m north of the north production well in the middle basin, and a 50 mm monitoring well (MW-23) located 245 m north of the north production well in the north basin. All three monitoring wells were equipped with pressure transducers. However, it is proposed to maintain two pressure transducers at MW-21 and MW-22 for continuous monitoring. A manual water level reading with an electronic tape is proposed semi-annually at MW-10, MW-23 and MW-14. The monitoring of these wells will provide water level data on each of the three basins as well as MW-14 located outside of the basins.

Site 2 – SE24-5-27W

The proposed monitoring system for site 2 will include pressure transducers installed in MW-103 near the proposed production well and in MW-104 located adjacent to the Harmon farmstead. Manual level readings are proposed semi-annually at MW-100, MW-101 and MW-102. MW-100 is located near the Miner and Carr properties. Each monitoring well is protected with a locked steel cover. However, at each monitoring well location, a second 50 mm monitoring well (without steel cover and lock) was provided for public observations.

2. Water Testing

Water tests are taken daily on a routine basis to ensure that the water is safe and to monitor how well the treatment process is performing. We test the water at the WTP and in the distribution system. We perform daily tests at the WTP on 6 different aspects of the treatment process.

- Distribution Tests (*water taken from a point in the distribution system*) on average 6 tests per day.
- Treated Tap (*water taken from a point in the WTP before it leaves the plant*) on average 6 tests per day.
- Raw (*untreated well water as it enters the WTP*) on average 4 tests per day.
- Permeate (*water from the R.O. Unit before chemical addition*) on average 3 tests per day.
- Sand-filter (*treated water from the sand-filter, before it blends with R.O. water*) 7 tests per day, 5 when chlorine isn't used as a pre-treatment.
- MTU or Main Treatment Unit (*water from all 12 vessels and 4 stages on MTU#2 and 11 vessels and 3 stages on MTU#1*) 30 tests per day for conductivity.
- Chlorine we test chlorine daily at 3 locations in the plant (post treatment) before it enters the distribution system. We also test 1 location in Melita and 3 more rurally on a daily basis.

There are on average 56 tests performed a day at the WTP and another 6 rurally, or 1,860 tests a month, 22,630 tests a year.

2.1. Bacterial Testing

We sample the raw water (untreated well water), the treated water (water leaving the treatment plant) and the water in 4 locations in the distribution system one from a location in the RM of Two Borders, another from a location in the RM of Brenda-Waskada and one each from the outgoing waters at the Napinka and Waskada reservoirs every two weeks (bi-weekly) for the presence of Total Coli forms (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. Since the completion of phase 2 WTP staff now collects 6 samples instead of the 10 samples previously. New licences were issued in 2012 and now Melita, Brenda (Napinka and Medora) and Waskada have to do their own sampling for their distribution systems. These 6 samples are then sent via courier to a provincially sanctioned lab in Winnipeg for testing. For 2019 all samples sent for testing passed.

| 2019 Results Total Coliform Bi-weekly Sampling | | |
|--|-----------------------|---------------------------|
| Sample | Samples Submitted | Sample Results |
| Raw | 26/26, 100% compliant | All samples tested passed |
| Treated | 26/26, 100% compliant | All samples tested passed |
| Two Borders @ | 26/26, 100% compliant | All samples tested passed |
| Outgoing Napinka | 26/26, 100% compliant | All samples tested passed |
| Outgoing Waskada | 26/26, 100% compliant | All samples tested passed |
| Brenda-Waskada@ | 26/26, 100% compliant | All samples tested passed |

| 2019 Results E.Coli Bi-weekly Sampling | | |
|--|-----------------------|---------------------------|
| Sample | Samples Submitted | Sample Results |
| Raw | 26/26, 100% compliant | All samples tested passed |
| Treated | 26/26, 100% compliant | All samples tested passed |
| Two Borders @ | 26/26, 100% compliant | All samples tested passed |
| Outgoing Napinka | 26/26, 100% compliant | All samples tested passed |
| Outgoing Waskada | 26/26, 100% compliant | All samples tested passed |
| Brenda-Waskada@ | 26/26, 100% compliant | All samples tested passed |

2.2. Disinfection

The final step in the treatment of safe water is disinfection. Disinfection is the selective destruction or inactivation of potential disease causing organisms in water. Per the *Drinking Water Safety Act* the Melita PWS must ensure that a disinfection residual of at least:

- 0.5 mg/L 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. Chlorine analyzer recorded 3,153,600 for 2019 and all were above the standard.
- 0.1 mg/L of free chlorine per litre of water is detectable at all times at any point in the distribution network. 1 sample taken daily at 3 different locations in the distribution system all were above the standard.

- 95% of water produced through the filters per month is disinfected within validated UV conditions. Which is monitored by the SCADA and verified daily by us which is a crucial part of the 3-log removal for the filter system.

For 2019 all samples tested met the above standards.

2.3. Type of Disinfection Used

The Melita WTP disinfects by adding a 12% sodium hypochlorite solution to the water via 4 chlorinator pumps. One for the raw water before it enters each sand-filter (pre-treatment) and two for the blended water before it enters the reservoir. In 2012 three UV units were added after the filter. In 2014 three more UV units were added after the second filter. Log reduction relates to the percentage of microorganisms physically removed or inactivated by a given process.

- 1-log reduction = 90%
- 2-log reduction = 99%
- 3-log reduction = 99.9%
- 4-log reduction = 99.99%

2.4. Equipment Redundancy and Monitoring Requirements

As required by the *Drinking Water Safety Act* the Melita PWS ensures continuous disinfection is maintained at the WTP by keeping in stock all spare parts required for the chlorinators, as well there are two spare chlorinator pumps kept at the plant. Disinfection residuals are monitored continuously by an online monitor that monitors the water continuously as it leaves the WTP. We also monitor the residuals daily at the WTP and in the distribution system; these tests are performed at the WTP after the samples are collected. The results of all tests are recorded on our records at the WTP as well as Monthly Chlorination and UV Report forms which are sent to the regional *Drinking Water Officer* at the end of each month, to check for standard compliance.

Online Turbidity Monitoring Equipment



| 2019 Monitoring Requirement Results | | |
|--------------------------------------|--|-------------------------|
| Parameter | Monitoring Requirement | Results |
| Free Chlorine (treated water) | Continuous sampling of water entering the distribution system following at least 20 minutes of contact time at the Melita WTP. | 100% compliant |
| Free Chlorine (treated water) | A confirmatory sample to be taken daily at the online chlorine analyzer sampling or effluent point. | 365/365, 100% compliant |
| Free Chlorine (distribution system) | One sample per day of water leaving the Napinka Reservoir | 365/365, 100% compliant |
| Free Chlorine (distribution system) | One sample per day of water leaving the Waskada Reservoir | 365/365, 100% compliant |
| Total Chlorine (treated water) | One sample per day of water entering the distribution system following at least 20 minutes of contact time at the Melita WTP. | 365/365, 100% compliant |
| Total Chlorine (distribution system) | One sample per day of water leaving the Napinka Reservoir | 365/365, 100% compliant |
| Total Chlorine (distribution system) | One sample per day of water leaving the Waskada Reservoir | 365/365, 100% compliant |
| Ultraviolet Disinfection | Continuous monitoring of UV intensity level for each operating unit # 1 | 100% compliant |
| Ultraviolet Disinfection | Continuous monitoring of UV intensity level for each operating unit # 2 | 100% compliant |
| Ultraviolet Disinfection | Continuous monitoring of UV intensity level for each operating unit # 3 | 100% compliant |
| Ultraviolet Disinfection | Continuous monitoring of UV intensity level for each operating unit # 4 | 100% compliant |
| Ultraviolet Disinfection | Continuous monitoring of UV intensity level for each operating unit # 5 | 100% compliant |
| Ultraviolet Disinfection | Continuous monitoring of UV intensity level for each operating unit # 6 | 100% compliant |

2.5. Turbidity Testing

Turbidity is a measurement of the clarity of water. We use turbidity as another means to tell us how well our treatment system is working and to remove particles and other contaminants that can cause the water to look cloudy and affect our disinfection process. Turbidity is tested daily, the raw, treated, sand-filters and distribution by a portable testing meter. The water from the sand-filters and from the MTUs is monitored continuously while the plant is in operation, by two separate online turbidity monitors. The results of all turbidity tests are recorded on our records at the WTP as well as Monthly Turbidity Report forms which are sent to the regional *Drinking Water Officer* at the end of each month to check for standard compliance.

For 2019 all samples met the turbidity standards.

| 2019 Turbidity Monitoring Results | | |
|-----------------------------------|--|---------------------------|
| Parameter | Monitoring Requirement | Results |
| Turbidity | One raw water sample per day | 365/365, 100% compliant |
| Turbidity | Continuous sampling of the effluent from each operating membrane filtration unit # 1 | 100% compliant |
| Turbidity | Continuous sampling of the effluent from each operating membrane filtration unit # 2 | 100% compliant |
| Turbidity | A confirmatory sample to be taken daily at the online turbidity analyzer sampling or effluent point unit # 1 | 365/365, 100% compliant |
| Turbidity | A confirmatory sample to be taken daily at the online turbidity analyzer sampling or effluent point unit # 2 | 365/365, 100% compliant |
| Turbidity (distribution system) | At the same time and locations as bacteriological distribution system sampling | |
| Sample | Samples Submitted | Sample Results |
| Raw | 26/26, 100% compliant | All samples tested passed |
| Treated | 26/26, 100% compliant | All samples tested passed |
| Two Borders @ | 26/26, 100% compliant | All samples tested passed |
| Outgoing Napinka | 26/26, 100% compliant | All samples tested passed |
| Outgoing Waskada | 26/26, 100% compliant | All samples tested passed |
| Brenda-Waskada@ | 26/26, 100% compliant | All samples tested passed |

2.6. Other Testing Performed at the WTP

- Iron Testing: Is performed daily on the following samples, distribution, treated tap, sand-filter. Every 11 days on the raw and every 11 days on permeate.
- Manganese Testing: Is performed daily on the following sample, sand-filter and every 11 days on the distribution, treated tap, raw and permeate.
- PH Testing: Is performed daily on the following samples, treated tap, raw, permeate and concentrate.
- Hardness Testing: Is performed every 11 days on the following samples, raw and treated tap.
- Chlorine Testing: Is performed daily on the following samples, distribution, and treated tap and sand-filter. As previously described in sections 2.2 and 2.3.
- Conductivity Testing: Is performed daily on the following samples, permeate, distribution, treated tap, raw, sand-filter and all 23 vessels on both RO units.

2.7. Plant Operation

The WTP is monitored continuously by the computer system; it is continuously taking readings from 85 different locations by sensors, probes, and meters. This information is displayed in real-time on a different number of screens (see Figure A, B, C which show three different computer screens) and is also recorded and compiled in the form of a trend. These trends can be accessed at any time and show a history of plant operation in various areas (see Figure D for an example of a trend screen).

Figure A

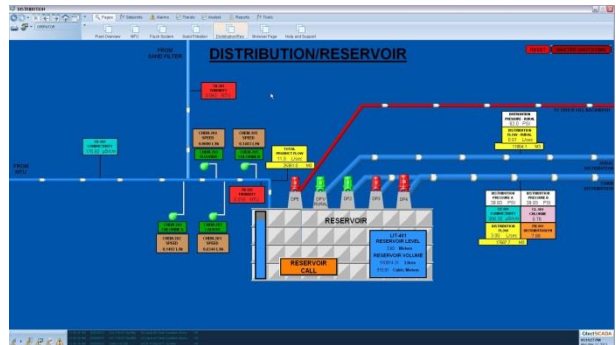
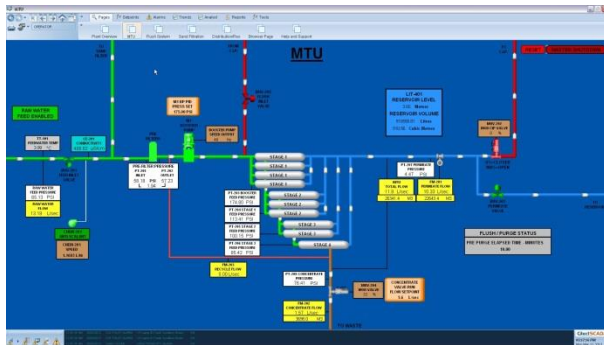


Figure B

Figure C

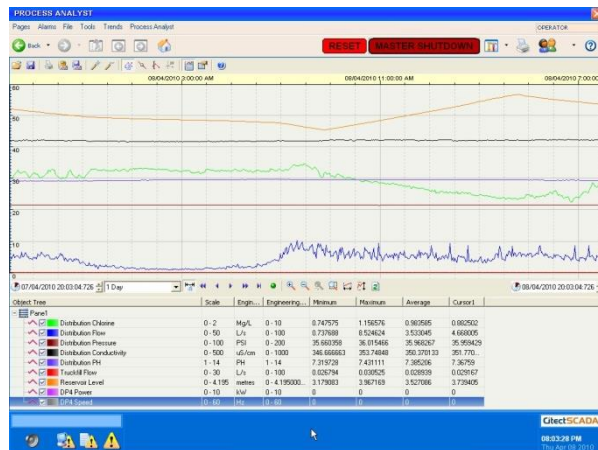
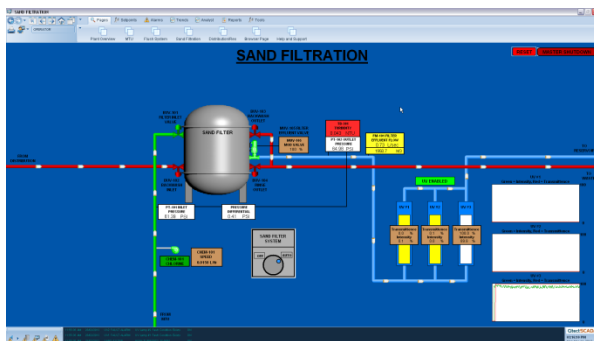


Figure D

2.8. Chemicals Added to our Water and Why

- Sodium Hypochlorite 12%: (Chlorine) Disinfectant, source of available chlorine.
- Avista Vitec 4000: (Antiscalant) Injected in the raw water before the membranes to protect them and aid in the treatment process.
- Sodium Hydroxide 50%: (Caustic Soda) Acid neutralization raises PH.

3. Disinfectant Residual, Turbidity, Bacteria, and Overall Performance Results

For 2019, the SWRWC PWS has met all regulatory requirements in regard to monitoring and reporting in the WTP, and in the distribution system. (*see Table 1 and Appendix “B” – Annual Audit – 2019*).

3.1. List of Water Quality Standards

The province of Manitoba has adopted several water quality standards from the *Guidelines for Canadian Drinking Water Quality* developed by Health Canada and two regulations under the *Drinking Water Safety Act* (*see Table 1*). A copy of the Annual Audit – 2019 from the Office of Drinking Water is in *Appendix “B”*.

4. Water System Incidents and Corrective Actions

In 2019 the SWRWC PWS still has two residents with taste and odour issues due to line size and length and the SWRWC has a plan in place to permanently solve the problem for one and a maintenance plan for the other.

5. Additional Records Required

As of August 2012, fluoride is no longer added to the water.

Daily Log Sheets are also kept to check plant performance, copies of these forms are sent into the Water Services Board for review.

Distribution Flows and Pressures Data Sheets are also kept to keep an eye on flows and pressures of the water leaving the reservoir.

Conductivity Sheets are also kept to check plant performance, copies are also sent into the Water Services Board for review.

Pressures and Flows are also recorded at 4 locations on the rural pipeline (Napinka Reservoir, the Napinka Booster Station, Medora, Medora Booster Station and Waskada Reservoir).

6. Drinking Water Safety Orders and Actions Taken in Response

In 2019, no drinking water safety orders were issued for the SWRWC PWS.

7. Boil Water Advisories Issued and Actions Taken in Response

In 2019, no boil water advisories were issued for the SWRWC.

8. Warnings Issued/Charges Laid in Accordance with the Drinking Water Safety Act

In 2019, no warnings were issued or charges laid for the SWRWC PWS.

9. Major Expenses Incurred

None for 2019.

10. Future System Expansion and/or Increased Production

Proposals have been made but as of the time this report was completed no funding has been awarded.

11. Water Production/Usage for 2019

The treatment system capacity was designed to meet a 20-year future demand for Melita as well as additional capacity for the rural water system. The water system production and usage are summarized in the following charts in ***Appendix "A" – Usage Charts.***

Appendix “A” – Usage Charts

Raw

| Total Gals | Highest Day | Lowest Day | Daily Average |
|------------|-------------|------------|---------------|
| 49,830,838 | 344,714 | 62,775 | 136,523 |

Melita

| Total Gals | Highest Day | Lowest Day | Daily Average |
|------------|-------------|------------|---------------|
| 25,689,206 | 159,912 | 35,463 | 70,381 |

Melita Truck Fill

| Total Gals | Highest Day | Lowest Day | Daily Average |
|------------|-------------|------------|---------------|
| 452,427 | 27,093 | 0 | 1,240 |

Napinka

| Total Gals | Highest Day | Lowest Day | Daily Average |
|------------|-------------|------------|---------------|
| 1,064,457 | 13,216 | 1,762 | 2,916 |

Napinka Truck Fill

| Total Gals | Highest Day | Lowest Day | Daily Average |
|------------|-------------|------------|---------------|
| 77,593 | 2,511 | 0 | 213 |

Medora

| Total Gals | Highest Day | Lowest Day | Daily Average |
|------------|-------------|------------|---------------|
| 570,937 | 6,388 | 661 | 1,564 |

Waskada

| Total Gals | Highest Day | Lowest Day | Daily Average |
|------------|-------------|------------|---------------|
| 3,627,087 | 6,388 | 4,626 | 9,937 |

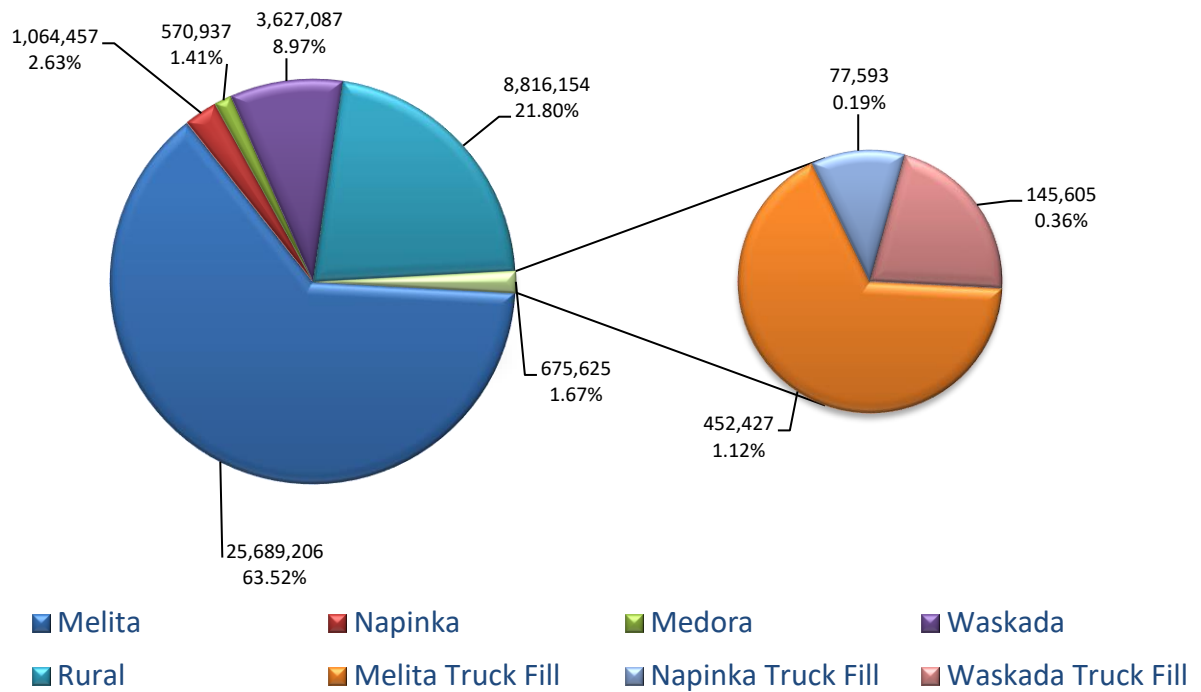
Waskada Truck Fill

| Total Gals | Highest Day | Lowest Day | Daily Average |
|------------|-------------|------------|---------------|
| 145,605 | 6,761 | 0 | 399 |

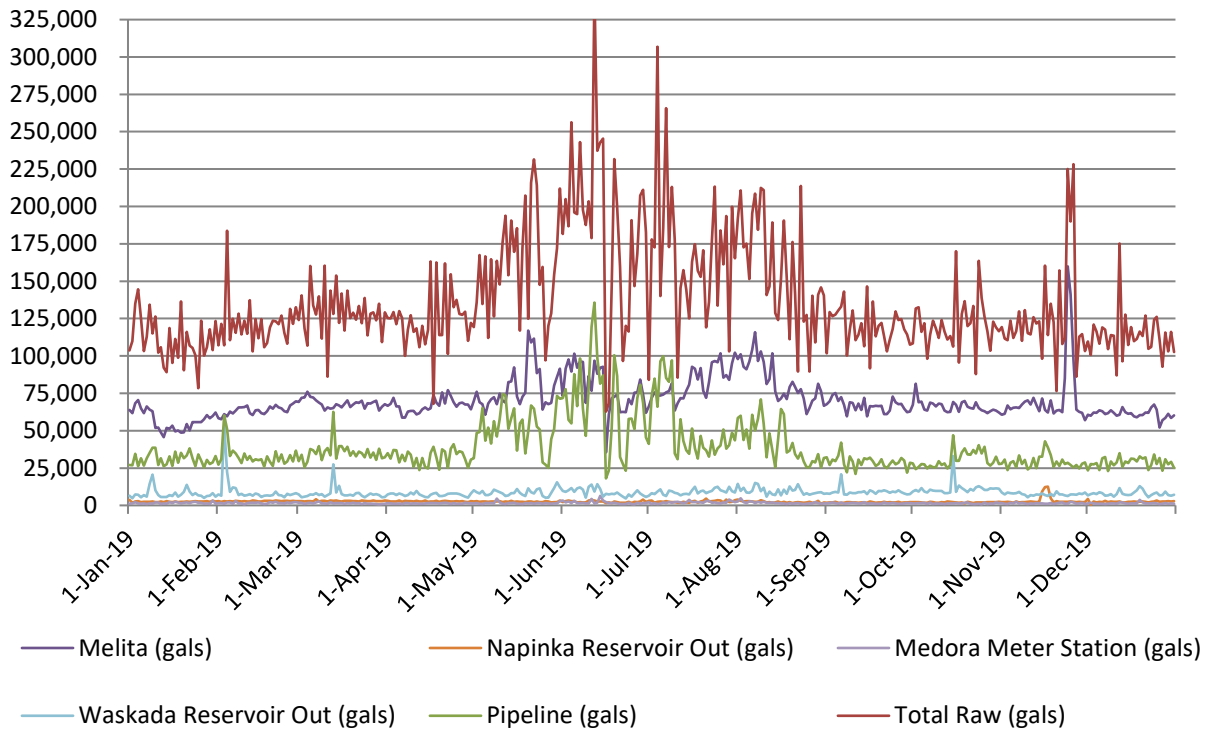
Rural

| Total Gals | Highest Day | Lowest Day | Daily Average |
|------------|-------------|------------|---------------|
| 8,816,154 | 109,691 | 11,013 | 24,155 |

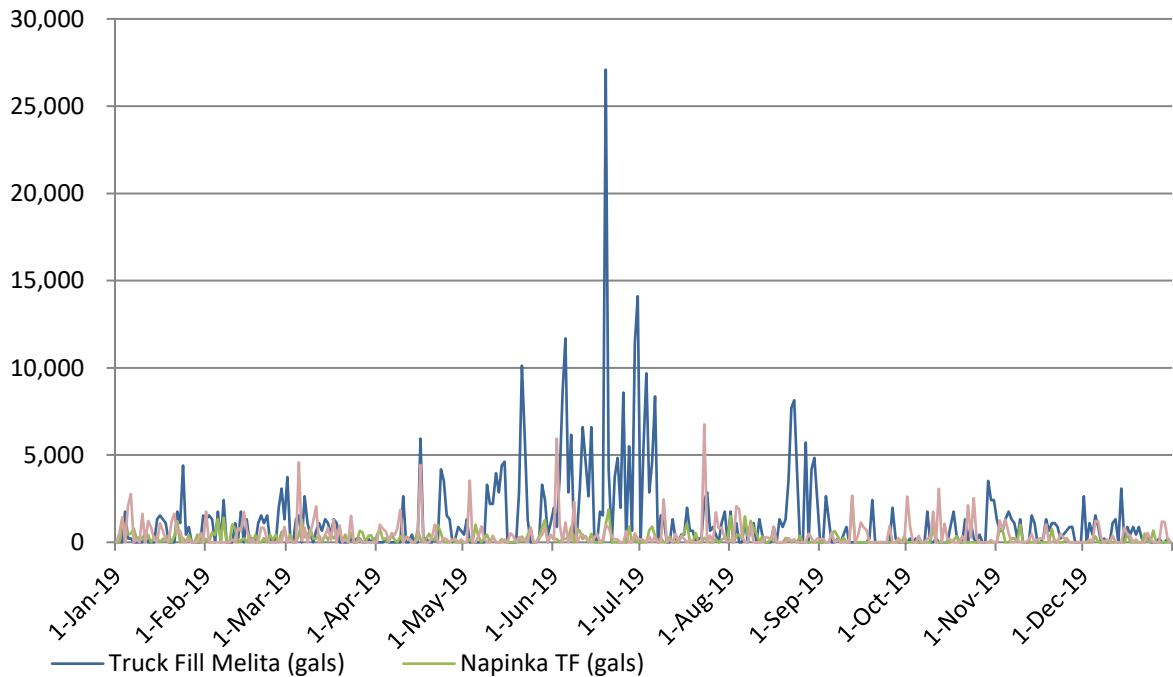
2019 Usage Chart in Imperial Gallons



2019 Usage Chart



2019 Truck Fill Usage Chart



Appendix “B” – Annual Audit 2019



Conservation and Climate

Office of Drinking Water
1129 Queens Avenue
Brandon Manitoba Canada R7A 1L9
T 204-724-0685 F 204-726-6567
www.gov.mb.ca/drinkingwater

January 17, 2020

PWS Code: 205.10

Diane Woodworth
Southwest Regional Water Co-op
Box 40
Waskada, MB R0M 2E0

2019 Annual Compliance Audit

Dear Ms. Woodworth:

Please find enclosed the 2019 Annual Compliance Audit for the Southwest Regional Co-op public water system (PWS). The report compares water system compliance to The Drinking Water Safety Act and its supporting regulations, and the terms and conditions of the water system's current operating licence (PWS-11-495-01).

Where non-compliance items are identified, the issues do not necessarily translate into increased public health risk. The Office of Drinking Water uses processes, including boil water advisories, to notify water users of a public health risk.

Please review the following terms and conditions of your operating licence to ensure ongoing compliance:

- Water quality sampling frequencies identified in *Table 2*.
- Water System Assessment (due date: March 1, 2021)
- 2019 Public Water System Annual Report (due date: March 31, 2020)
- Advisory Notification Plan (due date: May 1, 2020)

Facility Classification and Operator Certification

In 2020, Conservation and Climate will be enforcing on the Water and Wastewater Facility Operators Regulation MR. 77/2003 beginning with Public Water Systems classified at Level 3 and Level 4 Water Treatment Facilities and Water Distribution. The focus will be on operator certification and submission of an up-to-date Table of Organization.

Operational Guidelines

Water suppliers that own and operate any portion of their water supply on a seasonal basis, such as a campground or park, are reminded they are required to follow Seasonal Water System Start-up/Shutdown procedures. Your operating licence may be amended in the future to reflect this requirement; however, in the interim, the protocol must be followed.

Water suppliers are reminded to immediately notify the Office of Drinking Water of any condition(s) that may affect the ability of the water system to produce or deliver safe drinking water. These conditions include:

- treatment upsets, bypass conditions, operation outside of licence conditions
- contamination of source or treated water
- a disinfection, filtration, or distribution system failure

Operational Guidelines to assist operators in meeting regulatory obligations for monitoring and reporting under The Drinking Water Safety Act, including Seasonal System and Emergency Reporting requirements, can be found on our website at: www.gov.mb.ca/drinkingwater.

Additional Information

Health Canada has updated National Guidelines, including algae (cyanobacteria toxins) manganese and lead. Owners and operators are encouraged to review Health Canada's guidelines and related chemistry results to determine what impact they may have on your water supply. You will receive notification of any changes to Health Canada's Guidelines for Canadian Drinking Water Quality and Manitoba Standards should they affect your water supply.

The 2019 Annual Compliance Audit is based on information submitted to this office. If you have questions regarding non-compliance items identified in this audit, please review your records prior to contacting this office. If your records conflict with the audit information, please call me at (204) 724-0685.

Sincerely,



Nancy Fitzgerald
Regional Drinking Water Officer

e.copy: Brock Bolton, General Manager and Lead Operator
Angela Meier, Manitoba Water Services Board

2019 Annual Compliance Audit

Water System: SOUTHWEST REGIONAL WATER CO-OP - PWS

Code: 205.10

Water System Owner: Southwest Regional Water Co-op Inc.

Water System Operating Licence: PWS-11-495-01

Expiry Date: November 30, 2021

- 1) This report documents the Southwest Regional Water Co-op Public Water System compliance for the period from January 1 to December 31, 2019.
- 2) Addendum A to this report provides specific information on the non-compliance incidents identified in the summary below.
- 3) Other than the information provided in attached Addendum A, the water supplier has complied with *The Drinking Water Safety Act*, its supporting regulations, and the terms and conditions of the water system's current operating licence
- 4) This report is based on information submitted by the water supplier, agents of the water supplier, and / or the Province of Manitoba.

Summary of Non-Compliance Incidents:

| |
|---------------|
| None reported |
|---------------|

Addendum A: Record of Non-Compliance
 Water System: SOUTHWEST REGIONAL WATER CO-OP - PWS
 Report period: January 1, 2019 to December 31, 2019.

Enforcement Action Taken

| Date | Incident | Outcome |
|------|---------------|---------|
| | None reported | |

Disinfection Requirements

| Date | Incident | Outcome |
|------|---------------|---------|
| | None reported | |

Bacteriological Requirements

| Date | Incident | Outcome |
|------|---------------|---------|
| | None reported | |

Microbial Requirements

| Date | Incident | Outcome |
|------|---------------|---------|
| | None reported | |

Turbidity Requirements

| Date | Incident | Outcome |
|------|---------------|---------|
| | None reported | |

Chemical Requirements

| Date | Incident | Outcome |
|------|---------------|---------|
| | None reported | |

Operational Requirements

| Date | Incident | Outcome |
|------|---------------|---------|
| | None reported | |

Table 1: Water Quality/Treatment Standards

| Parameter | Quality Standard | SWRWC Result |
|------------------------------|--|--------------|
| Total Coliform | Less than one total coliform bacteria detectable per 100 mL in all treated and distributed water | 100% |
| E. Coli | Less than one E. Coli bacteria detectable per 100 mL in all treated and distributed water | 100% |
| Chlorine Residual | A free chlorine residual of at least 0.5 mg/L in water entering the distribution system following a minimum contact time of 20 minutes | 100% |
| | A free chlorine residual of at least .01 mg/L at all times at any point in the water distribution system. | 100% |
| Ultraviolet Disinfection | 95% of water produced per month is disinfected within validated conditions | 100% |
| Turbidity | Less than or equal to 0.1 NTU in 99% of the measurements in a month of the effluent from each membrane filtration unit | 100% |
| | Not exceeded 0.3 NTU for any continuous measurement | 100% |
| Total Trihalomethanes (THMs) | Less than or equal to 0.10 mg/L of February quarterly sample | 0.0082 |
| Total Trihalomethanes (THMs) | Less than or equal to 0.10 mg/L of May quarterly sample | 0.0061 |
| Total Trihalomethanes (THMs) | Less than or equal to 0.10 mg/L of August quarterly sample | 0.0125 |
| Total Trihalomethanes (THMs) | Less than or equal to 0.10 mg/L of November quarterly sample | 0.0061 |
| Total Trihalomethanes (THMs) | Less than or equal to 0.10 mg/L as locational annual average of quarterly samples | 0.0082 |
| Haloacetic Acids (HAAs) | Less than or equal to 0.08 mg/L of February quarterly sample | <0.0054 |
| Haloacetic Acids (HAAs) | Less than or equal to 0.08 mg/L of May quarterly sample | <0.0054 |
| Haloacetic Acids (HAAs) | Less than or equal to 0.08 mg/L of August quarterly sample | <0.0054 |
| Haloacetic Acids (HAAs) | Less than or equal to 0.08 mg/L of November quarterly sample | <0.0054 |
| Haloacetic Acids (HAAs) | Less than or equal to 0.08 mg/L as locational annual average of quarterly samples | <0.0054 |
| Arsenic | Less than or equal to 0.01 mg/L | .00022 |
| Benzene | Less than or equal to 0.005 mg/L | <0.00050 |
| Fluoride | Less than or equal to 1.5 mg/L | <0.020 |
| Lead | Less than or equal to 0.01 mg/L in the water distribution system | <0.000127 |
| Nitrate | Less than or equal to 45 mg/L measured as nitrate (10 mg/L measured as nitrogen) | 0.105 |
| Trichloroethylene | Less than or equal to 0.005 mg/L | <0.00050 |
| Tetrachloroethylene | Less than or equal to 0.01 mg/L | <0.00050 |
| Uranium | Less than or equal to 0.02 mg/L | 0.00112 |

Appendix "c" – General Chemistry Results 2019



Manitoba Water Services Board - SRWC
ATTN: BROCK BOLTON
Southwest Regional Water Co-op
Box 364
Melita MB R0M 1L0

Date Received: 13-AUG-19
Report Date: 30-AUG-19 11:10 (MT)
Version: FINAL

Client Phone: 204-522-3463

Certificate of Analysis

Lab Work Order #: L2327179
Project P.O. #: NOT SUBMITTED
Job Reference: SOUTHWEST REGIONAL WATER CO-OP 205.10
C of C Numbers:
Legal Site Desc: 52992

Hua Wo
Chemistry Laboratory Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721
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Environmental

www.alsglobal.com

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ANALYTICAL REPORT

Physical Tests (WATER)

| | | ALS ID | | L2327179-1 | L2327179-2 |
|----------------------------------|----------|----------------|----------------|--|---|
| | | Sampled Date | | 12-AUG-19 | 12-AUG-19 |
| | | Sampled Time | | 10:50 | 10:57 |
| | | Sample ID | | SWRWCO-OP 1 - RAW | SWRWCO-OP 2 - TREATED |
| Analyte | Unit | Guide Limit #1 | Guide Limit #2 | | |
| Colour, True | CU | 15 | - | <5.0 | <5.0 |
| Conductivity | umhos/cm | - | - | 640 | 193 |
| Hardness (as CaCO ₃) | mg/L | - | - | 379 HTC | 66.6 HTC |
| Langelier Index (4 C) | No Unit | - | - | 0.71 | -0.53 |
| Langelier Index (60 C) | No Unit | - | - | 1.5 | 0.25 |
| pH | pH units | 7.00-10.5 | - | 8.03 | 7.94 |
| Total Dissolved Solids | mg/L | 500 | - | 405 | 113 |
| Transmittance, UV (254 nm) | %T/cm | - | - | 90.2 | 98.6 |
| Turbidity | NTU | - | - | 1.05 | <0.10 |

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

#1: GCDWQ - Aesthetic Objective/Other Value

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Anions and Nutrients (WATER)

| | | ALS ID | | L2327179-1 | L2327179-2 |
|---|------|----------------|----------------|-------------------|--|
| | | Sampled Date | | 12-AUG-19 | 12-AUG-19 |
| | | Sampled Time | | 10:50 | 10:57 |
| | | Sample ID | | SWRWCO-OP 1 - RAW | SWRWCO-OP 2 - TREATED |
| Analyte | Unit | Guide Limit #1 | Guide Limit #2 | | |
| Alkalinity, Total (as CaCO ₃) | mg/L | - | - | 286 | 85.1 |
| Ammonia, Total (as N) | mg/L | - | - | 0.013 | <0.010 |
| Bicarbonate (HCO ₃) | mg/L | - | - | 348 | 104 |
| Bromide (Br) | mg/L | - | - | 0.055 | <0.010 |
| Carbonate (CO ₃) | mg/L | - | - | <0.60 | <0.60 |
| Chloride (Cl) | mg/L | 250 | - | 3.78 | 2.00 |
| Fluoride (F) | mg/L | - | 1.5 | 0.086 | 0.020 |
| Hydroxide (OH) | mg/L | - | - | <0.34 | <0.34 |
| Nitrate (as N) | mg/L | - | 10 | 0.218 | 0.105 |
| Nitrite (as N) | mg/L | - | 1 | 0.0035 | <0.0050 OLW |
| Sulfate (SO ₄) | mg/L | 500 | - | 76.1 | 14.5 |

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

#1: GCDWQ - Aesthetic Objective/Other Value

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Organic / Inorganic Carbon (WATER)

| | | ALS ID | | L2327179-1 | L2327179-2 |
|--------------------------|------|----------------|----------------|-------------------|--|
| | | Sampled Date | | 12-AUG-19 | 12-AUG-19 |
| | | Sampled Time | | 10:50 | 10:57 |
| | | Sample ID | | SWRWCO-OP 1 - RAW | SWRWCO-OP 2 - TREATED |
| Analyte | Unit | Guide Limit #1 | Guide Limit #2 | | |
| Dissolved Organic Carbon | mg/L | - | - | 2.73 | 0.89 RRV |
| Total Organic Carbon | mg/L | - | - | 2.50 | <0.50 RRV |

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

#1: GCDWQ - Aesthetic Objective/Other Value

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

 Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.

 Analytical result for this parameter exceeds Guide Limit listed on this report.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Total Metals (WATER)

| | | ALS ID | | L2327179-1 | L2327179-2 |
|-----------------------|------|----------------|----------------|-------------|-------------|
| | | Sampled Date | | 12-AUG-19 | 12-AUG-19 |
| | | Sampled Time | | 10:50 | 10:57 |
| | | Sample ID | | SWRWCO-OP 1 | SWRWCO-OP 2 |
| | | | | RAW | TREATED |
| Analyte | Unit | Guide Limit #1 | Guide Limit #2 | | |
| Aluminum (Al)-Total | mg/L | 0.1 | - | <0.0030 | <0.0030 |
| Antimony (Sb)-Total | mg/L | - | 0.006 | 0.00011 | <0.00010 |
| Arsenic (As)-Total | mg/L | - | 0.01 | 0.00074 | 0.00022 |
| Barium (Ba)-Total | mg/L | - | 1 | 0.106 | 0.0205 |
| Beryllium (Be)-Total | mg/L | - | - | <0.00010 | <0.00010 |
| Bismuth (Bi)-Total | mg/L | - | - | <0.000050 | <0.000050 |
| Boron (B)-Total | mg/L | - | 5 | 0.025 | 0.017 |
| Cadmium (Cd)-Total | mg/L | - | 0.005 | <0.000050 | <0.000050 |
| Calcium (Ca)-Total | mg/L | - | - | 86.8 | 16.0 |
| Cesium (Cs)-Total | mg/L | - | - | <0.000010 | <0.000010 |
| Chromium (Cr)-Total | mg/L | - | 0.05 | <0.00010 | 0.00013 |
| Cobalt (Co)-Total | mg/L | - | - | 0.00028 | <0.00010 |
| Copper (Cu)-Total | mg/L | 1 | 2 | <0.00050 | 0.00383 |
| Iron (Fe)-Total | mg/L | 0.3 | - | 0.285 | <0.010 |
| Lead (Pb)-Total | mg/L | - | 0.005 | <0.000050 | 0.000127 |
| Lithium (Li)-Total | mg/L | - | - | 0.0146 | 0.0045 |
| Magnesium (Mg)-Total | mg/L | - | - | 39.4 | 6.49 |
| Manganese (Mn)-Total | mg/L | 0.02 | 0.12 | 0.319 | 0.00621 |
| Molybdenum (Mo)-Total | mg/L | - | - | 0.00155 | 0.000309 |
| Nickel (Ni)-Total | mg/L | - | - | 0.00130 | <0.00050 |
| Phosphorus (P)-Total | mg/L | - | - | 0.216 | <0.030 |
| Potassium (K)-Total | mg/L | - | - | 3.49 | 1.16 |
| Rubidium (Rb)-Total | mg/L | - | - | 0.00126 | 0.00047 |
| Selenium (Se)-Total | mg/L | - | 0.05 | 0.000220 | <0.000050 |
| Silicon (Si)-Total | mg/L | - | - | 11.0 | 2.45 |
| Silver (Ag)-Total | mg/L | - | - | <0.000010 | <0.000010 |
| Sodium (Na)-Total | mg/L | 200 | - | 7.30 | 14.2 |
| Strontium (Sr)-Total | mg/L | - | 7 | 0.163 | 0.0319 |
| Sulfur (S)-Total | mg/L | - | - | 26.1 | 4.36 |
| Tellurium (Te)-Total | mg/L | - | - | <0.00020 | <0.00020 |
| Thallium (Tl)-Total | mg/L | - | - | <0.000010 | <0.000010 |
| Thorium (Th)-Total | mg/L | - | - | <0.00010 | <0.00010 |
| Tin (Sn)-Total | mg/L | - | - | <0.00010 | <0.00010 |

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

#1: GCDWQ - Aesthetic Objective/Other Value

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

 Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.

 Analytical result for this parameter exceeds Guide Limit listed on this report.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Total Metals (WATER)

| | | ALS ID | | L2327179-1 | L2327179-2 |
|----------------------|------|----------------|----------------|---------------|---------------|
| | | Sampled Date | | 12-AUG-19 | 12-AUG-19 |
| | | Sampled Time | | 10:50 | 10:57 |
| | | Sample ID | | SWRWCO-OP 1 - | SWRWCO-OP 2 - |
| | | | | RAW | TREATED |
| Analyte | Unit | Guide Limit #1 | Guide Limit #2 | | |
| Titanium (Ti)-Total | mg/L | - | - | <0.00030 | <0.00030 |
| Tungsten (W)-Total | mg/L | - | - | <0.00010 | <0.00010 |
| Uranium (U)-Total | mg/L | - | 0.02 | 0.00587 | 0.00112 |
| Vanadium (V)-Total | mg/L | - | - | 0.00060 | <0.00050 |
| Zinc (Zn)-Total | mg/L | 5 | - | <0.0030 | <0.0030 |
| Zirconium (Zr)-Total | mg/L | - | - | <0.00020 | <0.00020 |

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

#1: GCDWQ - Aesthetic Objective/Other Value

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Volatile Organic Compounds (WATER)

| | | ALS ID | | L2327179-1 |
|---------------------------------------|------|----------------|----------------|---------------|
| | | Sampled Date | | 12-AUG-19 |
| | | Sampled Time | | 10:50 |
| | | Sample ID | | SWRWCO-OP 1 - |
| | | | | RAW |
| Analyte | Unit | Guide Limit #1 | Guide Limit #2 | |
| Benzene | mg/L | - | 0.005 | <0.00050 |
| 1,1-dichloroethene | mg/L | - | 0.014 | <0.00050 |
| Dichloromethane | mg/L | - | 0.05 | <0.0050 |
| Ethylbenzene | mg/L | 0.0016 | 0.14 | <0.00050 |
| MTBE | mg/L | 0.015 | - | <0.00050 |
| Tetrachloroethene | mg/L | - | 0.01 | <0.00050 |
| Toluene | mg/L | 0.024 | 0.06 | <0.00050 |
| Trichloroethene | mg/L | - | 0.005 | <0.00050 |
| o-Xylene | mg/L | - | - | <0.00050 |
| m+p-Xylenes | mg/L | - | - | <0.00040 |
| Xylenes (Total) | mg/L | 0.02 | 0.09 | <0.00064 |
| Surrogate: 4-Bromofluorobenzene (SS) | % | - | - | 81.3 |
| Surrogate: 1,4-Difluorobenzene (SS) % | | - | - | 91.2 |

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

#1: GCDWQ - Aesthetic Objective/Other Value

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

 Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.

 Analytical result for this parameter exceeds Guide Limit listed on this report.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.