

ODW Guideline 2009-03

GUIDELINE FOR PREPARING PUBLIC WATER SYSTEM ANNUAL REPORTS

February 2009

Prepared by
The Office of Drinking Water
Manitoba Water Stewardship

Guideline for Preparing a – Public Water System Annual Report –

Purpose:

Section 32 of the Drinking Water Safety Regulation (MR 40/2007) requires public water systems serving 1000 or more people to produce an annual report about the operation of the system. The report must be issued to water users with a copy sent to your Regional Drinking Water Officer within 3 months (by March 31st) of the end of the operating year.

The purpose of the Public Water System Annual Report is to promote public transparency with regard to drinking water. The public has a right to easy access to information related to the water they drink and the water system that provides that water, including the following:

- A brief description of the water system including its water supply source
- A description of the disinfection methods and other treatment applied, and a summary of the disinfectant residual test results;
- A list of the water quality standards that apply to the system and a summary of the analytical results (for raw and treated water) for each standard;
- A summary of corrective actions taken related to complying with the standards when incidents of failure have occurred;
- A summary of any additional records that have been required by the Office of Drinking Water (ex: turbidity reports, UV maintenance log);
- A description of any Drinking Water Safety Orders issued on the system and the actions taken in response to each one;
- A description of any Boil Water Advisories issued on the system and the actions taken in response to each one;
- A summary of any charges laid on the system pursuant to *The Drinking Water Safety Act*;
- A description of any major expenses incurred during the reporting year, and anticipated major expenses, to repair, replace, or install equipment; and
- Any other information or description of any other activities that the supplier believes should be communicated (ex: expansion and upgrading plans, water rate adjustments, funding proposals, training initiatives).

The production of a Public Water System Annual Report validates the system owner's willingness to be accountable for the quality of water being produced and the condition of the water system. As a result, consumers gain more confidence in their community's water supply and become more understanding when rate increases are required to maintain or improve the system. In addition, the reports may be used as a promotional mechanism to attract new residents or commerce to a given community.

To aid communities in the completion of their annual report, two examples are attached: one for a community that uses a groundwater source (wells) and one for a community that uses a surface water source (lake, river, etc.). The groundwater example is presented in a more technical fashion; the surface water example is presented in a question/answer format.

If you intend to use the examples, it is suggested that you review both formats and choose the one most suitable for your situation. The formats are interchangeable. You can use the question and answer format for a groundwater system or the technical format for a surface water system.

You are not obligated to use the same format as presented in the examples; however, you must ensure that your report contains all the information as required in Section 32 of the Drinking Water Safety Regulation available at:

www.gov.mb.ca/waterstewardship/odw/reg-info/acts-regs/index.html.

The report can be presented in report form or as a brochure/pamphlet. In either case, the tone and content of the document should reflect the expected level of understanding of the readers.

Summary of Report Requirements:

Sections that must be commented on for all water systems required to prepare a report are:

- Description of water system
- Disinfection
- List of water quality testing* and results
- Major expenses (reporting year only)
- Future expenses (next 2 years)

Sections that may or may not apply for the operating year in question include:

- Emergencies, compliance issues and other operational issues (ex: major water main breaks)
- Drinking Water Safety Orders
- Boil Water Advisories
- Enforcement actions

Report Distribution:

As per Section 32 (subsections 3 and 4), MR 40/2007, water systems must ensure free copies of the report are made available to water users and that the report is posted on an Internet website. In addition one copy of the report must be submitted to your Drinking Water Officer.

Please include a covering letter with the copy of the report that is sent to the Drinking Water Officer. The letter should include the following information:

- The date that the report was placed on an Internet website and website address;
- The location where free paper copies are available;
- The method(s) used to notify water users that the report is available.

Questions:

Any questions related to producing a Public Water System Annual Report should be directed to the Drinking Water Officer associated with your water system.

*The List of Water Quality Standards is specified in your operating licence. If your operating licence has not been issued, Schedule B MR 41/2007 contains the standards that will be applied. Water Quality results can be taken from the chemical audit currently undertaken by the Office of Drinking Water. If you have any questions, please contact your regional Drinking Water Officer.

**TOWN OF
SUMMERLAND**

Public Water System Annual Report

- 2007 -

EXAMPLE ONLY

Prepared by:
Jeff Curley, Operator-in-Charge

To report an emergency, call the Emergency 24hr pager number: 204-999-9999

Town of Summerland Annual Water System Operation Report - 2007

The Town of Summerland, Manitoba strives to provide high quality drinking water in sufficient quantity to meet the needs of the public. It is our goal to do so in a safe, cost effective manner while remaining in compliance with the regulatory requirements governing the provision of drinking water.

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 Community of Summerland water system.

Where do we get our water from?

The Old Mud River has a reputation of not only being a superb recreational water resource, but water quality information has shown that, with treatment, the water is the best source for a drinking water supply for our town.

From the Old Mud River, the water makes its way by gravity flow to a pumping station located on West Burn Drive. From that point the water is pumped to the Summerland Water Treatment Facility for treatment.

Why do we treat our water?

We treat our water to ensure that safe and pleasing drinking water is supplied to the homes and businesses in Summerland. In addition, new Provincial Regulations have set health based drinking water standards for all public water systems. The Town of Summerland is committed to meeting or exceeding the water quality standards set by the province while providing the best tap water in Eastern Manitoba.

What type of water treatment do we use?

Due to the high water quality already existing in the Old Mud River, we are able to keep our treatment process relatively simple compared to some jurisdictions that have lower quality source waters. Treatment consists of an “enhanced coagulation/flocculation process” followed by filtration. These processes are designed to clarify the water and remove microbial contaminants, such as bacteria, and organic materials that are naturally found in river waters.

Why and how do we disinfect our water?

The final step in the treatment of safe water is disinfection. Disinfection is the selective destruction or inactivation of disease causing organisms in water. The *Drinking Water Safety Act* and supporting regulations require that water is disinfected before it leaves the water treatment facility and that an adequate amount of disinfectant is in the distribution system (water piping network) to ensure the water is safe right to the consumer’s tap.

The treated water is disinfected using two methods. The first disinfection method is by Ultraviolet (UV) Light Disinfection. The water passes by a UV light after it is filtered. The UV light is designed to inactivate (kill) microscopic parasites commonly found in river water such as *Cryptosporidium*

and Giardia that can cause illness such as Beaver Fever. The second disinfection method is chlorination. Though chlorine is relatively ineffective against Cryptosporidium and Giardia, it is added to kill bacteria and viruses that are commonly found in surface water such as rivers. An adequate amount of Chlorine is added before the water enters the storage reservoir to ensure an effective kill and to provide a disinfectant residual in the +20 km of water piping throughout the Town of Summerland.

Are any other chemicals added to our water? Why?

We add orthophosphates and fluoride to the water.

Orthophosphate is added to form a protective coating on water pipes, valves and plumbing components. This protective coating reduces corrosion, thus minimizing maintenance costs and reducing the presence of lead in the drinking water.

Fluoride is added as part of the Provincial Fluoridation Program at levels that help prevent tooth decay. Many studies support the addition of fluoride.

How much water storage do we have?

A reservoir was built underneath the Summerland Water Treatment Facility to ensure that enough water is available to meet water users' needs and for fire fighting. The reservoir has a capacity of 143,000m³; this is approximately 3 days worth of storage. The reservoir is designed so that the water is always moving and never gets stale.

What is the 'distribution system'?

The water distribution system is the network of underground pipes used to carry the treated water from the water treatment facility to the homes and businesses in Summerland. We have 20.6 km of high density polyethylene (poly) piping throughout the Town of Summerland. The piping is interconnected (looped) to ensure that fresh safe water is continuously supplied. We carry out regular maintenance in the distribution system such as our seasonal flushing program in May and fire hydrant testing in cooperation with the Summerland Volunteer Fire Department.

Is our water tested? What for? When?

Water tests are taken on a routine basis to ensure that the water is safe and to monitor how well the treatment facility is performing. We test the water at the water treatment facility and in the distribution system at various locations and times. It is a regulatory requirement that all water test results associated with water safety be submitted to the provincial Office of Drinking Water for review.

Bacterial testing: We test the raw water (untreated river water), the treated water (leaving the water treatment facility) and the water in the distribution system (within the Town of Summerland) every two weeks (bi-weekly) for the presence of Total Coliform and E. coli bacteria. If these bacteria are present in the water it is an indication that disease causing organisms may also be present.

Disinfectant testing: We test the level of chlorine in the treated water every day to ensure that the water leaving the water treatment facility has enough chlorine to ensure proper disinfection. We also test chlorine levels in the distribution system every time we take water samples for bacterial testing.

We undertake regular maintenance of the UV light disinfection system four times per year as prescribed by the manufacturer.

Turbidity testing: Turbidity is a measurement of the clarity of water. We use turbidity 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 processes. Turbidity is tested daily as the raw river water enters the treatment facility and after each filter.

Trihalomethane (THM) testing: Trihalomethanes are formed when chlorine reacts with naturally occurring organic matter in the water. Studies have shown a link between high levels of THMs and cancer. For that reason the province has set a health based standard for THMs of 100 micrograms per litre of water. The THM standard is based on an average of four samples per year. We test THM levels in two locations in the distribution system on a seasonal basis.

Iron testing: The Old Mud River has naturally occurring iron levels above the aesthetic limits established by Health Canada's *Guidelines for Canadian Drinking Water Quality*. Elevated iron levels do not pose a risk to health. However, excessive iron can produce unpleasant tastes and odors in the water, and can cause the water to appear discolored and stain plumbing fixtures and laundry. Our treatment process removes iron. Iron is tested as the water enters the treatment facility and after treatment.

What are the results of the tests? Can we get copies?

The following table summarizes all the treated water test results for 2007:

Testing Parameter	Standard	Performance Objective	Summerland WTF performance	Did we meet the standard?	Did we meet our process performance objectives?
Bacterial	0 Total Coliform (TC), 0 E. coli (EC)		100 %	Yes	Yes
Chlorine (leaving res.)	0.5 mg/L		100 %	Yes	Yes
Chlorine (in piping network)	0.1 mg/L		100 %	Yes	Yes
Turbidity	0.3 NTU*		100 %	Yes	Yes
THM	0.1 mg/L		0 % (average for 2007 was 0.13mg/L)	No	No
Iron		0.3 mg/L	100 %	---	Yes

*NTU (nephelometric turbidity units)

Copies of all test results can be found in Appendix A or (link to results).

How do we plan to meet the Standard or Our Performance Objective for Trihalomethanes?

The Town of Summerland has been monitoring Trihalomethanes (THM) for the past five years and has met provincial and federal guidelines. However, as the summary table above indicates, our treatment system did not meet the Standard or Summerland's performance objectives for THM for 2007. The THM standard of 0.1 mg/L is based on a running average of quarterly samples and the health risks associated with elevated THM's are based on a life time exposure. The THM result for 2007 was 0.13 mg/L and is not considered a 'high' level of THM. The table below shows the results of all THM testing performed during 2007:

Sample Date	THM Result (mg/L)
March 15, 2007	0.08
June 17, 2007	0.09
August 20, 2007	0.24
November 14, 2007	0.10
Average	0.13

The summer of 2007 was very hot and the water level in the Old Mud River was at its lowest recorded level for over 30 years. The low water level and hot weather combined to make the water 'dirtier' than normal. The treatment system was adjusted to contend with the abnormal raw water quality; however, as the test results indicate, the treatment system during this time could not completely and effectively deal with the poor in-coming water quality.

Since that time, the Public Works Staff have been working closely with Engineers and chemical supply companies to determine the best course of action required to ensure that the Summerland Treatment Facility can effectively manage poor raw water quality as experienced during the summer of 2007.

What do we have in place to alert Public Works Staff to water emergencies?

There are mechanisms in place to alert Public Works Staff to any emergencies that might affect the town's water supply. We have developed an Emergency Response Plan for our water system (available at the Town Office or Link) and have implemented an 'Operator On-call' program. Trained operators are available at any time to respond to emergencies as they arise.

Were there any emergencies, regulatory compliance issues or other operational issues to report for 2007?

During 2007, we responded to one low chlorine test, two turbidity exceedences, and one major water main break:

Low Chlorine:

- June 1, 2007, a chlorine residual in the distribution system was below the required 0.1 mg/L requirement. The local water main was flushed. Retesting confirmed good chlorine residuals. As per Provincial Regulations, a Corrective Actions Report was completed and filed with the Office of Drinking Water.

Turbidity:

- March 1, 2007, a turbidity reading from the treated water leaving Filter #1 exceeded the 0.3 NTU* standard for over 12 hours. The filter was backwashed (cleaned) and kept out of service until turbidity levels met the standard. As per Provincial regulations, a Corrective Actions Report was completed and filed with the Office of Drinking Water.
- October 23, 2007, a turbidity reading from the treated water leaving Filter #3 exceeded the 1.0 NTU. The filter was backwashed. Since the turbidity values were still above the 0.3 NTU standard after backwashing, the filter media was inspected and then replaced during the week of November 1. Filter #3 was tested and put back into service the week of November 7. As per Provincial regulations, a Corrective Actions Report was completed and filed with the Office of Drinking Water.

Water Main:

- April 23, 2007, staff responded to a call from a residence that was out of water on PR 329. Water use to residents along Jct. 43 North to PR 329, South to HWY 96 was interrupted for 7 hours while we repaired the break. South Burn Elementary School and Little Tykes Daycare were closed due to the water interruption; however potable water was supplied overland to the South Burn Senior School and Polly Burn Hospital. As per Provincial regulations, a Corrective Actions Report was completed and filed with the Office of Drinking Water.

Were there any major expenses incurred in 2007?

The unexpected problem with Filter #3 resulted in the replacement of filter media; however, costs were within the public works budget. No other major expenses occurred in 2007.

Future system expansion or expenses expected?

The Town of Summerland has applied for Federal and Provincial funding to assist in the rehabilitation of our aging water distribution system (piping network). We expect to be notified of the funding requests mid 2008.

An Engineering Assessment will be undertaken in 2008 in response to elevated THM experienced this past year and to comply with provincial requirements. The cost of this assessment is \$20,000.00 and has been included in the 2008 public works budget.

Further expansion of the water system south of Summerland towards the Supper Sand Hills is in the planning stages; this will result in an additional 10 km of piping and 120 new homes. Costs of the extension will be shared by the developer and Town as per agreement.

Who can we call with questions or concerns regarding our drinking water?

For general questions during regular business hours, call the Town of Summerland Office 190 Main St, 8:30 to 5:00 (closed 12:00 to 1:00 for lunch) 204-333-3333 or send an email to ...Information is also available on our website at ...

To report an issue with your water supply during regular business hours, call the Water Treatment Plant Operator: Jeff Curley 204-333-1111 (plant), 204-333-1010 (cell).

To report an emergency, call the Emergency 24hr pager number: 204-999-9999

Public Water System Annual Report

- 2007 -

Name of the Public Water System: **Winterland Public Water System**

Name of the legal owner: **Town of Winterland**

Contact person: **Reginald Halladay, Chief Administrative Officer**

Phone: **(204) 945-8913**

Email: **Winterland@mts.net**

Website: **www.winterland.ca**

Water system's emergency number: **(204) 945-9999**

Name of Operator: **Barry Jackson, Senior Plant Operator**

Phone during business hours: **(204) 945-9119**

Emergency number: **(204) 795-9614**

Date prepared: February 1, 2008

Reginald Halladay
Chief Administrative Officer
Town of Winterland

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Introduction:

The 2007 Annual Report for the Town of Winterland summarizes the Water Utility's ability to produce safe potable water and meet provincial regulations.

1. Description of the Water System:

The Winterland Public Water System provides potable drinking water to a population of 1500 residents (2007 Census). Treated water produced from 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 Winterland Water Treatment Plant (WTP) receives groundwater from three wells located 1.5 kilometres north of Winterland. The three wells (*See Appendix A-Well Logs*) draw groundwater from the Three-River Aquifer. Well #1 and 2 were drilled in 1976 while Well #3 was drilled in 1992. All three wells were drilled to a depth of approximately 80 feet. Raw water pumped from the wells into a 200mm pipeline where it flows to the raw water reservoir located beneath the water plant.

As water flows through the ground it dissolves metals and minerals. In the case of the Three-River Aquifer, the water has come into contact with iron, manganese, calcium carbonate (hardness causing mineral) and arsenic. The first three items do not pose health concerns, rather they are known as aesthetic water quality parameters. Arsenic, on the other hand, is a health related water quality parameter.

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 kettles and hot water tanks which can reduce the life expectancy of these appliances.

Arsenic is a health based water quality parameter. Exposure to arsenic in drinking water at levels above 0.001 mg/l is associated with an increased risk of cancer.

The current water treatment process is designed to remove iron, manganese and arsenic down to acceptable levels and softened the water down to a total hardness of 120mg/L. With regard to hardness, people have individual preferences about the amount of hardness they desire in their water. Individual homeowners, who desire softer water, have the ability to install softeners.

The Winterland water treatment process contains two treatment trains (*See Appendix B – Treatment Process*). Each treatment train consists of two manganese greensand filters and a membrane filtration unit followed by disinfection and fluoridation.

Iron and Manganese are removed from raw water by the addition of potassium permanganate followed by greensand filtration. The potassium permanganate is added to the raw water to cause the iron and manganese to come out of solution

(precipitate). The precipitated iron and manganese is subsequently removed from the water in the greensand filter.

Hardness and arsenic are removed by the membrane filtration units (nanofiltration). Following nanofiltration, chlorination and fluoridation occurs. 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 Winterland distribution system via two 15 horsepower duty pumps. The distribution system is completely looped and has approximate piped length of 20 kilometres. Piping is comprised of 80% cast iron and 20% PVC.

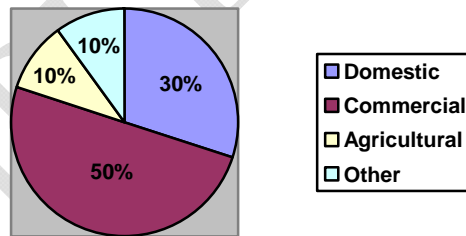
1.4. Storage reservoirs:

Name: Raw Reservoir	Capacity: 50,000 gallons
Name: Treated Reservoir	Capacity: 100,000 gallons
Name: Water Tower	Capacity: 150,000 gallons

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

The Winterland distribution system is comprised of 380 service connections. All service connections are metered. Water is provided to a large demographic (*See Figure 1.1*).

Figure 1.1



1.6. Classification and Certification:

- Class 2 Water Treatment Facility Classification
- Certification level of operators:
 - Barry Jackson, Level 2
 - Don Rider, Level 2
 - Jake Young, Level 1

2. Disinfection System in Use:

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 Winterland PWS must ensure that a disinfectant 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 at any point in the distribution network.

2.1. Type of disinfection system used:

The Winterland WTP disinfects by adding a 12% sodium hypochlorite solution to water via a chlorinator pump.

2.2. Equipment redundancy and monitoring requirements

As required by the *Drinking Water Safety Act* the Winterland 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 water treatment plant and periodically 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. Disinfectant residual overall performance/results:

For 2007, the Winterland Public Water System has met all regulatory requirements in regard to monitoring and reporting disinfection residuals leaving the water treatment plant and in the distribution system.

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 concentration for a groundwater supply source. Concentration values in excess constitute a health-related issue and require corrective actions. The 2007 results for the Winterland Public Water System are summarized in the following table:

Source	Parameter	Standard	Frequency	Test Results
Groundwater	TC & EC*	No TC or EC	Bi-weekly	96% passed
	Disinfectant	WTP (>0.5mg/L)	Daily	100% compliance
		Distribution (0.1 mg/L)	Periodically	100% compliance
	Lead	0.01 mg/l		0.00 mg/L
	Arsenic	0.01 mg/l		0.001 mg/L
	Benzene	0.005 mg/l		0.00 mg/L
	Fluoride	1.5 mg/l		1.00 mg/L
	Nitrate	as nitrate: 45 mg/l as nitrogen: 10 mg/l	Every three years.	0.00 mg/L
				0.00 mg/L
	Tetrachloroethylene	0.03 mg/l		0.00 mg/L
Trichloroethylene	0.005 mg/l		0.00 mg/L	
Uranium	0.02 mg/l		0.00 mg/L	

**Bacterial testing: We test the raw water (untreated well water), the treated water (leaving the water treatment facility) and the water in the distribution system (within the Town of Snoflake) every two weeks (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

Incident 1: Major water main break (July 19, 2007)

A water main break occurred on the water line at 103 Davies Street. Water was shut off for 2 hours during repairs. A total of twenty-five households were affected. Once repaired, the water main was disinfected according to the AWWA Standard C939, and brought back on-line. Bacteriological samples were sent in and passed (*See Appendix "C" – 2007 Bacteriological Sample Results*).

Incident 2: Positive total coliform sample in distribution system (October 30, 2007)

Bacteriological sample taken at 555 Main Street tested positive for a TC=50; EC=0 (*See Appendix "C" – 2007 Bacteriological Sample Results*). Distribution line was flushed, chlorine residuals measured, and the location was re-sampled. Results came back negative. Filled out corrective action form and sent form to regional Drinking Water Officer along with test results at the end of the month.

5. Additional records required

As part of 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 by-weekly for analysis (*See Appendix "D" – 2007 Fluoridation Results*). The Winterland PWS 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. In 2007, fluoride levels never exceeded the 1.20 mg/L recommended limit.

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

In 2007, no Drinking Water Safety Orders were issued for the Winterland Public Water System.

7. Boil Water Advisories Issued and Actions Taken in Response

In 2007, no Boil Water Advisories were issued for the Winterland Public Water System.

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

On April 25, 2007 a Warning was issued to the Winterland Public Water System in accordance with section 32(1) of *Drinking Water Safety Regulation* with regards to failure to submit the 2006 Annual Report by the March 31, 2007 deadline. Report was produced and submitted to the Office of Drinking Water on May 3, 2007.

9. Major Expenses Incurred

In 2007, the greensand filtration media was replaced at a cost of \$10 000.

10. Future System Expansion and/or Increased Production

In 2008, the Town of Winterland will be replacing piping along 4th thru 8th streets removing 10% of the cast iron piping and replacing it with PVC piping. An amount of \$10,000 will be spent on an engineering assessment as required by the Winterland Public Water System's Operating Licence.

Appendix (if applicable)