

2016 Annual Water Public Report

TABLE OF CONTENTS

BACKGROUND INFORMATION

Water Distribution System History	Page 2
Water Distribution System Description	“ ”
Standards	Page 3
Manganese	“ ”
Water Storage Facilities	Page 4
Well Maintenance	Page 5
Valve Exercising	“ ”
Water Main Flushing	“ ”
Future Plans	Page 6

APPENDICES

Ministry of Health Permit	Appendix “A”
Bacteriological Test Results	Appendix “B”
Water System Inspection Report	Appendix “C”

BACKGROUND INFORMATION

Water Distribution System History

Since 1992, water purveyors in B.C. have been required to possess an Operating Permit issued by the Ministry of Health, which includes following the *Guidelines for Canadian Safe Drinking Water Sixth Edition* and the *British Columbia Safe Drinking Water Regulation Canadian Drinking Water Guidelines*.

Water Distribution System Description

The Town of Smithers water system currently draws water from three wells. In 1996, Well #1 was replaced with the current well. Well #1 (19th Avenue) is located about 30 feet away from the original well and is connected to the same pumphouse. It is 268 feet deep and in a sand and gravel aquifer with a 12 inch telescoping screen between 234 and 265 feet. This pumphouse is used for annual chlorine application for Spring Water Main Flushing.

Lab analysis indicated that the water was slightly soft with relatively low mineral content. It met objectives except that the manganese level was 0.087 mg/L, which is slightly above the limit of 0.05 mg/L. The field pH during the latter stages of development was 8.4 and the lab pH at the end of development was 8.1 – slightly alkaline but below the upper limit of 8.5.

Well #2 (Victoria Street well) is 244 feet deep, in the same aquifer, well confined from potential contamination from an old landfill site, and with a similar screen from 193 to 235 feet. Its capacity is unknown, but lower than Well #1.

The Town concluded that the only practical way of determining the capacity of the aquifer in which Wells #1 and #2 are located, was by way of observing performance during long-term use as production wells.

Well #3 (Riverside Park) is located adjacent to the Bulkley River, is 92 feet deep, in a very dirty silty, but easily developed gravel aquifer, and with a similar screen from 64 to 85 feet. Confinement of the aquifer is unknown. Field checks indicated hardness at 85 mg/L, pH 8.5 (at upper limit), iron 0 – “excellent water as confirmed by later lab analysis”. Capacity was estimated at possibly 700 USGPM, but could only practically be determined by observing performance during long-term use as a production well.

The Town reported that the Well #1 (19th Avenue) currently produces about 70 L/s (1,100 USGPM), the Well #2 (Victoria Street) produces about 17 L/s (270 USGPM) and the Well #3 (Riverside Park) produces about 60 L/s (950 USGPM). The system serves approximately 5,400 people.

Standards

The Town of Smithers has a Ministry of Health permit to operate a drinking water system with 301 -10000 connections (copy of permit attached – Appendix “A”). The Emergency Response Plan is reviewed and updated annually.

Bacteriological is tested bi-weekly from 14 locations around the Town of Smithers including parks, schools and private residences. These samples are taken to the local Ministry of Health office and sent to an accredited lab for testing and analyzed for presence of Total Coliforms and E. Coli.

In 2016:

Samples that contained Total Coliform: 0/119

Samples that contained E. Coli 0/119

Number of consecutive samples that contained Total Coliform: 0

Number of samples that contained Total Coliform in the last 30 days: 0/4

A complete breakdown of Total Coliform and E. Coli results can be found in Appendix ‘B’.

Chemical testing is done at 3 Wells annually from 3 locations and are taken to the local Ministry of Health Office and samples sent to an accredited lab for testing and are analyzed for chemical and physical parameters including potability, metals and mercury. A history of results can be found in Appendix C.

The results can also be found at Northern Health Website - Healthspace.ca/nha - Smithers Community Water Systems - Samples

As shown by the annual results, other than a high Manganese (Mn) count, which is an Aesthetic Objective and that there were some exceedances (refer to information below under Manganese) identified during testing, the Town of Smithers water quality meets or exceeds Health Canada standards

Manganese (Mn)

In chemical behavior and occurrence in natural water, manganese resembles iron. Manganese is much less abundant in rocks however. As a result, the concentration of manganese in water is generally less than that of iron. In water containing dissolved carbon dioxide, manganese dissolves as manganous iron. This sometimes occurs in ground waters and in water near the bottom of lakes and reservoirs.

Manganous iron is more stable in water in the presence of dissolved oxygen than ferrous (reduced) iron under similar circumstances. Manganese concentrations greater than 1 mg/L may result where manganese-bearing minerals are attacked by water under reducing conditions or where some types of bacteria are active.

Manganese is an essential trace element for humans. It plays an important role in many enzyme systems. Chronic toxicity has not been reported. The main problem with manganese in drinking water has to do with undesirable taste and discoloration (black) of the water. Aesthetic quality guidelines address parameters, which may affect consumer acceptance of drinking water, such as taste, odour and color. Operational guidelines are set for parameters that may affect processes at a treatment plant or in the drinking water distribution system. The aesthetic objective for manganese in drinking water is 0.05 mg/L. The presence of manganese in drinking water supplies may be objectionable for a number of reasons. At undesirable tastes in beverages. As with iron, the presence of manganese in water may lead to the accumulation of microbial growths in the distribution system. Even at concentrations below 0.05 mg/L, manganese may form coatings on water distribution pipes that may slough off as black precipitates.

Manganese levels for Well # 1 (19th Avenue) 0.138 mg/L, Well #3 (Riverside) 0.149 mg/L and Well #2 (Victoria Street) 0.101 mg/L.

For more information regarding drinking water, please refer to Health Canada and the Canadian Drinking Water Guidelines (CDWG) [Canadian Drinking Water Guidelines - Manganese](#).

Water Storage Facilities

The distribution system includes two reservoirs, both of which float on the system. The Float on the System is a method of operating a water storage facility. Daily flow into the facility is approximately equal to the average daily demand for water. When consumer demands for water are low, the storage facility will be filling. During periods of high demand, the facility will be emptying. The reservoir levels are lowered and raised significantly each day. One reservoir is 265,000 gallons and is approximately 10 feet deep. The other is 1,000,000 gallons and 25 feet deep. Both have a single inlet/outlet and the distribution system is flushed annually.

The main Moncton Road reservoir was built in 1975. The reservoir has been tested and the Condition Survey is on file in the Chief Operator's Office as well as in the Engineering Department at the Town Office. This reservoir was cleaned in 2005 and an average of 3" of sediment was removed from the bottom.

The small reservoir on Zobnick Road was built in 1950; it contains two compartments and is underground. Access is by manhole. Based on the 1999 inspection, the inside condition was satisfactory and the bottom surface was clean. The Zobnick reservoir was cleaned in September 2015.

Well Maintenance

Well maintenance is a critical component of our water infrastructure maintenance program. As the water from the three wells is introduced into our distribution grid untreated, we conduct maintenance and monitoring. The water levels are measured and recorded to ensure the aquifer is not over utilized and the system is checked for malfunctions. The system is flushed regularly and all activities around the wells are closely monitored and regulated. The Environmental Operators Certification Program of British Columbia certifies the employees who maintain this facility. Smithers has a Class 1 system and the Town has three employees who are all level 2 certified that maintain the facilities.

In May of each year when the Town of Smithers flushes its water lines, it follows the American Water Works Association Standards using injection pumps. The Town of Smithers injects liquid Chlorine in to the water at Well #1 (19th Avenue) and Well #3 (Riverside pump houses). The town maintains a residual of 0.20 mg/L while flushing.

Valve Exercising

Valves are interspersed along water mains and can be shut or opened to alter the flow of water. These valves can be buried or left closed causing maintenance challenges by restricting the water flow through the main. In response to these problems, the Town of Smithers staff began a valve-exercising program in 2003. A Town of Smithers crew inspects each valve annually, exposing buried valves, making repairs and exercising every valve by turning it first to a closed position then back to open. This process begins in June and lasts approximately two weeks. When the water main flushing program is completed in May, the valves are checked to ensure all valves are open to give us adequate water supply and fire protection.

The Town of Smithers has 576 flow control valves attached to the underground network. The valves are primarily used to control the direction of water flow and to isolate areas of the network for inspection or repair. If a valve were to fail, water flow to the affected main would be impaired until repaired. The expected service life of a flow control valve is 40 to 50 years without cathodic protection and 100 years with cathodic protection. Cathodic Protection (CP) is a technique used to control the corrosion of metal surface by making it the cathode of an electrochemical cell. A simple method of protection connects protected metal to a more easily corroded "sacrificial metal" to act as the anode.

Water Main Flushing

The Town of Smithers conducts a water main flushing program once a year, usually in the month of May. At this time, chlorine is added to the water system via Well #1 (19th Avenue) and Well #3 (Riverside Park pump stations). Chlorine injection pumps inject liquid hypochlorite into the water. When a water pump kicks on so does the chlorine pump. It will inject sodium hypochlorite at less than 2 parts per million. Testing is done three times a day to be sure the level stays below 2 PPM. It usually

runs at 1.60 PPM, which would give a residual of 0.20 PPM at all times during the flushing program.

As water is drawn from the aquifer, it collects contaminants, transporting them to the Town of Smithers water system. In addition to accumulated debris, some areas of the water system are susceptible to water stagnation, where water usage is low or water mains terminate at a cul-de-sac or dead-end water main. Accumulated debris and stagnant water inhibit flow through mains, cause dirty water and create a favourable environment for bacteria growth. In response to these concerns, chlorine is added during flushing to offset any bacteria that might be disturbed during the flushing program. The Town of Smithers initiated a water main flushing program in 1978. Each main is flushed annually during daytime hours. When flushing, a hydrant is opened and the water stream is used to expel the contents of the main.

Chlorination of the Town of Smithers water supply takes place at two pumping stations, Well #1 (19th Avenue) and Well #3 (Riverside Park). In 2002, the Town of Smithers replaced the old chlorine gas system with a new hypo-chlorate (liquid chlorine) system, which is only used once a year in May when the Town of Smithers flushes it's 46.7 km of water mains.

We take our responsibility as a water supplier very seriously and take pride in the fact that we are able to maintain a system that consistently provides the Town of Smithers with the highest quality of potable water.

FUTURE PLANS

In 2016, the Town of Smithers plans to:

- Loop water line from 19th Street up Carnaby Street to Victoria Street

Respectfully submitted,



Dale Chartrand
Chief Utilities Operator

DC/jb



2016 Annual Water Public Report

APPENDIX "A"

2016 Ministry of Health Permit

PERMIT TO OPERATE

A Drinking Water System with
301-10000 Connections

System Name: Smithers Community Water System
Physical Location: Smithers Community Water System
1027 Aldous Street
Smithers BC
Owner Name: Town of Smithers

Conditions of Permit

- > Bacteriological sampling required minimum of twice weekly, from locations that are representative of the distribution system, as approved by the Environmental Health Officer.
- > Chemical sampling is required minimum yearly, from each source, or at the request of the Environmental Health Officer.
- > An Emergency Response plan shall be maintained and updated annually; or as required.

1-Jul-1992

Effective Permit Date


Environmental Health Officer

30-Jun-2016

Permit Revised Date

*This permit must be displayed
in a conspicuous place and is non-transferable*



northern health
the northern way of caring



2016 Annual Water Public Report

APPENDIX "B"

2016 Bacteriological Test Results

Sample Range Report

Northern Health - Northwest Health Service Delivery Area

Facility Name: Smithers Regional Airport - Water System
Facility Type: WS2
Date Range: Apr 1 2016 to Jun 30 2016
Date Created: Jul 04 2016

Operator Dale Chartrand
 c/o Town of Smithers
 Box 879
 Smithers, BC V0J 2N0

Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
<u>Smithers Airport - Terminal Building, Terminal Building</u>				
	4/5/2016	L1	L1	
	5/10/2016	L1	L1	
	6/13/2016	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Smithers Airport - Maintenance Shop, Smithers</u>				
	4/5/2016	L1	L1	
	5/10/2016	L1	L1	
	6/13/2016	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Lake Kathlyn Elementary School - Staffroom kitchen sink, 7620 Highway 16</u>				
	4/5/2016	L1	L1	
	5/10/2016	L1	L1	
	6/13/2016	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0

Result Values: E - estimated L - less than G - greater than

Samples that contain total coliform:	0	0.00% of total
Samples that contain e. coli:	0	0.00% of total
Samples that contain fecal coliform:	0	0.00% of total
Number of consecutive samples that contain total coliform:	0	
Number of samples that contain total coliform in last 30 days:	0/3	
Total number of samples:	9	

Sample Range Report

Northern Health - Northwest Health Service Delivery Area

Facility Name: Smithers Community Water System
Facility Type: WS1A
Date Range: Jan 1 2016 to Mar 31 2016
Date Created: Apr 08 2016

Operator Dale Chartrand
 Box 879
 Smithers, BC V0J 2N0

Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
<u>Municipal Office, Aldous Avenue</u>				
	1/12/2016	L1	L1	
	1/25/2016	L1	L1	
	2/9/2016	L1	L1	
	2/29/2016	L1	L1	
	3/8/2016	L1	L1	
	3/22/2016	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Hilltop Inn, Main Street</u>				
	1/25/2016	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Smithers Civic Centre,</u>				
	1/25/2016	L1 B45	L1	
	2/29/2016	L1 B9	L1	
	3/22/2016	<u>L1 B23</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Municipal Works Yard, 16 th Avenue</u>				
	1/25/2016	L1	L1	
	2/29/2016	L1	L1	
	3/22/2016	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Hudson Bay Lodge, Highway 16 East.</u>				
	2/29/2016	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0

Result Values: E - estimated L - less than G - greater than

SHIPPED MAR 1 2016

Sample Range Report

Northern Health - Northwest Health Service Delivery Area

Facility Name: Smithers Community Water System
Facility Type: WS1A
Date Range: Jan 1 2016 to Feb 29 2016
Date Created: Mar 17 2016

Operator Dale Chartrand
 Box 879
 Smithers, BC V0J 2N0

Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
<u>Municipal Office, Aldous Avenue</u>				
	1/12/2016	L1	L1	
	1/25/2016	L1	L1	
	2/9/2016	L1	L1	
	2/29/2016	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Smithers Civic Centre,</u>				
	1/25/2016	L1 B45	L1	
	2/29/2016	<u>L1 B9</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Hilltop Inn, Main Street</u>				
	1/25/2016	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Municipal Works Yard, 16 th Avenue</u>				
	1/25/2016	L1	L1	
	2/29/2016	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Hudson Bay Lodge, Highway 16 East.</u>				
	2/29/2016	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0

Result Values: E - estimated L - less than G - greater than

Samples that contain total coliform:	0		0.00% of total
Samples that contain e. coli:	0		0.00% of total
Samples that contain fecal coliform:	0		0.00% of total

Number of consecutive samples that contain total coliform:	0	
Number of samples that contain total coliform in last 30 days:	0/4	
Total number of samples:	10	

Comments:

As per Permit Condition a minimum of 6 samples are required monthly but only 5 were submitted in January and February of 2016. Discussion to be had about switching to weekly sampling for all systems without treatment as a standard of best practice. Please contact if there are questions.



Environmental Health Officer
Mar 17 2016

FOR FURTHER INFORMATION PLEASE CALL: Shane Wadden (250) 847-6400

Definitions:

- Total Coliforms: total coliforms are organisms that are found all around us in the environment (ie on plants, animals and humans). They may or may not be harmful. Northern Health uses these organisms as indicator organisms. If total coliforms are found in the water, that indicates to the Environmental Health Officer (EHO) that other organisms may also be present.
- Fecal Coliforms: bacterial contamination from human or animal waste (feces).
- Escherichia coli: bacterial contamination from human or animal waste (feces).

Codes:

- A: means not tested; likely sample is too long in transit to the lab.
- B# (number) or BG: means the number of non-coliform background bacteria colonies. High numbers (>200) may indicate deteriorating water quality
- CFU: colony forming units
- E. Coli: means Escherichia coli.
- EST: means estimated count.
- L1: means less than 1 (<1) – essentially 0. Satisfactory.
- OG: means overgrowth of bacterial colonies; not possible to count coliform bacteria – unsatisfactory.
- R: means not tested; resample is likely required
- T: means not tested; likely sample is too long in transit to the lab.
- TNTC: means too numerous to count Similar to OG – unsatisfactory.



2016 Annual Water Public Report

APPENDIX "C"

2016 Inspection Report

Water System Inspection Report

Inspection Information	
Facility Name:	Smithers Community Water System
Facility Number:	1610732
Officer:	Shane Wadden
Inspection type:	Routine
Inspection date:	April 26, 2016
Follow-up Inspection Required:	No
Hazard Rating:	Low

Critical Hazards

These items relate to public health or safety, and must receive immediate attention.

Operation & Maintenance

These items must be corrected within a designated time period.


Comments

- No violations at time of inspection.
- The Smithers Community Water System distributes water to the community from 3 deep wells. Wells are located at 19th Avenue (81.4m), Riverside (28.7m), and Victoria St (79.2m). Well log data has been supplied for the three wells but Riverside well requires further data and follow up to understand if this aquifer is confined or not. Currently there is no clear confinement layer and additional information, if available, should be supplied for review by the Public Health Engineer. If additional information cannot be supplied then a hydrogeological assessment of the well is required. Other methods of measuring potential impact of surface waters on a ground water source may also be available as an alternative to the hydrogeological assessment. Monitoring of turbidity and/or other conditions specific to surface waters may prove to provide significant information and may be more cost effective. Contact with the Public Health Engineer should be made to discuss options that are most suitable for your situation.
- There is no treatment for the water sources. Annually there is approximately one month each spring where the system is disinfected with chlorine and is part of the ongoing maintenance of the distribution system. Chlorine disinfection of the distribution system will begin on May 2, 2016. The procedure for disinfection is accompanied by the flushing of lines to remove build up from the distribution lines. There are approximately 194 hydrants, as per the Annual Report that was supplied, that are flushed in the Spring each year. The Town of Smithers ensures that they are following an approved method for the flushing and disinfection of the distribution system.
- Sampling is currently taking place several times a month but will be modified to ensure weekly sampling at different areas that provide a representation of the distribution system. Weekly sampling will commence in May of 2016.
- Chemistry and bacteriological sampling is currently up to date. Lead levels for this system are extremely low from all three sources and testing is completed annually.

- Storage - Two reservoirs provide an ongoing supply to the Town of Smithers.
- The Monkton Road (Tatlow) reservoir continues to show signs of potential degradation and should be monitored for change over the next few years to determine the rate of degradation. An assessment of the reservoir is strongly suggested at this time. Currently it appears that there is some leaching out, due to pressure, but it is unlikely that there is any leaching in. This reservoir was last cleaned, by divers, in 2005 and a report was supplied. Cleaning of the reservoir fenced area is required and includes brush removal and removal of spray paint cans.
- The Zobnick Road reservoir was cleaned in September of 2015 and report information was provided.
- Emergency Response Plan was updated in April of 2016.
- Annual Report was submitted for 2015 and posted to the Town of Smithers website for public viewing. A copy is available for the public upon request.

Private Comments

- Joint inspection with Dale Chartrand
- Regarding weekly sampling - A new permit with the following condition will be issued: "Bacteriological sampling required weekly (with a minimum of 6 samples per month) from locations that are representative of the distribution system as approved by the Environmental Health Officer". Upon receipt of the new permit the old permit is to be surrendered to our office.
- Dates requested to be provided for all source and storage components of system.
- In the 2005 divers report for the Monkton Road reservoir the following statement was made by Phoenix Marine Services: "Assessment of the leakage at the concrete joint was carried out. It is apparent that at the inner side of the subjected wall panel there is not enough depth and penetration in subjected surface cracks in order to apply Aquatapoxy sealant". Based on the changes noted during visual inspections over the past few years this option should be reconsidered at this time. See report or receive further consultation for additional information.
- If more specific information is available about the Riverside Well contact EHO Wadden to discuss.


Shane Wadden
EHO 2