

2019

# District Of 100 Mile House Drinking Water Annual Report



## Introduction

This report was prepared in compliance with the requirements under the British Columbia Drinking Water Protection Act (DWPA) and the District of 100 Mile House Operating Permit. Included in this document is an overview of the treatment and distribution system within the District, a summary of the total water consumption and water quality analysis within the system and a recap of projects and related operations. This report has been provided to Interior Health and posted on the District of 100 Mile House website for public reading.

## District of 100 Mile House Water System

The District of 100 Mile House drinking water system consists of a single treatment plant that feeds the distribution system through most areas of 100 Mile House. The water distribution system consists of three reservoirs, one booster station and a pressure reducing station. The storage capacity of our reservoirs is as follows: Low Zone Reservoir - 1.2 million liters, High Zone Reservoir – 455,000 liters and the Exeter Reservoir – 1.6 Million Liters.

## District of 100 Mile House Water Treatment Plant

The Water treatment plant commissioned in September 2018 treats ground water that is collected from three deep wells located next to the water treatment plant. The water is filtered through a Biological treatment process. When the well the water makes contact with the natural media, (the Biolite™ “S”) the natural occurring bacteria in the water start to consume the Manganese and Iron that is naturally present in the ground water which then forms the precipitate (sludge). The filtered water is then chlorinated and stored in our clear well before being introduced into the distributed system. The filter media is maintained through periodic backwashes which removes the precipitant (sludge) accumulated in the filter media. The bacteria naturally existing in the raw water stay in the media, even after an adapted wash of the filter. The backwashed water and waste material are then stored in the backwash wastewater recovery tank where the sludge will be sent to a holding tank, and the water will be recovered and reintroduced into the raw water entering the filter tank.



## Water Treatment Plant Production

2019 water consumption was lower than any of the past 5 years.

Figure 2: Monthly Total Production for the Past 5 Years

						Year to Year Comparison		
	2015	2016	2017	2018	2019	Average	Minimum	Maximum
January	33,291	35,234	36,405	38,975	32,247	35,230	32,247	38,975
February	31,249	32,038	32,963	35,434	27,998	31,940	27,998	35,434
March	35,303	35,256	35,855	39,150	32,000	35,513	32,000	39,150
April	37,391	40,609	36,187	40,866	30,858	37,158	30,858	40,866
May	50,862	52,337	46,264	61,000	50,049	52,102	46,264	61,000
June	68,734	55,552	66,881	52,474	59,347	60,598	52,474	66,881
July	75,447	60,088	94,560	77,069	49,196	71,272	49,196	94,560
August	73,940	61,812	80,275	73,960	57,980	67,593	61,812	80,275
September	48,546	45,589	53,458	47,155	41,492	47,248	41,492	41,185
October	39,775	41,185	37,348	31,879	31,512	36,340	31,512	41,185
November	35,489	36,626	38,861	30,941	28,055	33,994	28,055	38,861
December	36,243	36,597	39,627	40,184	29,908	36,512	29,908	39,627
<b>Total</b>	<b>566,270</b>	<b>532,923</b>	<b>598,704</b>	<b>569,087</b>	<b>470,637</b>	<b>547,524</b>		
Daily Peak	3,013	3,098	3,866	3,534	2,881			
Peak Date	10-July	18-Aug	06-Aug	14-July	10-Aug			
Daily Low	721	828	895	728	600			
Average Daily Usage	1,551	1,460	1,640	1,559	1,289			

These monthly numbers can be graphically seen in Figure 3. Total consumption for 2019 was 98,450 cubic meters less than 2018. Consumption has been measured in cubic meters.

## Distribution System Overview

The distribution system consists of 24.98 km of water mains, 1 booster station, 3 reservoirs, and a total of approximately 850 connections.

### Distribution System

The maintenance of the distribution system consists of actively replacing lines that have either reached the end of their functional life, need upgrading due to inadequate sizing for development, or are in poor condition and cause issues.

*Figure 5: Water Main Material Summary*

<b>Length by Material Type</b>	<b>Abandoned Pipe (km)</b>	<b>Existing Total (km)</b>
PVC:	0.105	12.76
AC:	0.48	12.22
<b>Total:</b>	<b>0.585</b>	<b>24.98</b>

### SCADA – Supervisory Control and Data Acquisition (SCADA)

The SCADA system is designed to allow operators real time data on how the Water treatment plant and distribution system are functioning, as well as enabling a operator to make changes to the operation of the Water treatment plant and booster station. The SCADA system is also designed to send an alarm to the operator if there is problem within the system to help ensure that the Districts water distribution system continues to function.

## Distribution Sampling

The District of 100 Mile House is committed to providing safe drinking water to each and every connection within its service area. To this end the distribution system is sampled at least 3 different locations weekly. These locations change on a weekly basis. These samples are analyzed for background bacterial counts, total coliforms and E. Coli.

## Background Bacterial Monitoring

Background bacteria monitoring is done through what is called a heterotrophic plate count (HPC). Heterotrophic bacteria are a group of bacteria that use carbon as a food source and can be found in a variety of water sources. Most bacteria found in water are actually heterotrophic. In general, these bacteria are not pathogenic and the HPC test in itself will not tell you whether the water is bad to drink. Because of this there is no maximum acceptable concentration (MAC) as stated in the Canadian Drinking Water Guidelines. What this test does tell you is whether there are conditions within the system that bacteria can regrow or thrive in.

The District of 100 Mile House uses this test to monitor integrity and overall 'health' of the distribution system. If a sample is positive for background bacteria greater than 200 counts the system is flushed and resampled. Any positive counts of any size for background bacteria are also resampled immediately which is above and beyond any legislative requirements.

## Coliform Bacterial Monitoring

Coliform bacteria are a group of bacteria that is a little more of a narrow focus from the HPC test. These bacteria again represent a large group of bacteria found in water, soil, on vegetation and in the feces of mammals. Most of these bacteria are not harmful to humans, but because of the ease of testing of this bacteria it makes for a great indicator of contamination.

In water treatment systems there is a zero threshold allowance for coliforms within water samples. If a sample shows up positive for coliforms the site is immediately resampled and if there are again coliforms a boil water advisory put in place. The distribution area is then pulled offline and cleaned before being put back into action and resampled.

## E. Coli Bacterial Monitoring

E. Coli bacteria are a sub section of coliform bacteria. Again these bacteria may not be harmful to human health, but specific strains can cause serious health issues and even death in some instances. These bacteria are also found almost exclusively in warm blooded feces and therefore a definite sign of contamination. Any positive counts for coliforms or E.coli result in an immediate boil water advisory, resampling and cleaning of the affected area.

## 2019 Bacterial Monitoring Results

There was a total of 1 positive result for background bacteria and 2 positive for coliforms in 2019. After resampling the background bacteria positive sample, all results came back negative. After resampling both coliform positive results, all results came back negative. There were no positive results for E.Coli bacteria in 2019.



## TEST RESULTS

**REPORTED TO PROJECT** 100 Mile House, District of  
Drinking Water - Chemistry

**WORK ORDER REPORTED** 9011727  
2020-01-21 10:29

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
<b>Moore Ave Hydrant (9011727-01)   Matrix: Water   Sampled: 2019-01-22 10:24</b>						
<b>Calculated Parameters</b>						
Total Trihalomethanes	0.0164	MAC = 0.1	0.00400	mg/L		N/A
<b>Haloacetic Acids</b>						
Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L		2019-01-30
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L		2019-01-30
Dichloroacetic Acid	< 0.0020	N/A	0.0020	mg/L		2019-01-30
Trichloroacetic Acid	< 0.0020	N/A	0.0020	mg/L		2019-01-30
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L		2019-01-30
Total Haloacetic Acids (HAA5)	< 0.00200	MAC = 0.08	0.00200	mg/L		N/A
Surrogate: 2-Bromopropionic Acid	102		70-130	%		2019-01-30
<b>Volatile Organic Compounds (VOC)</b>						
Bromodichloromethane	0.0047	N/A	0.0010	mg/L		2019-01-26
Bromoform	0.0027	N/A	0.0010	mg/L		2019-01-26
Chloroform	0.0032	N/A	0.0010	mg/L		2019-01-26
Dibromochloromethane	0.0057	N/A	0.0010	mg/L		2019-01-26
Surrogate: Toluene-d8	77		70-130	%		2019-01-26
Surrogate: 4-Bromofluorobenzene	77		70-130	%		2019-01-26
<b>Water Treatment Plant (9011727-02)   Matrix: Water   Sampled: 2019-01-22 09:48</b>						
<b>Calculated Parameters</b>						
Total Trihalomethanes	0.0192	MAC = 0.1	0.00400	mg/L		N/A
Hardness, Total (as CaCO3)	626	None Required	0.500	mg/L		N/A
<b>Haloacetic Acids</b>						
Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L		2019-01-30
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L		2019-01-30
Dichloroacetic Acid	< 0.0020	N/A	0.0020	mg/L		2019-01-30
Trichloroacetic Acid	< 0.0020	N/A	0.0020	mg/L		2019-01-30
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L		2019-01-30
Total Haloacetic Acids (HAA5)	< 0.00200	MAC = 0.08	0.00200	mg/L		N/A
Surrogate: 2-Bromopropionic Acid	104		70-130	%		2019-01-30
<b>Total Metals</b>						
Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L		2019-01-28
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L		2019-01-28
Arsenic, total	0.00139	MAC = 0.01	0.00050	mg/L		2019-01-28
Barium, total	0.0108	MAC = 1	0.0050	mg/L		2019-01-28
Beryllium, total	< 0.00010	N/A	0.00010	mg/L		2019-01-28
Bismuth, total	< 0.00010	N/A	0.00010	mg/L		2019-01-28
Boron, total	0.0312	MAC = 5	0.0050	mg/L		2019-01-28
Cadmium, total	< 0.000010	MAC = 0.005	0.000010	mg/L		2019-01-28



## TEST RESULTS

**REPORTED TO PROJECT** 100 Mile House, District of Drinking Water - Chemistry

**WORK ORDER REPORTED** 9062113  
2019-07-02 15:18

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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**District Office (9062113-01) | Matrix: Water | Sampled: 2019-06-19 12:59**

**Calculated Parameters**

Total Trihalomethanes	0.00621	MAC = 0.1	0.00400	mg/L	N/A
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**Haloacetic Acids**

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2019-06-28
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2019-06-28
Dichloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2019-06-28
Trichloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2019-06-28
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2019-06-28
Total Haloacetic Acids (HAA5)	< 0.00200	MAC = 0.08	0.00200	mg/L	N/A
Surrogate: 2-Bromopropionic Acid	108		70-130	%	2019-06-28

**Volatile Organic Compounds (VOC)**

Bromodichloromethane	0.0018	N/A	0.0010	mg/L	2019-06-26
Bromoform	< 0.0010	N/A	0.0010	mg/L	2019-06-26
Chloroform	0.0023	N/A	0.0010	mg/L	2019-06-26
Dibromochloromethane	0.0022	N/A	0.0010	mg/L	2019-06-26
Surrogate: Toluene-d8	101		70-130	%	2019-06-26
Surrogate: 4-Bromofluorobenzene	107		70-130	%	2019-06-26

**Water Treatment Plant (9062113-02) | Matrix: Water | Sampled: 2019-06-19 11:51**

**Calculated Parameters**

Hardness, Total (as CaCO3)	579	None Required	0.500	mg/L	N/A
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**Total Metals**

Aluminum, total	0.0140	OG < 0.1	0.0050	mg/L	2019-06-26
Antimony, total	0.00030	MAC = 0.006	0.00020	mg/L	2019-06-26
Arsenic, total	0.00229	MAC = 0.01	0.00050	mg/L	2019-06-26
Barium, total	0.0248	MAC = 1	0.0050	mg/L	2019-06-26
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2019-06-26
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2019-06-26
Boron, total	0.0293	MAC = 5	0.0050	mg/L	2019-06-26
Cadmium, total	0.000097	MAC = 0.005	0.000010	mg/L	2019-06-26
Calcium, total	56.1	None Required	0.20	mg/L	2019-06-26
Chromium, total	0.00062	MAC = 0.05	0.00050	mg/L	2019-06-26
Cobalt, total	0.00056	N/A	0.00010	mg/L	2019-06-26
Copper, total	0.00401	MAC = 2	0.00040	mg/L	2019-06-26
Iron, total	0.293	AO ≤ 0.3	0.010	mg/L	2019-06-26
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2019-06-26
Lithium, total	0.00477	N/A	0.00010	mg/L	2019-06-26
Magnesium, total	107	None Required	0.010	mg/L	2019-06-26
Manganese, total	0.605	MAC = 0.12	0.00020	mg/L	2019-06-26
Molybdenum, total	0.00069	N/A	0.00010	mg/L	2019-06-26



## TEST RESULTS

REPORTED TO PROJECT 100 Mile House, District of Drinking Water - Chemistry

WORK ORDER REPORTED 9100422 2019-10-10 10:18

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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**Fire Training Grounds (9100422-01) | Matrix: Water | Sampled: 2019-10-02 12:51**

**Calculated Parameters**

Hardness, Total (as CaCO3)	155	None Required	0.500	mg/L	N/A
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**Dissolved Metals**

Lithium, dissolved	0.00880	N/A	0.00010	mg/L	2019-10-09
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2019-10-09
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2019-10-09
Arsenic, dissolved	< 0.00050	N/A	0.00050	mg/L	2019-10-09
Barium, dissolved	< 0.0050	N/A	0.0050	mg/L	2019-10-09
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2019-10-09
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2019-10-09
Boron, dissolved	0.0164	N/A	0.0050	mg/L	2019-10-09
Cadmium, dissolved	< 0.000010	N/A	0.000010	mg/L	2019-10-09
Calcium, dissolved	5.99	N/A	0.20	mg/L	2019-10-09
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2019-10-09
Cobalt, dissolved	< 0.00010	N/A	0.00010	mg/L	2019-10-09
Copper, dissolved	0.0261	N/A	0.00040	mg/L	2019-10-09
Iron, dissolved	0.012	N/A	0.010	mg/L	2019-10-09
Lead, dissolved	0.00052	N/A	0.00020	mg/L	2019-10-09
Magnesium, dissolved	34.0	N/A	0.010	mg/L	2019-10-09
Manganese, dissolved	0.0132	N/A	0.00020	mg/L	2019-10-09
Molybdenum, dissolved	0.0110	N/A	0.00010	mg/L	2019-10-09
Nickel, dissolved	< 0.00040	N/A	0.00040	mg/L	2019-10-09
Phosphorus, dissolved	0.317	N/A	0.050	mg/L	2019-10-09
Potassium, dissolved	7.90	N/A	0.10	mg/L	2019-10-09
Selenium, dissolved	< 0.00050	N/A	0.00050	mg/L	2019-10-09
Silicon, dissolved	23.5	N/A	1.0	mg/L	2019-10-09
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2019-10-09
Sodium, dissolved	143	N/A	0.10	mg/L	2019-10-09
Strontium, dissolved	0.0204	N/A	0.0010	mg/L	2019-10-09
Sulfur, dissolved	3.8	N/A	3.0	mg/L	2019-10-09
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2019-10-09
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2019-10-09
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2019-10-09
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2019-10-09
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2019-10-09
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2019-10-09
Uranium, dissolved	0.000882	N/A	0.000020	mg/L	2019-10-09
Vanadium, dissolved	< 0.0010	N/A	0.0010	mg/L	2019-10-09
Zinc, dissolved	0.0065	N/A	0.0040	mg/L	2019-10-09
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2019-10-09





## TEST RESULTS

**REPORTED TO PROJECT** 100 Mile House, District of  
Drinking Water - Bacteria

**WORK ORDER REPORTED** 9040308  
2019-04-08 16:28

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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**Exeter Reservoir (9040308-01) | Matrix: Water | Sampled: 2019-04-02 12:45**

**Microbiological Parameters**

Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2019-04-03	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2019-04-03	

**Petro Canada (9040308-02) | Matrix: Water | Sampled: 2019-04-02 13:02**

**Microbiological Parameters**

Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2019-04-03	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2019-04-03	

**100 Mile New & Used (9040308-03) | Matrix: Water | Sampled: 2019-04-02 13:17**

**Microbiological Parameters**

Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2019-04-03	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2019-04-03	

**Water Treatment Plant (9040308-04) | Matrix: Water | Sampled: 2019-04-02 12:33**

**Microbiological Parameters**

Heterotrophic Plate Count	73	N/A	5	CFU/mL	2019-04-03	HT1
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**Sample Qualifiers:**

HT1 The sample was prepared and/or analyzed past the recommended holding time.