

# **Fernie Alpine Resort Utility Corporation**

## **Potable Water System Operational Summary 2023**

### **Potable Water System Operations Summary**

The potable water system continues to operate well, meeting all Canadian Drinking Water Standards. In 2023 there were no advisories or warnings issued.

Construction of the new reservoir is complete, and the reservoir is now in service. FARUC is currently reviewing the final costs with the BC Government's Comptroller of Water Rights.

Commissioning of the new Potable Water Treatment Plant is targeted for Fall 2024. FARUC has now received a permit from BC Interior Health for the connection of well 2 and the additional monitoring equipment to complete the assessment for installation of the UV filter. Upon completion of this facility, a levy will be applied to recover the existing customers cost share of the works. Further details on the cost recoveries can be found in the Comptroller of Water Rights decision letter referenced below.

### **2023 Water Rates**

A review of FARUC's potable water system and rate structure was completed in 2018 and reviewed by the BC Government's Comptroller of Water Rights. The Comptroller approved a new Tariff and rate structure for the water system. A copy of the new Tariff and decision by the Comptroller can be viewed at <https://skifernie.com/utility-services/>. As such, the water rate for 2023 remained \$53.00/BU, with \$21.00/BU being deposited into the Water Replacement Trust Fund. Funds in the trust can only be released with the Comptroller's approval.

### **2023 Facility Classification & Emergency contact**

The FARUC Water Treatment Plant is classified as a Level 1 Water Facility.

FARUC currently employs one full time manager and two operators. All three are fully qualified. Operators are either on duty or on-call 24 hrs./day.

**In case of Emergency, please contact FAR Security – 1 -250 – 423 – 9086.**

### **2023 Potable Water System Improvements**

Work was completed on the rehabilitation of well 2 and the well was retested for pumping rate. The rehab work did provide a higher yield, showing the benefit of the rehab work. This work will be repeated on well 1 when commissioning the WTP system. A sample was taken during the test and sent for full chemical and metals analysis.

### **2023 Fire Hydrant Testing**

Attached are the results of the annual fire hydrant testing.

### **2023 Bacterial Testing**

Weekly Bacterial Test samples were taken as required by BC Interior Health. There were no failed tests for either E. Coli or Coliforms and no boil water advisories were issued in 2023.

### **Potable Water Quality**

Attached is a copy of the Well test from June of 2023. A sample was taken during the pump test administered by SNC Lavalin. Also included is a copy of the government of Canada's criteria regarding drinking water.

The intent is to pump test both wells in the fall of 2024 at which time samples will be collected from both wells and sent for full analysis. Results will be posted in the 2024 annual summary.

Fernie Alpine Resort Water Distribution 2023 Summary																															
Month	Chlorine Residual (mg/L)																						Water Usage (m <sup>3</sup> )			Turbidity (NTU)				Independent Testing	
	Reservoir 1 CL <sub>2</sub>		Reservoir 2 CL <sub>2</sub>		River Pump CL <sub>2</sub>		WWTP CL <sub>2</sub>		Shop CL <sub>2</sub>		Tamarack CL <sub>2</sub>		Boomerang CL <sub>2</sub>		Lizard Creek CL <sub>2</sub>		Snow Creek CL <sub>2</sub>		Pantry CL <sub>2</sub>		River Pp			Spring		River					
	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Total	Average	Median	Average	Median	T. Coliform	E. Coli		
Jan	0.88	0.88	0.91	0.84	0.73	0.67	0.84	0.80	0.83	0.79	0.81	0.69	0.76	0.73	0.89	0.80	0.75	0.68	0.74	0.76	493	520	15297	0.153	0.152	0.122	0.121	>1	>1		
Feb	1.62	1.53	0.95	0.91	0.83	0.74	0.83	0.81	0.83	0.82	1.02	0.97	0.86	0.83	0.98	0.94	0.96	0.96	0.92	0.92	519	480	14538	0.138	0.140	0.125	0.124	>1	>1		
Mar	0.81	0.80	0.79	0.79	0.75	0.66	0.80	0.78	0.79	0.79	0.88	0.86	0.75	0.73	0.79	0.86	0.80	0.79	0.77	0.78	482	481	14935	0.210	0.124	0.132	0.128	>1	>1		
Apr	0.31	0.18	0.66	0.72	0.85	0.77	0.82	0.81	0.80	0.81	0.80	0.76	0.70	0.71	0.75	0.76	0.70	0.72	0.73	0.74	360	317	10791	0.425	0.293	0.174	0.158	>1	>1		
May	1.22	1.20	1.08	1.06	0.81	0.77	0.89	0.90	0.80	0.77	0.76	0.80	0.76	0.75	0.98	0.94	0.95	0.94	0.89	0.92	137	152	4245	0.172	0.109	0.253	0.192	>1	>1		
June	1.63	1.55	1.19	1.13	0.90	0.83	0.82	0.83	0.82	0.82	0.92	0.90	0.89	0.86	0.97	0.97	1.03	0.99	0.78	0.80	339	299	10167	0.107	0.095	0.277	0.270	ok	ok		
July	1.99	1.66	1.03	1.03	0.88	0.84	0.81	0.83	0.87	0.86	0.85	0.87	0.77	0.80	0.96	0.97	0.91	0.93	0.85	0.88	524	503	16252	0.318	0.289	0.223	0.090	>1	>1		
Aug	1.25	1.21	1.00	1.00	1.09	1.04	0.85	0.86	0.88	0.88	0.93	0.95	0.83	0.82	0.95	0.93	0.90	0.90	0.87	0.87	574	556	17806	0.222	0.070	0.104	0.103	>1	>1		
Sept	1.88	1.50	0.90	0.90	0.95	0.98	0.82	0.81	0.81	0.81	0.80	0.80	0.86	0.86	0.81	0.80	0.90	0.89	0.87	0.86	458	437	13747	N/A	N/A	0.115	0.116	>1	>1		
Oct	1.20	1.01	1.01	1.00	0.98	1.00	0.89	0.85	0.77	0.85	0.88	0.85	0.97	0.97	0.87	0.89	0.88	0.88	0.86	0.83	299	266	9263	0.151	0.118	0.100	0.094	>1	>1		
Nov	1.04	1.07	0.94	0.99	1.10	1.08	0.88	0.88	0.86	0.82	0.86	0.90	1.02	1.07	0.91	0.93	0.89	0.92	1.06	0.98	246	247	7379	0.451	0.156	0.169	0.165	>1	>1		
Dec	1.64	1.10	1.18	1.12	1.21	1.02	0.93	0.92	0.95	0.93	1.03	1.05	1.27	1.30	0.92	0.93	1.03	1.03	1.06	1.06	407	406	12605	0.323	0.200	0.180	0.180	>1	>1		
Annual	1.29	1.15	0.97	1.00	0.92	0.84	0.85	0.83	0.83	0.82	0.88	0.86	0.87	0.82	0.90	0.93	0.89	0.91	0.87	0.87	403	421	147025	0.243	0.140	0.164	0.126	no	no		



# SPROUSE FIRE & SAFETY

Unit #38, 5329 – 72 Ave. SE, Calgary, Alberta T2C 3C4  
Phone: (403) 265-3891 Fax: (403) 237-7861

## FIRE HYDRANT INSPECTION REPORT

DATE: 19-Jun-2023

CUSTOMER BUILDING ADDRESS: Fernie Alpine Resort c/o Resorts of the Canadian Rockies

DESCRIPTION OF SYSTEM (No. of Hydrants, Manufacturer, Hydrant Type, Layout):

1. McAvity M67 (1975). 2. Mueller Century(1981). 3. Mueller Century(1981)

### Hydrant List:

<b>No. 1 of 27 Location:</b> At the Main Ticket Kiosk Center Court		<b>Shut Off Location:</b> Approximately 3' behind Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 100 PSI	Residual Pres w/2.5" F.O.: 90 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>
Pitot Pressure: 30 PSI	<b>Calculated Flow:</b> 924 GPM		
<b>No. 2 of 27 Location:</b> At the Griz Inn Entrance		<b>Shut Off Location:</b> Unknown	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 115 PSI	Residual Pres w/2.5" F.O.: 107 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>
Pitot Pressure: 40 PSI	<b>Calculated Flow:</b> 1067 GPM		
<b>No. 3 of 27 Location:</b> At the Entrance to parking lot of Fernie Lodging Co.		<b>Shut Off Location:</b> Approximately 3' West of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 80 PSI	Residual Pres w/2.5" F.O.: 50 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>
Pitot Pressure: 24 PSI	<b>Calculated Flow:</b> 826 GPM		

REPAIRS (Replacing O-rings, Gaskets, Caps Missing, Valve Rubber, Internal Components):

N/A

COMMENTS & RECOMMENDATIONS (Painting, Replacing Internal Components)

The Fire Hydrants at this location have been inspected and were found to be in a suitable condition for regular service on June 19,2023.Sprouse Fire and Safety Corp assumes no further liability.



# SPROUSE FIRE & SAFETY

Unit #38, 5329 – 72 Ave. SE, Calgary, Alberta T2C 3C4  
Phone: (403) 265-3891 Fax: (403) 237-7861

## FIRE HYDRANT INSPECTION REPORT

DATE: 19-Jun-2023

CUSTOMER BUILDING ADDRESS: Fernie Alpine Resort c/o Resorts of the Canadian Rockies

DESCRIPTION OF SYSTEM (No. of Hydrants, Manufacturer, Hydrant Type, Layout):

4. Mueller Century. 5. Mueller Century

6. Mueller Century

### Hydrant List:

<b>No. 4 of 27 Location:</b> Timberline Crescent (beside premise #4553)		<b>Shut Off Location:</b> Approximately 3' South of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 100 PSI	Residual Pres w/2.5" F.O.: 50 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>
Pitot Pressure: 27 PSI	<b>Calculated Flow:</b> 876 GPM		
<b>No. 5 of 27 Location:</b> Corner of Timberline Crescent ( Premise 4477).		<b>Shut Off Location:</b> Approximately 3' South of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 130 PSI	Residual Pres w/2.5" F.O.: 60 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>
Pitot Pressure: 26 PSI	<b>Calculated Flow:</b> 860 GPM		
<b>No. 6 of 27 Location:</b> Timberline Crescent (beside premise 4427)		<b>Shut Off Location:</b> Approximately 16" NE of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 115 PSI	Residual Pres w/2.5" F.O.: 105 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>
Pitot Pressure: 32 PSI	<b>Calculated Flow:</b> 954 GPM		

REPAIRS (Replacing O-rings, Gaskets, Caps Missing, Valve Rubber, Internal Components):

N/A

COMMENTS & RECOMMENDATIONS (Painting, Replacing Internal Components)

The Fire Hydrants at this location have been inspected and were found to be in a suitable condition for regular service on June 19,2023.Sprouse Fire and Safety Corp assumes no further liability.



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## FIRE HYDRANT INSPECTION REPORT

DATE: 19-Jun-2023

CUSTOMER BUILDING ADDRESS: Fernie Alpine Resort c/o Resorts of the Canadian Rockies.

DESCRIPTION OF SYSTEM (No. of Hydrants, Manufacturer, Hydrant Type, Layout):

7. Mueller Centurion 8. McAvity 67 Brigadier (1995)

9. McAvity 67 Brigadier (1995)

### Hydrant List:

No. 7 of 27 Location:		Timberline Crescent at premise 4389		Shut Off Location: 2' SW of Hydrant	
<b>Visual Inspection</b>	<b>Visual Under Pressure</b>	<b>Inspection Under Bonnet</b>	<b>Correct Drainage/Vacuum</b>		
Paint Required <input type="checkbox"/>	Leaks <input type="checkbox"/>	Damage <input type="checkbox"/>	Unacceptable <input type="checkbox"/>		
Rusting <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>	Rusting <input type="checkbox"/>	Poor <input type="checkbox"/>		
Leaks <input type="checkbox"/>	<b>Lubricate Nozzle Caps</b>	Leaks <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>		
Ok <input checked="" type="checkbox"/>	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>			
Static Pressure: 130 PSI	<b>Inspect Packing/ Hold down Plate</b>	<b>Inspect Main Gate/Valve Seat</b>			
Residual Pres w/2.5" F.O.: 70 PSI	Replace Packing <input type="checkbox"/>	Gasket Torn <input type="checkbox"/>			
Pitot Pressure: 30 PSI	OK <input checked="" type="checkbox"/>	Seat Scored <input type="checkbox"/>			
<b>Calculated Flow: 924 GPM</b>		OK <input checked="" type="checkbox"/>			
No. 8 of 27 Location:		At Entrance to Maintenance Shop		Shut Off Location: Unknown	
<b>Visual Inspection</b>	<b>Visual Under Pressure</b>	<b>Inspection Under Bonnet</b>	<b>Correct Drainage/Vacuum</b>		
Paint Required <input type="checkbox"/>	Leaks <input type="checkbox"/>	Damage <input type="checkbox"/>	Unacceptable <input type="checkbox"/>		
Rusting <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>	Rusting <input type="checkbox"/>	Poor <input type="checkbox"/>		
Leaks <input type="checkbox"/>	<b>Lubricate Nozzle Caps</b>	Leaks <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>		
Ok <input checked="" type="checkbox"/>	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>			
Static Pressure: 70 PSI	<b>Inspect Packing/ Hold down Plate</b>	<b>Inspect Main Gate/Valve Seat</b>			
Residual Pres w/2.5" F.O.: 60 PSI	Replace Packing <input type="checkbox"/>	Gasket Torn <input type="checkbox"/>			
Pitot Pressure: 26 PSI	OK <input checked="" type="checkbox"/>	Seat Scored <input type="checkbox"/>			
<b>Calculated Flow: 860 GPM</b>		OK <input checked="" type="checkbox"/>			
No. 9 of 27 Location:		Located at Poler Peaks Lodge (Lodge #8)		Shut Off Location: Unknown (curb box at entrance?)	
<b>Visual Inspection</b>	<b>Visual Under Pressure</b>	<b>Inspection Under Bonnet</b>	<b>Correct Drainage/Vacuum</b>		
Paint Required <input type="checkbox"/>	Leaks <input type="checkbox"/>	Damage <input type="checkbox"/>	Unacceptable <input type="checkbox"/>		
Rusting <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>	Rusting <input type="checkbox"/>	Poor <input type="checkbox"/>		
Leaks <input type="checkbox"/>	<b>Lubricate Nozzle Caps</b>	Leaks <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>		
Ok <input checked="" type="checkbox"/>	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>			
Static Pressure: 80 PSI	<b>Inspect Packing/ Hold down Plate</b>	<b>Inspect Main Gate/Valve Seat</b>			
Residual Pres w/2.5" F.O.: 60 PSI	Replace Packing <input type="checkbox"/>	Gasket Torn <input type="checkbox"/>			
Pitot Pressure: 23 PSI	OK <input checked="" type="checkbox"/>	Seat Scored <input type="checkbox"/>			
<b>Calculated Flow: 809 GPM</b>		OK <input checked="" type="checkbox"/>			

REPAIRS (Replacing O-rings, Gaskets, Caps Missing, Valve Rubber, Internal Components):

N/A

COMMENTS & RECOMMENDATIONS (Painting, Replacing Internal Components)

The Fire Hydrants at this location have been inspected and were found to be in a suitable condition for regular service on June 19, 2023. Sprouse Fire and Safety Corp assumes no further liability.



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Phone: (403) 265-3891 Fax: (403) 237-7861

## FIRE HYDRANT INSPECTION REPORT

DATE: 19-Jun-2023

CUSTOMER BUILDING ADDRESS: Fernie Alpine Resorts c/o Resorts of the Canadian Rockies

DESCRIPTION OF SYSTEM (No. of Hydrants, Manufacturer, Hydrant Type, Layout):

10. McAvity 67 Brigadier (1995). 11. McAvity 67 Brigadier (1995)

12. McAvity 67 Brigadier (1999)

### Hydrant List:

<b>No. 10 of 27 Location:</b> Right side of Cul De Sac (at Fire Lane).		<b>Shut Off Location:</b> Approximately 2' N of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 85 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>	
Residual Pres w/2.5" F.O.: 60 PSI			
Pitot Pressure: 24 PSI			
<b>Calculated Flow:</b> 826 GPM			
<b>No. 11 of 27 Location:</b> Highline Drive at premise 5400		<b>Shut Off Location:</b> Approximately 4' NW of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 140 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>	
Residual Pres w/2.5" F.O.: 100 PSI			
Pitot Pressure: 41 PSI			
<b>Calculated Flow:</b> 1080 GPM			
<b>No. 12 of 27 Location:</b> Stone Creek Chalets 5423		<b>Shut Off Location:</b> Approximately 3' N of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 105 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>	
Residual Pres w/2.5" F.O.: 85 PSI			
Pitot Pressure: 28 PSI			
<b>Calculated Flow:</b> 893 GPM			

REPAIRS (Replacing O-rings, Gaskets, Caps Missing, Valve Rubber, Internal Components):

NA

COMMENTS & RECOMMENDATIONS (Painting, Replacing Internal Components)

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Phone: (403) 265-3891 Fax: (403) 237-7861

## FIRE HYDRANT INSPECTION REPORT

DATE: 20-Jun-2023

CUSTOMER BUILDING ADDRESS: Fernie Alpine Resorts c/o Resorts of the Canadian Rockies

DESCRIPTION OF SYSTEM (No. of Hydrants, Manufacturer, Hydrant Type, Layout):

13. McAvity 67 Brigadier (1995). 14. McAvity 67 Brigadier (1995)

15. McAvity M67 (1995)

### Hydrant List:

<b>No. 13 of 27</b>		<b>Location:</b> Highline Drive at Lizard Creek Lodge Entrance		<b>Shut Off Location:</b> Approximately 4' N of Hydrant	
<b>Visual Inspection</b>	<b>Visual Under Pressure</b>	<b>Inspection Under Bonnet</b>	<b>Correct Drainage/Vacuum</b>		
Paint Required <input type="checkbox"/>	Leaks <input type="checkbox"/>	Damage <input type="checkbox"/>	Unacceptable <input type="checkbox"/>		
Rusting <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>	Rusting <input type="checkbox"/>	Poor <input type="checkbox"/>		
Leaks <input type="checkbox"/>	<b>Lubricate Nozzle Caps</b>	Leaks <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>		
Ok <input checked="" type="checkbox"/>	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>			
Static Pressure: 115 PSI		<b>Inspect Packing/ Hold down Plate</b>		<b>Inspect Main Gate/Valve Seat</b>	
Residual Pres w/2.5" F.O.: 100 PSI		Replace Packing <input type="checkbox"/>		Gasket Torn <input type="checkbox"/>	
Pitot Pressure: 28 PSI		OK <input checked="" type="checkbox"/>		Seat Scored <input type="checkbox"/>	
<b>Calculated Flow:</b> 893 GPM				OK <input checked="" type="checkbox"/>	
<b>No. 14 of 27</b>		<b>Location:</b> Highline Drive at Ingamo Lodge		<b>Shut Off Location:</b> Approximately 2' SE of Hydrant	
<b>Visual Inspection</b>	<b>Visual Under Pressure</b>	<b>Inspection Under Bonnet</b>	<b>Correct Drainage/Vacuum</b>		
Paint Required <input type="checkbox"/>	Leaks <input type="checkbox"/>	Damage <input type="checkbox"/>	Unacceptable <input type="checkbox"/>		
Rusting <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>	Rusting <input type="checkbox"/>	Poor <input type="checkbox"/>		
Leaks <input checked="" type="checkbox"/>	<b>Lubricate Nozzle Caps</b>	Leaks <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>		
Ok <input type="checkbox"/>	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>			
Static Pressure: 120 PSI		<b>Inspect Packing/ Hold down Plate</b>		<b>Inspect Main Gate/Valve Seat</b>	
Residual Pres w/2.5" F.O.: 100 PSI		Replace Packing <input type="checkbox"/>		Gasket Torn <input type="checkbox"/>	
Pitot Pressure: 24 PSI		OK <input checked="" type="checkbox"/>		Seat Scored <input type="checkbox"/>	
<b>Calculated Flow:</b> 826 GPM				OK <input checked="" type="checkbox"/>	
<b>No. 15 of 27</b>		<b>Location:</b> Highline Drive at Premise # 5281		<b>Shut Off Location:</b> Approximately 8' S of Hydrant	
<b>Visual Inspection</b>	<b>Visual Under Pressure</b>	<b>Inspection Under Bonnet</b>	<b>Correct Drainage/Vacuum</b>		
Paint Required <input checked="" type="checkbox"/>	Leaks <input type="checkbox"/>	Damage <input type="checkbox"/>	Unacceptable <input type="checkbox"/>		
Rusting <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>	Rusting <input type="checkbox"/>	Poor <input type="checkbox"/>		
Leaks <input type="checkbox"/>	<b>Lubricate Nozzle Caps</b>	Leaks <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>		
Ok <input checked="" type="checkbox"/>	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Ok <input checked="" type="checkbox"/>			
Static Pressure: 95 PSI		<b>Inspect Packing/ Hold down Plate</b>		<b>Inspect Main Gate/Valve Seat</b>	
Residual Pres w/2.5" F.O.: 88 PSI		Replace Packing <input type="checkbox"/>		Gasket Torn <input type="checkbox"/>	
Pitot Pressure: 32 PSI		OK <input checked="" type="checkbox"/>		Seat Scored <input type="checkbox"/>	
<b>Calculated Flow:</b> 954 GPM				OK <input checked="" type="checkbox"/>	

REPAIRS (Replacing O-rings, Gaskets, Caps Missing, Valve Rubber, Internal Components):

NA

COMMENTS & RECOMMENDATIONS (Painting, Replacing Internal Components)

The Fire Hydrants at this location have been inspected and were found to be in a suitable condition for regular service on June 20, 2023. Sprouse Fire and Safety Corp assumes no further liability.





# SPROUSE FIRE & SAFETY

Unit #38, 5329 – 72 Ave. SE, Calgary, Alberta T2C 3C4  
Phone: (403) 265-3891 Fax: (403) 237-7861

## FIRE HYDRANT INSPECTION REPORT

DATE: 20-Jun-2023

CUSTOMER BUILDING ADDRESS: Fernie Alpine Resorts c/o Resorts of the Canadian Rockies

DESCRIPTION OF SYSTEM (No. of Hydrants, Manufacturer, Hydrant Type, Layout):

16.McAvity 67 Brigadier (1995). 17.McAvity 67 Brigadier

18. McAvity 67 Brigadier

### Hydrant List:

<b>No. 16 of 27 Location:</b> Highline Drive at Premise 5263		<b>Shut Off Location:</b> Approximately 5' NE of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 85 PSI	Residual Pres w/2.5" F.O.: 80 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>
Pitot Pressure: 22 PSI	<b>Calculated Flow:</b> 791 GPM		
<b>No. 17 of 27 Location:</b> Snow Creek Lodge Entrance		<b>Shut Off Location:</b> Approximately 4' NE of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 90 PSI	Residual Pres w/2.5" F.O.: 80 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>
Pitot Pressure: 26 PSI	<b>Calculated Flow:</b> 860 GPM		
<b>No. 18 of 27 Location:</b> 5220 Highline Close		<b>Shut Off Location:</b> Approximately 3' NE of Hydrant	
<b>Visual Inspection</b> Paint Required <input checked="" type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 60 PSI	Residual Pres w/2.5" F.O.: 50 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>
Pitot Pressure: 20 PSI	<b>Calculated Flow:</b> 754 GPM		

REPAIRS (Replacing O-rings, Gaskets, Caps Missing, Valve Rubber, Internal Components):

NA

COMMENTS & RECOMMENDATIONS (Painting, Replacing Internal Components)

The Fire Hydrants at this location have been inspected and were found to be in a suitable condition for regular service on June 20, 2023. Sprouse Fire and Safety Corp assumes no further liability



# SPROUSE FIRE & SAFETY

Unit #38, 5329 – 72 Ave. SE, Calgary, Alberta T2C 3C4  
Phone: (403) 265-3891 Fax: (403) 237-7861

## FIRE HYDRANT INSPECTION REPORT

DATE: 20-Jun-2023

CUSTOMER BUILDING ADDRESS: Fernie Alpine Resorts c/o Resorts of the Canadian Rockies

DESCRIPTION OF SYSTEM (No. of Hydrants, Manufacturer, Hydrant Type, Layout):

19. McAvity M67 Brigadier 20. McAvity M67 Brigadier 1999

21. McAvity M67 Brigadier

### Hydrant List:

<b>No. 19 of 27 Location:</b> Bears Paw Lodge 5383 Highline Drive		<b>Shut Off Location:</b> Approximately 4' West of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 80 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>	
Residual Pres w/2.5" F.O.: 70 PSI			
Pitot Pressure: 22 PSI			
<b>Calculated Flow:</b> 791 GPM			
<b>No. 20 of 27 Location:</b> 5375 Snow Pines Drive (Corner of Property).		<b>Shut Off Location:</b> Approximately 7' SW of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 90 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input type="checkbox"/>	
Residual Pres w/2.5" F.O.: 65 PSI			
Pitot Pressure: 24 PSI			
<b>Calculated Flow:</b> 826 GPM			
<b>No. 21 of 27 Location:</b> Timberline Crescent at Balsam Lodge		<b>Shut Off Location:</b> Approximately 4' East of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input type="checkbox"/>
Static Pressure: 95 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input type="checkbox"/>	
Residual Pres w/2.5" F.O.: 70 PSI			
Pitot Pressure: 28 PSI			
<b>Calculated Flow:</b> 893 GPM			

REPAIRS (Replacing O-rings, Gaskets, Caps Missing, Valve Rubber, Internal Components):

NA

COMMENTS & RECOMMENDATIONS (Painting, Replacing Internal Components)

The Fire Hydrants at this location have been inspected and were found to be in a suitable condition for regular service on June 20, 2023. Sprouse Fire and Safety Corp assumes no further liability.



# SPROUSE FIRE & SAFETY

Unit #38, 5329 – 72 Ave. SE, Calgary, Alberta T2C 3C4  
Phone: (403) 265-3891 Fax: (403) 237-7861

## FIRE HYDRANT INSPECTION REPORT

DATE: 20-Jun-2023

CUSTOMER BUILDING ADDRESS: Fernie Alpine Resorts c/o Resorts of the Canadian Rockies

DESCRIPTION OF SYSTEM (No. of Hydrants, Manufacturer, Hydrant Type, Layout):

22). McAvity M67 Brigadier (2017). 24). McAvity M67B (2017)

23). McAvity M67B (2000)

### Hydrant List:

<b>No. 22 of 27 Location:</b> Corner of ski hill road and resort drive		<b>Shut Off Location:</b> Unknown	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 95 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>	
Residual Pres w/2.5" F.O.: 55 PSI			
Pitot Pressure: 18 PSI			
<b>Calculated Flow:</b> 716 GPM			
<b>No. 23 of 27 Location:</b> Timber landing at Cul de Sac		<b>Shut Off Location:</b> Approximately 10' S of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 65 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>	
Residual Pres w/2.5" F.O.: 55 PSI			
Pitot Pressure: 22 PSI			
<b>Calculated Flow:</b> 791 GPM			
<b>No. 24 of 27 Location:</b> 5420 Timber Landing		<b>Shut Off Location:</b> Approximately 10' S of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 90 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>	
Residual Pres w/2.5" F.O.: 60 PSI			
Pitot Pressure: 20 PSI			
<b>Calculated Flow:</b> 754 GPM			

REPAIRS (Replacing O-rings, Gaskets, Caps Missing, Valve Rubber, Internal Components):

NA

COMMENTS & RECOMMENDATIONS (Painting, Replacing Internal Components)

The Fire Hydrants at this location have been inspected and were found to be in a suitable condition for regular service on June 20, 2023. Sprouse Fire and Safety Corp assumes no further liability.



# SPROUSE FIRE & SAFETY

Unit #38, 5329 – 72 Ave. SE, Calgary, Alberta T2C 3C4  
Phone: (403) 265-3891 Fax: (403) 237-7861

## FIRE HYDRANT INSPECTION REPORT

DATE: 19-Jun-2023

CUSTOMER BUILDING ADDRESS: Fernie Alpine Resorts c/o Resorts of the Canadian Rockies.

DESCRIPTION OF SYSTEM (No. of Hydrants, Manufacturer, Hydrant Type, Layout):

25) McAvity M67B (2017). 26) McAvity Brigadier (2021)

27) McAvity Brigadier (2021)

### Hydrant List:

<b>No. 25 of 27 Location:</b> Entrance to Timber Land Estates		<b>Shut Off Location:</b> Approximately 10' S of Hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 115 PSI	Residual Pres w/2.5" F.O.: 85 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>
Pitot Pressure: 34 PSI	<b>Calculated Flow:</b> 984 GPM		
<b>No. 26 of 27 Location:</b> Right of the Elk river homes sign		<b>Shut Off Location:</b> 20' North of hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input checked="" type="checkbox"/> Ok <input type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 115 PSI	Residual Pres w/2.5" F.O.: 80 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>
Pitot Pressure: 30 PSI	<b>Calculated Flow:</b> 924 GPM		
<b>No. 27 of 27 Location:</b> Elk river lot 37		<b>Shut Off Location:</b> 15' NW of hydrant	
<b>Visual Inspection</b> Paint Required <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Visual Under Pressure</b> Leaks <input checked="" type="checkbox"/> Ok <input type="checkbox"/> <b>Lubricate Nozzle Caps</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>Inspection Under Bonnet</b> Damage <input type="checkbox"/> Rusting <input type="checkbox"/> Leaks <input type="checkbox"/> Ok <input checked="" type="checkbox"/>	<b>Correct Drainage/Vacuum</b> Unacceptable <input type="checkbox"/> Poor <input type="checkbox"/> Ok <input checked="" type="checkbox"/>
Static Pressure: 110 PSI	Residual Pres w/2.5" F.O.: 80 PSI	<b>Inspect Packing/ Hold down Plate</b> Replace Packing <input type="checkbox"/> OK <input checked="" type="checkbox"/>	<b>Inspect Main Gate/Valve Seat</b> Gasket Torn <input type="checkbox"/> Seat Scored <input type="checkbox"/> OK <input checked="" type="checkbox"/>
Pitot Pressure: 22 PSI	<b>Calculated Flow:</b> 791 GPM		

REPAIRS (Replacing O-rings, Gaskets, Caps Missing, Valve Rubber, Internal Components):

N/A

COMMENTS & RECOMMENDATIONS (Painting, Replacing Internal Components)

These Fire Hydrants are in a suitable condition for regular service as tested on June 20, 2023.

Sprouse Fire and Safety Corp assumes no further liability.

## CERTIFICATE OF ANALYSIS

Work Order	: <b>CG2307475</b>	Page	: 1 of 6
Client	: <b>SNC-Lavalin Inc.</b>	Laboratory	: Calgary - Environmental
Contact	: Genevieve Pomerleau	Account Manager	: Lovepreet Kaur
Address	: 45800 Mennie Rd Cranbrook AB Canada	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250 354 1664	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 08-Jun-2023 08:55
PO	: 695248	Date Analysis Commenced	: 08-Jun-2023
C-O-C number	: 6935572022	Issue Date	: 15-Jun-2023 18:06
Sampler	: Marc Beaton		
Site	: ----		
Quote number	: GARP Assessment - Drinking Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

## Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Andrew Fox		Metals, Calgary, Alberta
Elke Tabora		Inorganics, Calgary, Alberta
George Huang	Supervisor - Inorganic	Metals, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Metals, Calgary, Alberta
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Metals, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta
Wayne Smith	Client Services Specialist	Inorganics, Waterloo, Ontario





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
-	no units
% T/cm	% transmittance per centimetre
µS/cm	microsiemens per centimetre
AU/cm	absorbance units per centimetre
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
MPN/100mL	most probable number per hundred millilitres
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



## Analytical Results

Sub-Matrix: Water					Client sample ID	WELL 2-230607	----	----	----	----
(Matrix: Water)					Client sampling date / time	07-Jun-2023 07:50	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2307475-001	-----	-----	-----	-----	
					Result	----	----	----	----	
Physical Tests										
Absorbance, UV (@ 254nm)	----	E404/VA	0.0050	AU/cm	0.0080	----	----	----	----	
Alkalinity, total (as CaCO3)	----	E290/CG	1.0	mg/L	223	----	----	----	----	
Colour, true	----	E329/CG	5.0	CU	<5.0	----	----	----	----	
Conductivity	----	E100/CG	2.0	µS/cm	454	----	----	----	----	
Langelier index (@ 15°C)	----	EC105/CG	0.010	-	0.676	----	----	----	----	
Langelier index (@ 20°C)	----	EC105/CG	0.010	-	0.750	----	----	----	----	
Langelier index (@ 25°C)	----	EC105/CG	0.010	-	0.821	----	----	----	----	
Langelier index (@ 4°C)	----	EC105/CG	0.010	-	0.501	----	----	----	----	
Langelier index (@ 60°C)	----	EC105/CG	0.010	-	1.26	----	----	----	----	
Langelier index (@ 77°C)	----	EC105/CG	0.010	-	1.47	----	----	----	----	
pH	----	E108/CG	0.10	pH units	8.04	----	----	----	----	
Solids, total dissolved [TDS]	----	E162/CG	10	mg/L	257	----	----	----	----	
Turbidity	----	E121/CG	0.10	NTU	0.72	----	----	----	----	
Transmittance, UV (@ 254nm)	----	E404/VA	1.0	% T/cm	98.2	----	----	----	----	
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/CG	0.60	mg/L	237	----	----	----	----	
pH, saturation (@ 4°C)	----	EC105/CG	0.010	pH units	7.54	----	----	----	----	
pH, saturation (@ 15°C)	----	EC105/CG	0.010	pH units	7.36	----	----	----	----	
pH, saturation (@ 20°C)	----	EC105/CG	0.010	pH units	7.29	----	----	----	----	
pH, saturation (@ 25°C)	----	EC105/CG	0.010	pH units	7.22	----	----	----	----	
pH, saturation (@ 60°C)	----	EC105/CG	0.010	pH units	6.77	----	----	----	----	
pH, saturation (@ 77°C)	----	EC105/CG	0.010	pH units	6.57	----	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	----	----	----	----	
Chloride	16887-00-6	E235.Cl/CG	0.50	mg/L	26.9	----	----	----	----	
Fluoride	16984-48-8	E235.F/CG	0.020	mg/L	0.190	----	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	0.0652	----	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0010	----	----	----	----	
Nitrogen, total organic	----	EC363/CG	0.050	mg/L	<0.056	----	----	----	----	





Analytical Results

Sub-Matrix: Water					Client sample ID	WELL 2-230607	----	----	----	----
(Matrix: Water)					Client sampling date / time	07-Jun-2023 07:50	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2307475-001	Result	-----	-----	-----	-----
Anions and Nutrients										
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0074	----	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/CG	0.30	mg/L	8.00	----	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318/CG	0.050	mg/L	<0.050	----	----	----	----	----
Cyanides										
Cyanide, strong acid dissociable (Total)	----	E333/WT	0.0050	mg/L	<0.0050	----	----	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/CG	0.50	mg/L	<0.50	----	----	----	----	----
Total Sulfides										
Sulfide, total (as S)	18496-25-8	E395/VA	0.0015	mg/L	<0.0015	----	----	----	----	----
Sulfide, total (as H2S)	7783-06-4	E395/VA	0.0016	mg/L	<0.0016	----	----	----	----	----
Microbiological Tests										
Coliforms, total	----	E010/CG	1	MPN/100mL	<1	----	----	----	----	----
Heterotrophic plate count [HPC]	----	E010.HPC/CG	1	MPN/100mL	4	----	----	----	----	----
Coliforms, Escherichia coli [E. coli]	----	E010/CG	1	MPN/100mL	<1	----	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/CG	0.0100	mg/L	0.0240	----	----	----	----	----
Antimony, total	7440-36-0	E420/CG	0.00050	mg/L	<0.00050	----	----	----	----	----
Arsenic, total	7440-38-2	E420/CG	0.00010	mg/L	0.00013	----	----	----	----	----
Barium, total	7440-39-3	E420/CG	0.0200	mg/L	0.110	----	----	----	----	----
Boron, total	7440-42-8	E420/CG	0.100	mg/L	<0.100	----	----	----	----	----
Cadmium, total	7440-43-9	E420/CG	0.000200	mg/L	<0.000200	----	----	----	----	----
Calcium, total	7440-70-2	E420/CG	0.100	mg/L	68.3	----	----	----	----	----
Chromium, total	7440-47-3	E420/CG	0.00200	mg/L	<0.00200	----	----	----	----	----
Copper, total	7440-50-8	E420/CG	0.00100	mg/L	0.0176	----	----	----	----	----
Iron, total	7439-89-6	E420/CG	0.030	mg/L	<0.030	----	----	----	----	----
Lead, total	7439-92-1	E420/CG	0.000500	mg/L	0.000915	----	----	----	----	----
Magnesium, total	7439-95-4	E420/CG	0.100	mg/L	16.2	----	----	----	----	----
Manganese, total	7439-96-5	E420/CG	0.00200	mg/L	0.140	----	----	----	----	----
Mercury, total	7439-97-6	E508/CG	0.0000050	mg/L	<0.0000050	----	----	----	----	----
Potassium, total	7440-09-7	E420/CG	0.100	mg/L	0.633	----	----	----	----	----



## Analytical Results

Sub-Matrix: Water					Client sample ID	WELL 2-230607	----	----	----	----
(Matrix: Water)					Client sampling date / time	07-Jun-2023 07:50	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2307475-001	Result	-----	-----	-----	-----
Total Metals										
Selenium, total	7782-49-2	E420/CG	0.00100	mg/L	<0.00100	----	----	----	----	----
Sodium, total	7440-23-5	E420/CG	2.00	mg/L	12.5	----	----	----	----	----
Uranium, total	7440-61-1	E420/CG	0.000100	mg/L	0.000650	----	----	----	----	----
Zinc, total	7440-66-6	E420/CG	0.0500	mg/L	<0.0500	----	----	----	----	----
Dissolved Metals										
Calcium, dissolved	7440-70-2	E421/CG	0.050	mg/L	59.4	----	----	----	----	----
Magnesium, dissolved	7439-95-4	E421/CG	0.0050	mg/L	14.1	----	----	----	----	----
Potassium, dissolved	7440-09-7	E421/CG	0.050	mg/L	0.573	----	----	----	----	----
Sodium, dissolved	7440-23-5	E421/CG	0.050	mg/L	11.5	----	----	----	----	----
Dissolved metals filtration location	----	EP421/CG	-	-	Laboratory	----	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2307475</b>	Page	: 1 of 11
Client	: <b>SNC-Lavalin Inc.</b>	Laboratory	: Calgary - Environmental
Contact	: Genevieve Pomerleau	Account Manager	: Lovepreet Kaur
Address	: 45800 Mennie Rd Cranbrook AB Canada	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250 354 1664	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 08-Jun-2023 08:55
PO	: 695248	Issue Date	: 15-Jun-2023 18:06
C-O-C number	: 6935572022		
Sampler	: Marc Beaton		
Site	: ----		
Quote number	: GARP Assessment - Drinking Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

# Guidelines for Canadian Drinking Water Quality

## Summary Tables

September 2022

This document may be cited as follows:

Health Canada (2022). Guidelines for Canadian Drinking Water Quality—Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.

The document was prepared by Health Canada in collaboration with the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment.

Any questions or comments on this document may be directed to the following

Water and Air Quality Bureau  
Healthy Environments and Consumer Safety Branch  
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Tel.: 1-833-223-1014 (toll free)  
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Other documents for the Guidelines for Canadian Drinking Water Quality can be found on the following web page:  
<https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality.html>

# Table of Contents

Introduction ..... 1

Abbreviations ..... 2

Tables ..... 3

    Table 1. Microbiological Parameters..... 3

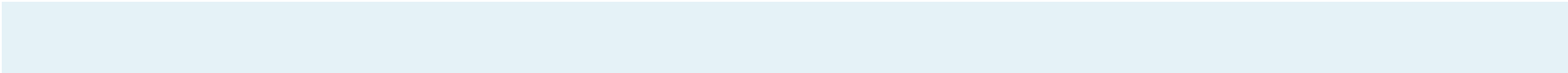
    Table 2. Chemical and Physical Parameters ..... 7

    Table 3. Radiological Parameters..... 32

    Table 4. Guidance Documents ..... 34

    Table 5. Withdrawn Guidelines..... 37

    Table 6. Guidelines and Guidance in Progress..... 39



## Introduction

The Guidelines for Canadian Drinking Water Quality are established by Health Canada in collaboration with the [Federal-Provincial-Territorial Committee on Drinking Water](#) (CDW) and other federal government departments. Health Canada publishes the guidelines and other information on the website [Drinking water quality in Canada](#). The tables in this document summarize the values and key information from each of the guidelines. **Health Canada updates this document regularly, but you should always consult individual guideline technical documents and guidance documents on the website [Water Quality—Reports and Publications](#) for the most current information.**

Each guideline was established based on current, published scientific research related to health effects, aesthetic effects, and operational considerations. Guidelines (maximum acceptable concentrations or treatment goals) are based on a comprehensive review of the known health effects associated with each contaminant, on exposure levels and on the availability of treatment and analytical technologies. Aesthetic objectives (e.g., for taste or odour) are provided when they play a role in determining whether consumers will consider the water drinkable. Operational guidance values are provided when a substance may interfere with or impair a treatment process or technology (e.g., turbidity interfering with chlorination or UV disinfection) or adversely affect drinking water infrastructure (e.g., corrosion of pipes).

Guidelines for Canadian Drinking Water Quality are established specifically for contaminants that meet all of the following criteria:

1. Exposure to the contaminant could lead to adverse health effects in humans;
2. The contaminant is frequently detected or could be expected to be found in a large number of drinking water supplies throughout Canada; and
3. The contaminant is detected, or could be expected to be detected, in drinking water at a level that is of possible human health significance.

If a contaminant or issue of interest does not meet all these criteria, Health Canada and CDW may choose not to establish a numerical guideline or develop a guideline technical document. In that case, advice may be provided through a guidance document in order to convey operational or management information related to a contaminant or issue of concern.

Guidelines are [systematically reviewed](#) to assess the need to update them. When a guideline is reaffirmed, both the year of the original publication and the year of reaffirmation are shown below after the name of the parameter.



## Abbreviations

A	acceptability (parameter type)
ALARA	as low as reasonably achievable
AO	aesthetic objective
CDW	Federal-Provincial-Territorial Committee on Drinking Water
D	disinfectant (parameter type)
DBP	disinfectant by-product (parameter type)
HPC	heterotrophic plate count
I	inorganic chemical (parameter type)
MAC	maximum acceptable concentration
NTU	nephelometric turbidity units
O	organic chemical (parameter type)
OG	operational guidance value
P	pesticide (parameter type)
QMRA	quantitative microbial risk assessment
T	treatment-related (parameter type)
TCU	true colour units

## Tables

**Table 1. Microbiological Parameters**

In general, the highest priority guidelines are those dealing with microbiological contaminants, such as bacteria, protozoa and viruses. Since it is difficult to perform routine analysis of harmful microorganisms that might be present in inadequately treated drinking water, the microbiological guidelines focus on indicator organisms, such as E.coli and total coliforms, and treatment goals for pathogens. The use of a source-to-tap approach that includes source water protection, adequate treatment, and a well-maintained distribution system helps to reduce microorganisms to levels that have not been associated with illness and meet the guidelines outlined below.

Parameter (published, reaffirmed)	Guideline	Common Sources	Health Considerations	Applying the Guideline and Comments
Enteric protozoa: <i>Giardia</i> and <i>Cryptosporidium</i> (2019)	Treatment goal: Minimum 3 log removal and/or inactivation of cysts and oocysts	Human and animal feces	<i>Giardia</i> and <i>Cryptosporidium</i> are commonly associated with gastrointestinal upset (nausea, vomiting, and diarrhoea). Less common health effects vary. <i>Giardia</i> infections may include prolonged gastrointestinal upset, malaise and malabsorption. <i>Cryptosporidium</i> infections, in immunocompromised individuals, can occur outside the gastrointestinal tract.	Monitoring for <i>Cryptosporidium</i> and <i>Giardia</i> in source waters will provide valuable information for a risk-based assessment of treatment requirements. Depending on the source water quality, a greater log removal and/or inactivation may be required.
Enteric viruses (2019)	Treatment goal: Minimum 4 log reduction (removal and/or inactivation) of enteric viruses	Human feces	Commonly associated with gastrointestinal upset (nausea, vomiting, diarrhoea); less common health effects can include respiratory symptoms, central nervous system infections, liver	Enteric viruses have been detected in surface and groundwater sources. Routine monitoring for viruses is not practical, and assessing the vulnerability of source waters to

Parameter (published, reaffirmed)	Guideline	Common Sources	Health Considerations	Applying the Guideline and Comments
			infections and muscular syndromes.	viral contamination is difficult; thus, treatment is a way to reduce risk. Disinfection is a critical barrier.
<i>Escherichia coli</i> ( <i>E. coli</i> ) (2020)	MAC: None detectable per 100 mL	Human and animal feces	<i>E. coli</i> is an indicator of fecal contamination that is used as a tool to verify the quality of the drinking water. Its detection indicates recent fecal contamination and that microorganisms capable of causing gastrointestinal illnesses may also be present. Pathogens in human and animal feces pose the greatest immediate danger to public health.	In <u>water leaving a treatment plant</u> , the presence of <i>E. coli</i> indicates a serious breach in treatment. In a <u>distribution or storage system</u> , detection of <i>E. coli</i> can indicate that the water has become contaminated during distribution. In <u>non-disinfected groundwater</u> , the presence of <i>E. coli</i> indicates that the groundwater has been affected by fecal contamination. <i>E. coli</i> should be monitored in conjunction with other indicators, as part of a source-to-tap approach to producing drinking water of an acceptable quality.
Total coliforms (2020)	MAC of none detectable/100 mL in water leaving a treatment plant and in non- disinfected groundwater leaving the well	Human and animal feces; naturally occurring in water, soil and vegetation	Total coliforms are not used as indicators of potential health effects from pathogenic microorganisms; they are used as a tool to determine how well the drinking water treatment system is operating and to indicate water quality changes in the distribution system.	Total coliforms should be monitored in the distribution system because they are used to indicate changes in water quality. In <u>water leaving a treatment plant</u> , total coliforms should be measured in conjunction with other indicators to assess water quality; the presence of total coliforms

Parameter (published, reaffirmed)	Guideline	Common Sources	Health Considerations	Applying the Guideline and Comments
				<p>indicates a serious breach in treatment.</p> <p>In a <u>distribution and storage system</u>, detection of total coliforms can indicate regrowth of the bacteria in biofilms or intrusion of untreated water.</p> <p>Detection of total coliforms from consecutive samples from the same site or from more than 10% of the samples collected in a given sampling period should be investigated.</p> <p>In <u>non-disinfected groundwater</u>, the presence of total coliforms may indicate that the system is vulnerable to contamination, or it may be a sign of bacterial regrowth.</p>
Turbidity (2012)	<p>Treatment limits for individual filters or units:</p> <ul style="list-style-type: none"> <li>- Conventional and direct filtration: <math>\leq 0.3</math> NTU<sup>1</sup></li> <li>- slow sand and diatomaceous</li> </ul>	<p>Naturally occurring particles:</p> <p><i>Inorganic</i>: clays, silts, metal precipitates</p> <p><i>Organic</i>: decomposed plant &amp; animal debris, microorganisms</p>	<p>Particles can harbour microorganisms, protecting them from disinfection, and can entrap heavy metals and biocides; elevated or fluctuating turbidity in filtered water can indicate a problem with the water treatment process and a potential increased risk of pathogens in treated water.</p>	<p>Guidelines apply to individual filter turbidity for systems using surface water or groundwater under the direct influence of surface water.</p> <p>The decision to exempt a waterworks from filtration should be made by the appropriate authority based on site-specific considerations, including historical</p>

Parameter (published, reaffirmed)	Guideline	Common Sources	Health Considerations	Applying the Guideline and Comments
	earth filtration: $\leq 1.0 \text{ NTU}^2$ - membrane filtration: $\leq 0.1 \text{ NTU}^3$			<p>and ongoing monitoring data. To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of 1.0 NTU or less. For systems that use groundwater, turbidity should generally be below 1.0 NTU.</p> <p>Filtration systems should be designed and operated to reduce turbidity levels as low as reasonably achievable and strive to achieve a treated water turbidity target from individual filters of less than 0.1 NTU.</p>

<sup>1</sup> in at least 95% of measurements either per filter cycle or per month; never to exceed 1.0 NTU.

<sup>2</sup> in at least 95% of measurements either per filter cycle or per month; never to exceed 3.0 NTU.

<sup>3</sup> in at least 99% of measurements per operational filter period or per month. Measurements greater than 0.1 NTU for a period greater than 15 minutes from an individual membrane unit should immediately trigger an investigation of the membrane unit integrity.

**Table 2. Chemical and Physical Parameters**

Guidelines for chemical and physical parameters are the following:

1. health based and listed as maximum acceptable concentrations (MAC);
2. based on aesthetic considerations and listed as aesthetic objectives (AO); or
3. established based on operational considerations and listed as operational guidance values (OG).

In general, the highest priority guidelines are those dealing with microbiological contaminants. Any measure taken to reduce concentrations of chemical contaminants should not compromise the effectiveness of disinfection.

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
T	Aluminum (2021)	2.9	OG: 0.1	Naturally occurring; aluminum salts used as coagulants in drinking water treatment; leaching from cement-based materials; dissolution of activated alumina media (where applicable)	<b>Health basis of MAC:</b> Neuromuscular effects (hind- and fore-limb grip strength, foot splay), urinary tract effects and general toxicity.	The MAC and OG apply to all drinking water supplies (including groundwater) and are to be applied as locational running annual averages. The OG value is established to minimize the potential for the accumulation and release of metals in the distribution system and to avoid other operational and aesthetic issues. It takes treatment achievability into consideration.
I	Ammonia (2013)	None required		Naturally occurring; released from agricultural	Levels of ammonia, either naturally present in the	To help prevent nitrification, limit excess

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
				or industrial wastes; added as part of chloramination for drinking water disinfection	source water or added as part of a disinfection strategy, can affect water quality in the distribution system (e.g., nitrification) and should be monitored. A guideline value is not necessary as it is produced in the body and efficiently metabolized in healthy people; no adverse effects at levels found in drinking water.	free ammonia entering the distribution system to below 0.1 mg/L, and preferably below 0.05 mg/L, measured as nitrogen. Nitrification can lead to the formation of nitrite/nitrate, decreased chloramine residual and increased bacterial count.
I	Antimony (1997)	0.006		Naturally occurring (erosion); soil runoff; industrial effluents; leaching from plumbing materials and solder	<b>Health basis of MAC:</b> Microscopic changes in organs and tissues (thymus, kidney, liver, spleen, thyroid)	MAC takes into consideration analytical achievability; plumbing should be thoroughly flushed before water is used for consumption.
I	Arsenic (2006)	0.010 ALARA		Naturally occurring (erosion and weathering of soils, minerals, ores); releases from mining; industrial effluent	<b>Health basis of MAC:</b> Cancer (lung, bladder, liver, skin) (classified as human carcinogen) <b>Other:</b> Skin, vascular and neurological effects (numbness and tingling of extremities)	MAC based on treatment achievability; elevated levels associated with certain groundwaters; levels should be kept as low as reasonably achievable.

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
I	Asbestos (1989, 2005)	None required		Naturally occurring (erosion of asbestos minerals and ores); decay of asbestos-cement pipes		Guideline value not necessary; no evidence of adverse health effects from exposure through drinking water.
P	Atrazine (1993)	0.005		Leaching and/or runoff from agricultural use	<b>Health basis of MAC:</b> Developmental effects (reduced body weight of offspring) <b>Other:</b> Potential increased risk of ovarian cancer or lymphomas (classified as possible carcinogen)	MAC applies to sum of atrazine and its <i>N</i> - dealkylated metabolites - diethylatrazine, deisopropylatrazine, hydroxyatrazine, diaminochlorotriazine; Persistent in source waters.
I	Barium (2020)	2.0		Naturally occurring; releases or spills from industrial uses	<b>Health basis of MAC:</b> Kidney effects	MAC is for total barium and takes into consideration exposure estimates from all sources.
O	Benzene (2009)	0.005		Releases or spills from industrial uses	<b>Health basis of MAC:</b> Bone marrow (red and white blood cell) changes and cancer (classified as human carcinogen) <b>Other:</b> Blood system and immunological responses	MAC takes into consideration all exposures from drinking water, which include ingestion, as well as inhalation and dermal absorption during showering and bathing.



Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
O	Benzo[a]pyrene (2016)	0.000 04		Leaching from liners in water distribution systems	<b>Health basis of MAC:</b> Stomach tumours (classified as human carcinogen)	
I	Boron (1990)	5		Naturally occurring; leaching or runoff from industrial use	<b>Health basis of MAC:</b> Reproductive effects (testicular atrophy, spermatogenesis) <b>Other:</b> Limited evidence of reduced sexual function in men	MAC based on treatment achievability.
DBP	Bromate <sup>3</sup> (2018)	0.01		Contaminant in hypochlorite solution; by- product of drinking water disinfection with ozone	<b>Health basis of MAC:</b> Tumours of the testicular mesothelium (classified as a possible human carcinogen)	Efforts to reduce bromate concentrations must not compromise the effectiveness of disinfection. Bromate is difficult to remove from drinking water once formed. The recommended strategy is controlling the ozonation process; use of certified treatment chemicals and; appropriate handling and storage of hypochlorite. Quarterly monitoring of raw water bromide is recommended to allow

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
						correlation to bromate or brominated DBPs.
P	Bromoxynil (2022)	0.03		Leaching and/or runoff from agricultural use	<b>Health basis of MAC:</b> Increased clinical signs (panting, salivation, liquid feces, pale gums) and liver weight, as well as both decreases in body weight and body weight gain	None
I	Cadmium (2020)	0.007		Leaching from galvanized pipes and solders; industrial and municipal waste	<b>Health basis of MAC:</b> Kidney damage. <b>Other:</b> Bone effects (decreased bone density)	MAC is for total cadmium and takes into consideration exposure estimates from all sources. Sampling should be done at the tap to reflect average exposure similar to sampling done for lead. The contribution of cadmium in drinking water is generally from the galvanized steel used in pipes and well components. The best approach to minimize exposure to cadmium from drinking water is to replace galvanized steel

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
						and components. Drinking water treatment devices are also an effective option.
<b>I</b>	Calcium (1987, 2005)	None required		Naturally occurring (erosion and weathering of soils, minerals, ores)	No evidence of adverse health effects from calcium in drinking water.	Guideline value not necessary; calcium contributes to hardness.
<b>O</b>	Carbon tetrachloride (2010)	0.002		Industrial effluents and leaching from hazardous waste sites	<b>Health basis of MAC:</b> Liver toxicity <b>Other:</b> Kidney damage; liver tumours (classified as probable carcinogen)	MAC takes into consideration all exposures from drinking water, which include ingestion, as well as inhalation and dermal absorption during showering and bathing.
<b>D</b>	Chloramines (2020)	None required		Monochloramine is used as a secondary disinfectant; formed in drinking water when chlorine is added in the presence of ammonia	Guideline value not necessary due to low toxicity at concentrations found in drinking water	Chloramine residuals in most Canadian drinking water distribution systems are typically below 4 mg/L.
<b>DBP</b>	Chlorate (2008)	1		By-product of drinking water disinfection with chlorine dioxide; possible contaminant in hypochlorite solution	<b>Health basis of MAC:</b> Thyroid gland effects (colloid depletion)	As chlorate is difficult to remove once formed, its formation should be controlled by respecting the maximum feed dose of 1.2 mg/L of chlorine

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
						dioxide and managing /monitoring formation in hypochlorite solutions.
I	Chloride (1979, 2005)		AO: ≤ 250	Naturally occurring (seawater intrusion); dissolved salt deposits, highway salt, industrial effluents, oil well operations, sewage, irrigation drainage, refuse leachates	A guideline value is not necessary as health effects are not of concern at levels found in drinking water.	Based on taste and potential for corrosion in the distribution system.
D	Chlorine (2009)	None required		Used as drinking water disinfectant	A guideline value is not necessary due to low toxicity at concentrations found in drinking water	Free chlorine concentrations in most Canadian drinking water distribution systems range from 0.04 to 2.0 mg/L.
D	Chlorine dioxide (2008)	None required		Used as drinking water disinfectant (primary disinfection only)	A guideline value for chlorine dioxide is not required because of its rapid reduction to chlorite in drinking water	A maximum feed dose of 1.2 mg/L of chlorine dioxide should not be exceeded to control the formation of chlorite and chlorate.
DBP	Chlorite (2008)	1		By-product of drinking water disinfection with chlorine dioxide	<b>Health basis of MAC:</b> Neurobehavioural effects (lowered auditory startle amplitude, decreased exploratory activity),	Chlorite formation should be controlled by respecting the maximum feed dose of 1.2 mg/L of chlorine dioxide and

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
					decreased absolute brain weight, altered liver weights	managing /monitoring formation in hypochlorite solutions.
P	Chlorpyrifos (1986)	0.09	None	Leaching and/or runoff from agricultural or other uses	<b>Health basis of MAC:</b> Nervous system effects (cholinesterase inhibition)	Not expected to leach significantly into groundwater.
I	Chromium (2018)	0.05		Naturally occurring (erosion of minerals); releases or spills from industrial uses	<b>Health basis of MAC:</b> Hyperplasia of the small intestine from chromium (VI). <b>Other:</b> No definitive evidence of toxicity to Chromium (III).	MAC protects against both cancer and non-cancer effects from Chromium (VI) and is established for total chromium.
T	Colour (1979, 2005)		AO: ≤ 15 TCU	Naturally occurring organic substances, metals; industrial wastes	A guideline value is not necessary as health effects are not of concern at levels found in drinking water.	May interfere with disinfection; removal is important to ensure effective treatment.
I	Copper (2019)	2	AO: 1	Naturally occurring; leaching from copper piping	<b>Health basis of MAC:</b> Gastrointestinal effects (short-term), liver and kidney effects (long-term).	Water samples should be taken at the tap. MAC is for total copper and protects against both short term and long term exposures. AO is based on taste and water discolouration (resulting in

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
						staining of laundry and plumbing fixtures).
I	Cyanide (1979, 1991)	0.2		Industrial and mining effluents; release from organic compounds	<b>Health basis of MAC:</b> No clinical or other changes at the highest dose tested	At the levels seen in Canadian waters, cyanide is not a concern as it can be detoxified to a certain extent in the human body.
O	Cyanobacterial toxins (2018)	0.0015		Naturally occurring - released from populations of cyanobacteria (planktonic blooms and benthic mats)	<b>Health basis of MAC:</b> Liver effects	MAC is for total microcystins (intra- and extra-cellular) Note that infants can ingest a significantly larger volume of water per body weight. As a precautionary measure, where levels of total microcystins in treated water are detected above a reference value of 0.4 µg/L, the public in the affected area should use an alternate suitable source of drinking water (such as bottled water) to reconstitute infant formula.
P	Dicamba (2022)	0.11		Leaching or runoff from agricultural or other uses	<b>Health basis of MAC:</b> Liver effects	Readily leaches into groundwater.

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
O	1,4-Dichlorobenzene <sup>2</sup> (1987)	0.005	AO: ≤ 0.001	Releases or spills from industrial effluents; use of urinal deodorants	<b>Health basis of MAC:</b> Benign liver tumours and adrenal gland tumours (classified as probable carcinogen)	AO based on odour; levels above the AO would render drinking water unpalatable.
O	1,2-Dichloroethane (2014)	0.005		Releases or spills from industrial effluents; leachate from waste disposal	<b>Health basis of MAC:</b> Cancer of the mammary gland (classified as probable carcinogen)	The MAC protects against both cancer and non- cancer effects and takes into consideration all exposures from drinking water, which include ingestion as well as inhalation and dermal absorption during showering and bathing.
O	1,1-Dichloroethylene (1994)	0.014		Releases or spills from industrial effluents	<b>Health basis of MAC:</b> Liver effects (fatty changes)	
O	Dichloromethane (2011)	0.05		Industrial and municipal wastewater discharges	<b>Health basis of MAC:</b> Liver effects (liver foci and areas of cellular alteration). <b>Other:</b> Classified as probable carcinogen	The MAC protects against both cancer and non- cancer effects and takes into consideration all exposures from drinking water, which include ingestion as well as inhalation and dermal absorption during showering and bathing.

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
P	2,4-Dichlorophenoxy acetic acid (2,4-D) (2022)	0.1		Leaching and/or runoff from agricultural and non- cropland use	<b>Health basis of MAC:</b> Kidney effects	High potential to leach into groundwater.
P	Dimethoate and omethoate (2022)	0.02		Leaching and/or runoff from agricultural and non-agricultural use	<b>Health basis of MAC:</b> Nervous system effects (cholinesterase inhibition)	MAC is for dimethoate. An additive approach should be taken in which the sum of the detected concentrations of dimethoate and omethoate (expressed as a dimethoate equivalent value) does not exceed the MAC for dimethoate.
I	1,4-Dioxane (2021)	0.050		Generally not detected in Canadian water supplies, but there have been contaminations of drinking water supplies near landfills and industrial sites	<b>Health basis of MAC:</b> liver effects that occur before the development of cancer	1,4 Dioxane is difficult to remove using conventional drinking water treatment. Treatment technologies such as advanced oxidation processes and synthetic adsorbents need to be considered. Reverse osmosis membranes may be capable of removing 1,4- dioxane at both the



Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
						municipal and residential scale.
<b>P</b>	Diquat (2022)	0.05		Leaching and/or runoff from agricultural use; added directly to water to control aquatic weeds	<b>Health basis of MAC:</b> Cataract formation	Unlikely to leach into groundwater.
<b>O</b>	Ethylbenzene (2014)	0.14	AO: 0.0016	Emissions, effluents or spills from petroleum and chemical industries	<b>Health basis of MAC:</b> Effects on the liver and pituitary gland. <b>Other:</b> Tumour formation at various sites in animals, including kidney, lung, liver and testes.	MAC protects against both cancer and non-cancer health effects. MAC takes into consideration all exposures from drinking water, which include ingestion, as well as inhalation and dermal absorption during showering and bathing. AO is based on odour.
<b>I</b>	Fluoride (2010)	1.5		Naturally occurring (rock and soil erosion); may be added to promote dental health	<b>Basis of MAC:</b> Moderate dental fluorosis (based on cosmetic effect, not health)	Beneficial in preventing dental caries.
<b>DBP</b>	Formaldehyde (1997)	None required		By-product of disinfection with ozone; releases from industrial effluents	A guideline value is not necessary as health effects are not of concern at levels found in drinking water.	A guideline value is not necessary, as levels in drinking water are below the level at which adverse health effects may occur.

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
<b>P</b>	Glyphosate (1987, 2005)	0.28		Leaching and/or runoff from various uses in weed control	<b>Health basis of MAC:</b> Reduced body weight gain	Not expected to migrate to groundwater.
<b>DBP</b>	Haloacetic acids – Total (HAAs) <sup>3</sup> (2008)	0.08 ALARA		By-product of drinking water disinfection with chlorine	<b>Health basis of MAC:</b> Liver cancer (DCA); DCA is classified as probably carcinogenic to humans <b>Other:</b> Other organ cancers (DCA, DBA, TCA); liver and other organ effects (kidney and testes weights) (MCA)	Refers to the total of monochloroacetic acid (MCA), dichloroacetic acid (DCA), trichloroacetic acid (TCA), monobromoacetic acid (MBA) and dibromoacetic acid (DBA); MAC is based on ability to achieve HAA levels in distribution systems without compromising disinfection; precursor removal limits formation.
<b>T</b>	Hardness (1979)	None required		Naturally occurring (sedimentary rock erosion and seepage, runoff from soils); levels generally higher in groundwater	Although hardness may have significant aesthetic effects, a guideline has not been established because public acceptance of hardness may vary considerably according to the local conditions; major contributors to hardness	Hardness levels between 80 and 100 mg/L (as CaCO <sub>3</sub> ) provide acceptable balance between corrosion and incrustation; where a water softener is used, a separate unsoftened supply for cooking and

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
					(calcium and magnesium) are not of direct public health concern	drinking purposes is recommended.
I	Iron (1978, 2005)		AO: ≤ 0.3	Naturally occurring (erosion and weathering of rocks and minerals); acidic mine water drainage, landfill leachates, sewage effluents and iron-related industries	No evidence exists of dietary iron toxicity in the general population.	Based on taste and staining of laundry and plumbing fixtures.
I	Lead (2019)	0.005 ALARA		Leaching from plumbing (lead service lines, lead solder and brass fittings)	<p><b>Health basis of MAC:</b> Reduced intelligence in children measured as decreases in IQ is the most sensitive and well established health effect of lead exposure. There is no known safe exposure level to lead.</p> <p><b>Other:</b> Possible effects include behavioral effects in children. Reduced cognition, increased blood pressure, and renal dysfunction in adults are also possible; classified</p>	MAC is for total lead. Lead levels should be kept as low as reasonably achievable. Sampling should be done at the tap to reflect average exposure. The most significant contribution of lead in drinking water is generally from the lead service line that supplies drinking water to the home. The best approach to minimize exposure to lead from drinking water is to remove the full lead service line. Drinking

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
					as probably carcinogenic to humans	water treatment devices are also an effective option.
I	Magnesium (1978)	None required		Naturally occurring (erosion and weathering of rocks and minerals)	No evidence of adverse health effects from magnesium in drinking water, therefore a guideline value is not necessary.	No additional comments.
P	Malathion (1986, 2005)	0.19		Leaching and/or runoff from agricultural and other uses	<b>Health basis of MAC:</b> Nervous system effects (cholinesterase inhibition)	Not expected to leach into groundwater.
I	Manganese (2019)	0.12	AO: ≤ 0.02	Dissolution of naturally occurring minerals commonly found in soil and rock. Other sources include industrial discharge, mining activities and leaching from landfills.	<b>Health Basis of MAC:</b> Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. <b>Other:</b> Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	AO based on minimizing the occurrence of discoloured water, consumer complaints and staining of laundry.
I	Mercury (1986)	0.001		Releases or spills from industrial effluents; waste disposal; irrigation or	<b>Health basis of MAC:</b> Irreversible neurological symptoms	Applies to all forms of mercury; mercury generally not found in

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
				drainage of areas where agricultural pesticides are used		drinking water, as it binds to sediments and soil.
<b>P</b>	2-Methyl-4- chlorophenoxyacetic acid (MCPA) (2022)	0.35		Leaching and/or runoff from agricultural and other uses	<b>Health basis of MAC:</b> Kidney effects (increased absolute and relative weights, urinary bilirubin, crystals and pH) <b>Other:</b> Systemic, liver, testicular, reproductive/developmental and nervous system effects	Can potentially leach into groundwater.
<b>O</b>	Methyl tertiary- butyl ether (MTBE) (2006)		AO: ≤ 0.015	Spills from gasoline refineries, filling stations and gasoline-powered boats; seepage into groundwater from leaking storage tanks	The AO is lower than levels associated with potential toxicological effects, it is considered protective of human health. Studies on toxic effects remain inconclusive.	AO based on odour; levels above the AO would render water unpalatable.
<b>P</b>	Metribuzin (2021)	0.08		Leaching and/or runoff from agricultural use	<b>Health basis of MAC:</b> Liver effects (increased ornithine carboxytransferase, increased incidence and severity of mucopolysaccharide	Leaching into groundwater depends on topography, precipitation and site-specific soil characteristic such as organic matter content and soil pH.

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
					droplets, hepatic necrobiosis)	
I	Nitrate (2013)	45 as nitrate; 10 as nitrate- nitrogen		Naturally occurring; leaching or runoff from agricultural fertilizer use, manure and domestic sewage; may be produced from excess ammonia or nitrification in the distribution system	<b>Health basis of MAC:</b> Methaemoglobinaemia (blue baby syndrome) and effects on thyroid gland function in bottle-fed infants <b>Other:</b> Classified as possible carcinogen under conditions that result in endogenous nitrosation	Systems using chloramine disinfection or that have naturally occurring ammonia should monitor the level of nitrate in the distribution system. Homeowners with a well should test concentration of nitrate in their water supply.
I	Nitritotriacetic acid (NTA) (1990)	0.4		Sewage contamination	<b>Health basis of MAC:</b> Kidney effects (nephritis and nephrosis) <b>Other:</b> Classified as possible carcinogen	MAC is based upon exposure mainly attributable (80%) to drinking water with 20% of exposure attributable to food.
I	Nitrite (2013)	3 as nitrite; 1 as nitrite- nitrogen		Naturally occurring; leaching or runoff from agricultural fertilizer use, manure and domestic sewage; may be produced from excess ammonia or nitrification in the distribution system	<b>Health basis of MAC:</b> Methaemoglobinaemia (blue baby syndrome) in bottle-fed infants less than 6 months of age <b>Other:</b> Classified as possible carcinogen under conditions that	Systems using chloramine disinfection or that have naturally occurring ammonia should monitor the level of nitrite in the distribution system. Homeowners with a well should test

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
					result in endogenous nitrosation	concentration of nitrite in their water supply.
<b>DBP</b>	<i>N</i> -Nitroso dimethylamine (NDMA) (2010)	0.000 04		By-product of drinking water disinfection with chlorine or chloramines; industrial and sewage treatment plant effluents	<b>Health basis of MAC:</b> Liver cancer (classified as probable carcinogen)	MAC takes into consideration all exposures from drinking water, which include ingestion, as well as inhalation and dermal absorption during showering and bathing.; levels should be kept low by preventing formation during treatment.
<b>A</b>	Odour (1979, 2005)		Inoffensiv e	Biological or industrial sources	<b>Not applicable</b>	Important to provide drinking water with no offensive odour, as consumers may seek alternative sources that are less safe.
<b>O</b>	Pentachloropheno l (1987, 2005)	0.06	AO: ≤ 0.03	By-product of drinking water disinfection with chlorine; industrial effluents	<b>Health basis of MAC:</b> Reduced body weight, changes in clinical parameters, histological changes in kidney and liver, reproductive effects (decreased neonatal survival and growth)	AO based on odour; levels above the AO would render drinking water unpalatable.

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
O	Perfluorooctane Sulfonate (PFOS) (2018)	0.0006		Synthetic chemical used in consumer products and fire-fighting foams for their water and oil repellant properties.	<b>Health basis of MAC:</b> Adverse effects in the liver. Additional effects at low doses include thyroid and immune effects and changes in serum lipid levels.	Additive effects with PFOA were considered. The sum of PFOS and PFOA concentrations in drinking water divided by their respective MAC should not exceed 1.
O	Perfluorooctanoic Acid (PFOA) (2018)	0.0002		Synthetic chemical used in consumer products and fire-fighting foams for their water and oil repellant properties.	<b>Health basis of MAC:</b> Adverse effects in the liver. Additional effects at low doses include delay in mammary, estrogenic and developmental effects.	Additive effects with PFOS were considered. The sum of PFOA and PFOS concentrations in drinking water divided by their respective MAC should not exceed 1.
T	pH (2015)		7.0–10.5 <sup>4</sup>	Not applicable	<b>Not applicable</b>	The control of pH is important to maximize treatment effectiveness, control corrosion and reduce leaching from distribution system and plumbing components.
I	Selenium (2014)	0.05		Naturally occurring (erosion and weathering of rocks and soils) and release from coal ash from coal-fired power plants and mining,	<b>Health basis of MAC:</b> chronic selenosis symptoms in humans following exposure to high levels <b>Other:</b> Hair loss, tooth decay, weakened nails	Selenium is an essential nutrient. Most exposure is from food; little information on toxicity of selenium from drinking water. Selenium can be found in non-leaded brass



Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
				refining of copper and other metals.	and nervous system disturbances at extremely high levels of exposure	alloy where it is added to replace lead.
I	Silver (1986, 2005)	None required		Naturally occurring (erosion and weathering of rocks and soils)	<b>Not applicable</b>	Guideline value not required as drinking water contributes negligibly to an individual's daily intake.
I	Sodium (1979)		AO: ≤ 200	Naturally occurring (erosion and weathering of salt deposits and contact with igneous rock, seawater intrusion); sewage and industrial effluents; sodium-based water softeners	For persons on strict sodium-reduced diets applying to all sources, levels in drinking water should be below 20 mg/L	Based on taste; where a sodium-based water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended.
I	Strontium (2019)	7.0		Naturally occurring (erosion and weathering of rocks); effluents from mining or other industries	<b>Health basis of MAC:</b> Bone effects (adverse effects on bone formation in infants as well as rickets, osteomalacia)	MAC is protective of the most sensitive sub-population, infants.
I	Sulphate (1994)		AO: ≤ 500	Industrial wastes	High levels (above 500 mg/L) can cause physiological effects such as diarrhoea or dehydration	Based on taste; it is recommended that health authorities be notified of drinking water sources containing sulphate

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
						concentrations above 500 mg/L.
<b>I</b>	Sulphide (1992)		AO: ≤ 0.05	Can occur in the distribution system from the reduction of sulphates by sulphate-reducing bacteria; industrial wastes	Not applicable	Based on taste and odour; levels above the AO would render water unpalatable.
<b>A</b>	Taste (1979, 2005)		Inoffensive	Biological or industrial sources	Not applicable	Important to provide drinking water with no offensive taste, as consumers may seek alternative sources that are less safe.
<b>T</b>	Temperature (1979, 2005)		AO: ≤ 15°C	Not applicable	Not applicable	Temperature indirectly affects health and aesthetics through impacts on disinfection, corrosion control and formation of biofilms in the distribution system.
<b>O</b>	Tetrachloroethylene (2015)	0.01		Spill or other point source of contamination	<b>Health basis of MAC:</b> Neurological effects (colour confusion) in humans <b>Other:</b> Classified as probably carcinogenic to humans, based on	Primarily a concern in groundwater, as it volatilizes easily from surface water; MAC takes into consideration all exposures from drinking water, which include

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
					sufficient evidence in experimental animals and limited evidence in humans	ingestion, as well as inhalation and dermal absorption during showering and bathing.
<b>O</b>	Toluene (2014)	0.06	AO: 0.024	Emissions, effluents or spills from petroleum and chemical industries	<b>Health basis of MAC:</b> Adverse neurological effects, including vibration thresholds, colour discrimination, auditory thresholds, attention, memory and psychomotor functions <b>Other:</b> Insufficient information to determine whether toluene is carcinogenic to humans.	MAC takes into consideration all exposures from drinking water, which include ingestion, as well as inhalation and dermal absorption during showering and bathing. AO is based on odour.
<b>A</b>	Total dissolved solids (TDS) (1991)		AO: ≤ 500	Naturally occurring; sewage, urban and agricultural runoff, industrial wastewater	Not applicable	Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate.

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
O	Trichloroethylene (2005)	0.005		Industrial effluents and spills from improper disposal	<b>Health basis of MAC:</b> Developmental effects (heart malformations) <b>Other:</b> Classified as probable carcinogen	MAC takes into consideration all exposures from drinking water, which include ingestion, as well as inhalation and dermal absorption during showering and bathing.
O	2,4,6- Trichlorophenol (1987, 2005)	0.005	AO: ≤ 0.002	By-product of drinking water disinfection with chlorine; industrial effluents and spills	<b>Health basis of MAC:</b> Liver cancer (classified as probable carcinogen)	AO based on odour; levels above the AO would render drinking water unpalatable.
DBP	Trihalomethanes <sup>3</sup> (THMs) (2006)	0.1		By-product of drinking water disinfection with chlorine; industrial effluents	<b>Health basis of MAC:</b> Liver effects (fatty cysts) (chloroform classified as possible carcinogen) <b>Other:</b> Kidney and colorectal cancers	Refers to the total of chlorodibromomethane, chloroform, bromodichloromethane and bromoform; MAC based on health effects of chloroform. MAC takes into consideration all exposures from drinking water, which include ingestion, as well as inhalation and dermal absorption during showering and bathing. Utilities should make every effort to maintain

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
						concentrations as low as reasonably achievable without compromising the effectiveness of disinfection. Recommended strategy is precursor removal. The separate MAC for BDCM was rescinded in April 2009.
I	Uranium (2019)	0.02		Naturally occurring (erosion and weathering of rocks and soils); mill tailings; emissions from nuclear industry and combustion of coal and other fuels; phosphate fertilizers	<b>Health basis of MAC:</b> Kidney effects	Based on challenges and operational cost impacts for some private wells and small systems; MAC is for total uranium and is protective in relation to both chemical and radiological hazards.
O	Vinyl chloride (2013)	0.002 ALARA		Industrial effluents; degradation product from organic solvents in groundwater; leaching from polyvinyl chloride pipes	<b>Health basis of MAC:</b> Liver cancer (classified as human carcinogen) <b>Other:</b> Raynaud's disease, effects on bone, circulatory system, thyroid, spleen, central nervous system	Based on analytical achievability. MAC takes into consideration all exposures from drinking water, which include ingestion, as well as inhalation and dermal absorption during showering and bathing.

Type <sup>1</sup>	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Applying the Guideline and Comments
						Leaching from polyvinyl chloride pipe is not expected to be significant.
<b>O</b>	Xylenes (total) (2014)	0.09	AO: 0.02	Emissions, effluents or spills from petroleum and chemical industries	<b>Health basis of MAC:</b> Adverse neuromuscular effects <b>Other:</b> Insufficient information to determine whether xylenes are carcinogenic to humans	MAC takes into consideration all exposures from drinking water, which include ingestion, as well as inhalation and dermal absorption during showering and bathing. AO is based on odour.
<b>I</b>	Zinc (1979, 2005)		AO: ≤ 5.0	Naturally occurring; industrial and domestic emissions; leaching may occur from galvanized pipes, hot water tanks and brass fittings	Zinc is an essential element and is generally considered to be non-toxic, however levels above the AO in water would render it unpalatable.	AO based on taste; water with zinc levels above the AO tends to be opalescent and develops a greasy film when boiled; plumbing should be thoroughly flushed before water is consumed.

<sup>1</sup> Parameter types: **A** – Acceptability; **D** – Disinfectant; **DBP** – Disinfection by-product; **P** – Pesticide; **I** – Inorganic chemical; **O** – Organic chemical; **T** – Treatment related parameter.

In cases where total dichlorobenzenes are measured and concentrations exceed the most stringent value (0.005 mg/L), the concentrations of the individual isomers should be established.

<sup>3</sup> Expressed as a locational running annual average of quarterly samples.

<sup>4</sup> No units.

### Table 3. Radiological Parameters

Guidelines for radiological parameters focus on routine operational conditions of existing and new water supplies and do not apply in the event of contamination during an emergency involving a large release of radionuclides into the environment. MACs have been established for the most commonly detected natural and artificial radionuclides in Canadian drinking water sources, using internationally accepted equations and principles and based solely on health considerations.

The MACs are based on exposure solely to a specific radionuclide. The radiological effects of two or more radionuclides in the same drinking water source are considered to be additive. Thus, the sum of the ratios of the observed concentration to the MAC for each contributing radionuclide should not exceed 1.

Water samples may be initially analysed for the presence of radioactivity using gross alpha and gross beta screening rather than measurements of individual radionuclides. If screening levels are exceeded (0.5 Bq/L for gross alpha and 1.0 Bq/L for gross beta), then concentrations of specific radionuclides should be analysed. A guideline for radon in drinking water is not deemed necessary and has not been established. Information on radon is presented because of its significance for indoor air quality in certain situations.

Parameter (published, reaffirmed)	MAC (Bq/L)	Common sources	Health basis of MAC	Comments
<b>Cesium-137 (2009)</b>	10	Nuclear weapons fallout and emissions from nuclear reactors	Cancer of the lung, breast, thyroid, bone, digestive organs and skin; leukaemia	Fixation by sediments in aquatic environments reduces its concentration in water bodies. Ingested <sup>137</sup> Cs is readily absorbed into soft tissues, but is eliminated relatively quickly.
<b>Iodine-131 (2009)</b>	6	Sewage effluent	Cancer of the lung, breast, thyroid, bone, digestive organs and skin; leukaemia	No additional comments
<b>Lead-210 (2009)</b>	0.2	Naturally occurring (decay product of radon)	Cancer of the lung, breast, thyroid, bone, digestive organs and skin; leukaemia	Corresponds to total lead concentration of $7 \times 10^{-8}$ µg/L

<b>Parameter (published, reaffirmed)</b>	<b>MAC (Bq/L)</b>	<b>Common sources</b>	<b>Health basis of MAC</b>	<b>Comments</b>
<b>Radium-226 (2009)</b>	0.5	Naturally occurring	Cancer of the lung, breast, thyroid, bone, digestive organs and skin; leukaemia	No additional comments
<b>Radon (2009)</b>	None required	Naturally occurring (leaching from radium-bearing rocks and soils; decay product of radium-226)	Health risk from ingestion considered negligible due to high volatility	Mainly a groundwater concern; if concentrations in drinking water exceed 2000 Bq/L actions should be taken to reduce release into indoor air (e.g. proper venting of drinking water supply)
<b>Strontium-90 (2009)</b>	5	Nuclear weapons fallout	Cancer of the lung, breast, thyroid, bone, digestive organs and skin; leukaemia	Has a long residence time in bone and its beta particles have high energy. Radioactive strontium (90Sr) should not be confused with stable strontium. The two species of strontium have quite different origins, and their concentrations in drinking water are not correlated.
<b>Tritium (2009)</b>	7000	Naturally occurring (cosmogenic radiation); releases from nuclear reactors	Cancer of the lung, breast, thyroid, bone, digestive organs and skin; leukaemia	Not removed by drinking water treatment
<b>Uranium 1999</b>	N/A		MAC based on chemical properties	See information provided in Table 2



**Table 4. Guidance Documents**

In certain situations, Health Canada, in collaboration with the Federal-Provincial-Territorial Committee on Drinking Water, may choose to develop guidance documents for issues that do not meet the criteria for guideline development and for specific issues for which operational or management guidance is warranted. These documents are offered as information for drinking water authorities and help provide guidance relating to contaminants, drinking water management issues or emergency situations.

Parameter/subject (published)	Comments
Chloral hydrate in drinking water (2008)	Exposure levels in Canada far below concentration that would cause health effects; levels above 0.2 mg/L may indicate a concern for health effects and should be investigated.
Controlling corrosion in drinking water distribution systems (2009)	Addresses strategies to deal with leaching of lead from materials in the distribution system; sampling protocols can be used to assess corrosion and the effectiveness of remediation/control measures to reduce lead levels in drinking water; corrective measures are outlined to address lead sources.
Issuing and rescinding boil water advisories in Canadian drinking water supplies (2015)	Summarizes factors for consideration when responsible authorities issue or rescind boil water advisories. Provides trend information on reasons boil water advisories are issued in Canada.
Issuing and rescinding drinking water avoidance advisories in emergency situations (2009)	Summarizes factors for consideration when responsible authorities issue or rescind drinking water avoidance advisories in emergency situations.
Monitoring the Biological Stability of Drinking Water in Distribution Systems (2022)	Distribution systems represent a complex and dynamic environment. Monitoring changes in biological stability in these systems is important to minimize potential risks to consumers. This guidance document discusses (1) the concept of biological stability, (2) causes of water quality deterioration in the distribution system, (3) health risks (e.g., waterborne outbreaks) and aesthetic issues (e.g., colour) associated with this deterioration, (4) monitoring tools and parameters that can be used to assess biological stability, and (5) distribution system management strategies to minimize public health risks. This guidance document replaces the Guidance on the Use of Heterotrophic Plate Counts in Canadian Drinking Water Supplies.

Parameter/subject (published)	Comments
Natural organic matter in drinking water (NOM) (2020)	The presence and characteristics of natural organic matter (NOM) can have significant impacts on drinking water treatment processes, and consequently the safety of drinking water. Seasonal and weather-related events can significantly affect the concentration and character of NOM. This guidance document reviews and assesses: 1) the impacts of NOM and the associated indirect health risks; 2) source-specific treatability study requirements to ensure the most appropriate process is selected to meet treated water quality goals; 3) treatment options and their effectiveness; 4) tools available to monitor raw, treated and distribution system water quality.
Overview of the Microbiological Aspects of Drinking Water Quality (2021)	Provides an overview of the microbiological considerations to ensure drinking water quality, integrating key content of the relevant guideline technical documents and guidance documents to illustrate how they fit into the source-to-tap approach.
Potassium from water softeners (2008)	Not a concern for general population; those with kidney disease or other conditions, such as heart disease, coronary artery disease, hypertension or diabetes, and those who are taking medications that interfere with normal body potassium handling should avoid the consumption of water treated by water softeners using potassium chloride.
Temperature aspects of drinking water (2021)	Water temperature affects all physical, chemical, microbiological, and biochemical processes to some extent from the source through treatment and distribution to in-building plumbing. In turn, this affects water quality and can result in issues related to health-based contaminants and aesthetics. This document summarizes how temperature is discussed in the Guidelines for Canadian Drinking Water Quality and highlights aspects that may be relevant to drinking water utilities when developing and implementing management strategies.
Use of Enterococci as an indicator in Canadian drinking water supplies (2020)	Enterococci are a bacteriological indicator of fecal contamination. This indicator can supplement E. coli and total coliforms monitoring programs to provide additional information into fecal contamination issues. The document provides information on how enterococci can be used in a drinking water monitoring program.
Use of Quantitative Microbial Risk Assessment (QMRA) in Drinking Water (2019)	Provides guidance on the use of QMRA to assist in understanding microbiological risks in Canadian water systems.

Parameter/subject (published)	Comments
Waterborne pathogens (2022)	<p>Numerous types of pathogenic microorganisms can spread through drinking water to cause human illness. Some are present in human or animal feces and can cause gastrointestinal illness when fecally contaminated water is consumed. Others are naturally found in aquatic environments and can cause opportunistic infections when the conditions in engineered water systems (e.g., drinking water distribution systems and building/premise plumbing) allow them to multiply and spread. This guidance document discusses sources of these pathogens, associated health effects, (pathogen) detection methods, treatment considerations, and management strategies to minimize public health risks.</p>

**Table 5. Withdrawn Guidelines**

Health Canada, in collaboration with the Federal-Provincial-Territorial Committee on Drinking Water, has established a science-based process to systematically review older guidelines and withdraw those that are no longer required. Guidelines are withdrawn for parameters that are no longer found in Canadian drinking water supplies at levels that could pose a risk to human health. This includes pesticides that are no longer registered for use in Canada and mixtures of contaminants that are addressed individually.

Type	Parameter	Type	Parameter
P	Aldicarb	P	Mirex
P	Aldrin + dieldrin	O	monochlorobenzene
P	Azinphos-methyl	P	paraquat
P	Bendiocarb	P	Parathion
P	Carbaryl	P	Pesticides (total)
P	Carbofuran	O	Phenols (total)
P	Chlordane (total isomers)	P	phorate
P	Cyanazine	O	Phthalic acid esters (PAE)
P	Diazinon	P	picloram
O	1,2-dichlorobenzene	O	Polychlorinated biphenyls (PCBs)
P	Dichlorodiphenyltrichloroethane (DDT) + metabolites	O	Polycyclic aromatic hydrocarbons (PAHs) (excluding benzo[a]pyrene)
O	2,4-dichlorophenol	O	Resin acids
P	Diclofop-methyl	P	Simazine
P	Dinoseb	O	Tannin
P	Diuron	P	Temephos
P	Endrin	P	Terbufos

Type	Parameter	Type	Parameter
O	Gasoline and its organic constituents	O	2,3,4,6-tetrachlorophenol
P	Heptachlor + heptachlor epoxide	O	Total organic carbon
O	Lignin	P	Toxaphene
P	Lindane	P	Triallate
P	Methoxychlor	P	2,4,5-Trichlorophenoxyacetic acid <sup>2</sup> (2,4,5-T)
P	Methyl-parathion	P	2,4,5-Trichlorophenoxypropionic acid (2,4,5-TP)
P	Metolachlor	P	Trifluralin

## **Table 6. Guidelines and Guidance in Progress**

The following are parameters for which Health Canada is developing or updating guidelines and guidance over the next few years.

- Acrylamide
- Antimony
- Arsenic
- Asbestos
- Atrazine
- Boron
- Guidance on sampling and mitigation measures for controlling corrosion
- Haloacetic acids
- Iron
- Malathion
- Operational guidance for drinking water utilities
- Per- and polyfluoroalkyl substances (PFAS)
- Premise plumbing
- Radiological parameters
- Trihalomethanes
- Turbidity