

2015 Annual Water Public Report

TABLE OF CONTENTS

BACKGROUND INFORMATION

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

APPENDICES

Ministry of Health Permit	Appendix “A”
Bacteriological Test Results	Appendix “B”
Chemical Annual Test Results	Appendix “C”

BACKGROUND INFORMATION

Water Distribution System History

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

The Town of Smithers developed its first waterworks system in 1976, taking water from the Bulkley River. At the time, the standard for confirming potability involved testing the water for smell and taste. Further to finding new ways to treat the water, we also developed new methods of testing it for potability.

Water Distribution System Description

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

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

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

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

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

The Town reported that the Well #1 (19th Avenue) currently produces about 70 L/s (1,100 USGPM), the Well #2 (Victoria Street) produces about 17 L/s (270 USGPM)

and the Well #3 (Riverside Park) produces about 60 L/s (950 USGPM). The system serves approximately 5,400 people.

Standards

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

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

In 2015:

Samples that contained Total Coliform: 0/83

Samples that contained E. Coli 0/83

Number of consecutive samples that contained Total Coliform: 0

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

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

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

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

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

Manganese (Mn)

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

Manganous iron is more stable in water in the presence of dissolved oxygen than ferrous (reduced) iron under similar circumstances. Manganese concentrations

greater than 1 mg/L may result where manganese-bearing minerals are attacked by water under reducing conditions or where some types of bacteria are active.

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

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

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

Water Storage Facilities

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

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

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

Well Maintenance

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

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

Valve Exercising

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

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

Water Main Flushing

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

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

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

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

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

FUTURE PLANS

In 2016, the Town of Smithers plans to:

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

Respectfully submitted,

Dale Chartrand
Chief Utilities Operator

DC/jb



2015 Annual Water Public Report

APPENDIX "A"

2015 Ministry of Health Permit



northern health

PERMIT TO OPERATE

A Drinking Water System with
301-10000 Connections

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

Conditions of Permit

- a) Bacteriological sampling required minimum 6 samples monthly, from locations that are representative of the distribution system, as approved by the Environmental Health Officer.
- b) Turbidity shall be maintained at a maximum level of 1 NTU in accordance with the Guidelines for Canadian Drinking Water Quality.
- c) Chemical sampling is required yearly or at the request of the Environmental Health Officer.
- d) An up-to-date Emergency Response plan shall be maintained.

1-Jul-1992

Effective Permit Date

Environmental Health Officer

21-Feb-2011

Permit Revised Date

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





2015 Annual Water Public Report

APPENDIX "B"

2015 Bacteriological Test Results

Sample Range Report

Northern Health - Northwest Health Service Delivery Area

Facility Name: Smithers Community Water System
Facility Type: WS1A
Date Range: Jul 1 2015 to Sep 30 2015
Date Created: Nov 10 2015

Operator Dale Chartrand
 Box 879
 Smithers, BC V0J 2N0

Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
<u>Municipal Office, Aldous Avenue</u>				
	7/7/2015	L1	L1	
	7/14/2015	L1	L1	
	8/4/2015	L1	L1	
	8/24/2015	L1	L1	
	9/8/2015	L1	L1	
	9/22/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Petrocan Bulk Plant - sink, Railway Ave, Smithers</u>				
	8/24/2015	L1	L1	
	9/28/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Smithers Civic Centre,</u>				
	7/14/2015	L1	L1	
	8/24/2015	L1	L1	
	9/22/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Riverside Park Cookhouse, Riverside Drive</u>				
	7/7/2015	L1	L1	
	7/14/2015	3	L1	
	7/21/2015	L1	L1	
	9/8/2015	L1	L1	
	9/22/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	1	0	0
<u>Hilltop Inn, Main</u>				

<u>Street</u>	8/24/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>PIR Mill - Office coffee room, Tatlow Road</u>	8/24/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Municipal Works Yard, 16 th Avenue</u>	7/14/2015	L1	L1	
	8/4/2015	L1 B3	L1	
	9/22/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Court Street RV Fill, Court Street</u>	7/7/2015	L1	L1	
	7/14/2015	L1	L1	
	8/4/2015	L1	L1	
	8/24/2015	L1	L1	
	9/8/2015	L1	L1	
	9/22/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Riverside Park, Riverside Drive</u>	8/4/2015	L1	L1	
	8/24/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Hudson Bay Lodge, Highway 16 East.</u>	8/24/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0

Result Values:

E - estimated

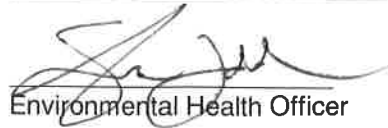
L - less than

G - greater than

Samples that contain total coliform:	1	3.33% of total
Samples that contain e. coli:	0	0.00% of total
Samples that contain fecal coliform:	0	0.00% of total
Number of consecutive samples that contain total coliform:	0	
Number of samples that contain total coliform in last 30 days:	0/0	
Total number of samples:	30	

Comments:

Thank You



Environmental Health Officer

Nov 10 2015

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

Definitions:

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

Codes:

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

Sample Range Report

Northern Health - Northwest Health Service Delivery Area

Facility Name: Smithers Community Water System
Facility Type: WS1A
Date Range: Jan 1 2015 to Mar 31 2015
Date Created: Apr 21 2015

Operator Dale Chartrand
 Box 879
 Smithers, BC V0J 2N0


Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
<u>Municipal Office, Aldous Avenue</u>				
	1/6/2015	L1	L1	
	1/27/2015	L1	L1	
	2/10/2015	L1	L1	
	2/24/2015	L1	L1	
	3/9/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Smithers Civic Centre,</u>				
	1/27/2015	L1	L1	
	2/24/2015	L1	L1	
	3/24/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Hilltop Inn, Main Street</u>				
	2/24/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Hudson Bay Lodge, Highway 16 East.</u>				
	2/24/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0
<u>Municipal Works Yard, 16 th Avenue</u>				
	1/6/2015	L1	L1	
	2/24/2015	L1	L1	
	3/24/2015	<u>L1</u>	<u>L1</u>	
	Total Positive :	0	0	0

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

Samples that contain total coliform:	0	0.00% of total
Samples that contain e. coli:	0	0.00% of total
Samples that contain fecal coliform:	0	0.00% of total
Number of consecutive samples that contain total coliform:	0	
Number of samples that contain total coliform in last 30 days:	0/3	
Total number of samples:	13	

Comments:

Thank You


 Environmental Health Officer
 Apr 21 2015

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

Definitions:

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

Codes:

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



2015 Annual Water Public Report

APPENDIX "C"

2015 Chemical Annual Test Results

Town of Smithers
Work Order: N512010

LAB #	N512010-01	N512010-02	N512010-03
SAMPLED DATE	30-Nov-15	30-Nov-15	30-Nov-15
SAMPLED TIME	12:55	13:03	13:15
SAMPLE ID	19th Ave Well	Victoria St Well	Riverside Well

	MRL Units	CDWG			
Bacteriological Parameters (Water)					
Total Coliforms	1 MPN/100 mL	MAC = None Detected (<1)	<1	<1	<1
E. coli	1 MPN/100 mL	MAC = None Detected (<1)	<1	<1	<1
Anions (Water)					
Chloride	1.0 mg/L	AO <= 250	12.0	3.7	2.7
Fluoride	0.05 mg/L	MAC = 1.5	0.14	0.15	<0.10
Nitrite (as N)	0.01 mg/L	MAC = 1	<0.01	<0.01	<0.01
Nitrate + Nitrite (as N)	0.10 mg/L	MAC = 10	<0.10	<0.10	<0.10
Sulfate	1.0 mg/L	AO <= 500	2.1	5.9	9.6
General Parameters (Water)					
pH	1.0 -	6.5-8.5	8.2	8.2	8.1
Alkalinity (total, as CaCO ₃)	1 mg/L	=	210	210	110
Conductivity	1.0 uS/cm	=	421	410	226
Colour	1 PtCo units	AO <= 15	2	3	3
Turbidity	0.05 NTU	MAC = 1	0.16	0.41	0.15
Solids, Total Dissolved / TDS	1.0 mg/L	AO <= 500	240	240	130
Calculated Parameters (Water)					
Nitrate (as N)	0.10 mg/L	MAC = 10	<0.10	<0.10	<0.10
Hardness (total, as CaCO ₃)	0.50 mg/L	=	85.2	69.4	90.9
Total Recoverable Metals (Water)					
Aluminum, total	0.005 mg/L	OG < 0.1	<0.005	0.006	<0.005
Antimony, total	0.0001 mg/L	MAC = 0.006	<0.0001	<0.0001	<0.0001
Arsenic, total	0.0005 mg/L	MAC = 0.01	0.0015	0.0031	0.0028
Barium, total	0.005 mg/L	MAC = 1	0.086	0.104	0.053
Beryllium, total	0.0001 mg/L	=	<0.0001	0.0002	<0.0001
Bismuth, total	0.0001 mg/L	=	<0.0001	<0.0001	<0.0001
Boron, total	0.004 mg/L	MAC = 5	0.050	0.055	0.017
Cadmium, total	0.00001 mg/L	MAC = 0.005	<0.00001	0.00027	<0.00001
Calcium, total	0.2 mg/L	=	22.2	18.1	23.6
Chromium, total	0.0005 mg/L	MAC = 0.05	<0.0005	0.0006	<0.0005
Cobalt, total	0.00005 mg/L	=	<0.00005	0.00017	<0.00005
Copper, total	0.0002 mg/L	AO <= 1	0.0017	0.0136	0.0066
Iron, total	0.01 mg/L	AO <= 0.3	<0.01	0.02	0.02

Northern Laboratories (2010) Ltd.

 Mailing Address: P.O. Box 1035 Prince Rupert, BC V8J 4B7 • Shipping Address: 251 Kaien Rd. Prince Rupert, BC
 Phone: 250.627.1906 • Fax: 250.627.8214 • www.norlabsltd.com • info@norlabsltd.com



ANALYTICAL REPORT

Town of Smithers

Work Order: N512010

LAB #			N512010-01	N512010-02	N512010-03
SAMPLED DATE			30-Nov-15	30-Nov-15	30-Nov-15
SAMPLED TIME			12:55	13:03	13:15
SAMPLE ID			19th Ave Well	Victoria St Well	Riverside Well
	MRL Units	CDWG			
Total Recoverable Metals (continued)					
Lead, total	0.0001 mg/L	MAC = 0.01	0.0003	0.0009	0.0001
Lithium, total	0.0001 mg/L	-	0.0029	0.0039	0.0006
Magnesium, total	0.01 mg/L	-	7.20	5.85	7.76
Manganese, total	0.0002 mg/L	AO <= 0.05	0.138	0.101	0.149
Mercury, total	0.00002 mg/L	MAC = 0.001	<0.00002	<0.00002	<0.00002
Molybdenum, total	0.0001 mg/L	-	0.0041	0.0055	0.0011
Nickel, total	0.0002 mg/L	-	<0.0002	0.0011	<0.0002
Phosphorus, total	0.02 mg/L	-	0.07	0.08	0.07
Potassium, total	0.02 mg/L	-	1.44	1.42	0.58
Selenium, total	0.0005 mg/L	MAC = 0.05	<0.0005	<0.0005	<0.0005
Silicon, total	0.5 mg/L	-	6.9	7.1	5.1
Silver, total	0.00005 mg/L	-	<0.00005	0.00005	<0.00005
Sodium, total	0.02 mg/L	AO <= 200	65.5	77.6	13.6
Strontium, total	0.001 mg/L	-	0.277	0.260	0.230
Sulfur, total	1 mg/L	-	4	5	6
Tellurium, total	0.0002 mg/L	-	<0.0002	<0.0002	<0.0002
Thallium, total	0.00002 mg/L	-	<0.00002	0.00004	<0.00002
Thorium, total	0.0001 mg/L	-	<0.0001	<0.0001	<0.0001
Tin, total	0.0002 mg/L	-	<0.0002	<0.0002	<0.0002
Titanium, total	0.005 mg/L	-	<0.005	<0.005	<0.005
Uranium, total	0.00002 mg/L	MAC = 0.02	0.00057	0.00093	0.00006
Vanadium, total	0.001 mg/L	-	0.001	0.002	<0.001
Zinc, total	0.004 mg/L	AO <= 5	<0.004	0.008	<0.004
Zirconium, total	0.0001 mg/L	-	<0.0001	<0.0001	<0.0001