

REPORTED TO Regional District of Thompson Nicola
300 - 465 Victoria Street
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ATTENTION Shawn Kratchmer

WORK ORDER 7090562

PO NUMBER

RECEIVED / TEMP 2017-09-06 09:00 / 21°C

PROJECT Loon Lake CWS

REPORTED 2017-09-25

PROJECT INFO

COC NUMBER B50459

General Comments:

CARO Analytical Services employs methods which are conducted according to procedures accepted by appropriate regulatory agencies, and/or are conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts, except where otherwise agreed to by the client.

The results in this report apply to the samples analyzed in accordance with the Chain of Custody or Sample Requisition document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

Work Order Comments:

This is a revised report. Refer to Appendix 3 for details



Authorized By:

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Account Manager

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Loon Lake CWS

WORK ORDER REPORTED 7090562
2017-09-25

Analysis Description	Method Reference	Technique	Location
Alkalinity in Water	APHA 2320 B*	Titration with H2SO4	Kelowna
Ammonia, Total in Water	APHA 4500-NH3 G*	Automated Colorimetry (Phenate)	Kelowna
Anions by IC in Water	APHA 4110 B	Ion Chromatography with Chemical Suppression of Eluent Conductivity	Kelowna
Carbon, Total Organic in Water	APHA 5310 B	High Temperature Combustion, Infrared CO2 Detection	Kelowna
Colour, True in Water	APHA 2120 C	Spectrophotometry (456 nm)	Kelowna
Conductivity in Water	APHA 2510 B	Conductivity Meter	Kelowna
Dissolved Metals by ICPMS in Water	APHA 3030 B / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Haloacetic Acids in Water	EPA 552.3*	Liquid-Liquid Microextraction, Derivatization and GC-ECD	Richmond
Hardness (as CaCO3) in Water	APHA 2340 B	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	N/A
Mercury, dissolved by CVAFS in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
Mercury, total by CVAFS in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
Solids, Total Dissolved in Water	APHA 2540 C*	Gravimetry (Dried at 103-105C)	Kelowna
Total Metals by ICPMS in Water	APHA 3030 E* / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Transmissivity at 254 nm in Water	APHA 5910 B*	Ultraviolet Absorption	Kelowna
Trihalomethanes in Water	EPA 5030B / APHA 6200 B	Purge&Trap / Purge and Trap Capillary Column GC-MSD	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Method Reference Descriptions:

APHA Standard Methods for the Examination of Water and Wastewater, 22nd Edition, American Public Health Association/American Water Works Association/Water Environment Federation
EPA United States Environmental Protection Agency Test Methods

Glossary of Terms:

MRL Method Reporting Limit
< Less than the Reported Detection Limit (RDL) - the RDL may be higher than the MRL due to various factors such as dilutions, limited sample volume, high moisture, or interferences
AO Aesthetic objective
MAC Maximum acceptable concentration (health based)
OG Operational guideline (treated water)
% T Percent Transmittance
CU Colour Units (referenced against a platinum cobalt standard)
mg/L Milligrams per litre
µS/cm Microsiemens per centimetre

Standards / Guidelines Referenced in this Report:

Guidelines for Canadian Drinking Water Quality (Feb 2017)

Website: http://www.hc-sc.gc.ca/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/sum_guide-res_recom-eng.pdf

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user

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Analyte	Result / Recovery	Standard / Guideline	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: Loon Lake (7090562-01) [Water] Sampled: 2017-09-05 09:30

Anions

Chloride	20.5	AO ≤ 250	0.10	mg/L	N/A	2017-09-08	
Fluoride	0.27	MAC = 1.5	0.10	mg/L	N/A	2017-09-08	
Nitrate (as N)	0.350	MAC = 10	0.010	mg/L	N/A	2017-09-08	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	N/A	2017-09-08	
Sulfate	9.6	AO ≤ 500	1.0	mg/L	N/A	2017-09-08	

General Parameters

Alkalinity, Total (as CaCO3)	368	N/A	1.0	mg/L	N/A	2017-09-08	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	N/A	2017-09-08	
Alkalinity, Bicarbonate (as CaCO3)	368	N/A	1.0	mg/L	N/A	2017-09-08	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	N/A	2017-09-08	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	N/A	2017-09-08	
Ammonia, Total (as N)	0.084	None Required	0.020	mg/L	N/A	2017-09-09	
Carbon, Total Organic	6.27	N/A	0.50	mg/L	N/A	2017-09-12	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	N/A	2017-09-08	
Conductivity (EC)	748	N/A	2.0	µS/cm	N/A	2017-09-08	
Solids, Total Dissolved	441	AO ≤ 500	15	mg/L	N/A	2017-09-07	
UV Transmittance @ 254nm	82.6	N/A	0.10	% T	N/A	2017-09-08	

Calculated Parameters

Total Haloacetic Acids (HAA5)	0.0489	MAC = 0.08	0.00200	mg/L	N/A	N/A	
Total Trihalomethanes	0.0705	MAC = 0.1	0.00400	mg/L	N/A	N/A	
Hardness, Total (as CaCO3)	300	None Required	0.500	mg/L	N/A	N/A	
Nitrate+Nitrite (as N)	0.350	N/A	0.0200	mg/L	N/A	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	N/A	2017-09-12	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	N/A	2017-09-12	
Arsenic, dissolved	0.00180	N/A	0.00050	mg/L	N/A	2017-09-12	
Barium, dissolved	< 0.0050	N/A	0.0050	mg/L	N/A	2017-09-12	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	N/A	2017-09-12	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	N/A	2017-09-12	
Boron, dissolved	0.0648	N/A	0.0050	mg/L	N/A	2017-09-12	
Cadmium, dissolved	< 0.000010	N/A	0.000010	mg/L	N/A	2017-09-12	
Calcium, dissolved	29.3	N/A	0.20	mg/L	N/A	2017-09-12	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	N/A	2017-09-12	
Cobalt, dissolved	< 0.00010	N/A	0.00010	mg/L	N/A	2017-09-12	
Copper, dissolved	0.00098	N/A	0.00040	mg/L	N/A	2017-09-12	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	N/A	2017-09-12	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	N/A	2017-09-12	
Lithium, dissolved	0.00107	N/A	0.00010	mg/L	N/A	2017-09-12	
Magnesium, dissolved	55.1	N/A	0.010	mg/L	N/A	2017-09-12	
Manganese, dissolved	0.00164	N/A	0.00020	mg/L	N/A	2017-09-12	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2017-09-11	2017-09-12	
Molybdenum, dissolved	0.00491	N/A	0.00010	mg/L	N/A	2017-09-12	
Nickel, dissolved	0.00137	N/A	0.00040	mg/L	N/A	2017-09-12	
Phosphorus, dissolved	0.232	N/A	0.050	mg/L	N/A	2017-09-12	

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Sample ID: Loon Lake (7090562-01) [Water] Sampled: 2017-09-05 09:30, Continued

Dissolved Metals, Continued

Potassium, dissolved	10.1	N/A	0.10	mg/L	N/A	2017-09-12	
Selenium, dissolved	< 0.00050	N/A	0.00050	mg/L	N/A	2017-09-12	
Silicon, dissolved	18.1	N/A	1.0	mg/L	N/A	2017-09-12	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	N/A	2017-09-12	
Sodium, dissolved	65.7	N/A	0.10	mg/L	N/A	2017-09-12	
Strontium, dissolved	0.0462	N/A	0.0010	mg/L	N/A	2017-09-12	
Sulfur, dissolved	3.7	N/A	3.0	mg/L	N/A	2017-09-12	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	N/A	2017-09-12	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	N/A	2017-09-12	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	N/A	2017-09-12	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	N/A	2017-09-12	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	N/A	2017-09-12	
Uranium, dissolved	0.00394	N/A	0.000020	mg/L	N/A	2017-09-12	
Vanadium, dissolved	0.0041	N/A	0.0010	mg/L	N/A	2017-09-12	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	N/A	2017-09-12	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	N/A	2017-09-12	

Total Metals

Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L	2017-09-11	2017-09-12	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2017-09-11	2017-09-12	
Arsenic, total	0.00196	MAC = 0.01	0.00050	mg/L	2017-09-11	2017-09-12	
Barium, total	< 0.0050	MAC = 1	0.0050	mg/L	2017-09-11	2017-09-12	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2017-09-11	2017-09-12	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2017-09-11	2017-09-12	
Boron, total	0.0852	MAC = 5	0.0050	mg/L	2017-09-11	2017-09-12	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010	mg/L	2017-09-11	2017-09-12	
Calcium, total	31.4	None Required	0.20	mg/L	2017-09-11	2017-09-12	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2017-09-11	2017-09-12	
Cobalt, total	0.00026	N/A	0.00010	mg/L	2017-09-11	2017-09-12	
Copper, total	0.00161	AO ≤ 1	0.00040	mg/L	2017-09-11	2017-09-12	
Iron, total	0.106	AO ≤ 0.3	0.010	mg/L	2017-09-11	2017-09-12	
Lead, total	< 0.00020	MAC = 0.01	0.00020	mg/L	2017-09-11	2017-09-12	
Lithium, total	0.00129	N/A	0.00010	mg/L	2017-09-11	2017-09-12	
Magnesium, total	54.9	None Required	0.010	mg/L	2017-09-11	2017-09-12	
Manganese, total	0.361	AO ≤ 0.05	0.00020	mg/L	2017-09-11	2017-09-12	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2017-09-11	2017-09-12	
Molybdenum, total	0.00478	N/A	0.00010	mg/L	2017-09-11	2017-09-12	
Nickel, total	0.00208	N/A	0.00040	mg/L	2017-09-11	2017-09-12	
Phosphorus, total	0.187	N/A	0.050	mg/L	2017-09-11	2017-09-12	
Potassium, total	11.2	N/A	0.10	mg/L	2017-09-11	2017-09-12	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2017-09-11	2017-09-12	
Silicon, total	19.9	N/A	1.0	mg/L	2017-09-11	2017-09-12	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2017-09-11	2017-09-12	
Sodium, total	63.8	AO ≤ 200	0.10	mg/L	2017-09-11	2017-09-12	
Strontium, total	0.0539	N/A	0.0010	mg/L	2017-09-11	2017-09-12	
Sulfur, total	4.2	N/A	3.0	mg/L	2017-09-11	2017-09-12	

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Sample ID: Loon Lake (7090562-01) [Water] Sampled: 2017-09-05 09:30, Continued

Total Metals, Continued

Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2017-09-11	2017-09-12	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2017-09-11	2017-09-12	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2017-09-11	2017-09-12	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2017-09-11	2017-09-12	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2017-09-11	2017-09-12	
Uranium, total	0.00375	MAC = 0.02	0.000020	mg/L	2017-09-11	2017-09-12	
Vanadium, total	0.0041	N/A	0.0010	mg/L	2017-09-11	2017-09-12	
Zinc, total	0.0056	AO ≤ 5	0.0040	mg/L	2017-09-11	2017-09-12	
Zirconium, total	0.00014	N/A	0.00010	mg/L	2017-09-11	2017-09-12	

Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2017-09-14	2017-09-14	
Monobromoacetic Acid	0.0024	N/A	0.0020	mg/L	2017-09-14	2017-09-14	
Dichloroacetic Acid	0.0181	N/A	0.0020	mg/L	2017-09-14	2017-09-14	
Trichloroacetic Acid	0.0283	N/A	0.0020	mg/L	2017-09-14	2017-09-14	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2017-09-14	2017-09-14	
Surrogate: 2-Bromopropionic Acid	117		70-130	%	2017-09-14	2017-09-14	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0094	N/A	0.0010	mg/L	2017-09-05	2017-09-11	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2017-09-05	2017-09-11	
Chloroform	0.0599	N/A	0.0010	mg/L	2017-09-05	2017-09-11	
Dibromochloromethane	0.0011	N/A	0.0010	mg/L	2017-09-05	2017-09-11	
Surrogate: Toluene-d8	93		70-130	%	2017-09-05	2017-09-11	
Surrogate: 4-Bromofluorobenzene	98		70-130	%	2017-09-05	2017-09-11	

Sample ID: Loon Lake - Raw Water (7090562-02) [Water] Sampled: 2017-09-05 09:30

F2

Total Metals

Manganese, total	0.270	AO ≤ 0.05	0.00020	mg/L	2017-09-22	2017-09-23	
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Sample / Analysis Qualifiers:

F2 The sample was not field-preserved with HNO₃ and was therefore preserved in the laboratory and held for at least 16 hours prior to analysis for total metals.

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2017-09-25

Sample ID	Changed	Change	Analysis	Analyte(s)
7090562-02	2017-09-21	Sample ID	N/A	N/A