



Manitoba Water Services Board - CRWC
ATTN: GRANT MCGORMAN
Cartier Regional Water Co-op
Box 217
St. Eustache MB R0H 1H0

Date Received: 19-MAR-19
Report Date: 27-MAR-19 14:01 (MT)
Version: FINAL

Client Phone: 204-353-4055

Certificate of Analysis

Lab Work Order #: L2246039
Project P.O. #: NOT SUBMITTED
Job Reference: CARTIER REGIONAL - PWS 36.00
C of C Numbers:
Legal Site Desc: 28128



Hua Wo
Chemistry Laboratory Manager

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ANALYTICAL REPORT

Physical Tests (WATER)

		ALS ID		L2246039-1	L2246039-2
		Sampled Date		19-MAR-19	19-MAR-19
		Sampled Time		09:30	09:30
		Sample ID			
Analyte	Unit	Guide Limit #1	Guide Limit #2	CARTIER REGIONAL 1 - RAW	CARTIER REGIONAL 2 TREATED
Colour, True	CU	15	-	13.7	<5.0
Conductivity	umhos/cm	-	-	1090	288
Hardness (as CaCO3)	mg/L	-	-	490 ^{HTC}	79.5 ^{HTC}
Langelier Index (4 C)	No Unit	-	-	0.66	N/A
Langelier Index (60 C)	No Unit	-	-	1.4	N/A
pH	pH units	7.00-10.5	-	7.92	7.40
Total Dissolved Solids	mg/L	500	-	793	177
Transmittance, UV (254 nm)	%T/cm	-	-	61.4	91.4
Turbidity	NTU	-	-	3.08	<0.10

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

#1: GCDWQ - Aesthetic Objective/Other Value

#2: GCDWQ - Maximum Acceptable Concentrations (Pre-2003)

Anions and Nutrients (WATER)

		ALS ID		L2246039-1	L2246039-2
		Sampled Date		19-MAR-19	19-MAR-19
		Sampled Time		09:30	09:30
		Sample ID			
Analyte	Unit	Guide Limit #1	Guide Limit #2	CARTIER REGIONAL 1 - RAW	CARTIER REGIONAL 2 TREATED
Alkalinity, Total (as CaCO3)	mg/L	-	-	322	86.9
Ammonia, Total (as N)	mg/L	-	-	0.049	<0.010
Bicarbonate (HCO3)	mg/L	-	-	392	106
Bromide (Br)	mg/L	-	-	0.082	<0.010
Carbonate (CO3)	mg/L	-	-	<0.60	<0.60
Chloride (Cl)	mg/L	250	-	27.6	7.27
Fluoride (F)	mg/L	-	1.5	0.182	0.392
Hydroxide (OH)	mg/L	-	-	<0.34	<0.34
Nitrate (as N)	mg/L	-	10	1.39	0.482
Nitrite (as N)	mg/L	-	1	0.0072	<0.0010
Sulfate (SO4)	mg/L	500	-	273	50.0

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

#1: GCDWQ - Aesthetic Objective/Other Value

#2: GCDWQ - Maximum Acceptable Concentrations (Pre-2003)

Organic / Inorganic Carbon (WATER)

		ALS ID		L2246039-1	L2246039-2
		Sampled Date		19-MAR-19	19-MAR-19
		Sampled Time		09:30	09:30
		Sample ID			
Analyte	Unit	Guide Limit #1	Guide Limit #2	CARTIER REGIONAL 1 - RAW	CARTIER REGIONAL 2 TREATED
Dissolved Organic Carbon	mg/L	-	-	7.62	0.61
Total Organic Carbon	mg/L	-	-	7.22	0.72

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

#1: GCDWQ - Aesthetic Objective/Other Value

#2: GCDWQ - Maximum Acceptable Concentrations (Pre-2003)

- Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
- Analytical result for this parameter exceeds Guide Limit listed on this report.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Total Metals (WATER)

Analyte	Unit	ALS ID		L2246039-1	L2246039-2
		Guide Limit #1	Guide Limit #2	19-MAR-19 09:30 CARTIER REGIONAL 1 - RAW	19-MAR-19 09:30 CARTIER REGIONAL 2 TREATED
Aluminum (Al)-Total	mg/L	0.1	-	0.110	<0.0030
Antimony (Sb)-Total	mg/L	-	0.006	0.00018	<0.00010
Arsenic (As)-Total	mg/L	-	0.01	0.00332	0.00061
Barium (Ba)-Total	mg/L	-	1	0.104	0.0159
Beryllium (Be)-Total	mg/L	-	-	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	<0.000050	<0.000050
Boron (B)-Total	mg/L	-	-	0.118	0.094
Cadmium (Cd)-Total	mg/L	-	0.005	0.0000137	<0.0000050
Calcium (Ca)-Total	mg/L	-	-	101	16.6
Cesium (Cs)-Total	mg/L	-	-	0.000016	<0.000010
Chromium (Cr)-Total	mg/L	-	0.05	0.00021	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.00018	<0.00010
Copper (Cu)-Total	mg/L	1	-	0.00282	0.0265
Iron (Fe)-Total	mg/L	0.3	-	0.146	<0.010
Lead (Pb)-Total	mg/L	-	0.005	0.000116	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0623	0.0139
Magnesium (Mg)-Total	mg/L	-	-	57.7	9.27
Manganese (Mn)-Total	mg/L	0.05	-	0.0134	0.00093
Molybdenum (Mo)-Total	mg/L	-	-	0.00331	0.000518
Nickel (Ni)-Total	mg/L	-	-	0.00330	0.00081
Phosphorus (P)-Total	mg/L	-	-	0.257	0.437
Potassium (K)-Total	mg/L	-	-	13.5	2.67
Rubidium (Rb)-Total	mg/L	-	-	0.00274	0.00049
Selenium (Se)-Total	mg/L	-	0.05	0.000478	0.000081
Silicon (Si)-Total	mg/L	-	-	10.9	2.30
Silver (Ag)-Total	mg/L	-	-	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	200	-	61.9	32.2
Strontium (Sr)-Total	mg/L	-	-	0.392	0.0615
Sulfur (S)-Total	mg/L	-	-	97.9	17.8
Tellurium (Te)-Total	mg/L	-	-	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	-	-	<0.000010	<0.000010
Thorium (Th)-Total	mg/L	-	-	<0.00010	<0.00010
Tin (Sn)-Total	mg/L	-	-	<0.00010	<0.00010

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

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- Analytical result for this parameter exceeds Guide Limit listed on this report.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Total Metals (WATER)

		ALS ID		L2246039-1	L2246039-2
		Sampled Date		19-MAR-19	19-MAR-19
		Sampled Time		09:30	09:30
		Sample ID		CARTIER	CARTIER
Analyte	Unit	Guide Limit #1	Guide Limit #2	REGIONAL 1 - RAW	REGIONAL 2 TREATED
Titanium (Ti)-Total	mg/L	-	-	0.00307	<0.00030
Tungsten (W)-Total	mg/L	-	-	<0.00010	<0.00010
Uranium (U)-Total	mg/L	-	0.02	0.00431	0.000679
Vanadium (V)-Total	mg/L	-	-	0.00142	<0.00050
Zinc (Zn)-Total	mg/L	5	-	0.0046	0.0037
Zirconium (Zr)-Total	mg/L	-	-	0.000290	<0.000060

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

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Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.

Analytical result for this parameter exceeds Guide Limit listed on this report.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Reference Information

Qualifiers for Individual Parameters Listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-CO3CO3-CALC-WP	Water	Alkalinity, Carbonate	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by carbonate is calculated and reported as mg CO ₃ 2-/L.			
ALK-HCO3HCO3-CALC-WP	Water	Alkalinity, Bicarbonate	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by bicarbonate is calculated and reported as mg HCO ₃ -/L.			
ALK-OHOH-CALC-WP	Water	Alkalinity, Hydroxide	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by hydroxide is calculated and reported as mg OH-/L.			
ALK-TITR-WP	Water	Alkalinity, Total (as CaCO ₃)	APHA 2320B
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. Total alkalinity is determined by titration with a strong standard mineral acid to the successive HCO ₃ - and H ₂ CO ₃ endpoints indicated electrometrically.			
BR-L-IC-N-WP	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)-LR
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
C-DOC-HTC-WP	Water	Dissolved Organic Carbon by Combustion	APHA 5310 B-WP
Filtered (0.45 um) sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO ₂ which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
C-TOC-HTC-WP	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP
Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO ₂ which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
CL-L-IC-N-WP	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
COLOUR-TRUE-WP	Water	Colour, True	APHA 2120C
True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
EC-WP	Water	Conductivity	APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.			
ETL-LANGELIER-4-WP	Water	Langelier Index 4C	Calculated
ETL-LANGELIER-60-WP	Water	Langelier Index 60C	Calculated
F-IC-N-WP	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HARDNESS-CALC-WP	Water	Hardness Calculated	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
IONBALANCE-CALC-WP	Water	Ion Balance Calculation	APHA 1030E
Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
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Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance (as % difference) cannot be calculated accurately for waters with very low electrical conductivity (EC), and is reported as "Low EC" where EC < 100 uS/cm (umhos/cm). Ion Balance is calculated as:

$$\text{Ion Balance (\%)} = \frac{[\text{Cation Sum} - \text{Anion Sum}]}{[\text{Cation Sum} + \text{Anion Sum}]}$$

MET-T-CCMS-WP Water Total Metals in Water by CRC ICPMS EPA 200.2/6020B (mod.)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-COL-WP Water Ammonia by colour APHA 4500 NH3 F

Ammonia in water samples forms indophenol when reacted with hypochlorite and phenol. The intensity is amplified by the addition of sodium nitroprusside and measured colourmetrically.

NO2-L-IC-N-WP Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-WP Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PH-WP Water pH APHA 4500H

The pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

SO4-IC-N-WP Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-WP Water Total Dissolved Solids (TDS) APHA 2540 SOLIDS C,E

A well-mixed sample is filtered through a glass fiber filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2C. The increase in vial weight represents the total dissolved solids.

TURBIDITY-WP Water Turbidity APHA 2130B (modified)

Turbidity in aqueous matrices is determined by the nephelometric method.

UV-%TRANS-WP Water UV Transmittance (Calculated) APHA 5910B

Test method is adapted from APHA Method 5910B. A sample is filtered through a 0.45 um polyethersulfone (PES) filter and its UV Absorbance is measured in a quartz cell at 254 nm. UV Transmittance is calculated from the UV Absorbance result and reported as UV Transmittance per cm. The analysis is carried out without pH adjustment.

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
----------------------------	---------------------

WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA
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Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

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

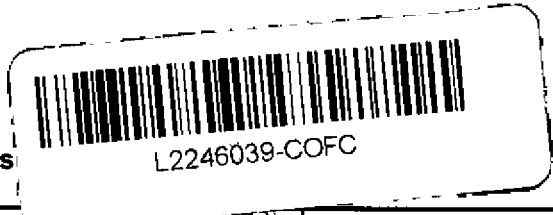
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Manitoba Conservation Water Stewardship
Office of Drinking
Water
1007 Century Street, Winnipeg, Manitoba,
Canada R3H 0W4

Chain of Custody (COC)
Manitoba Drinking Water Systems
ONLY FOR: Regulatory General Chemistry & VOC Samples



Report to Operator (email pdf):				Owner billing (Email):				Regular Service (default):		Regular Service (is 5-7 Days):	
Contact:	Grant McGorman, Lead Operator - CRWC			Contact:	MWSB Accounts Payable			Unless otherwise requested:		<input type="checkbox"/> 1 Day, rush / priority <input type="checkbox"/> 2 Day, rush / priority <input type="checkbox"/> 3 Day, rush / priority	
Address:	Box 217 St. Eustache MB R0H 1H0			Address:	Unit #1A - 2010 Currie Blvd. Brandon MB R7B 4E7						
Phone:	204-353-4055			Phone:	204-728-6075						
Email:	gmcgorman@crwc.ca; cartierwtp@crwc.ca; dvaillant@crwc.ca			Email:	mwsb3@gov.mb.ca						
Operator contact update (if different then above):				Owner contact update (if different then above):				Email pdf copy to:			
Contact:				Contact:				DWO:	Kale Black		
Address:				Address:				DWO Address:	25-309 Tupper St.N. Portage La Prairie, MB.		
Phone:				Phone:				DWO Phone:	204-795-6908		
Email:				Email:				DWO Email:	kale.black@gov.mb.ca; joern.muenster@gov.mb.ca		
Account:		ODW Report type:	EMS (Lab-MWS)	Client / Project Information:				Analysis Request			
Agency Code:	382	Project:	DWQ-C	Operation Name:	Cartier Regional PWS			MB-CH-PWS-V2013			Number of Containers
Lab:		Lab Work Order # / Job # (lab use only)		Operation Code (com code):	36.00						
				Operation Id:	28128						
				Sampled by:	Grant McGorman						
Lab Sample # (lab use only)	Sample Number (YYMMII9999)	Station Number (MB99XXD999) / (MB99XXY999)	Sample Identification	Date (dd-mmm-yyyy)	Time (hh:mm)	Sample Matrix	Sample Type				
	1903KB0005	MB05MJD041	Cartier Regional - Raw	19-Mar-2019	9:30AM	6	1	X			5
	1903KB0006	MB05MJD042	Cartier Regional - Treated	19-Mar-2019	9:30AM	10	1	X			5
Failure to complete all portions of this form may delay analysis.								Sample Matrix:		Sample Type:	
Please fill in this form LEGIBLY.								6-Raw Water, 10-Treated Water		1-Grab Sample	
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified by the Laboratory.											
For ALL other testing, please use Laboratory specific forms.											
DO NOT COPY or RE-USE this form. Sample Numbers are unique to the Office of Drinking Water and provided by DWO.											
Relinquished By:		Date & Time:	March 19/19 12:50pm	Received By: (lab use only)	MH	Date & Time: (lab use only)	19-3-19	Sample Condition (lab use only)			
Relinquished By:		Date & Time:		Received By: (lab use only)		Date & Time: (lab use only)	12:15	Temperature	15.3		
								Samples Received in Good Condition? Y / N (if no provide details)			

Operator mandatory

Operator optional

Operator to fill, if information above has changed

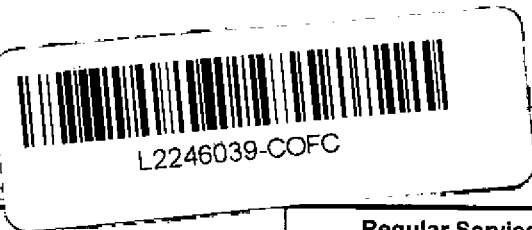
Opr to fill, Lab specific

pre-filled by DWO

Note: Cyanide and Mercury are not required and have been removed from the list.
Please use the Rev. July 29, 2013 Water System Chemistry List.

Manitoba Conservation Water Stewardship
Office of Drinking
Water
1007 Century Street, Winnipeg, Manitoba,
Canada R3H 0W4

Chain of Custody (COC)
Manitoba Drinking Water Systems
ONLY FOR: Regulatory General Chemistry & VOC Samples



Report to Operator (email pdf):				Owner billing (Email):				Regular Service (default):		Regular Service (is 5-7 Days):		
Contact:	Grant McGorman, Lead Operator - CRWC			Contact:	MWSB Accounts Payable			Unless otherwise requested:		<input type="checkbox"/> 1 Day, rush / priority <input type="checkbox"/> 2 Day, rush / priority <input type="checkbox"/> 3 Day, rush / priority		
Address:	Box 217 St. Eustache MB R0H 1H0			Address:	Unit #1A - 2010 Currie Blvd. Brandon MB R7B 4E7							
Phone:	204-353-4055			Phone:	204-728-6075							
Email:	gmcgorman@crwc.ca; cartierwtp@crwc.ca; dvaillant@crwc.ca			Email:	mwsb3@gov.mb.ca							
Operator contact update (if different then above):				Owner contact update (if different then above):				Email pdf copy to:				
Contact:				Contact:				DWO:	Kale Black			
Address:				Address:				DWO Address:	25-309 Tupper St.N. Portage La Prairie, MB.			
Phone:				Phone:				DWO Phone:	204-795-6908			
Email:				Email:				DWO Email:	kale.black@gov.mb.ca; joern.muenster@gov.mb.ca			
Account:		ODW Report type:	EMS (Lab-MWS)	Client / Project Information:				Analysis Request				
Agency Code:	382	Project:	DWQ-C	Operation Name:	Cartier Regional PWS			MB-CH-PWS-V2013 Number of Containers				
Lab:		Lab Work Order # / Job # (lab use only)		Operation Code (com code):	36.00							
				Operation Id:	28128							
				Sampled by:	Grant McGorman							
Lab Sample # (lab use only)	Sample Number (YYMMII9999)	Station Number (MB99XXD999) / (MB99XXY999)	Sample Identification	Date (dd-mmm-yyyy)	Time (hh:mm)	Sample Matrix	Sample Type					
	1903KB0005	MB05MJD041	Cartier Regional - Raw	19-Mar-2019	9:30AM	6	1	X		5		
	1903KB0006	MB05MJD042	Cartier Regional - Treated	19-Mar-2019	9:30AM	10	1	X		5		
Failure to complete all portions of this form may delay analysis.						Sample Matrix:		Sample Type:				
Please fill in this form LEGIBLY.						6-Raw Water, 10-Treated Water		1-Grab Sample				
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified by the Laboratory.												
For ALL other testing, please use Laboratory specific forms.												
DO NOT COPY or RE-USE this form. Sample Numbers are unique to the Office of Drinking Water and provided by DWO.												
Relinquished By:		Date & Time:	March 19/19 12:15 PM	Received By: (lab use only)	MH	Date & Time: (lab use only)	19-3-19	Sample Condition (lab use only)				
								Temperature	Samples Received in Good Condition? Y / N (if no provide details)			
Relinquished By:		Date & Time:		Received By: (lab use only)		Date & Time: (lab use only)	12:15	15.3				

Operator mandatory Operator optional Operator to fill, if information above has changed Opr to fill, Lab specific pre-filled by DWO

Note: Cyanide and Mercury are not required and have been removed from the list.
Please use the Rev. July 29, 2013 Water System Chemistry List.