



Environmental Division

**Certificate of Analysis**

HAGENSBORG WATER DISTRICT

ATTN: ROSEMARY SMART

1103 HIGHWAY 20

HAGENSBORG BC V0T 1H0

Reported On: 13-NOV-08 06:10 PM

Lab Work Order #: **L703072**

Date Received: **31-OCT-08**

Project P.O. #:

Job Reference:

Legal Site Desc: SEE BELOW

CofC Numbers: 08-045948

Other Information:

**Comments:** LSD: Part E 1/2 of E 1/2 of NE 1/4, Section 34, TWP 1, Range 3, Coast Range 3, Land District

Please note that this sample was logged in according to email correspondence between the client and account manager. All analyses were not requested on the chain of custody.

LINDSAY JONES  
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

## ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L703072-1			
		Description				
		Sampled Date	31-OCT-08			
		Sampled Time	09:00			
		Client ID	WATER			
Grouping	Analyte					
<b>WATER</b>						
<b>Field Tests</b>	Field pH (pH)		7.14			
<b>Physical Tests</b>	Colour, True (CU)		<5.0			
	Conductivity (uS/cm)		30.7			
	Hardness (as CaCO3) (mg/L)		11.6			
	Langelier Index Temperature (C)		10			
	Langelier Index (none)		-2.8			
	pH (pH)		7.14			
	Total Dissolved Solids (mg/L)		22			
	Transmittance, UV (254 nm) (% T)		95.0			
	Turbidity (NTU)		0.17			
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO3) (mg/L)		7.2			
	Ammonia as N (mg/L)		<0.020			
	Chloride (Cl) (mg/L)		<0.50			
	Fluoride (F) (mg/L)		<0.020			
	Nitrate (as N) (mg/L)		0.193			
	Nitrite (as N) (mg/L)		<0.0010			
	Sulfate (SO4) (mg/L)		4.99			
	Sulphide as S (mg/L)		<0.020			
<b>Organic / Inorganic Carbon</b>	Total Organic Carbon (mg/L)		0.93			
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)		0.0272			
	Antimony (Sb)-Total (mg/L)		<0.00050			
	Arsenic (As)-Total (mg/L)		0.00039			
	Barium (Ba)-Total (mg/L)		<0.020			
	Beryllium (Be)-Total (mg/L)		<0.0010			
	Boron (B)-Total (mg/L)		<0.10			
	Cadmium (Cd)-Total (mg/L)		<0.000017			
	Calcium (Ca)-Total (mg/L)		4.19			
	Chromium (Cr)-Total (mg/L)		<0.0010			
	Cobalt (Co)-Total (mg/L)		<0.00030			
	Copper (Cu)-Total (mg/L)		<0.0010			
	Iron (Fe)-Total (mg/L)		<0.030			
	Lead (Pb)-Total (mg/L)		<0.00050			
	Lithium (Li)-Total (mg/L)		<0.0050			
	Magnesium (Mg)-Total (mg/L)		0.22			
	Manganese (Mn)-Total (mg/L)		0.00054			
	Mercury (Hg)-Total (mg/L)		<0.000010			
	Molybdenum (Mo)-Total (mg/L)		<0.0010			
	Nickel (Ni)-Total (mg/L)		<0.0010			

## ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID Description Sampled Date Sampled Time Client ID				
		L703072-1 31-OCT-08 09:00 WATER				
<b>WATER</b>						
<b>Total Metals</b>	Potassium (K)-Total (mg/L)	<2.0				
	Selenium (Se)-Total (mg/L)	<0.0010				
	Silver (Ag)-Total (mg/L)	<0.000020				
	Sodium (Na)-Total (mg/L)	<2.0				
	Thallium (Tl)-Total (mg/L)	<0.00020				
	Tin (Sn)-Total (mg/L)	<0.00050				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00028				
	Vanadium (V)-Total (mg/L)	<0.0010				
	Zinc (Zn)-Total (mg/L)	<0.0050				
<b>Dissolved Metals</b>	Aluminum (Al)-Dissolved (mg/L)	0.0202				
	Antimony (Sb)-Dissolved (mg/L)	<0.00050				
	Arsenic (As)-Dissolved (mg/L)	<0.00020				
	Barium (Ba)-Dissolved (mg/L)	<0.020				
	Beryllium (Be)-Dissolved (mg/L)	<0.0010				
	Boron (B)-Dissolved (mg/L)	<0.10				
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017				
	Calcium (Ca)-Dissolved (mg/L)	4.29				
	Chromium (Cr)-Dissolved (mg/L)	<0.0010				
	Cobalt (Co)-Dissolved (mg/L)	<0.00030				
	Copper (Cu)-Dissolved (mg/L)	<0.0010				
	Iron (Fe)-Dissolved (mg/L)	<0.030				
	Lead (Pb)-Dissolved (mg/L)	<0.00050				
	Lithium (Li)-Dissolved (mg/L)	<0.0050				
	Magnesium (Mg)-Dissolved (mg/L)	0.21				
	Manganese (Mn)-Dissolved (mg/L)	0.00034				
	Mercury (Hg)-Dissolved (mg/L)	<0.000010				
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0010				
	Nickel (Ni)-Dissolved (mg/L)	<0.0010				
	Potassium (K)-Dissolved (mg/L)	<2.0				
	Selenium (Se)-Dissolved (mg/L)	<0.0010				
	Silver (Ag)-Dissolved (mg/L)	<0.000020				
	Sodium (Na)-Dissolved (mg/L)	<2.0				
	Thallium (Tl)-Dissolved (mg/L)	<0.00020				
	Tin (Sn)-Dissolved (mg/L)	<0.00050				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00025				
	Vanadium (V)-Dissolved (mg/L)	<0.0010				
	Zinc (Zn)-Dissolved (mg/L)	<0.0050				

# ALS LABORATORY GROUP ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L703072-1  31-OCT-08 09:00 WATER			
<b>Grouping</b>	<b>Analyte</b>				
<b>WATER</b>					
Aggregate Organics	Tannin & lignin (mg/L)	<10			

## Reference Information

## Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments
<b>Methods Listed (if applicable):</b>			
ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
<b>ALK-COL-VA</b>	Water	Alkalinity by Colourimetric (Automated)	APHA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
<b>ALK-PCT-VA</b>	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
<b>ANIONS-CL-IC-VA</b>	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC
This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.			
<b>ANIONS-F-IC-VA</b>	Water	Fluoride by Ion Chromatography	APHA 4110 "Determination of Anions by IC
This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.			
<b>ANIONS-NO2-IC-VA</b>	Water	Nitrite by Ion Chromatography	APHA 4110 "Determination of Anions by IC
This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.			
<b>ANIONS-NO3-IC-VA</b>	Water	Nitrate by Ion Chromatography	APHA 4110 "Determination of Anions by IC
This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.			
<b>ANIONS-SO4-IC-VA</b>	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC
This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.			
<b>AS-DIS-HVAAS-VA</b>	Water	Dissolved Arsenic in Water by HVAAS	EPA 3005A/7000 SERIES
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).			
<b>AS-TOT-HVAAS-VA</b>	Water	Total Arsenic in Water by HVAAS	EPA 3005A/7000 SERIES
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>COLOUR-TRUE-VA</b>	Water	Color (True) by Spectrometer	APHA 2120 "Color"

## Reference Information

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
<p>This analysis is carried out using procedures adapted from APHA Method 2120 "Color". Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Aparent Colour is determined without prior sample filtration. Colour is pH dependent. Unless otherwise indicated, reported colour results pertain to the pH of the sample as received, to within +/- 1 pH unit.</p>			
<b>EC-PCT-VA</b>	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
<p>This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.</p>			
<b>HARDNESS-CALC-VA</b>	Water	Hardness	APHA 2340B
<p>Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.</p>			
<b>HG-DIS-LOW-CVAFS-VA</b>	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7
<p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).</p>			
<b>HG-TOT-LOW-CVAFS-VA</b>	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7
<p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).</p>			
<b>LANGELIER-CALC-VA</b>	Water	Langelier Index	APHA 2330B
<p>Langelier Index provides an indication of scale formation potential at a given pH and temperature. Field pH is used where provided. Positive values indicate oversaturation with respect to CaCO<sub>3</sub>. Negative values indicate undersaturation of CaCO<sub>3</sub>. Langelier Index is calculated as per APHA 2330B Saturation Index.</p>			
<b>MET-DIS-CCME-ICP-VA</b>	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
<p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).</p>			
<b>MET-DIS-CCME-MS-VA</b>	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
<p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).</p>			
<b>MET-TOT-CCME-ICP-VA</b>	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B
<p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).</p>			
<b>MET-TOT-CCME-MS-VA</b>	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A
<p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA).</p>			

## Reference Information

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
<p>States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).</p>			
<b>MET-TOT-ICP-VA</b>	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B
<p>This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).</p>			
<b>NH3-SIE-VA</b>	Water	Ammonia by SIE	APHA 4500-NH3 "Nitrogen (Ammonia)"
<p>This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.</p>			
<b>PH-PCT-VA</b>	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
<p>This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode</p>			
<b>S2-T-COL-VA</b>	Water	Total Sulphide by Colorimetric	APHA 4500-S2 "Sulphide"
<p>This analysis is carried out using procedures adapted from APHA Method 4500-S2 "Sulphide". Sulphide is determined using the methylene blue colourimetric method.</p>			
<b>T+L-COL-VA</b>	Water	Tannin & Lignins by Colour	APHA 5550 'TANNIN & LIGNIN'
<p>This analysis is carried out using procedures adapted from APHA Method 5550 "Tannin &amp; Lignin ".</p>			
<b>TDS-VA</b>	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
<p>This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.</p>			
<b>TURBIDITY-VA</b>	Water	Turbidity by Meter	APHA 2130 "Turbidity"
<p>This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.</p>			
<b>UV-%TRANS-VA</b>	Water	% Transmittance by Spectrometry	APHA 5910B "UV Absorption Method" and EP
<p>This analysis is carried out using procedures adapted from APHA Method 5910B "Ultraviolet Absorption Method" and Method 415.3 "Determination of Total Organic Carbon and Specific UV Absorbance at 254nm in Source Water and Drinking Water", published by the United States Environmental Protection Agency (EPA). The sample is filtered through a 0.45um filter and measured for absorbance in a quartz cell at 254nm and reported as % Transmittance. The analysis is carried out without pH adjustment.</p>			
<p>** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. <i>The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:</i></p>			
Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

## Reference Information

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
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**GLOSSARY OF REPORT TERMS**

*Surr* - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

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.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



<b>Report to:</b> Rosemary Smart Company: Hagensborg Water District Contact: Rosemary Address: Box 25 Hagensborg, BC V0T1H0 1103 Highway 20 Phone: 250-982-2777 Fax: Same Invoice To: Same as Report? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Company: Contact: Address: Phone:		<b>Report Format / Distribution</b> Standard: Other: Select: PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital Email 1: hagensborgwaterdistrict@yahoo.ca Email 2: eaglelodge@xplornet.com		<b>Service Requested:</b> (rush - subject to availability) Regular (Default) Priority (2-3 Business Days) - 50% Surcharge Emergency (1 Business Day) - 100% Surcharge For Emergency < 1 Day, ASAP or Weekend - Contact ALS	
<b>Client / Project Information:</b> Job #: PO / AFE: Legal Site Description: Part E 1/2 of E 1/2 of NE 1/4 Section 34, Twp 1 Range 3, Const. Range 3, WMS DISTRICT Quote #: ALS Contact: Lindsay Sampler: Rosemary		<b>Analysis Request</b> (Indicate Filtered or Preserved, F/P)		Number of Containers <div style="text-align: right; font-size: 2em;">9</div>	
<b>Lab Work Order #</b> (lab use only)		<b>Sample Identification</b> (This description will appear on the report)			
Sample #	General (BC)	Date	Time	Sample Type	
1	General (BC)	Oct 31	10:00 AM	10/WT	
2	Sulphide (BC)	"	"	"	
3	CO <sub>2</sub> /NH <sub>3</sub> /TKN (BC)	"	"	"	
4	TDC (BC)	"	"	"	
5	Metals (BC)	"	"	"	
6	VOC (BEIX)(BC)	"	"	03/WT	

Account # HWD 100 - Water drawn from intake at dam site.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

<b>SHIPMENT RELEASE:</b> (client use) Released by: [Signature] Date & Time:		<b>SHIPMENT RECEPTION:</b> (lab use only) Received by: [Signature] Date: Oct 31 2007 Temperature: 6°C		<b>SHIPMENT VERIFICATION:</b> (lab use only) Verified by: Date & Time: Observations: Yes / No? If Yes attach SIF	
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REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENIF 18.00 Front