

**R E P O R T**

## **TLATLASIKWALA FIRST NATION**

### **Assessment Studies of Water and Wastewater Systems and Associated Water Management Practices at Selected First Nation Communities**

September  
2002

ASSOCIATED  
ENGINEERING



007359

# Analysis Report



CANTEST LTD.

Professional  
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**REPORT ON:** Analysis of Water Sample  
**REPORTED TO:** David Nairne & Associates Ltd.  
Suite 250  
171 Esplanade  
North Vancouver, B.C.  
V7M 3J9

Att'n: Mr. Doug Ewing

**PROJECT NAME:** Bull Harbour, Hope Island

**NUMBER OF SAMPLES:** 1

**REPORT DATE:** November 19, 1999

**DATE SUBMITTED:** November 3, 1999

**GROUP NUMBER:** 9110419

**SAMPLE TYPE:** Water

## TEST METHODS:

**pH, Laboratory** - pH analysis was performed in the laboratory using a pH meter. It must be recognized that the B.C. Ministry of Environment and other regulatory agencies recommend that pH be analyzed immediately upon sample collection. In light of this, pH measurements should be performed in the field.

**Conventional Parameters** - analyses were performed using procedures based on those described in "British Columbia Environmental Laboratory Manual For the Analysis of Water, Wastewater, Sediment and Biological Materials" (1994 Edition), Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater" 19th Edition, (1995) and 17th Edition (1989), published by the American Public Health Association.

**Mercury in Water** - analysis was performed using procedures based on U. S. EPA Method 1631, oxidative digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

**Metals in Water** - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS) or Graphite Furnace Atomic Absorption Spectrophotometry.

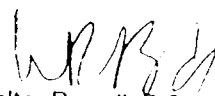
## COMMENTS:

The sample was received in **unpreserved two liter bottles**. Samples requiring analysis for Sulphide should be preserved with Zinc Acetate and **samples requiring Ammonia** should be preserved with Sulphuric Acid at time of sampling.

## TEST RESULTS:

(See following pages)

CAN TEST LTD.

  
Walter Brandl, B.Sc.  
Coordinator, Trace Metals Department

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REPORT DATE: November 19, 1999

GROUP NUMBER: 9110419

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		Unlabelled		
CAN TEST ID:		911040057	DETECTION LIMIT	UNITS
pH, Laboratory		5.60	-	pH units
True Color		5	5	CU
Turbidity		0.20	0.1	NTU
Hardness	CaCO3	<	1	mg/L
Hardness (Total)	CaCO3	<	1	mg/L
Total Dissolved Solids		47	10	mg/L
Total Alkalinity	CaCO3	1.9	0.5	mg/L
Fluoride	F	<	0.05	mg/L
Nitrate	N	<	0.05	mg/L
Sulphate	SO4	<	0.5	mg/L
Dissolved Organic Carbon	C	<	1	mg/L
Total Organic Carbon	C	<	1	mg/L
Ammonia Nitrogen	N	0.03	0.02	mg/L
Sulphide	S	<	0.05	mg/L

CU = color units

mg/L = milligrams per liter

< = Less than detection limit

NTU = nephelometric turbidity units

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ROUP NUMBER: 9110419

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Unlabelled	Unlabelled		
SAMPLE PREPARATION:		TOTAL	DISSOLVED		
CAN TEST ID:		911040057	911040057	DETECTION LIMIT	UNITS
Aluminum	Al	-	0.014	0.005	mg/L
Antimony	Sb	-	<	0.001	mg/L
Arsenic	As	-	<	0.001	mg/L
Barium	Ba	-	<	0.001	mg/L
Beryllium	Be	-	<	0.001	mg/L
Boron	B	-	<	0.05	mg/L
Cadmium	Cd	-	0.0011	0.0002	mg/L
Calcium	Ca	0.14	0.10	0.01	mg/L
Chromium	Cr	-	<	0.001	mg/L
Cobalt	Co	-	<	0.001	mg/L
Copper	Cu	-	0.002	0.001	mg/L
Iron	Fe	-	<	0.05	mg/L
Lead	Pb	-	<	0.001	mg/L
Magnesium	Mg	-	0.11	0.05	mg/L
Manganese	Mn	-	0.002	0.001	mg/L
Mercury	Hg	-	<	0.05	µg/L
Molybdenum	Mo	-	<	0.001	mg/L
Nickel	Ni	-	<	0.001	mg/L
Phosphorus	PO4	-	<	0.01	mg/L
Potassium	K	-	0.09	0.01	mg/L
Selenium	Se	-	<	0.002	mg/L
Silicon	SiO2	-	<	0.05	mg/L
Silver	Ag	-	<	0.0001	mg/L
Sodium	Na	-	0.91	0.05	mg/L
Strontium	Sr	-	<	0.001	mg/L
Tellurium	Te	-	<	0.001	mg/L
Thallium	Tl	-	<	0.0001	mg/L
Thorium	Th	-	<	0.0005	mg/L
Tin	Sn	-	<	0.001	mg/L
Titanium	Ti	-	<	0.001	mg/L
Uranium	U	-	<	0.0005	mg/L
Vanadium	V	-	<	0.001	mg/L
Zinc	Zn	-	0.007	0.005	mg/L

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**Metals Analysis in Water**

CLIENT SAMPLE IDENTIFICATION:	Unlabelled	Unlabelled		
SAMPLE PREPARATION:	TOTAL	DISSOLVED		
CAN TEST ID:	911040057	911040057	DETECTION LIMIT	UNITS
Zirconium Zr	-	<	0.01	mg/L

mg/L = milligrams per liter  
< = Less than detection limit

$\mu\text{g/L}$  = micrograms per liter

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GROUP NUMBER: 9110419

Batch Quality Control for Conventional Parameters in Water

Parameter		QC Type	QC Result	Units	Lower Limit	Upper Limit
pH, Laboratory		pH Calibration Verification	100.0	% Recovery	98	102
		Duplicate	0.1	R.P.D.	0	3
		Duplicate	0.1	R.P.D.	0	3
True Color		Blank	< 5	CU	0	5
		Calibration Verification	100.0	% Recovery	75	105
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	0.0	R.P.D.	0	10
Turbidity		Blank	< 0.1	NTU	0	0.1
		Duplicate	1.8	R.P.D.	0	15
		Duplicate	4.7	R.P.D.	0	15
		Duplicate	6.5	R.P.D.	0	15
Total Dissolved Solids		Duplicate	11.1	R.P.D.	0	18
Total Alkalinity	CaCO3	Blank	1.7	mg/L	0	2.5
		Alkalinity Calibration Ver.	94.3	% Recovery	85	115
		Duplicate	0.5	R.P.D.	0	9
		Duplicate	1.2	R.P.D.	0	9
Fluoride	F	Blank	< 0.05	mg/L	0	0.05
		Dionex Certified Standard	92.4	% Recovery	90	110
		Duplicate	NC	R.P.D.	0	10
Nitrate	N	Blank	< 0.05	mg/L	0	0.05
		Dionex Certified Standard	101.5	% Recovery	90	110
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	2.5	R.P.D.	0	10
		Duplicate	NC	R.P.D.	0	10
		Duplicate	PASS	R.P.D.	0	10
Sulphate	SO4	Blank	< 0.5	mg/L	0	1

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ROUP NUMBER: 9110419

Batch Quality Control for Conventional Parameters in Water

Parameter		QC Type	QC Result	Units	Lower Limit	Upper Limit
Sulphate	SO4	Dionex Certified Standard	100.0	% Recovery	90	110
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	0.4	R.P.D.	0	10
		Duplicate	NC	R.P.D.	0	10
Total Organic Carbon	C	Blank	< 1	mg/L	0	1
		Certified Standard	98.0	% Recovery	90	110
		Duplicate	NC	R.P.D.	0	12
Ammonia Nitrogen	N	Blank	< 0.02	mg/L	0	0.02
		Spike	106.0	% Recovery	80	120
		Duplicate	0.0	R.P.D.	0	12
Sulphide	S	Blank	< 0.05	mg/L	0	0.05
		Duplicate	5.1	R.P.D.	0	15

CU = color units

NTU = nephelometric turbidity units

mg/L = milligrams per liter

< = Less than detection limit

R.P.D. = Relative Percent Difference

PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.

NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

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Batch Quality Control for Dissolved Metals Analysis in Water (QC# 13197)

Parameter		Dissolved Blank (mg/L)	Dissolved Blank Limits	Duplicate (R.P.D.) 911040057	Duplicate Limits	Duplicate (R.P.D.) 911040144	Duplicate Limits
Aluminum	Al	0.004	0.015	PASS	20	-	-
Antimony	Sb	< 0.0002	0.001	NC	20	-	-
Arsenic	As	< 0.0002	0.001	NC	20	-	-
Barium	Ba	0.0003	0.001	-	-	-	-
Beryllium	Be	< 0.0002	0.001	-	-	-	-
Cadmium	Cd	< 0.00004	0.001	NC	20	-	-
Chromium	Cr	< 0.0002	0.001	NC	20	-	-
Cobalt	Co	< 0.0002	0.001	NC	20	-	-
Copper	Cu	< 0.0002	0.001	NC	20	-	-
Lead	Pb	< 0.0002	0.001	NC	20	-	-
Manganese	Mn	< 0.0002	0.001	-	-	-	-
Mercury	Hg	< 0.05	0.05	NC	20	-	-
Molybdenum	Mo	< 0.0002	0.001	NC	20	-	-
Nickel	Ni	< 0.0002	0.001	NC	20	-	-
Potassium	K	0.005	0.05	0	20	0	20
Silver	Ag	< 0.00002	0.001	NC	20	-	-
Strontium	Sr	< 0.0002	0.001	-	-	-	-
Thallium	Tl	< 0.00002	0.001	NC	20	-	-
Thorium	Th	< 0.0001	0.0005	NC	20	-	-
Tin	Sn	< 0.0002	0.005	NC	20	-	-
Titanium	Ti	< 0.0002	0.001	-	-	-	-
Uranium	U	< 0.0001	0.0005	NC	20	-	-
Vanadium	V	< 0.0002	0.001	-	-	-	-
Zinc	Zn	0.002	0.01	-	-	-	-
Zirconium	Zr	< 0.002	0.01	-	-	-	-

mg/L = milligrams per liter

Mercury Hg expressed as: ug/L (micrograms per liter)

R.P.D. = Relative Percent Difference

PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.

NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

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Batch Quality Control for Dissolved Metals Analysis in Water (QC# 13197)

Parameter		Duplicate (R.P.D.) 911050035	Duplicate Limits
Aluminum	Al	13.3	20
Antimony	Sb	NC	20
Arsenic	As	NC	20
Cadmium	Cd	NC	20
Chromium	Cr	NC	20
Cobalt	Co	NC	20
Copper	Cu	NC	20
Lead	Pb	NC	20
Mercury	Hg	NC	20
Molybdenum	Mo	NC	20
Nickel	Ni	NC	20
Potassium	K	3.2	20
Silver	Ag	NC	20
Thallium	Tl	NC	20
Thorium	Th	NC	20
Tin	Sn	NC	20
Uranium	U	NC	20

mg/L = milligrams per liter

Mercury Hg expressed as: ug/L (micrograms per liter)

R.P.D. = Relative Percent Difference

NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

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**Batch Quality Control for Total Metals Analysis in Water (QC# 13184)**

Parameter	Duplicate (R.P.D.) 911030053	Duplicate Limits	Total Blank (mg/L)	Total Blank Limits
Calcium Ca	1.1	15	0.03	0.05

mg/L = milligrams per liter  
R.P.D. = Relative Percent Difference

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**Batch Quality Control Frequency Summary**

Colour Analysis (Batch# 13160)

QC Type	No. Samples
Blank	1
Duplicate	2
Batch Size	20

Total Metals Preparation (Batch# 13184)

QC Type	No. Samples
ICP Spike	1
Potassium/Silicon Spike	1
ICPMS Lab Fortified Blank	1
Total Blank	1
Duplicate	2
ICPMS Spike	2
Batch Size	38

Auto-Titrator Analysis (Batch# 13191)

QC Type	No. Samples
Blank	1
Duplicate	2
Batch Size	18

Dissolved Metals Preparation (Batch# 13197)

QC Type	No. Samples
Dissolved Blank	1
Duplicate	4
Batch Size	37

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**Batch Quality Control Frequency Summary**

Water Lab Ion Chromatography (Batch# 13232)

QC Type	No. Samples
Blank	1
Duplicate	6
Batch Size	62

Turbidity Analysis (Batch# 13271)

QC Type	No. Samples
Blank	1
Duplicate	3
Batch Size	26