

**ASSESSMENT STUDY OF
WATER AND WASTEWATER SYSTEMS
AND ASSOCIATED
WATER MANAGEMENT PRACTICES
AT LITTLE SHUSWAP LAKE**

**A
REPORT
TO
INDIAN AND NORTHERN AFFAIRS CANADA
BC REGION**

** *NovaTec Consultants Inc.*
*Environmental Engineers and Scientists***

December 2001

File No.: 1407.08I

Appendix C

Water Testing Results



CHEMICAL ANALYSIS REPORT

*Quasaut I.R. # 1
Little Shuway Band - Subdivision Water System*

Date: April 29, 1993

ASL File No. 8924C

Report On: Drinking Water Surveillance Program

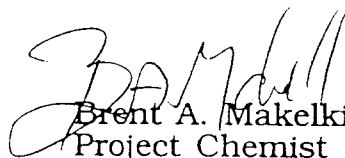
Report To: **Health & Welfare Canada**
Salmon Arm Health Centre
P.O. Box 1899
Salmon Arm, BC
V1E 4P9

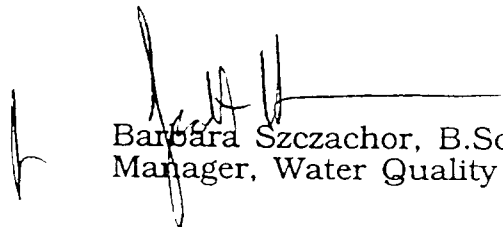
Attention: **Mr. D. Wahoski**, Environmental Health Officer

Received: February 24, 1993

ASL ANALYTICAL SERVICE LABORATORIES LTD.

per:


Brent A. Makelki, B.Sc.
Project Chemist


Barbara Szczachor, B.Sc.
Manager, Water Quality Lab

cc: Mr. R. Lawrence - Vancouver





REMARKS

File No. 8924C

The water as represented by the sample submitted can be characterized as moderately low with respect to dissolved mineralization. The water sample met Canadian and British Columbia drinking water guidelines for all parameters analysed.



RESULTS OF ANALYSIS - Water

Quasut F.R.#1
Subdivision
File No. 8924C

Little
Shuswap
Band
93 02 23

Physical Tests

Colour	CU	<5.0
Conductivity	umhos/cm	50.5
Total Dissolved Solids		31
Hardness	CaCO3	24.4
pH		6.90
Total Solids		32
Turbidity	NTU	0.30

Dissolved Anions

Alkalinity - Total	CaCO3	20.0
Chloride	Cl	<0.5
Fluoride	F	0.03
Sulphate	SO4	6.2

Nutrients

Ammonia Nitrogen	N	<0.005
Nitrate Nitrogen	N	0.120
Nitrite Nitrogen	N	<0.001
Nitrite/Nitrate Nitrogen	N	0.120

Cyanides

Total Cyanide	CN	<0.001
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Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.



Little
Shuswap
Band
93 02 23

Total Metals

Aluminum	T-Al	<0.005
Antimony	T-Sb	<0.0001
Arsenic	T-As	<0.0001
Barium	T-Ba	<0.010
Boron	T-B	<0.10
Cadmium	T-Cd	<0.0002
Calcium	T-Ca	7.88
Chromium	T-Cr	<0.001
Cobalt	T-Co	<0.001
Copper	T-Cu	0.176
Iron	T-Fe	<0.030
Lead	T-Pb	<0.001
Magnesium	T-Mg	1.15
Manganese	T-Mn	<0.005
Mercury	T-Hg	<0.00005
Potassium	T-K	<2.0
Selenium	T-Se	<0.0005
Sodium	T-Na	0.73
Uranium	T-U	0.00008
Zinc	T-Zn	0.032

Inorganic Parameters

Sulphide	S	<0.02
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Halogenated Volatiles

Bromodichloromethane	<0.001
Bromoform	<0.001
Carbon Tetrachloride	<0.001
Chlorobenzene	<0.001
Chloroform	<0.001
Dibromochloromethane	<0.001
1,2-Dichlorobenzene	<0.001
1,4-Dichlorobenzene	<0.001
1,2-Dichloroethane	<0.001
1,1-Dichloroethylene	<0.001
Tetrachloroethylene	<0.001
Trichloroethylene	<0.001
Trichlorofluoromethane	<0.001
Vinyl Chloride	<0.001

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.



Little
Shuswap
Band
93 02 23

Non-halogenated Volatiles

Benzene	<0.0005
Ethylbenzene	<0.0005
Toluene	<0.0005
meta- & para-Xylene	<0.0005
ortho-Xylene	<0.0005

Polyaromatic Hydrocarbons

Benzo(a)pyrene	<0.00001
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Chlorinated Phenols

2,4-Dichlorophenol	<0.001
2,4,6-Trichlorophenol	<0.001
2,3,4,6-Tetrachlorophenol	<0.001
Pentachlorophenol	<0.001

Organic Parameters

Total Organic Carbon C	<0.50
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Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

[SID] B.C. Region

93/07/13

[Maintain Water Systems]

Community ID	QUAAOUT	Quaaout
Water System ID	QUAAOU	

[Page 1/4]

ne Quaaout
 No. of Housing Units Serviced 35
 No. of Community Buildings Serviced 2
 Total Population Serviced 151
 Date of Last Update 93/07/13
 Source Type G
 Name of Source
 Diversion Structure?
 Water License? License No.
 License Name

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[SID] B.C. Region

93/07/13

[Maintain Water Systems]

Community ID	QUAAOUT	Quaaout
Water System ID	QUAAOU	

[Page 2/4]

Opts AQ? Y Fails:
 Meets MAC Y Fails:
 Bacteriological Quality & Sampling: Meets BACT? y
 Faecal 0
 Total 0
 No. of samples collected 0
 No. of samples with compliance 0

005049

Corrosion Related Quality Parameters
pH 8.9 Alkalinity 20 Calcium 24 TDS 31
Addressiveness Index 9.2

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[SID] B.C. Region

93/07/13

[Maintain Water Systems]

Community ID	QUAAOUT	Quaaout
Water System ID	QUAAOU	

[Page 3/4]

Distribution	C	
Existing Treatment	None	
Required Treatment	None	
Treatment Operated?	N	
Meets Fireflow?		
System Capacity	0	L/Min.
Ave. Daily Demand	0	L/Min.
Max. Daily Demand	0	L/Min.
Estimated Leakage	0	L/Min.
Length of A.C.P.	0	m.

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[SID] B.C. Region

93/07/13

[Maintain Water Systems]

Community ID	QUAAOUT	Quaaout
Water System ID	QUAAOU	

[Page 4/4 - Water System Comments]

10 homes have drilled well plus storage in a subdivision.
1 home have a drilled well plus pressure system (near church)(Tomma).
9 homes have individual drilled wells.
subdivision sample 06/16/93 met all Canadian Drinking Water Quality
guidelines.
sample dated 93/02/23 met all Canadian Drinking Water Quality guidelines.

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CHEMICAL ANALYSIS REPORT

*North Bay I.R.#5
Tappen Water system - Subdivision*

Date: May 7, 1993

ASL File No. 8824C

Report On: Drinking Water Surveillance Program


Report To: **Health & Welfare Canada**
Salmon Arm Health Centre
P.O. Box 1899
Salmon Arm, BC
V1E 4P9

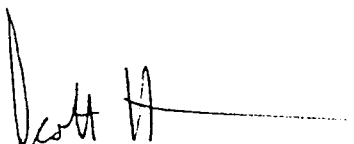
Attention: **Mr. D. Wahoski**, Environmental Health Officer

Received: February 19, 1993

ASL ANALYTICAL SERVICE LABORATORIES LTD.

per:


 Brent A. Makelki, B.Sc.
 Project Chemist


 Scott Hannam
 Manager, Trace Organics Lab

cc: Mr. R. Lawrence - Vancouver





REMARKS

File No. 8824C

The water samples submitted can be characterized as moderately high with respect to dissolved mineralization. The samples met the Canadian Drinking Water Guidelines for all parameters analysed with the exception of Iron and Manganese for "Tappen Water System". These parameters are limited for aesthetic purposes rather than health considerations.



RESULTS OF ANALYSIS

North Bay D.R.#5

File No. 8824C

Tappen
Water
System
93 02 18

Physical Tests

Colour	CU	6.0
Conductivity	umhos/cm	667
Total Dissolved Solids		423
Hardness	CaCO3	279
pH		8.01
Total Solids		430
Turbidity	NTU	1.90

Dissolved Anions

Alkalinity - Total	CaCO3	275
Chloride	Cl	1.4
Fluoride	F	0.22
Sulphate	SO4	74.4

Nutrients

Ammonia Nitrogen	N	3.53
Nitrate Nitrogen	N	0.013
Nitrite Nitrogen	N	<0.001
Nitrite/Nitrate Nitrogen	N	0.013

Cyanides

Total Cyanide	CN	<0.001
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Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.



RESULTS OF ANALYSIS

File No. 8824C

Tappen
Water
System
93 02 18Total Metals

Aluminum	T-Al	<0.005
Antimony	T-Sb	0.0002
Arsenic	T-As	0.0480
Barium	T-Ba	0.139
Boron	T-B	<0.10
Cadmium	T-Cd	<0.0002
Calcium	T-Ca	55.5
Chromium	T-Cr	<0.001
Cobalt	T-Co	<0.001
Copper	T-Cu	0.002
Iron	T-Fe	0.409
Lead	T-Pb	<0.001
Magnesium	T-Mg	34.1
Manganese	T-Mn	0.063
Mercury	T-Hg	<0.00005
Potassium	T-K	5.1
Selenium	T-Se	<0.0005
Sodium	T-Na	31.4
Uranium	T-U	0.00009
Zinc	T-Zn	<0.005

Inorganic Parameters

Sulphide	S	<0.02
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Halogenated Volatiles

Bromodichloromethane	<0.001
Bromoform	<0.001
Carbon Tetrachloride	<0.001
Chlorobenzene	<0.001
Chloroform	<0.001
Dibromochloromethane	<0.001
1,2-Dichlorobenzene	<0.001
1,4-Dichlorobenzene	<0.001
1,2-Dichloroethane	<0.001
1,1-Dichloroethylene	<0.001
Tetrachloroethylene	<0.001
Trichloroethylene	<0.001
Trichlorofluoromethane	<0.001
Vinyl Chloride	<0.001

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.



RESULTS OF ANALYSIS

File No. 8824C

Tappen
Water
System
93 02 18

Non-halogenated Volatiles

Benzene	<0.0005
Ethylbenzene	<0.0005
Toluene	<0.0005
meta- & para-Xylene	<0.0005
ortho-Xylene	<0.0005

Polyaromatic Hydrocarbons

Benzo(a)pyrene	<0.00001
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Chlorinated Phenols

2,4-Dichlorophenol	<0.001
2,4,6-Trichlorophenol	<0.001
2,3,4,6-Tetrachlorophenol	<0.001
Pentachlorophenol	<0.001

Organic Parameters

Total Organic Carbon	C	1.36
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Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

[Maintain Water Systems]

Community ID	TAPPEN	Tappen
Water System ID	TAPPEN	

ie Tappen

No. of Housing Units Serviced	15
No. of Community Buildings Serviced	1
Total Population Serviced	60
Date of Last Update	93/07/13
Source Type	G
Name of Source	
Diversion Structure?	
Water License?	License No.
License Name	

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[Maintain Water Systems]

Community ID	TAPPEN	Tappen
Water System ID	TAPPEN	

pts AO? N Fails: IRON MANGAN

meets MAC Y Fails:

Bacteriological Quality & Sampling: Meets BACT? Y

Faecal 0

Total 0

No. of samples collected 0

No. of samples with sampling 0

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[SID] B.C. Region

[Maintain Water Systems]

93/07/13

Community ID	TAPPEN	Tappen
Water System ID	TAPPEN	

[Page 3/4]

Distribution	C	
Existing Treatment	U	
Required Treatment	U	
Treatment Operated?	Y	✓
Meets Fireflow?	U	
System Capacity	0	L/Min.
Ave. Daily Demand	0	L/Min.
Max. Daily Demand	0	L/Min.
Estimated Leakage	0	L/Min.
Length of A.C.P.	0	m.

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[SID] B.C. Region

[Maintain Water Systems]

93/07/13

Community ID	TAPPEN	Tappen
Water System ID	TAPPEN	

[Page 4/4 - Water System Comments]

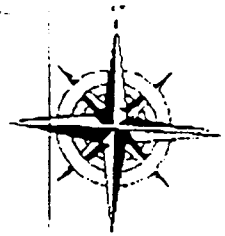
4 houses and community hall on central system. 6 houses on individual well systems.
 Mn=0.06; Fe=0.5; TDS=600.

Sample 02/18/93 Met all Canadian Drinking Water Quality Guidelines except Fe,Mn.

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Little Shuswap



HEALTH CANADA
INDIAN HEALTH SERVICES
P.O. BOX 1899 SALMON ARM B.C. V1E 4P9.

TO: Brent Stan
Indian Affairs
Van
1-604-666-5159
DATE: Mar 29/96

PAGES TO FOLLOW 2

ORIGINAL MAILED: YES
NO 0

FROM: DENNIS WAHOSKI
ENVIRONMENTAL HEALTH OFFICER

FAX: 604-832-4223.
PHONE: 604-832-6185.

COMMENTS: Tupper But - division Water system
North Bay T.R.H 5
metal scan Oct 21, 1994

copy of the above conducted by
our Occupational Health Science Lab
in Ottawa.

Regards,
Dennis

PROTECTED/PROTÉGÉS

OCCUPATIONAL HEALTH SCIENCES

Occupational and Environmental
Health Services Directorate
Building 17, Du Chardon St.
Tunney's Pasture
OTTAWA, Ontario, K1A 0L3
(613) 957-8550

SCIENCES DE LA SANTÉ AU
TRAVAIL

Direction des services de
santé au travail et d'hygiène
du milieu
Immeuble 17, rue Du Chardon
Pré Tunney, OTTAWA, Ontario
K1A 0L3

TO/A: Mr. D. Wahoski
Environmental Health Officer
Pacific Region

ANALYST(S)/ANALYSTE(S)

LUC Bigras *16-2-94*

REQUEST/DEMANDE

Metal Scan/
Drinking water(1)

REPORT/RAPPORT

94-0684

SURVEY SITE/SITE DE L'ÉTUDE

Drilled Well (Oliver Arnouse)
Tappen B.C.

ISSUED/EMISSION

October 21, 1994

RECEIVED/RECEPTION

October 21, 1994

Please see the attached page(s) for results.
Veuillez voir la(les) page(s) ci-jointe(s) pour les résultats.

S. Hall Oct 24/94
Stephen F. Hall
Chief, Analytical Services

HEALTH CANADA / SANTE CANADA
 HEALTH SERVICES DIRECTORATE / DIRECTION GENERALE DES SERVICES MEDICAUX

Water analysis report

Laboratory #: 2771

Identification: Drilled Well ([redacted])

s.19(1)

Tappen

Analysis	Concentration (mg/L)	Guidelines (1)	Limits of detection
Aluminum	0.0177	-	0.0002
Antimony	<0.0003	-	0.0002
Arsenic	0.0298 **	0.025	0.0004
Barium	0.1493	1	0.0002
Beryllium	<0.0005	-	0.0005
Boron	0.0534	5	0.0040
Cadmium	<0.0001	0.005	0.0001
Chromium	0.0023	0.05	0.0010
Cobalt	0.0009	-	0.0001
Copper	0.0016	<1.0*	0.0002
Iron	0.5261	<0.3*	0.0010
Lead	0.0004	0.01	0.0002
Manganese	0.0665	<0.05*	0.0010
Mercury	<0.0008	0.001	0.0008
Molybdenum	0.0106	-	0.0003
Nickel	0.0012	-	0.0009
Selenium	<0.002	0.01	0.0020
Silver	<0.0003	-	0.0003
Uranium	<0.0001	0.1	0.0001
Vanadium	0.0037	-	0.0001
Zinc	0.0044	<5.0*	0.0001

(1) GUIDELINES (MAC, IMAC, AO) FROM THE CANADIAN DRINKING WATER (1983).

* AESTHETIC OBJECTIVES

** RESULT ABOVE GUIDELINES

Building 17, Tunney's Pasture / Pré Tunney
 Ottawa, Ontario
 K1A 0L3
 (813)957-8547

10/21/94

CLIENT
SHUSHAP

ANALYTICAL DATA REPORT
TAPPEN WATER SYSTEM DESIGN
BRIEF-INNOVATION ENGINEERING
JULY 1988
File No. H1524

RESULTS OF ANALYSIS
s.19(1)

Well
97 03 26
14:30

Physical Tests

Colour	(CU)	<5
Conductivity	(umhos/cm)	574
Total Dissolved Solids		359
Hardness	CaCO ₃	241
pH		8.23
Turbidity	(NTU)	0.8

Dissolved Anions

Alkalinity-Total		CaCO ₃	208
Chloride	Cl		0.7
Fluoride	F		0.67
Sulphate	SO ₄		95.1

Nutrients

Nitrate Nitrogen		N	0.019
Nitrite Nitrogen		N	0.002

Bacteriological Tests

Coliform Bacteria - Fecal	<2
Coliform Bacteria - Total	<2

Total Metals

Aluminum	T-Al	<0.2
Arsenic	T-As	0.0053
Barium	T-Ba	0.04
Boron	T-B	<0.1
Cadmium	T-Cd	<0.0002
Calcium	T-Ca	57.0
Chromium	T-Cr	<0.01
Copper	T-Cu	<0.01
Iron	T-Fe	0.17
Lead	T-Pb	<0.001
Magnesium	T-Mg	22.5
Manganese	T-Mn	0.088
Mercury	T-Hg	<0.00005
Potassium	T-K	7
Selenium	T-Se	<0.0005
Sodium	T-Na	27
Zinc	T-Zn	<0.005

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except for pH, Colour (CU),
Conductivity (umhos/cm), Turbidity (NTU), and Coliform Bacteria (MPN/100mL).
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS

File No. H1524

s.19(1)

Well

97 03 26
14:30

Dissolved Metals

Aluminum	D-Al	<0.2
Arsenic	D-As	0.0054
Barium	D-Ba	0.04
Boron	D-B	<0.1
Cadmium	D-Cd	<0.0002
Calcium	D-Ca	58.2
Chromium	D-Cr	<0.01
Copper	D-Cu	<0.01
Iron	D-Fe	0.13
Lead	D-Pb	<0.001
Magnesium	D-Mg	23.3
Manganese	D-Mn	0.090
Mercury	D-Hg	<0.00005
Potassium	D-K	8
Selenium	D-Se	<0.0005
Sodium	D-Na	28
Zinc	D-Zn	<0.005

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except for pH, Colour (CU),
 Conductivity (umhos/cm), Turbidity (NTU), and Coliform Bacteria (MPN/100mL).
 < = Less than the detection limit indicated.

Appendix 1 - REGULATORY CRITERIA

File No. H1524

Health Canada

Guidelines for Canadian Drinking Water Quality, Sixth Ed., 1996.
 All limits are Maximum Acceptable Concentration (MAC) unless otherwise indicated.
 Limits expressed as milligrams per litre except pH, Turbidity, Colour, and Coliform Bacteria.

		Lower Limit	Upper Limit	Notes
Physical Tests				
Colour	(CU)	-	15 CU	1
Total Dissolved Solids		-	500 mg/L	1
Hardness	CaCO ₃	-	-	2
pH		6.5	8.5	1
Turbidity	(NTU)	-	5 NTU	3, 4
Dissolved Anions				
Chloride	Cl	-	250 mg/L	1
Fluoride	F	-	1.5 mg/L	
Sulphate	SO ₄	-	500 mg/L	1, 5
Nutrients				
Nitrate Nitrogen	N	-	10.0 mg/L	
Nitrite Nitrogen	N	-	1.0 mg/L	
Bacteriological Tests				
Coliform Bacteria - Fecal		-	0	
Coliform Bacteria - Total		-	-	6
Total Metals				
Arsenic	T-As	-	0.025 mg/L	7
Barium	T-Ba	-	1.0 mg/L	
Boron	T-B	-	5.0 mg/L	7
Cadmium	T-Cd	-	0.005 mg/L	
Chromium	T-Cr	-	0.05 mg/L	
Copper	T-Cu	-	1.0 mg/L	1, 3
Iron	T-Fe	-	0.3 mg/L	1
Lead	T-Pb	-	0.01 mg/L	3, 8
Manganese	T-Mn	-	0.05 mg/L	1
Mercury	T-Hg	-	0.001 mg/L	
Selenium	T-Se	-	0.01 mg/L	
Sodium	T-Na	-	200 mg/L	1
Zinc	T-Zn	-	5.0 mg/L	1, 3

- 1 Aesthetic Objective (AO) (taste, odour, appearance, etc.)
- 2 Maximum not established; levels > 200 mg/L are considered poor but may be tolerated (AO).
- 3 At point of consumption (AO).
- 4 1 NTU maximum allowed for water entering distribution systems.
- 5 There may be a laxative effect in some individuals when sulphate levels exceed 500 mg/L.
- 6 No sample should contain more than 10 organisms per 100mL and no consecutive samples should be positive (MAC).
- 7 Interim Maximum Acceptable Concentration (IMAC).
- 8 First drawn water may be high, flush system before sampling (MAC).

Appendix 1 - REGULATORY CRITERIA

File No. H1524

Health Canada

Guidelines for Canadian Drinking Water Quality, Sixth Ed., 1996.
 All limits are Maximum Acceptable Concentration (MAC) unless otherwise indicated.
 Limits expressed as milligrams per litre except pH, Turbidity, Colour, and Coliform Bacteria.

		Lower Limit	Upper Limit	Notes
<u>Dissolved Metals</u>				
Arsenic	D-As	-	0.025 mg/L	3
Barium	D-Ba	-	1.0 mg/L	
Boron	D-B	-	5.0 mg/L	3
Cadmium	D-Cd	-	0.005 mg/L	
Chromium	D-Cr	-	0.05 mg/L	
Copper	D-Cu	-	1.0 mg/L	1, 2
Iron	D-Fe	-	0.3 mg/L	1
Lead	D-Pb	-	0.01 mg/L	2, 4
Manganese	D-Mn	-	0.05 mg/L	1
Mercury	D-Hg	-	0.001 mg/L	
Selenium	D-Se	-	0.01 mg/L	
Sodium	D-Na	-	200 mg/L	1
Zinc	D-Zn	-	5.0 mg/L	1, 2

- 1 Aesthetic Objective (AO) (taste, odour, appearance, etc.)
- 2 At point of consumption (AOC)
- 3 Interim Maximum Acceptable Concentration (IMAC)
- 4 First drawn water may be high, flush system before sampling(MAC)

DRAFT

SRC ANALYTICAL

101 Research Drive

Saskatoon, Saskatchewan S7N 3R2

(306) 933-6932 1-800-240-8808


Fax: (306) 933-7922

Golder Associates
#100 - 388 1st Avenue
Kamloops, British Columbia V2C 6W3
Attn: Scott Green

Date Samples Received: 01-Apr-97

Client P.O.: PROJ#972-3035

Analysis has been reviewed by:


Dave Chorney
Radiochemistry Supervisor

RECEIVED
APR 14 1997

- Test methods and data are validated by the laboratory's Quality Assurance Program. SRC Analytical is accredited by the Standards Council of Canada (SCC), in cooperation with the Canadian Association for Environmental Analytical Laboratories (CAEAL). Specific tests are listed in the scope of accreditation approved by the SCC.
- Routine methods follow recognized procedures from sources such as:
 - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
 - Environment Canada
 - US EPA
 - CANMET
- Samples will be kept for 30 working days after the final report is sent. Please contact the lab if you have any special requirements.

SRC ANALYTICAL

101 Research Drive
 Saskatoon, Saskatchewan S7N 3R2
 (306) 933-6932 1-800-240-8808

Golder Associates
 #100 - 388 1st Avenue
 Kamloops, British Columbia V2C 6W3
 Attn: Scott Green

08-Apr-97 11:36

Date Samples Received: 01-Apr-97 Client P.O.: PROJ#972-3035

SAMPLE	CLIENT DESCRIPTION	
4390	WELL MAR 26/97	*WATER*

s.19(1)

ANALYTE	UNITS	4390
RADIONUCLIDES		
Gross alpha	Bq/L	<0.12
Gross beta	Bq/L	0.24±0.21

CHEMICAL ANALYSIS REPORT

Date: April 14, 1997
ASL File No. H1750
Report On: 972-3035 Water Analysis
Report To: **Golder Associates Ltd.**
100 - 388 First Avenue
Kamloops, BC
V2C 6W3
Attention: **Mr. Scott Green**
Received: April 4, 1997

ASL ANALYTICAL SERVICE LABORATORIES LTD.
per:

Brent A. Makelki, B.Sc.
Project Chemist

Joyce Chow, B.Sc.
Project Chemist

REMARKS

File No. H1750

The water as represented by the sample submitted met the Canadian Drinking Water Guidelines for all parameters analysed with the exception of manganese. This parameter is usually limited for aesthetic purposes rather than health considerations.

For the submitted water sample concentration of specific dissolved metals is greater than the corresponding total metals concentration. The explanation for these findings is one or a combination of the following:

- 1) contamination in the field during sample filtration,
- 2) contamination during general handling, storage and/or transportation,
- 3) analytical variability.

Analytical variability is typically less than 10% at concentrations greater than 10 times the detection limit, or twice the detection limit at concentrations that are less than 10 times the detection limit.

For further clarification on any of the above information, please contact your ASL representative.

RESULTS OF ANALYSIS

File No. H1750

TW-1

97 04 03

Physical Tests

Colour	(CU)		<5
Conductivity	(umhos/cm)		628
Total Dissolved Solids			408
Hardness	CaCO3		345
pH			8.06
Turbidity	(NTU)		0.5

Dissolved Anions

Alkalinity-Total		CaCO3	269
Chloride	Cl		0.7
Fluoride	F		0.27
Sulphate	SO4		97

Nutrients

Nitrate Nitrogen		N	0.008
Nitrite Nitrogen		N	<0.001

Bacteriological Tests

Coliform Bacteria - Fecal		<1
Coliform Bacteria - Total		<1

Total Metals

Aluminum	T-Al	<0.2
Arsenic	T-As	0.0074
Barium	T-Ba	0.06
Boron	T-B	<0.1
Cadmium	T-Cd	<0.0002
Calcium	T-Ca	68.7
Chromium	T-Cr	<0.01
Copper	T-Cu	<0.01
Iron	T-Fe	0.03
Lead	T-Pb	<0.001
Magnesium	T-Mg	39.4
Manganese	T-Mn	0.131
Mercury	T-Hg	<0.00005
Potassium	T-K	7
Selenium	T-Se	<0.0005
Sodium	T-Na	12
Zinc	T-Zn	0.011

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except for pH. Colour (CU),
 Conductivity (umhos/cm), Turbidity (NTU), and Coliform Bacteria (CFU/100mL).
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS

File No. H1750

TW-1

97 04 03

Dissolved Metals

Aluminum	D-Al	<0.2
Arsenic	D-As	0.0074
Barium	D-Ba	0.06
Boron	D-B	<0.1
Cadmium	D-Cd	<0.0002
Calcium	D-Ca	71.4
Chromium	D-Cr	<0.01
Copper	D-Cu	<0.01
Iron	D-Fe	0.03
Lead	D-Pb	<0.001
Magnesium	D-Mg	40.5
Manganese	D-Mn	0.137
Mercury	D-Hg	<0.00005
Potassium	D-K	6
Selenium	D-Se	<0.0005
Sodium	D-Na	12
Zinc	D-Zn	0.011

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except for pH, Colour (CU),
 Conductivity (umhos/cm), Turbidity (NTU), and Coliform Bacteria (CFU/100mL).
 < = Less than the detection limit indicated.

Appendix 1 - REGULATORY CRITERIA

File No. H1750

Health Canada

Guidelines for Canadian Drinking Water Quality, Sixth Ed., 1996.
All limits are Maximum Acceptable Concentration (MAC) unless otherwise indicated.

Limits expressed as milligrams per litre except pH, Turbidity, Colour, and Coliform Bacteria.

		Lower Limit	Upper Limit	Notes
Physical Tests				
Colour	(CU)	-	15 CU	1
Total Dissolved Solids		-	500 mg/L	1
Hardness	CaCO ₃	-	-	2
pH		6.5	8.5	1
Turbidity	(NTU)	-	5 NTU	3, 4
Dissolved Anions				
Chloride	Cl	-	250 mg/L	1
Fluoride	F	-	1.5 mg/L	
Sulphate	SO ₄	-	500 mg/L	1, 5
Nutrients				
Nitrate Nitrogen	N	-	10.0 mg/L	
Nitrite Nitrogen	N	-	1.0 mg/L	
Bacteriological Tests				
Coliform Bacteria - Fecal		-	0	
Coliform Bacteria - Total		-	-	6
Total Metals				
Arsenic	T-As	-	0.025 mg/L	7
Barium	T-Ba	-	1.0 mg/L	
Boron	T-B	-	5.0 mg/L	7
Cadmium	T-Cd	-	0.005 mg/L	
Chromium	T-Cr	-	0.05 mg/L	
Copper	T-Cu	-	1.0 mg/L	1, 3
Iron	T-Fe	-	0.3 mg/L	1
Lead	T-Pb	-	0.01 mg/L	3, 8
Manganese	T-Mn	-	0.05 mg/L	1
Mercury	T-Hg	-	0.001 mg/L	
Selenium	T-Se	-	0.01 mg/L	
Sodium	T-Na	-	200 mg/L	1
Zinc	T-Zn	-	5.0 mg/L	1, 3

- 1 Aesthetic Objective (AO) (taste, odour, appearance, etc.)
- 2 Maximum not established, levels > 200 mg/L are considered poor but may be tolerated (AO).
- 3 At point of consumption (AO).
- 4 1 NTU maximum allowed for water entering distribution systems.
- 5 There may be a laxative effect in some individuals when sulphate levels exceed 500 mg/L.
- 6 No sample should contain more than 10 organisms per 100mL and no consecutive samples should be positive (MAC).
- 7 Interim Maximum Acceptable Concentration (IMAC)

005071

Outlines of the methodologies utilized for the analysis of the samples submitted are as follows:

Conventional Parameters in Water

These analyses are carried out in accordance with procedures described in "Methods for Chemical Analysis of Water and Wastes" (USEPA), "Manual for the Chemical Analysis of Water, Wastewaters, Sediments and Biological Tissues" (ECMOE), and/or "Standard Methods for the Examination of Water and Wastewater" (APHA). Further details are available on request.

Metals in Water

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 19th Edition 1995 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 or filtration (EPA Method 3005), followed by instrumental analysis by atomic absorption spectrophotometry (EPA Method 7000), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Mercury in Water

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 19th Edition 1995 published by the American Public Health Association. A cold-oxidation procedure involving bromine monochloride is used, followed by instrumental analysis by cold-vapour atomic absorption spectrophotometry (CVAAS).

End of Report

SRC ANALYTICAL

101 Research Drive

Saskatoon, Saskatchewan S7N 3R2

(306) 933-6932 1-800-240-8808

Fax: (306) 933-7922

Golder Associates
#100 - 388 1st Avenue
Kamloops, British Columbia V2C 6W3
Attn: Scott Green

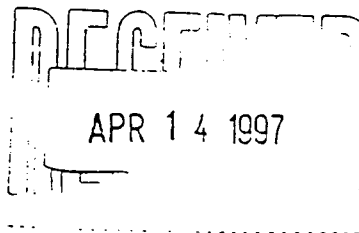
Date Samples Received: 07-Apr-97

Client P.O.:

Analysis has been reviewed by:



Dave Chorney
Radiochemistry Supervisor



- Test methods and data are validated by the laboratory's Quality Assurance Program. SRC Analytical is accredited by the Standards Council of Canada (SCC), in cooperation with the Canadian Association for Environmental Analytical Laboratories (CAEAL). Specific tests are listed in the scope of accreditation approved by the SCC.
- Routine methods follow recognized procedures from sources such as:
 - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
 - Environment Canada
 - US EPA
 - CANMET
- Samples will be kept for 30 working days after the final report is sent. Please contact the lab if you have any special requirements.

RUSH

SRC Group: 97-1078

SRC ANALYTICAL

101 Research Drive
Saskatoon, Saskatchewan S7N 3R2
(306) 933-6932 1-800-240-8808

Golder Associates
#100 - 388 1st Avenue
Kamloops, British Columbia V2C 6W3
Attn: Scott Green

08-Apr-97 11:36

Date Samples Received: 07-Apr-97 Client P.O.:

SAMPLE CLIENT DESCRIPTION
4723 TW-1 APR 3/97 *WATER*

ANALYTE UNITS 4723

RADIONUCLIDES

Gross alpha Bq/L <0.25
Gross beta Bq/L <0.32

Page(s) 005075 to\à 005076

Is(are) under consultation

Health Canada
 First Nations Health Branch.
 P.O. Box 1899
 Salmon Arm, B.C. V1E 4P9

Your file Votre référence

May 23, 2001

Our file Notre référence

File: 150-5-IR-44(11)

Kevin Potter
 Public Works
 Little Shuswap Band
 Box 1100 Chase B.C. VOE 1M0.

s.19(1)

Re: Water Sample Report

This report summarizes the bacteriological data pertinent to water sample(s) collected for the dates shown. Recommendations have been made where appropriate. Complete laboratory reports are on file and are available upon request.

<u>Date</u>	<u>Sample Location</u>	<u>Total Coliform</u>	<u>Faecal Coliform</u>	<u>Remarks</u>
Apr 23/01	Tappen Sub. c.w.s.	L1	L1	Satisfactory
May 14/01	Francois Sub Squilax c.w.s.	L1	L1	Satisfactory
May 14/01	Triplex Pr. Wells.	L1	L1	Satisfactory
May 14/01	Band Office pr. Well.	L1	L1	Satisfactory
May 14/01	Staff Housing pr. Well.	L1	L1	Satisfactory
May 14/01	Town Houses pr. Well c.w.s.	L1	L1	Satisfactory
May 14/01	Holding Road Sub c.w.s.	L1	L1	Satisfactory
May 14/01	Pow Wow Gr. Pr. Well.	L1	L1	Satisfactory
May 14/01	Quaaout Lodge Pool pr. Well	L2.2		Satisfactory
May 14/01	Quaaout HotTub pr. Well	L2.2		Satisfactory
May 14/01	Quaaout Lodge	L1	L1	Satisfactory
May 14/01	Tappen Sub. Tappen cws	L1	L1	Satisfactory
May 14/01	Tappen Sub. Tappen cws	L1	L1	Satisfactory

Remarks: none at this time

L indicates "less than"; EST indicates "estimated count"; OG indicates "overgrowth" (other non coliform bacteria interfere with accurate measurements and re sampling is normally requested)

Sincerely yours,

DS Wahoski

Dennis S. Wahoski, C.P.H.I.(C)
 A/Sr.Environmental Health Officer

Canada

Page(s) 005078 to\à 005081

Is(are) under consultation