

**Assessment Study of
Water and Wastewater Systems
and Associated Water Management Practices
at the Lheidli T'enneh First Nation Community**

**for the
Indian and Northern Affairs Canada
BC Region**



December, 2001

Appendix C

Water Quality Test Results

Community :: LHEIDLI T'ENNEH

Sampling Year :: 2000

s.19(1)

DATE	LOCATION	GB	TC	FC
02/03/00		28	0	0
02/03/00		18	0	0
02/03/00		30	0	0
04/11/00	Band Office South Shelly	0	0	0
04/11/00	Band Office - Water Cooler Unit	180	0	0
04/11/00	Band Office - Water Cooler	5949	0	0
04/11/00		0	0	0
04/27/00	Band Office South Shelly	0	0	0
04/27/00		4	0	0
04/27/00		3000	0	0
05/02/00		0	0	0
05/02/00		1340	0	0
05/02/00		3000	0	0
05/02/00		0	0	0
05/02/00		0	0	0
05/02/00		0	0	0
05/16/00		1260	0	0
05/16/00		482	0	0
05/16/00		8	0	0
05/16/00		258	590	482
05/16/00		0	0	0
05/23/00		322	0	0
05/23/00		240	0	0
05/23/00		590	0	0

s.19(1)

s.19(1)

05/23/00		144	0	0
05/23/00		0	0	0
05/23/00		148	18	0
05/23/00		4	0	0
05/23/00		144	0	0
05/30/00	Band Office South Shelly	0	0	0
05/30/00		0	0	0
05/30/00		0	0	0
05/30/00		0	0	0
05/30/00		0	0	0
05/30/00		0	0	0
05/30/00		2	0	0
05/30/00		0	0	0
06/29/00		8	0	0
06/29/00		0	0	0
06/29/00		0	0	0
06/29/00		88	2	0
06/29/00		0	0	0
06/29/00		10	2	0
06/29/00		6	0	0
07/07/00		0	8	0
07/07/00		0	0	0
07/07/00		0	0	0
07/07/00		0	0	0
07/07/00		2	0	0
07/07/00		1106	0	0
07/07/00		4	0	0
08/01/00		0	0	0

s.19(1)

08/01/00		0	0	0
08/01/00		88	0	0
08/01/00		0	0	0
08/01/00		2	0	0
08/01/00		96	0	0
08/01/00		0	0	0
08/01/00		480	0	0
09/08/00		0	0	0
09/08/00		518	0	0
09/08/00		762	0	0
09/08/00		364	0	0
10/23/00		9648	0	0
10/23/00		0	0	0
10/23/00		0	0	0
10/23/00		2	0	0
10/23/00		0	0	0
11/10/00		0	0	0
11/10/00		0	0	0
11/10/00		3966	18	0
11/10/00		9166	0	0
11/10/00		3000	2	0
11/10/00		0	0	0
11/28/00	Pumphouse - North Shelly	10452	0	0
11/28/00		13936	0	0
11/28/00		12864	0	0
11/28/00		3000	0	0
11/28/00		12596	0	0
11/28/00		4716	0	0

Community :: LHEIDLI T'ENNEH

Sampling Year :: 2001

DATE	LOCATION	GB	TC	FC
01/23/01	Pumphouse - North Shelly	0	0	0
02/23/01	Pumphouse - North Shelly	0	0	0
02/23/01		0	0	0
02/23/01		4	0	0
02/23/01		0	0	0
02/23/01		0	0	0
02/23/01		0	0	0
03/06/01	Pumphouse - North Shelly	4	0	0
03/06/01		224	0	0
03/06/01		366	0	0
03/06/01	Pumphouse - North Shelly After UV	1040	0	0
03/06/01		690	0	0
03/06/01		536	0	0
04/03/01	Band Office - South Shelly	2	0	0
04/03/01		0	0	0
04/03/01		0	0	0
04/03/01		0	0	0
04/03/01		30	0	0
04/03/01		0	0	0
06/04/01		1768	0	0
06/04/01		1194	0	0
06/04/01		1366	0	0
06/04/01		0	0	0
06/04/01	Band Office - South Shelly 06/04/01	50	0	0

s.19(1)

s.19(1)

06/04/01		0	0	0
06/14/01	Pumphouse - North Shelly Before Softener	0	0	0
06/14/01	Pumphouse - North Shelly	6566	0	0
06/14/01		6110	0	0
06/14/01		3189	0	0
06/14/01	Pumphouse - North Shelly After Chlorinator	764	0	0
07/06/01		0	0	0
07/06/01		4	0	0
07/06/01		44	0	0
07/06/01		0	0	0
08/09/01	Pumphouse - North Shelly Post Softener	12	0	0
08/09/01	Pumphouse - North Shelly Sink	22	0	0
08/09/01	Pumphouse - North Shelly After UV	28	0	0
08/09/01	Pumphouse - North Shelly Raw Water	98	0	0
08/09/01	Band Office - South Shelly	8	0	0
08/09/01	Pumphouse South Shelly Raw Water	48	0	0
08/21/01	Band Office - South Shelly	0	0	0
08/21/01	Pumphouse - North Shelly	2	0	0
09/21/01	Band Office - South Shelly	38	0	0
09/21/01	Pumphouse - South Shelly	0	0	0

Page(s) 005110 to\à 005123

Is(are) under consultation



RESULTS OF ANALYSIS - Water

File No. L4490ra

Sample ID	Lheidli
Sample Date	Comm.
Sample Time	System N.
	00 02 03
	13:30

Physical Tests

Colour	(CU)	<5
Conductivity	(umhos/cm)	501
Total Dissolved Solids		270
Hardness	CaCO3	275
pH		8.03
Turbidity	(NTU)	0.9

Dissolved Anions

Alkalinity-Total	CaCO3	279
Chloride	Cl	2.1
Fluoride	F	0.08
Sulphate	SO4	5

Nutrients

Nitrate Nitrogen	N	<0.1
Nitrite Nitrogen	N	<0.1

Total Metals

Aluminum	T-Al	<0.005
Arsenic	T-As	0.0016
Barium	T-Ba	0.100
Boron	T-B	<0.05
Cadmium	T-Cd	<0.0002
Calcium	T-Ca	76.5
Chromium	T-Cr	<0.001
Copper	T-Cu	0.118
Iron	T-Fe	0.06
Lead	T-Pb	<0.001
Magnesium	T-Mg	20.3
Manganese	T-Mn	0.455
Mercury	T-Hg	<0.00005
Potassium	T-K	2.84
Selenium	T-Se	<0.001
Sodium	T-Na	8.48
Uranium	T-U	0.00057
Zinc	T-Zn	0.029

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), and Turbidity (NTU).
 < = Less than the detection limit indicated.
 VPH = Volatile Petroleum Hydrocarbons.



RESULTS OF ANALYSIS - Water

File No. L6753

Sample ID

Lheidli
Tenneh
S. Shelley
00 05 02

Sample Date

Physical Tests

Colour	(CU)	<5
Conductivity	(umhos/cm)	499
Total Dissolved Solids		306
Hardness	CaCO3	266
pH		8.12
Turbidity	(NTU)	<0.1

Dissolved Anions

Alkalinity-Total	CaCO3	282
Chloride	Cl	0.5
Fluoride	F	0.17
Sulphate	SO4	7

Nutrients

Nitrate Nitrogen	N	<0.1
Nitrite Nitrogen	N	<0.1

Total Metals

Aluminum	T-Al	<0.005
Arsenic	T-As	0.0054
Barium	T-Ba	0.093
Boron	T-B	<0.05
Cadmium	T-Cd	<0.0002
Calcium	T-Ca	64.4
Chromium	T-Cr	<0.001
Copper	T-Cu	0.189
Iron	T-Fe	<0.03
Lead	T-Pb	<0.001
Magnesium	T-Mg	25.6
Manganese	T-Mn	0.173
Mercury	T-Hg	<0.00005
Potassium	T-K	6.14
Selenium	T-Se	<0.001
Sodium	T-Na	3.98
Uranium	T-U	0.00348
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), and Turbidity (NTU).
 < = Less than the detection limit indicated.



RESULTS OF ANALYSIS - Water

File No. L9174

Sample ID		N.Shelly	N.Shelly
	s.19(1)	Pump-	House
Sample Date		House	#1015
		00 07 21	00 07 21

Physical Tests

Colour	(CU)	<5	<5
Conductivity	(umhos/cm)	509	509
Total Dissolved Solids		317	297
Hardness	CaCO3	184	208
pH		8.07	8.13
Turbidity	(NTU)	0.5	0.6

Dissolved Anions

Alkalinity-Total		CaCO3	277	274
Chloride	Cl		4.0	4.1
Fluoride	F		0.06	0.06
Sulphate	SO4		6	6

Nutrients

Nitrate Nitrogen		N	<0.1	<0.1
Nitrite Nitrogen		N	<0.1	<0.1

Total Metals

Aluminum	T-Al	<0.005	<0.005
Arsenic	T-As	0.0017	0.0014
Barium	T-Ba	0.065	0.070
Boron	T-B	<0.05	<0.05
Cadmium	T-Cd	<0.0002	<0.0002
Calcium	T-Ca	49.2	55.6
Chromium	T-Cr	<0.001	<0.001
Copper	T-Cu	0.031	0.371
Iron	T-Fe	<0.03	<0.03
Lead	T-Pb	<0.001	<0.001
Magnesium	T-Mg	14.9	16.8
Manganese	T-Mn	0.492	0.207
Mercury	T-Hg	<0.00005	<0.00005
Potassium	T-K	2.39	2.61
Selenium	T-Se	<0.001	<0.001
Sodium	T-Na	32.7	35.4
Uranium	T-U	0.00052	0.00052
Zinc	T-Zn	0.045	0.059

Remarks regarding the analyses appear at the beginning of this report.
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 Conductivity (umhos/cm), and Turbidity (NTU).
 < = Less than the detection limit indicated.



PHILIP ANALYTICAL
15-Dec-00
Page 1 of 8

Certificate of Analysis

8577 Commerce Court
Burnaby, B.C.
Canada V5A 4N5
Tel 604 444 4808
Fax 604 444 4511

Reported To :

HEALTH CANADA

Client Code CE

220 - 177 VICTORIA STREET
PRINCE GEORGE, BC
V2L 5R8

Phone : (250) 561-5384
FAX : (250) 564-3272

Project Information :

Submitted By: PAUL BRODA

Requisition Forms :

Form 08055187 logged on 8-Dec-00 completed on 15-Dec-00

Remarks :

- + All organic data is blank corrected except for PCDD/F, Hi-res MS and CLP volatile analyses
- + 'MDL' = Method Detection Limit, '<' = Less than MDL, '—' = Not analyzed
- + 'CDWG' = Canadian Drinking Water Guidelines
- + Solids results are based on dry weight except Biota Analyses & Special Waste Oil & Grease
- + Organic analyses are not corrected for extraction recovery standards except for Isotope Dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)
- + All Groundwater samples except BTEX/VOC's or Purgeable Hydrocarbons are decanted and/or filtered prior to analysis unless otherwise mandated by regulatory agency
- + This report shall not be reproduced except in full, without the written approval of the laboratory

Methods used by Philip are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', 20th Edition, published by the American Public Health Association, or on US EPA protocols found in the 'Test Methods For Evaluating Solid Waste, Physical/Chemical Method, SW846', 3rd Edition. Other procedures are based on methodologies accepted by the appropriate regulatory agency. Methodology briefs are available by written request.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Liability for any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Philip for a period of 30 days from receipt of data or as per contract.

PHILIP Project Manager: James Teshima



PHILIP ANALYTICAL

15-Dec-00

Page 2 of 8

ANALYTICAL REPORT

Form 08055187

Client : HEALTH CANADA

Sampling site :

Submitted by : PAUL BRODA

Philip ID :	10084252	10084253
Client ID :	N SHELLY	N SHELLY W
	WELL RAW	ELL TREATE

Sparcode	Parameter	Unit	MDL	CDWC		
PHYSICAL						
00041220	pH	pH units	0.1	6.5-8.5	8.1	8.1
00021300	Color True	Col. Unit	5	15	< 5	< 5
00111160	Specific Conductance	uS/cm	1	--	499	501
SCC-CALC	Computed Conductance	uS/cm		--	554	555
CCPD-CALC	Conductance % Diff.	%		--	10.4	10.3
007R1035	Residue Filterable 1.0u (TDS)	mg/L	10	500	332	328
CTDSCALC	Computed TDS	mg/L		--	303	316
TDSRCALC	TDS % Diff.	%		--	-9.1	-3.7
00151140	Turbidity	NTU	0.10	1.0	0.85	0.17
0107CALC	Hardness Total -T	mg/L		500	96.4	< 0.3
GENERAL INORGANICS						
01011211	Alkalinity Phen. 8.3 as CaCO3	mg/L	1	--	< 1	< 1
01021210	Alkalinity Total as CaCO3	mg/L	1	--	283	282
CO3-CALC	Carbonate as CO3=	mg/L		--	< 0.5	< 0.5
HCO3-CALC	Bicarbonate as HCO3-	mg/L		--	345	344
OH-CALC	Hydroxide as OH-	mg/L		--	< 0.5	< 0.5
ANIONS						
11041334	Chloride Dissolved	mg/L	1.0	< 250	2.0	1.6
11061341	Fluoride Dissolved	mg/L	0.10	1.5	< 0.10	< 0.10
IonB-CALC	Ion Balance	%		--	1.3	2.8
Anns-CALC	Total Anions	meq/L		--	5.81	5.79
Cms-CALC	Total Cations	meq/L		--	5.97	6.12
Lang-CALC	Langelier Index	pH units		--	0.5	-0.9
pHSACALC	Saturation pH	pH units		--	7.6	9.0
NITROGEN						
1110CALC	Nitrate Nitrogen Dissolved (N)	mg/L		10.0	< 0.02	< 0.02
11091350	Nitrate + Nitrite (N)	mg/L	0.02	10.0	< 0.02	< 0.02
11111354	Nitrite Nitrogen (N)	mg/L	0.005	1.0	< 0.005	< 0.005

Matrix :	Water	Water
Sampled on:	00/12/07 16:00	00/12/07 16:00

CONTINUED on page 3



PHILIP ANALYTICAL

15-Dec-00
Page 3 of 8ANALYTICAL REPORT
Form 08055187Client : HEALTH CANADA
Sampling site :
Submitted by : PAUL BRODAPhilip ID : 10084252 10084253
Client ID : N SHELLY N SHELLY W
WELL RAW ELL TREATE

Sparcode	Parameter	Unit	MDL	CDWG		
SULFATE						
11211405	Sulfate	mg/L	1.0	< 500	4.9	4.9
METALS TOTAL						
Al-T0031	Aluminium	mg/L	0.02	—	< 0.02	0.03
As-TMS31	Arsenic	mg/L	0.001	0.025	0.003	0.003
Ba-T0031	Barium	mg/L	0.001	1.0	0.025	< 0.001
B-T0031	Boron	mg/L	0.008	5.0	< 0.008	< 0.008
Cd-TMS31	Cadmium	mg/L	0.0001	0.005	< 0.0001	< 0.0001
Ca-T0031	Calcium	mg/L	0.05	—	24.7	< 0.05
Cr-T0031	Chromium	mg/L	0.002	0.05	< 0.002	< 0.002
Cu-T0031	Copper	mg/L	0.001	1.0	0.086	0.008
Fe-T0031	Iron	mg/L	0.005	0.3	0.061	0.006
Pb-TMS31	Lead	mg/L	0.001	0.01	< 0.001	< 0.001
Mg-T0031	Magnesium	mg/L	0.05	—	8.44	< 0.05
Mn-T0031	Manganese	mg/L	0.001	0.05	0.186	0.002
Hg-T0310	Mercury	mg/L	0.00005	0.001	< 0.00005	< 0.00005
K-T0031	Potassium	mg/L	0.4	—	1.7	0.4
Se-TMS31	Selenium	mg/L	0.001	0.01	< 0.001	< 0.001
Na-T0031	Sodium	mg/L	0.010	200	91.7	140
U-TLLMS	Uranium	mg/L	0.00001	0.1	0.00052	0.00040
Zn-T0031	Zinc	mg/L	0.002	5.0	0.007	< 0.002

Matrix : Water Water
Sampled on: 00/12/07 16:00 00/12/07 16:00



PHILIP ANALYTICAL

03-Aug-00
Page 3 of 8

ANALYTICAL REPORT
Form 08053054

Client : HEALTH CANADA
Sampling site :
Submitted by : PAUL BRODA

Philip ID : 10044411 10044412
Client ID : N.SHELLEY N.SHELLEY
PUMPHOUSE HOUSE 1015

Sparcode	Parameter	Unit	MDL		
SULFATE					
11211405	Sulfate	mg/L	1.0	6.3	6.3
METALS TOTAL					
Al-T0031	Aluminum	mg/L	0.02	< 0.02	< 0.02
As-TMS31	Arsenic	mg/L	0.001	0.002	0.002
Ba-T0031	Barium	mg/L	0.001	0.065	0.061
B--T0031	Boron	mg/L	0.008	< 0.008	< 0.008
Cd-TMS31	Cadmium	mg/L	0.0001	< 0.0001	< 0.0001
Ca-T0031	Calcium	mg/L	0.05	55.0	52.7
Cr-T0031	Chromium	mg/L	0.002	< 0.002	< 0.002
Cu-T0031	Copper	mg/L	0.001	0.060	0.455
Fe-T0031	Iron	mg/L	0.005	0.024	< 0.005
Pb-TMS31	Lead	mg/L	0.001	< 0.001	< 0.001
Mg-T0031	Magnesium	mg/L	0.05	17.2	16.8
Mn-T0031	Manganese	mg/L	0.001	0.544	0.202
Hg-T0310	Mercury	mg/L	0.00005	< 0.00005	< 0.00005
K_T0031	Potassium	mg/L	0.4	2.3	2.3
Se-TMS31	Selenium	mg/L	0.001	< 0.001	< 0.001
Na-T0031	Sodium	mg/L	0.010	34.4	36.8
U--TLLMS	Uranium	mg/L	0.00001	0.00053	0.00050
Zn-T0031	Zinc	mg/L	0.002	0.037	0.040

Matrix : Water Water
Sampled on: 00/07/21 16:00 00/07/21 16:00



Free increase in
Zn level.

120-5-12
Ludli Tensch

ANALYTICAL SERVICES

20-Aug-01
Page 1 of 8

8577 Commerce Court
Burnaby, B.C.
Canada V5A 4N5
Tel 604 444 4808
Fax 604 444 4511

lysis

Reported To :

HEALTH CANADA

Client Code CE

220 - 177 VICTORIA STREET
PRINCE GEORGE, BC
V2L 5R8

Phone : (250) 561-5384
FAX : (250) 564-3272

Project Information :

Project ID : -
Submitted By: DAN HOOPER

Requisition Forms :

Form 08082465 logged on 10-Aug-01 completed on 18-Aug-01

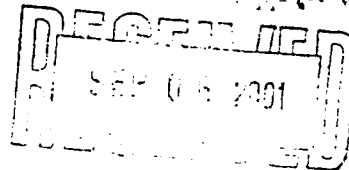
Remarks :

- ☒ All organic data is blank corrected except for PCDD/F, Hi-res MS and CLP volatile analyses
- ☒ 'MDL' = Method Detection Limit, '<' = Less than MDL, '---' = Not analyzed
- ☒ 'CDWG' = Canadian Drinking Water Guidelines
- ☒ Solids results are based on dry weight except Biota Analyses & Special Waste Oil & Grease
- ☒ Organic analyses are not corrected for extraction recovery standards except for Isotope Dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)
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PHILIP Project Manager: James Teshima





ANALYTICAL SERVICES

20-Aug-01
Page 2 of 8

ANALYTICAL REPORT

Client : HEALTH CANADA
Project : -
Sampling site :
Submitted by : DAN HOOPER

Philip ID : 11047488 11047489 11047490 11047491
Client ID : N SHELLEY N SHELLEY S SHELLEY S SHELLEY
 - RAW - SOFTNED - RAW - S BYPASS

Sparcode	Parameter	Unit	MDL	CDWG				
PHYSICAL								
00041220	pH	pH units	0.1	6.5-8.5	7.9	8.0	8.6	8.2
00021300	Color True	Col. Unit	5	15	5	< 5	< 5	< 5
00111160	Specific Conductance	uS/cm	1	---	517	522	562	506
SCCACALC	Computed Conductance	uS/cm		---	575	551	658	563
CCPDCALC	Conductance % Diff.	%		---	10.7	5.4	15.7	10.6
007H1035	Residue Filterable 1.0u (TDS)	mg/L	10	500	312	332	338	274
CTDSCALC	Computed TDS	mg/L		---	297	315	338	284
TDSRCALC	TDS % Diff.	%		---	-4.8	-5.2	-0.1	3.5
00151140	Turbidity	NTU	0.10	1.0	1.05	0.29	0.17	0.10
0107CALC	Hardness Total -T	mg/L		500	229	0.7	284	285
GENERAL INORGANICS								
01011211	Alkalinity Phen. 8.3 as CaCO3	mg/L	1	---	< 1	< 1	22	< 1
01021210	Alkalinity Total as CaCO3	mg/L	1	---	285	286	332	282
CO3-CALC	Carbonate as CO3=	mg/L		---	< 0.5	< 0.5	26.4	< 0.5
HCO3CALC	Bicarbonate as HCO3-	mg/L		---	347	349	351	344
OH--CALC	Hydroxide as OH-	mg/L		---	< 0.5	< 0.5	< 0.5	< 0.5
ANIONS								
11041334	Chloride Dissolved	mg/L	1.0	< 250	2.6	1.5	< 1.0	< 1.0
11061341	Fluoride Dissolved	mg/L	0.10	1.5	< 0.10	< 0.10	0.14	0.14
IonBCALC	Ion Balance	%		---	2.8	0.0	1.7	1.8
AnnsCALC	Total Anions	meq/L		---	5.88	5.90	6.84	5.83
CtnsCALC	Total Cations	meq/L		---	6.21	5.89	7.09	6.05
LangCALC	Langelier Index	pH units		---	0.7	-1.0	1.5	1.0
pHSACALC	Saturation pH	pH units		---	7.2	9.0	7.1	7.2
NITROGEN								
1110CALC	Nitrate Nitrogen Dissolved (N)	mg/L		10.0	< 0.02	< 0.02	0.03	0.03
11091350	Nitrate + Nitrite (N)	mg/L	0.02	10.0	< 0.02	< 0.02	0.03	0.03
11111354	Nitrite Nitrogen (N)	mg/L	0.005	1.0	< 0.005	< 0.005	< 0.005	< 0.005

Matrix : Water Water Water Water
Sampled on: 01/08/09 16:00 01/08/09 16:00 01/08/09 16:00 01/08/09 16:00

CONTINUED on page 3



ANALYTICAL SERVICES

20-Aug-01
Page 3 of 8

ANALYTICAL REPORT

Client : HEALTH CANADA
Project : -
Sampling site :
Submitted by : DAN HOOPER

Philip ID : 11047488 11047489 11047490 11047491
Client ID : N SHELLEY N SHELLEY S SHELLEY S SHELLEY
- RAW - SOFTNED - RAW - S BYPASS

Sparcode	Parameter	Unit	MDL	CDWG				
SULFATE								
11211405	Sulfate	mg/L	1.0	< 500	5.3	6.1	8.6	8.6
METALS TOTAL								
Al-T0031	Aluminum	mg/L	0.02	---	< 0.02	< 0.02	< 0.02	< 0.02
As-TMS31	Arsenic	mg/L	0.001	0.025	0.002	0.002	0.006	0.006
Ba-T0031	Barium	mg/L	0.001	1.0	0.097	< 0.001	0.110	0.091
B--T0031	Boron	mg/L	0.008	5.0	< 0.008	< 0.008	0.013	0.014
Cd-TMS31	Cadmium	mg/L	0.0001	0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Ca-T0031	Calcium	mg/L	0.05	---	62.7	0.14	66.0	66.0
Cr-T0031	Chromium	mg/L	0.002	0.05	< 0.002	< 0.002	< 0.002	< 0.002
Cu-T0031	Copper	mg/L	0.001	1.0	0.211	0.023	0.007	0.009
Fe-T0031	Iron	mg/L	0.005	0.3	0.204	0.034	0.056	< 0.005
Pb-TMS31	Lead	mg/L	0.001	0.01	0.002	< 0.001	0.004	< 0.001
Mg-T0031	Magnesium	mg/L	0.05	---	17.5	0.08	29.0	29.2
Mn-T0031	Manganese	mg/L	0.001	0.05	0.980	0.007	0.419	0.041
Hg-T0310	Mercury	mg/L	0.00005	0.001	< 0.00005	< 0.00005	< 0.00005	< 0.00005
K__T0031	Potassium	mg/L	0.4	---	1.9	0.6	6.0	5.9
Se-TMS31	Selenium	mg/L	0.001	0.01	< 0.001	< 0.001	< 0.001	< 0.001
Na-T0031	Sodium	mg/L	0.010	200	36.4	135	28.7	4.68
U--TLLMS	Uranium	mg/L	0.00001	0.1	0.00051	0.00051	0.00302	0.00298
Zn-T0031	Zinc	mg/L	0.002	5.0	0.016	0.009	0.066	< 0.002

Matrix : Water Water Water Water
Sampled on: 01/08/09 16:00 01/08/09 16:00 01/08/09 16:00 01/08/09 16:00



ANALYTICAL SERVICES

20-Aug-01
Page 4 of 8

DUPLICATE SUMMARY

Parameter	Client ID	Philip ID	Sample Conc.	Duplicate Conc.	MDL	Unit	Relative % Diff.
Chloride Dissolved	S SHELLEY - RAW	11047490	< 1.0	< 1.0	1.0	mg/L	0.00
Sulfate Dissolved	S SHELLEY - RAW	11047490	8.6	8.3	1.0	mg/L	3.55



ANALYTICAL SERVICES

20-Aug-01
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SPIKE SUMMARY

Parameter	Client ID	Philip ID	Sample Conc.	Sample & Spike Conc.	Spike Amount	Unit	Percent Recovery
Specific Conductance	Blank Spike. Batch :	14403133	< 1	1020	1015	uS/cm	101
Residue Filterable 1.0u (TDS)	Blank Spike. Batch :	14403170	< 10	100	100	mg/L	94
pH	Blank Spike. Batch :	14403131	< 0.1	6.0	6	pH units	100
Turbidity	Blank Spike. Batch :	14403145	< 0.10	1.98	2	NTU	97
Alkalinity Total as CaCO3	Blank Spike. Batch :	14403132	< 1	102	100	mg/L	102
Chloride Dissolved	Blank Spike. Batch :	14101390	< 1.0	100	100	mg/L	105
Fluoride Dissolved	Blank Spike. Batch :	14101403	< 0.10	0.48	.5	mg/L	96
Sulfate Dissolved	Blank Spike. Batch :	14101391	< 1.0	107	100	mg/L	107
Nitrate+Nitrite (N)	Blank Spike. Batch :	14101400	< 0.02	0.64	.6	mg/L	106
Nitrite Nitrogen (N)	Blank Spike. Batch :	14101400	< 0.005	0.210	.2	mg/L	104
Arsenic	Blank Spike. Batch :	14202485	< 0.001	0.019	.02	mg/L	96
Cadmium	Blank Spike. Batch :	14202485	< 0.0001	0.0170	.02	mg/L	85
Lead	Blank Spike. Batch :	14202485	< 0.001	0.017	.02	mg/L	84
Selenium	Blank Spike. Batch :	14202485	< 0.001	0.018	.02	mg/L	88
Mercury	Blank Spike. Batch :	14202450	< 0.00005	0.00048	.0005	mg/L	96
Chloride Dissolved	S SHELLEY - RAW	11047490	< 1.0	100	100	mg/L	100
Sulfate Dissolved	S SHELLEY - RAW	11047490	8.6	109	100	mg/L	101



ANALYTICAL SERVICES

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ANALYSIS DATES

	Philip ID:	11047488	11047489	11047490	11047491
	Client ID:	N SHELLEY - RAW	N SHELLEY - SOFTNED	S SHELLEY - RAW	S SHELLEY - S BYPASS
00041220	pH	13-AUG-2001	13-AUG-2001	13-AUG-2001	13-AUG-2001
00021300	Color True	13-AUG-2001	13-AUG-2001	13-AUG-2001	13-AUG-2001
00111160	Specific Conductance	13-AUG-2001	13-AUG-2001	13-AUG-2001	13-AUG-2001
007H1035	Residue Filterable 1.0u (TDS)	14-AUG-2001	14-AUG-2001	14-AUG-2001	14-AUG-2001
00151140	Turbidity	13-AUG-2001	13-AUG-2001	13-AUG-2001	13-AUG-2001
01011211	Alkalinity Phen. 8.3 as CaCO3	13-AUG-2001	13-AUG-2001	13-AUG-2001	13-AUG-2001
01021210	Alkalinity Total as CaCO3	13-AUG-2001	13-AUG-2001	13-AUG-2001	13-AUG-2001
11041334	Chloride Dissolved	13-AUG-2001	13-AUG-2001	13-AUG-2001	13-AUG-2001
11061341	Fluoride Dissolved	15-AUG-2001	15-AUG-2001	15-AUG-2001	15-AUG-2001
11091350	Nitrate+Nitrite (N)	15-AUG-2001	15-AUG-2001	15-AUG-2001	15-AUG-2001
11111354	Nitrite Nitrogen (N)	15-AUG-2001	15-AUG-2001	15-AUG-2001	15-AUG-2001
11211405	Sulfate	13-AUG-2001	13-AUG-2001	13-AUG-2001	13-AUG-2001
As-TMS31	Arsenic	16-AUG-2001	16-AUG-2001	16-AUG-2001	16-AUG-2001
Cd-TMS31	Cadmium	16-AUG-2001	16-AUG-2001	16-AUG-2001	16-AUG-2001
DOH-MET	DOH-MET	15-AUG-2001	15-AUG-2001	15-AUG-2001	15-AUG-2001
Pb-TMS31	Lead	16-AUG-2001	16-AUG-2001	16-AUG-2001	16-AUG-2001
Hg-T0310	Mercury	13-AUG-2001	13-AUG-2001	13-AUG-2001	13-AUG-2001
Se-TMS31	Selenium	16-AUG-2001	16-AUG-2001	16-AUG-2001	16-AUG-2001
U--TLLMS	Uranium	16-AUG-2001	16-AUG-2001	16-AUG-2001	16-AUG-2001
	Matrix:	Water	Water	Water	Water
	Sampled on:	9-AUG-2001	9-AUG-2001	9-AUG-2001	9-AUG-2001



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BATCH NUMBERS

	Philip ID:	11047488	11047489	11047490	11047491
	Client ID:	N SHELLEY - RAW	N SHELLEY - SOFTNED	S SHELLEY - RAW	S SHELLEY - S BYPASS
00041220	pH	14403131	14403131	14403131	14403131
00021300	Color True	14101385	14101385	14101385	14101385
00111160	Specific Conductance	14403133	14403133	14403133	14403133
007H1035	Residue Filterable 1.0u (TDS)	14403170	14403170	14403170	14403170
00151140	Turbidity	14403145	14403145	14403145	14403145
01011211	Alkalinity Phen. 8.3 as CaCO3	14403134	14403134	14403134	14403134
01021210	Alkalinity Total as CaCO3	14403132	14403132	14403132	14403132
11041334	Chloride Dissolved	14101390	14101390	14101390	14101390
11061341	Fluoride Dissolved	14101403	14101403	14101403	14101403
11091350	Nitrate+Nitrite (N)	14101400	14101400	14101400	14101400
11111354	Nitrite Nitrogen (N)	14101400	14101400	14101400	14101400
11211405	Sulfate	14101391	14101391	14101391	14101391
As-TMS31	Arsenic	14202485	14202485	14202485	14202485
Cd-TMS31	Cadmium	14202485	14202485	14202485	14202485
DOH-MET	DOH-MET	14202482	14202482	14202482	14202482
Pb-TMS31	Lead	14202485	14202485	14202485	14202485
Hg-T0310	Mercury	14202450	14202450	14202450	14202450
Se-TMS31	Selenium	14202485	14202485	14202485	14202485
U--TLLMS	Uranium	14202485	14202485	14202485	14202485
	Matrix:	Water	Water	Water	Water
	Sampled on:	9-AUG-2001	9-AUG-2001	9-AUG-2001	9-AUG-2001



ANALYTICAL SERVICES

20-Aug-01
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BLANK SUMMARY

All method blanks were less than MDL



FORT GEORGE I.R. 2

CHEMICAL ANALYSIS REPORT

Date: April 29, 1993

ASL File No. 9078C

Report On: Drinking Water Surveillance Program

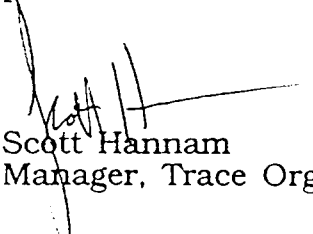
Report To: **Health & Welfare Canada**
 Medical Services
 409 - 280 Victoria Street
 Prince George, BC
 V2L 4X3

Attention: **Mr. Ian Baird**, Sr. Environmental Health Officer

Received: March 4, 1993

ASL ANALYTICAL SERVICE LABORATORIES LTD.

per:


 Scott Hannam
 Manager, Trace Organics Lab

Brent A. Makelki, B.Sc.
 Project Chemist

cc:R. Lawrence -Vancouver





REMARKS

File No. 9078C

The water as represented by the sample submitted can be characterized as moderately high with respect to dissolved mineralization. The water sample met the Canadian Drinking Water Guidelines for all parameters analysed with the exception of Colour, Total Iron and Total Manganese. These parameters are limited for aesthetic purposes only.



RESULTS OF ANALYSIS

File No. 9078C

North
Shelly

93 03 03

Physical Tests

Colour	CU	21.3
Conductivity	umhos/cm	595
Total Dissolved Solids		329
Hardness	CaCO3	292
pH		7.74
Total Solids		310
Turbidity	NTU	4.14

Dissolved Anions

Alkalinity - Total	CaCO3	288
Chloride	Cl	5.6
Fluoride	F	0.07
Sulphate	SO4	3.5

Nutrients

Ammonia Nitrogen	N	0.057
Nitrate Nitrogen	N	<0.005
Nitrite Nitrogen	N	0.004
Nitrite/Nitrate Nitrogen	N	<0.005

Cyanides

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

North
Shelly

93 03 03

Total Metals

Aluminum	T-Al	0.009
Antimony	T-Sb	<0.0001
Arsenic	T-As	0.0023
Barium	T-Ba	0.118
Boron	T-B	<0.10
Cadmium	T-Cd	<0.0002
Calcium	T-Ca	79.9
Chromium	T-Cr	<0.001
Cobalt	T-Co	<0.001
Copper	T-Cu	0.013
Iron	T-Fe	0.617
Lead	T-Pb	0.002
Magnesium	T-Mg	22.5
Manganese	T-Mn	1.32
Mercury	T-Hg	<0.00005
Potassium	T-K	2.7
Selenium	T-Se	<0.0005
Sodium	T-Na	2.67
Uranium	T-U	0.00044
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.

< = Less than the detection limit indicated.

Results are expressed as milligrams per litre except where noted.

North
Shelly

93 03 03

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	1.92
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Remarks regarding the analyses appear at the beginning of this report.
< = Less than the detection limit indicated.
Results are expressed as milligrams per litre except where noted.

service

laboratories

ltd.



CHEMICAL ANALYSIS REPORT

Date: April 27, 1993

ASL File No. 8802C

Report On: Drinking Water Surveillance Program

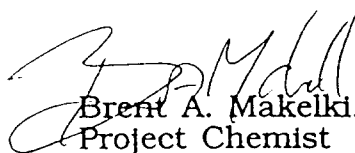
Report To: **Health & Welfare Canada**
Medical Services
409 - 280 Victoria Street
Prince George, BC
V2L 4X3

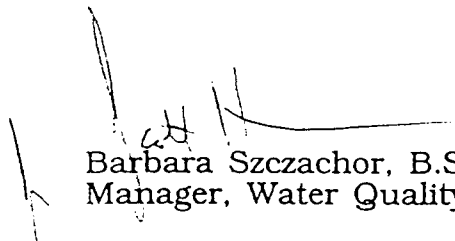
Attention: **Mr. Ian Baird**, Sr. Environmental Health Officer

Received: February 18, 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. 8802C

The water sample submitted can be characterized as moderately high with respect to dissolved mineralization. The sample met the Canadian Drinking Water Guidelines for all parameters analysed.



South
Shelly > FORK
93 02 17 GEORGE I.R.2

Physical Tests

Colour	CU	<5.0
Conductivity	umhos/cm	514
Total Dissolved Solids		328
Hardness	CaCO3	266
pH		7.95
Total Solids		328
Turbidity	NTU	<0.10

Dissolved Anions

Alkalinity - Total	CaCO3	293
Chloride	Cl	1.7
Fluoride	F	0.12
Sulphate	SO4	7.4

Nutrients

Ammonia Nitrogen	N	0.950
Nitrate Nitrogen	N	0.016
Nitrite Nitrogen	N	0.003
Nitrite/Nitrate Nitrogen	N	0.019

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.

South
Shelly

93 02 17

Total Metals

Aluminum	T-Al	<0.005
Antimony	T-Sb	<0.0001
Arsenic	T-As	0.0075
Barium	T-Ba	0.097
Boron	T-B	<0.10
Cadmium	T-Cd	<0.0002
Calcium	T-Ca	59.9
Chromium	T-Cr	<0.001
Cobalt	T-Co	<0.001
Copper	T-Cu	0.021
Iron	T-Fe	<0.030
Lead	T-Pb	0.001
Magnesium	T-Mg	28.4
Manganese	T-Mn	0.006
Mercury	T-Hg	<0.00005
Potassium	T-K	5.9
Selenium	T-Se	<0.0005
Sodium	T-Na	5.24
Uranium	T-U	0.00290
Zinc	T-Zn	0.006

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.

South
Shelly

93 02 17

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
----------------	----------

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	1.47
------------------------	------

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

SHELLEY

1986

<u>Parameter</u>		Raw South Shelley I.R. Feb 20/86	Drinking *1 Water Guidelines
<u>Physical Tests</u>			
Colour	CU	<5.	15. (A)
Conductivity	umhos/cm	421.	-
Hardness	(mg/L)	274.	-*2
pH		7.87	6.5-8.5 (A)
Turbidity	NTU	3.4	5. (A)
Dissolved Solids	(mg/L)	278.	500.
<u>Dissolved Anions</u>			
Alkalinity:			
Bicarbonate	CaCO ₃	276.	-
Carbonate	CO ₃	-	-
Chloride	Cl	<0.50	250. (A)
Fluoride	F	0.12	1.5 (H&A)
Silicate	SiO ₂	17.9	-
Sulphate	SO ₄	3.4	500. (H&A)
Nitrite/Nitrate	N	0.084	10.0 (H)
<u>Dissolved Metals</u>			
Arsenic	As	<0.10	0.05 (H)
Barium	Ba	0.099	1.0 (H)
Cadmium	Cd	<0.005	0.005 (H)
Calcium	Ca	59.8	-
Chromium	Cr	<0.005	0.05 (H)
Copper	Cu	<0.005	1.0 (H)
Iron	Fe	<0.03	-
Lead	Pb	<0.05	0.05 (H)
Magnesium	Mg	30.2	-
Manganese	Mn	0.42	0.05 (A)
Mercury	Hg	-	-
Potassium	K	5.05	-
Selenium	Se	-	-
Sodium	Na	4.50	-*3
Zinc	Zn	0.017	5.0 (A)
<u>Total Metals</u>			
Iron	Fe	0.57	0.30 (A)
Manganese	Mn	0.47	0.05 (A)

< = Less than A = Aesthetic reasons H = Health Considerations
 Results expressed as milligrams per litre except for pH,
 Conductivity (umhos/cm), Colour (CU), and Turbidity (NTU).
 *1 "Maximum acceptable concentration" as published by Health &
 Welfare Canada, 1989
 *2 Maximum level not established - water supplies with a hardness
 exceeding 200 mg/L are considered poor but will be tolerated.
 *3 Maximum level not established - of concern to consumers with
 sodium restricted diet. Levels exceeding 20 mg/L may be of
 concern in this circumstance.

Appendix D

Wastewater Quality Test Results

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