ASSESSMENT STUDY OF WATER AND WASTEWATER SYSTEMS AND ASSOCIATED WATER MANAGEMENT PRACTICES AT WILLIAMS LAKE

A
REPORT
TO

INDIAN AND NORTHERN AFFAIRS CANADA
BC REGION

NovaTec Consultants Inc.
Environmental Engineers and Scientists

December 2001

File No.: 1407.08G

Appendix C

Water Testing Results

Community :: *SUGARCANE WILLIAMS LAKE*

Sampling Year :: 2000

	DATE	LOCATION	GB	TC	FC	
1	02/07/00	Health Center	0	0	0	
	02/07/00	Gym	0	0	0	
	02/07/00	Chief Louie Center	0	0	0	
2	04/04/00	Health Center	0	6	0	1
	04/04/00	Gym	0	0	0	
	04/04/00	Chief Louie Center	8	6	0	
3	05/30/00	Stormy Sandy	0	0	0	
	05/30/00	Chief Louie Center	0	0	0	
	05/30/00	Gym	0	0	0	
4	06/07/00	Chief Will-yum Private Well #32	2626	804	0	ALL: PRIVATE WELL
	06/07/00	Chief Will-yum Private Well # 1	10	14	0	
	06/07/00	Chief Will-yum Private Well # 3	2760	8	0	
	06/07/00	Chief Will-yum Private Well # 27	7772	0	0	
	06/07/00	Chief Will-yum Private Well # 22	3216	56	0	
5	06/14/00	Chief Will-yum Private Well # 1	0	0	0	
	06/14/00	Chief Will-yum Private Well # 3	0	0	0	
	06/14/00	Chief Will-yum Private Well # 32	0	0	0	
6	06/28/00	Chief Will-yum Private Well Tent	6	0	0	
	06/28/00	Chief Will-yum Private Well # 3	266	0	0	
	06/28/00	Chief Will-yum Private Well # 32	0	0	0	
7	07/19/00	Health Center	5092	0	0	
	07/19/00	Chief Louie Center	9112	0	0	
	07/19/00	Chief Will-yum Private Well Tent	764	0	0	
	07/19/00	Gym	5628	0	0	

Community :: *SUGARCANE WILLIAMS LAKE*

Sampling Year :: 1999

DATE	LOCATION	GB	TC	FC
05/25/99	Clinic	0	0	0
06/23/99	Chief Will-yum Private Well Washroom	420	0	0
06/23/99	Chief Will-yum Private Well # 3	6995	0	0
06/23/99	Chief Will-yum Private Well# 17	1179	0	0
06/30/99	Chief Will-yum Private Well Bathhouse	268	9	0
06/30/99	Chief Will-yum Private Well # 17	0	0	0
06/30/99	Chief Will-yum Private Well # 29	0	0	0
10/12/99	Gym Washroom	0	0	0
10/12/99	Gym Kitchen	0	0	0
10/12/99		2626	0	0
10/12/99		0	0	0
10/12/99		0	0	0
10/12/99	Chief Louie Center	0	0	0
11/17/99	Chief Louie Center	0	0	0
11/17/99	House G6	0	0	0

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	07/19/00	Chief Will-yum Private Well # 5	260	0	0
8	08/02/00	Community Well	3000	4	0
	08/02/00	Band Office	22	0	0
	08/02/00	Medical Clinic	3000	0	0
	08/02/00		3000	0	0
	08/02/00	individual well	1394	0	0
9	08/09/00	Well # 3 - in field	.	.	0
	08/09/00	Well # 2 Pumphouse	24	4	0
	08/09/00	Chief Louie Center	208	0	0
	08/09/00	Reservoir Inflow	3072	6	0
10	08/29/00		362	0	0
	08/29/00	individual well	428	0	0
	08/29/00		1126	0	0
	08/29/00	Band Office	0	0	0
	08/29/00	Medical Clinic	2	0	0
11	09/28/00	Chief Louie Center	830	0	0
	09/28/00	Youth Center	78	0	0
12	09/25/00	Band Office	0	0	0
	09/25/00	Medical Center	21628	8	0
	09/25/00	individual well	160	0	0
	09/25/00		140	0	0
	09/25/00		0	0	0
	09/28/00	Chief Louie Center	830	0	0
	09/28/00	Youth Center	78	0	0
13	10/03/00	Youth Center	2948	0	0
	10/03/00		12864	5	0
	10/03/00		3000	6	0
	10/03/00	Chief Louie Center	428	0	0

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	10/03/00	Youth Center	2358	0	0
	10/03/00	Gym	3484	0	0
	10/03/00	Band Office	23852	0	0
14	10/05/00	Youth Center	8	0	0
	10/05/00	Gym	368	0	0
	10/05/00	Chief Louie Center	18	0	0
	10/05/00	Last Duplex	3000	0	0
15	10/24/00		1126	0	0
	10/24/00		2	0	0
	10/24/00		1876	0	0
	10/24/00	Band Office	2	0	0
	10/24/00		4	0	0
	10/24/00	Chief Will-yum Store	16	0	0
16	10/25/00	Youth Center	42	0	0
	10/25/00	Chief Louie Center	3859	0	0
	10/25/00	Pumphouse Well # 2	192	58	0
	10/25/00	Pumphouse Well # 2	2117	68	0
	10/25/00	Well # 3	12	0	0
	10/25/00	Well # 3	6	0	0
17	11/23/00		0	0	0
	11/23/00		6968	2	0
	11/23/00	Youth Center	1498	0	0
>					

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3 SAMPLING EVENTS WERE FOR A PRIVATE WELL ONLY

GB > 200 IN 1 OUT OF 14 SYSTEM SAMPLING EVENTS

Post-it™ Fax Note 7671E	Date Nov 5/01	# of pages ▸ 9
To Iain Baird	From Patti Joyce	
Co./Dept.	Co.	
Phone #	Phone #	
Fax # 564-3272	Fax # 296-3250	

FAXED to PJ Nov 6

PSC

ANALYTICAL SERVICES

01-Nov-01

ANALYTICAL

Client : HEALTH CANADA
Project : SUGARCANE
Sampling site :
Submitted by : PATTI JOYCE

Sparcode	Parameter	Unit	MDL	CDWG	PhilIp ID: 11068271 / Client ID: WELL IN FIELD	11068272 / WELL IN PUMPHOUSE	11068273 / BAND OFFICE
PHYSICAL							
00041220	pH	pH units	0.1	6.5-8.5	8.3	7.8	8.3
00021300	Color True	Col.Unit	5	15	< 5	10 ◂	< 5
00111160	Specific Conductance	uS/cm	1	—	946	681	948
ECCACALC	Computed Conductance	uS/cm		—	1150	769	1150
CCPDCALC	Conductance % Diff	%		—	19.4	12.1	19.2
007H1035	Residue Filterable 1.0u (TDS)	mg/L	10	500	→ 614	404	→ 616
CTDSCALC	Computed TDS	mg/L		—	621	379	623
TDSRCALC	TDS % Diff.	%		—	1.1	-6.3	1.1
00151140	Turbidity	NTU	0.10	1.0	→ 1.04 ✓	0.32	0.17
0107CALC	Hardness Total -T	mg/L		300	247	355	246
GENERAL INORGANICS							
01011231	Alkalinity Phen. 8.3 as CaCO3	mg/L	1	—	3	< 1	3
01021210	Alkalinity Total as CaCO3	mg/L	1	—	295	359	286
CO3-CALC	Carbonate as CO3=	mg/L		—	3.6	< 0.5	3.6
HCO3CALC	Bicarbonate as HCO3-	mg/L		—	351	438	354
OH-CALC	Hydroxide as OH-	mg/L		—	< 0.5	< 0.5	< 0.5
ANIONS							
11041334	Chloride Dissolved	mg/L	1.0	< 250	9.5	15.4	9.9
11061341	Fluoride Dissolved	mg/L	0.10	1.5	0.14	0.12	0.14
IonBCALC	Ion Balance	%		—	-0.9	1.2	-1.8
AnusCALC	Total Anions	meq/L		—	10.08	7.95	10.94
CatCALC	Total Cations	meq/L		—	10.67	8.16	10.55
LangCALC	Langelier Index	pH units		—	0.9	0.6	0.9
pHSACALC	Saturation pH	pH units		—	7.4	7.2	7.4
CARBON							
01030912	Organic Carbon - Total	mg/L	1.0	—	2.1	7.7 ✓	2.0
NITROGEN							
1110CALC	Nitrate Nitrogen Dissolved (N)	mg/L		10.0	< 0.02	0.10	< 0.02
11091350	Nitrate+Nitrite (N)	mg/L	0.02	10.0	< 0.02	0.11	< 0.02
				Matrix :	Water	Water	Water
				Sampled on:	01/10/16 01:30	01/10/15 02:00	01/10/16 02:30

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Community :: *SUGARCANE WILLIAMS LAKE*

Sampling Year :: 2001

	DATE	LOCATION	GB	TC	FC
1	01/12/01	Well # 2 - Sample 1	10	0	0
	01/12/01	Well # 2 - Sample 2	66	0	0
	01/12/01	Well # 3 - Sample 1	3000	0	0
	01/12/01	Well # 3 - Sample	3000	0	0
2	01/08/01	Last Duplex 18A	3000	0	0
	01/08/01	Youth Center	22	0	0
	01/08/01	Chief Louie Center	116	0	0
	01/08/01		22512	98	86
	01/08/01		370	2	0
	01/08/01		3000	2	0
3	01/22/01	Medical Clinic	1045	0	0
	01/22/01	Band Office	616	0	0
	01/22/01		2064	0	0
	01/22/01		4	0	0
4	02/20/01	Band Office	6	0	0
	02/20/01		0	0	0
	02/20/01		0	0	0
	02/20/01		24	0	0
5	04/03/01	Gym	2	0	0
	04/03/01	Chief Louie Center	0	0	0
	04/03/01		10	0	0
	04/03/01		544	0	0
6	05/09/01	Youth Center	1270	0	0
	05/09/01	Well # 3	1048	0	0

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	05/09/01	[redacted]	5521	0	0
	05/09/01	Chief Louie Center	1179	0	0
	05/09/01	[redacted]	12	0	0
	05/09/01	Well # 2	192	0	0
	05/09/01	Chief Will-yum # 5	108	0	0
	05/09/01	Chief Will-yum # 16	11256	0	0
7	06/12/01	Youth Center	10988	0	0
	06/12/01	Last Duplex # 18	3000	0	0
	06/12/01	Chief Louie Center	3000	0	0
	06/12/01	Chief Will-yum # 4	19564	0	0
	06/12/01	Chief Will-yum # 27	27872	0	0
8	07/17/01	Well # 3 Draw 1	96	0	0
	07/17/01	Well # 3 Draw 2	3000	0	0
	07/17/01	Chief Louie Center	0	0	0
	07/17/01	Band Office	0	0	0
	07/17/01	Well # 2 Pumphouse Draw 1	26	0	0
	07/17/01	Well # 2 Pumphouse Draw 2	28	0	0
	07/17/01	[redacted]	9943	0	0
	07/17/01	Gym	3000	0	0
	07/17/01	[redacted]	4288	0	0
9	07/31/01	Gym	3000	0	0
	07/31/01	[redacted]	1334	0	0
	07/31/01	Chief Will-yum # 1	11792	0	0
	07/31/01	Band Office	44	0	0
10	10/16/01	Band Office	4	0	0
	10/16/01	Health Center	0	0	0
	10/16/01	[redacted]	620	0	0
	10/16/01	Well # 3	70	0	0

GB > 100 IN & OUT 10 EVENTS (EXCLUDES YVETTE SEWERS AFTER SOFTENER SAMPLE)

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10/16/01	Well # 2	0	0	0
10/16/01		38	0	0

ANALYTICAL SERVICES

01-Nov-01
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ANALYTICAL REPORT

Client : HEALTH CANADA
Project : SUGARCANE
Sampling site :
Submitted by : PATTI JOYCE

Sparcode	Parameter	Unit	MDL	CDWG	Phillip ID : 11068271 Client ID : WELL IN FIELD	11068272 WELL IN PUMPHOUSE	11068273 BAND OFFICE
11311354	Nitrite Nitrogen (N)	mg/L	0.005	1.0	< 0.005	0.008	0.014
SULFATE							
11211405	Sulfate	mg/L	1.0	< 500	223	15.4	228
METALS TOTAL							
Al-T0031	Aluminum	mg/L	0.02	--	0.03	< 0.02	< 0.02
As-TM531	Arsenic	mg/L	0.001	0.025	0.014	0.001	0.013
Ba-T0031	Barium	mg/L	0.001	1.0	0.009	0.022	0.009
B-T0031	Boron	mg/L	0.008	5.0	0.222	0.016	0.219
Cd-TM531	Cadmium	mg/L	0.0001	0.005	0.0001	< 0.0001	< 0.0001
Ca-T0031	Calcium	mg/L	0.05	--	38.4	49.9	38.2
Cr-T0031	Chromium	mg/L	0.002	0.05	0.004	0.004	0.002
Cu-T0031	Copper	mg/L	0.001	1.0	0.009	0.009	0.009
Fe-T0031	Iron	mg/L	0.005	0.3	0.412	0.005	0.871
Pb-TM531	Lead	mg/L	0.001	0.01	0.018	0.004	< 0.001
Mg-T0031	Magnesium	mg/L	0.05	--	36.8	56.0	36.6
Mn-T0031	Manganese	mg/L	0.001	0.05	0.115	0.006	0.092
Hg-T0310	Mercury	mg/L	0.00005	0.001	< 0.00005	< 0.00005	< 0.00005
K-T0031	Potassium	mg/L	0.4	--	7.7	6.2	7.3
Se-TM531	Selenium	mg/L	0.001	0.01	< 0.001	< 0.001	< 0.001
Na-T0031	Sodium	mg/L	0.010	200	126	20.3	126
U-TILMS	Uranium	mg/L	0.00001	0.02	0.00281	0.00091	0.00282
Zn-T0031	Zinc	mg/L	0.002	5.0	0.830	0.541	0.013
SPECIAL ORGANICS							
ORSPORSP	Organics Special	None		--	- (1)	-- (2)	-- (3)
EX994SP	Prep for Specials	date			01/10/26	01/10/26	01/10/26
		Matrix :			Water	Water	Water
		Sampled on:			01/10/16 01:30	01/10/16 02:00	01/10/16 02:30

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ANALYTICAL SERVICES

01-Nov-01
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ANALYTICAL REPORT

Client : HEALTH CANADA
Project : SUGARCANE
Sampling site :
Submitted by : PATTI JOYCE

Limit for THM: 100µg/L

Result comments and/or text results :

(1) Text results for sample 11068271 sparcode ORSPORSP follow :

THM POTENTIAL BLANK 4.6ug/l
68271 11.30ug/l : 0.0113 mg/L WELL IN FIELD

(2) Text results for sample 11068272 sparcode ORSPORSP follow :

THM POTENTIAL BLANK 4.6ug/l
68272 79.89ug/l : 0.07949 mg/L WELL IN PUMP HOUSE

(3) Text results for sample 11068273 sparcode ORSPORSP follow :

THM POTENTIAL BLANK 4.64ug/l
68273 11.96ug/l : 0.01196 mg/L BAND OFFIC

CHEMICAL ANALYSIS REPORT

Date:	November 5, 2001
ALS File No.	N6854
Report On:	Sugarcane Water Analysis For Patti Joyce, EHO
Report To:	**Health Canada - EBS (Pacific)** 220 - 177 Victoria St. Prince George, BC V2L 5R8
Attention:	**Mr. Iain Baird**, Senior E.H.O.
Received:	October 17, 2001

ALS ENVIRONMENTAL
per:

Leanne Harris, B.Sc. - Project Chemist
Can Dang, B.Sc. - Project Chemist

cc: Patti Joyce, EHO
Health Canada - Williams Lake.

RESULTS OF ANALYSIS - Water File No. N6854

Sample ID		Well in Pump-house	Well in Field	Band Office
Sample Date		01 10 16	01 10 16	01 10 16
Sample Time		14:00	13:30	14:30
ALS ID		1	2	3
Inorganic Parameters				
Residual Chlorine - Total		5.0	3.2	3.8
Halogenated Volatiles				
Bromodichloromethane		1.57	0.460	0.050
Bromoform		<0.001	<0.001	<0.001
Chloroform		0.670	0.060	0.060
Dibromochloromethane		<0.001	0.011	0.011
Total Trihalomethanes	—>	1.81	—>0.401	—>0.102
Organic Parameters				
Total Organic Carbon	C	3.6	1.9	1.8

THM Limit: 0.1 mg/L

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.

METHODOLOGY File No. N6854

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" (BCMOE), and/or "Standard Methods for the Examination of Water and Wastewater" (APHA). Further details are available on request.

Volatile Organic Compounds and Volatile Hydrocarbons in Water

This procedure involves the purge and trap extraction of the sample prior to analysis for Volatile Hydrocarbons (VH) by capillary column gas chromatography with flame-ionization detection (GC/FID) and for specific Volatile Organic Compounds (VOC) by capillary column gas chromatography with mass spectrometric detection (GC/MS). The VH analysis is carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Volatile Hydrocarbons in Water by GC/FID" (Version 2.1, July 1999). The VOC analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).

Recommended Holding Time:
Sample: 7 days Extract: NA
Reference: BCMELP
For more detail see ALS Environmental "Collection & Sampling Guide"

Total Trihalomethanes (TTHM) in Water

Total Trihalomethanes is a calculation based on procedures described in "Standard Methods for the Examination of Water and Wastewater" (APHA). The calculation is as follows:

Total Trihalomethanes (ug Chloroform/L) = A + 0.728B + 0.574C + 0.472D

where:
A = [Chloroform] in ug/L
B = [Bromodichloromethane] in ug/L
C = [Dibromochloromethane] in ug/L

METHODOLOGY (cont'd) File No. N6854

D = [Bromoform] in ug/L

The Total Trihalomethane concentrations calculated are intended for non-regulatory reporting purposes.

Recommended Holding Time: Not Applicable

Carbon in Water

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". All fractions of carbon are determined by the combustion-infrared method. Total carbon includes organic carbon (covalently bonded in organic molecules) and inorganic carbon (carbonate, bicarbonate and dissolved carbon dioxide). Total organic carbon is the calculated difference between the total carbon and the inorganic carbon determination. Dissolved carbon fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

Recommended Holding Time:
Sample: 28 days
Reference: APHA
For more detail see ALS Environmental "Collection & Sampling Guide"

End of Report

RESULTS OF ANALYSIS - Quality Control File No. N6854

Sample ID	DHBA Spike % Recover
Sample Date	
Sample Time	
ALS ID	*DHBA Spk*
Halogenated Volatiles	
Chloroform	107

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.