

**ASSESSMENT STUDY OF WATER AND WASTEWATER SYSTEMS  
AND ASSOCIATED WATER MANAGEMENT PRACTICES  
T'SARTLIP FIRST NATION, SOUTH SAANICH IR NO. 1**

**For**

**Indian and Northern Affairs Canada  
British Columbia Region**

**By**

**UMA Engineering Ltd.  
3030 Gilmore Diversion  
Burnaby, British Columbia  
V5G 3B4**

**April 2002**

Assessment Study of Water and Wastewater Systems  
T'Sartlip First Nation, South Saanich IR No. 1

## Appendix D

# **WATER TESTING RESULTS** **(CHEMICAL/PHYSICAL/BACTERIOLOGICAL)** **WITH COMPARISONS TO THE** ***GUIDELINES FOR CANADIAN DRINKING WATER QUALITY (GCDWQ)***

#### 4.5.3. CHLORINE RESIDUAL AND WATER TEMPERATURE

**Chlorine Residual.** The annual average chlorine residual observed from all distribution system stations combined was 0.63 mg/L (Table 5). This value is similar to the level observed in previous years. The level of chlorine residual in the distribution system ranged between 0.0 and 1.59 mg/L. The highest value observed was well below the 3.0 mg/L limit in the Canadian Guidelines for chloramines. The chlorine residual gradually declined from January through June and then increased through September following the chlorine dosage increases (Figure 7).

**Water Temperature.** The annual average water temperature for the entire distribution system was 12.7°C and was slightly higher (11.3°C) than the temperature of the water entering the water system. The average monthly temperature ranged from 6.6°C in February to 19.8°C in August (Table 5). The maximum daily water temperature of 22.5°C was reached in Victoria during the month of August.

#### 4.6. CENTRAL SAANICH

Nine sampling locations were used by the Water Department to monitor the bacteriological quality of the water in the Central Saanich distribution system. All but two of these locations were sampled bi-weekly. Two locations were sampled monthly.

##### 4.6.1. SAMPLE COLLECTION

During 2000, a total of 205 bacteriological samples were collected from the Central Saanich distribution system (Table 6).

##### 4.6.2. BACTERIA

**Total Coliforms.** None of the samples collected from the Central Saanich distribution system contained total coliforms (Table 6 and Figure 8)). Thus, Central Saanich complied with the 10% total coliform positive limit for all months of the year during 2000. This is similar to previous years.

**Fecal Coliforms.** No fecal coliform bacteria were observed in any of the samples collected from the Central Saanich distribution system (Table 6).

##### 4.6.3. CHLORINE RESIDUAL AND WATER TEMPERATURE

**Chlorine Residual.** The annual average chlorine residual for the Central Saanich distribution system was 0.78 mg/L (Table 6) and the monthly average residuals followed a similar pattern as the Greater Victoria Distribution System combined increasing gradually through the end of the year (Figure 8).

**Water Temperature.** The annual average water temperature in the Central Saanich distribution system was 12.7°C with monthly averages ranging between

Capital Regional District Water Department  
**2000 BACTERIOLOGICAL SUMMARY OF GREATER VICTORIA'S DRINKING WATER**

**Table 5. Bacterial quality of Greater Victoria's distribution system in 2000 (entire service area).**

Month	Samples Collected	Total Coliforms				TCBK Samples	FC Samples	HPC2D		Chlorine Residual Average mg/L Cl <sub>2</sub>	Water Temp Average °C
		Samples TC>0	Samples TC>0	Resamples TC>0	Samples TC>10			Samples Collected	Samples >500		
JAN	160	0	0.0%	0	0	0	0	84	0	0.57	6.9
FEB	161	0	0.0%	0	0	0	0	88	0	0.60	6.6
MAR	182	0	0.0%	0	0	0	0	92	1	0.64	7.9
APR	154	0	0.0%	0	0	0	0	84	0	0.63	10.3
MAY	179	0	0.0%	0	0	1	0	94	1	0.57	12.6
JUN	183	3	1.6%	0	0	0	0	98	0	0.56	15.8
JUL	171	0	0.0%	0	0	0	0	93	2	0.63	18.8
AUG	182	4	2.2%	0	0	3	0	97	0	0.61	19.8
SEP	178	0	0.0%	0	0	5	0	97	1	0.70	17.5
OCT	184	1	0.5%	0	0	1	0	67	1	0.68	14.9
NOV	175	0	0.0%	0	0	0	0	80	2	0.70	10.7
DEC	143	0	0.0%	0	0	0	0	69	0	0.74	8.0
<b>TOTAL</b>	<b>2052</b>	<b>8</b>	<b>0.4%</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>1043</b>	<b>8</b>	<b>0.63</b>	<b>12.7</b>

**Table 6.**

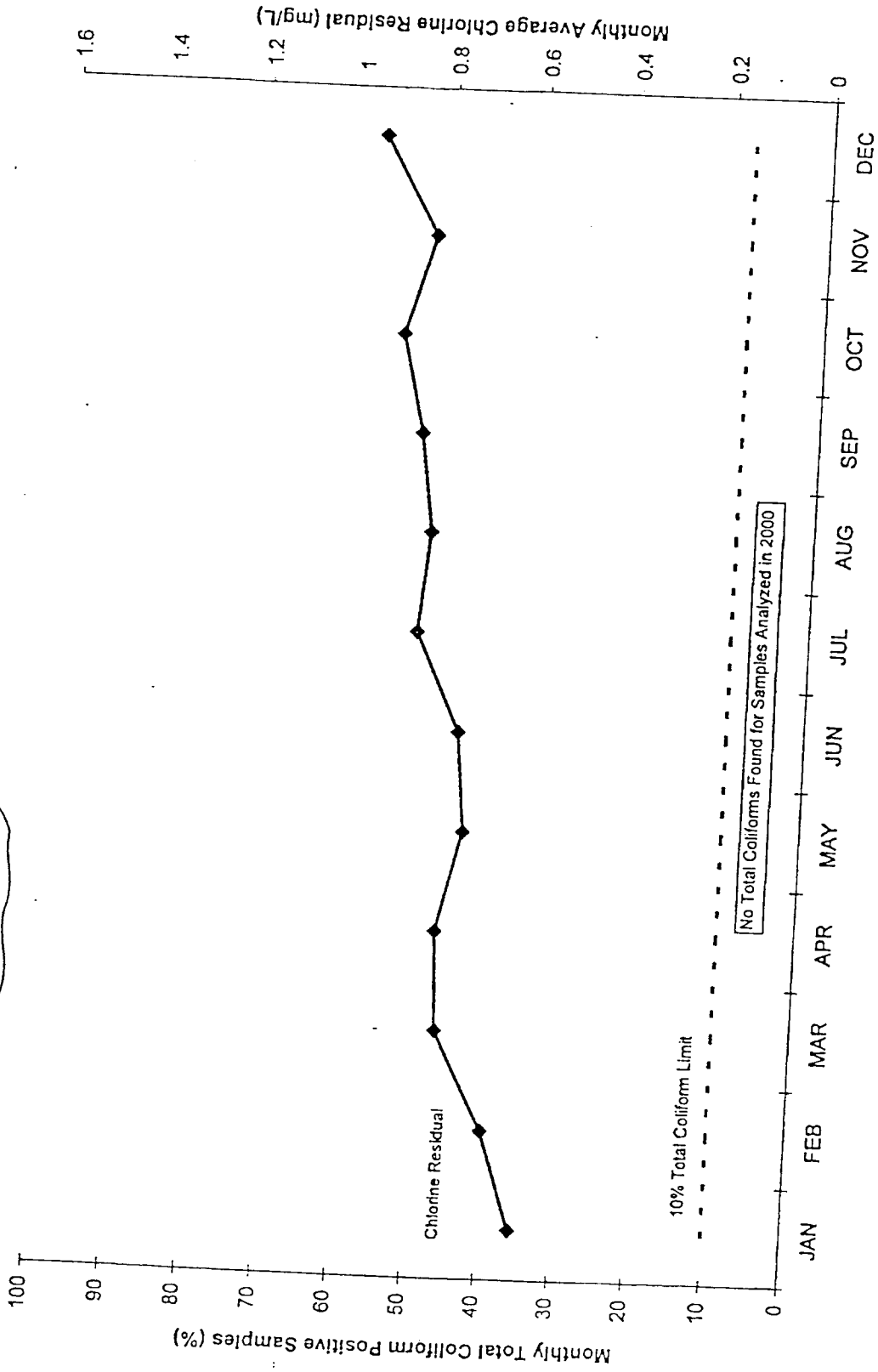
**Bacterial quality of Central Saanich's distribution system in 2000.**

Month	Samples Collected	Total Coliforms				TCBK Samples	FC Samples	HPC2D		Chlorine Residual Average mg/L Cl <sub>2</sub>	Water Temp Average °C
		Samples TC>0	Samples TC>0	Resamples TC>0	Samples TC>10			Samples Collected	Samples >500		
JAN	15	0	0.0%	0	0	0	0	7	0	0.57	7.0
FEB	14	0	0.0%	0	0	0	0	7	0	0.64	6.6
MAR	14	0	0.0%	0	0	0	0	7	0	0.75	7.5
APR	15	0	0.0%	0	0	0	0	8	0	0.76	9.7
MAY	20	0	0.0%	0	0	0	0	8	0	0.71	12.3
JUN	18	0	0.0%	0	0	0	0	8	0	0.73	15.3
JUL	18	0	0.0%	0	0	0	0	10	0	0.83	18.8
AUG	18	0	0.0%	0	0	0	0	10	0	0.81	19.7
AUG	18	0	0.0%	0	0	0	0	10	0	0.84	17.5
SEP	19	0	0.0%	0	0	0	0	10	0	0.84	17.5
OCT	19	0	0.0%	0	0	0	0	10	0	0.89	14.9
OCT	22	0	0.0%	0	0	0	0	6	0	0.89	14.9
NOV	18	0	0.0%	0	0	0	0	7	0	0.83	10.6
NOV	18	0	0.0%	0	0	0	0	7	0	0.83	10.6
DEC	14	0	0.0%	0	0	0	0	6	0	0.95	8.0
<b>TOTAL</b>	<b>205</b>	<b>0</b>	<b>0.0%</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>94</b>	<b>0</b>	<b>0.78</b>	<b>12.7</b>

TC = Total Coliforms, TCBK = Background colonies on Total Coliform test filter, FC = Fecal Coliforms  
 HPC2D = Heterotrophic Plate Count bacteria incubated for 2 days, Cl<sub>2</sub> = chlorine  
 > = Greater than, mg/L = milligrams per litre, °C = Degrees Celsius

Fig 8

Figure 8. Central Saanich - Total Coliforms and Chlorine Residual in 2000



Report to Don MacVicar, Environmental Health Officer, Health Canada, FAX 363-0179  
 G. Stewart Irwin, Manager, Water Quality Div., CRD Water Department

Station Description Sampling Point Location Code	Date	Time	Total Chlorine		Water Temp.		Total Coliforms		Fecal Coliforms		Hetero. Pfl. Cl.		Hetero. Pfl. Cl.		T.C. Background		Turbidity		Colour, True
			HACH DR 100	Field Test	mg/L as Cl <sub>2</sub>	FCL2T	WTEMP	TCMF	CFU/100 mL	FCMF	CFU/100 mL	FCMF	MF @ 35 C	MF @ 28 C	CFU/mL	HPC7D	CFU/100 mL	TCMFBK	
1217 Benvenuto Southside Quick-con. Metfbx blue lld CES-BR-08 <i>B-wood Bay / Tscathlp</i>	19-OCT-2001	13:10	1.05		13.9	0	0	0	0	0	L1	350	0	0	0	0	0	0	0
8161 Lochsike Drive QC in meter box <i>Tscathlp</i> CES-TU-01	17-OCT-2001	11:40	1.14		14.1	0	0	0	0	0	L1	60	0	0	0	0	0	0	0
E. Sooke Rd @ Rocky Pt Rd QC under metrvault lld <i>Seecher Bay</i> MET-PB-01	16-OCT-2001	10:55	1.28		12.8	0	0	0	0	0	1	50	0	0	0	0	0	0	0
1657 Barnett, PRV hoasbib under hatch <i>Seecher Bay</i> NOS-DP-02	19-OCT-2001	12:45	.08		14.2	0	0	0	0	0	1	2630	0	0	0	0	0	0	0
Sooke R. Rd. Pumphouse Continuous flow tap <i>T'souke</i> SOK-SR-01	18-OCT-2001	08:50	1.06		12.1	0	0	0	0	0	2	200	0	0	0	0	0	0	0

*Est/mrc*

Location Class: R11 HEALTH CANADA  
Report to Don MacVicar, Environmental Health Officer, Health Canada, FAX 363-0179  
G. Stewart Inwrn, Manager, Water Quality Div., CRD Water Department

Reporting Period: 09-SEP-2001 to 15-SEP-2001

Less than results of RE sample

Station Description Sampling Point Location Code	Date	Time	Total Chlorine		Water Temp.		Total Coliforms		Fecal Coliforms		Hetero. Pit. Ct.		Hetero. Pit. Ct.		T.C. Background	Turbidity	Colour, True	
			HACH DR 100	FCL2T	Field Test	Degrees Celcius	CFU/100 mL	TCMF	MEMBR. FILTRN	CFU/100 mL	MEMBR. FILTRN	CFU/100 mL	MF @ 35 C	MF @ 28 C				CFU/mL
Suggest @ Wallace hosebib on post CES-BR-07	10-SEP-2001	13:55	.94		18.3	0	0	0	0	0	0	0	0	0	0	0	0	0
Admirals meter vault red bx outside wall ESQ-ES-02	12-SEP-2001	08:57	.9		18.1	0	0	0	0	0	0	0	0	0	0	0	0	0
E. Sooke Rd @ Rocky Pt Rd QC under meter vault lid MET-PB-01	11-SEP-2001	12:00	1.41		17	RED	0	0	0	0	0	0	0	0	0	0	0	0
Sooke R. Rd. Pumphouse Continuous flow tap SOK-SR-01	11-SEP-2001	09:20	1.38		16.2	0	0	0	0	0	0	0	0	0	0	0	0	0
1528 Whiffen Spit Rd. green box @ meter SOK-WS-02	11-SEP-2001	10:36	.45		16.1	0	0	0	0	0	0	0	0	0	0	0	0	0
Craigtown meter vault gray box near door VIC-GL-01	10-SEP-2001	10:03	1.06		18.5	0	0	0	0	0	0	0	0	0	0	0	0	0

*Saanich Peninsula  
Footprint*

*Esquimalt/Songhees*

*Beach Bay*

*T'Saan-Ko*

*T'Saan-Ko I.R.#2*

*Esquimalt/Songhees*

EA

WEEKLY Analytical Report by Location Class

CRD WATER  
 Water Quality Int. Mon System  
 Inquiries at 474-9680  
 Location Class: R11 HEALTH CANADA  
 Reporting Period: 22-JUL-2001 to 28-JUL-2001

Report to Don MacVicar, Environmental Health Officer, Health Canada, FAX 363-0179  
 G. Stewart (w/in, Manager, Water Quality Div., CRD Water Department)

Station Description Sampling Point Location Code	Date	Time	Total Chlorine		Water Temp.		Total Coliforms		Fecal Coliforms		Hetero.Pil.CI.		Hetero.Pil.CI.		T.C. Background		Turbidity		Colour, True	
			HACH DR 100 mg/L as Cl <sub>2</sub>	FCLZT	Foaid Test	Degrees Cel's	WTEMP	TCMF	TCMF	FCMF	FCFU/100 mL	Membrm.Filtrn	CFU/100 mL	HPC7D	MF @ 35 C	MF @ 28 C	CFU/mL	CFU/100 mL		TCMFBK
1217 Benvenuto Southside Quick-con.Mettbx blue lid CES-BR-08	27-JUL-2001	13:15	1.03		18.5	0	0	0	0	0	0	430	0	0	0	0	0	0	0	0
8161 Lochside Drive QC in meter box CES-TU-01	25-JUL-2001	12:02	1.06		17.7	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0
E.Sooke Rd @ Rocky Pt Rd QC under manvatuit lid MET-PB-01	24-JUL-2001	11:23	.05		14.7	0	0	0	0	0	0	870	22	0	0	0	0	0	0	0
1657 Barrett, PRV hosebib under hatch NOS-DP-02	23-JUL-2001	12:23	.24		18.4	0	0	0	0	0	0	520	0	0	0	0	0	0	0	0
Sooke R. Rd. Pumphouse Continuous flow tap SOK-SR-01	24-JUL-2001	09:30	1.26		18.4	0	0	0	0	0	0	80	0	0	0	0	0	0	0	0

Remark Codes L Less than

Handwritten notes:  
 13:15  
 Sarnick Point  
 Tsawout  
 Sarnick Peninsula  
 Tsawout  
 Sarnick Peninsula  
 Tsawout

Handwritten signature: MF

Remark Codes RES RES Resusp. Special collectn

Station Description Sampling Point Location Code	Date	Time	Total Chlorine		Water Temp.		Fecal Coliforms		Hetero. PR. CL		T. C. Background		Turbidity
			HACH DR 100	Field Test	Membm. Filtrn	CFU/100 mL	MEMBR. FILTRN	CFU/100 mL	MEMBR. FILTRN	CFU/100 mL	MEMBR. FILTRN	CFU/100 mL	
1217 Benvenuto Southside Quick-con. Met/bx blue lid CES-BR-08	26-JUN-2001	12:55				15.8							
816+Loehsde Drive QC in meter box CES-TU-01						15.3							
E. Socke Rd @ Rocky Pt Rd QC under metalvalve lid MIET-PB-01 (Sanction 5/17						13.5							
1657 Bennett, PRV hose/bib under hatch NOS-DP-02						13.1							
Socks R. Rd, Pumphouse Continuous flow tap SOK-SR-01						14.5	RESO						

Station Description Sampling Point Location Code	Date	Time	Total Chlorine	Water Temp.	Fecal Coliforms	Hetero. PR. CL	T. C. Background	Turbidity	RES		NTU	TURB	TCU
									HPC2D	HPC7D			
1217 Benvenuto Southside Quick-con. Met/bx blue lid CES-BR-08	26-JUN-2001	12:55	1.02	15.8	0	0	0	0	0	430	0	0	0
816+Loehsde Drive QC in meter box CES-TU-01	27-JUN-2001	12:15	.81	15.3	0	0	0	0	0	60	0	0	0
E. Socke Rd @ Rocky Pt Rd QC under metalvalve lid MIET-PB-01 (Sanction 5/17	25-JUN-2001	13:55	.04	13.5	0	0	0	0	0	6	161	0	0
1657 Bennett, PRV hose/bib under hatch NOS-DP-02	25-JUN-2001	11:43	.02	13.1	1	0	0	0	0	27	268	0	0
Socks R. Rd, Pumphouse Continuous flow tap SOK-SR-01	26-JUN-2001	14:05	.02	14.5	RESO	0	0	0	0	630	298	0	0
1657 Bennett, PRV hose/bib under hatch NOS-DP-02	25-JUN-2001	12:17	.48	15.9	0	0	0	0	0	110	0	0	0
Socks R. Rd, Pumphouse Continuous flow tap SOK-SR-01	26-JUN-2001	08:33	1.21	15.3	0	0	0	0	0	50	0	0	0

Sanwick Ravine side  
Tsoontip

Tsoontip

MS

WEEKLY Analytic report by Location Class

Reporting Period: 01-JUL-2001 to 07-JUL-2001

Location Class: R11 HEALTH CANADA

Remark Codes: RES. RE-sample; Special collectn

Report to Don MacVicar, Environmental Health Officer, Health Canada, FAX 363-0179  
 G. Stewart Inchr, Manager, Water Quality Div., CRD Water Department

Station Description Sampling Point Location Code	Date	Time	Total Chlorine		Water Temp.		Fecal Coliforms		Hetero.Pti.Cl		T.C. Background		Turbidity		Colour, True	
			HACH DR 100	mg/L as Cl2	Field Test	Degrees Celcius	WTEMP	FCMF	FCFU/100 mL	MEMB.FILTRN	MF @ 95 C	MF @ 28 C	CFU/mL	HPC7D	TC/CFBK	NTU

Shuggett @ Wallace hosebib on post CES-BR-07	04-JUL-2001	13:40	1.09		17.7	0	0	0	2	120	0	0	0				
Admirals meter vault red bx, outside wall ESQ-ES-02	05-JUL-2001	08:26	1.17		17.7	0	0	0	2	0	0	0	0				
E. Sooker Rd @ Rocky Pt Rd QC under meter vault lid MET-PB-01	03-JUL-2001	11:35	0	.47	13.8	1	0	0	16	640	46	0					
Sooke R. Rd. Pumphouse Continuous flow tap SOK-SR-01	03-JUL-2001	09:10	1.1		17.1	0	0	0	2	180	0	0					
152B Whitten Spit Rd. green box @ meter SOK-WS-02	03-JUL-2001	10:00	.09		15.4	0	0	0			0	0					
Craigflower meter vault gray box near door VIC-GL-01	04-JUL-2001	09:25	1.35		20	0	0	0			0	0					

*Esquimalt/Songhees*

*ms*

CRD WATER  
 Water Quality In. Station System  
 Inquiries at: 474-9680

NO. 033

CRD WATER DEPT + 2503638129

10:50

07/17/01

0107410

CRD WATER

Water Quality Information System  
Inquiries at 474-9680

WEEKLY Analytical Report by Location Class

Location Class: R11 HEALTH CANADA

Page 1 of 2  
Date: 12-OCT-2001  
File: 701-15-16

Report to Don MacVicar, Environmental Health Officer, Health Canada, FAX 363-0178  
G. Stewart Irwin, Manager, Water Quality Div., CRD Water Department

Reporting Period: 30-SEP-2001 to 06-OCT-2001

Remark Codes

Station Description Sampling Point Location Code	Date	Time	Total Chlorine		Water Temp.		Total Coliforms		Fecal Coliforms		Hetero. Pfl. Ct.		Hetero. Pfl. Ct.		T.C. Background		Turbidity		Colour, True		
			HACH DR 100 mg/L as Cl <sub>2</sub>	FCLZT	Field Test	Degrees Celcius	WTEMP	TCMF	TCMU	Membrn. Filtrn CFU/100 mL	Membrn. Filtrn CFU/100 mL	FCMF	FCMU	MF @ 35 C CFU/mL	MF @ 28 C CFU/mL	HPC2D	HPC7D	TCMEBK	NTU	TURB	TCU
1217 Benvenuto Southside Quick-con. Metrbx blue lid CES-BR-08	03-OCT-2001	13:00	1.18		16.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8161 Lochside Drive QC in meter box CES-TV-01	03-OCT-2001	12:10	1.19		16.2	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0
E. Sooka Rd @ Rocky Pt Rd QC under manhole lid MET-FB-01	02-OCT-2001	11:42	.01		14.7	2	0	0	0	58	370	44									
Sooka R. Rd. Pumphouse Continuous flow tap SOK-SR-01	02-OCT-2001	09:42	1.26		14.1	0	0	0	0	1	20	0	0	0	0	0	0	0	0	0	0

*Benvenuto Bdy / Tsurkrip*

*Tsurkrip*

*Benvenuto Bdy*

*Tsurkrip*

NO. 452

CRD WATER DEPT + 2503630179

11:57

10/16/01

Assessment Study of Water and Wastewater Systems  
T'Sartlip First Nation, South Saanich IR No. 1

## Appendix E

# WASTEWATER TESTING RESULTS

(CHEMICAL/PHYSICAL/BACTERIOLOGICAL)

WITH COMPARISONS TO THE  
GUIDELINES FOR EFFLUENT QUALITY AND WASTEWATER  
TREATMENT AT FEDERAL ESTABLISHMENTS

N/A