

F I N A L R E P O R T

**AHOUSAHT
(MAAQTUSIIS VILLAGE)**

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

**ASSOCIATED
ENGINEERING**



**April
2002**

003353

Health Canada
Medical Services Branch
500-60 Front Street
Nanaimo, British Columbia
V9R 5H7

Ahousaht Band Administration
General Delivery
Ahousaht, British Columbia
V0R 1A0

February 7, 2000

Dear Chief and Council:

Subject: Bacteriological And Chemical Analysis- Community Drinking Water

Attached are the bacteriological and chemical laboratory analysis for your community drinking water.

The bacteriological samples were unsatisfactory. The clinic total coliforms exceeded the maximum level of 10 mg/l and the total plate count 100TPC. Cathy's Place lactose fermentors exceeded the maximum level of 2 and the total plate count of 100TPC. The Aeromonas spp.(total) included Aeromonas schubertii which is a potential enteric pathogen contributing to diahrea and abdominal gas. These results indicate inadequate disinfection and or point-source contamination. Therefore it is recommended that the free chlorine residual be obtained and maintained between 0.2 mg/l and 0.5 mg/l throughout the distribution system. The community drinking water should be boiled for 10 minutes prior to drinking until the free chlorine residual is achieved and three satisfactory samples are evident within 30 consecutive days.

The chemical analysis were in accordance with the Canadian Drinking Water Guidelines.

If you have any questions please call me at 250-754 4004.

Respectfully;

Joseph Charumski, C.P.H.I.(C)
Environmental Health Officer

c.c. Arlene Paul, CHR
Dr.Charmane Enns
Water Treatment Plant Operator

Health Canada
Medical Services Branch
Environmental Health Services
60 Front Street
Nanaimo, British Columbia
V9R 5H7

Chief and Council
Ahousaht Band Administration
General Delivery
Ahousaht, British Columbia
V0R 1A0

June 26, 2000

Dear Chief and Council;

Subject: Ahousaht Drinking Water Supply

On my recent visit to your community I met with Alec Dick to discuss the community's drinking water initiative. Also Mary MacKeown, CHN was in attendance. The following is a summary of our meeting and my visit.

At the meeting the drinking water boil advisory was discussed. Due to the past unsatisfactory bacteriological results of the drinking water, the cross connections within the distribution system and the lack of routine bacteriological analysis the drinking water boil advisory was recommended and is still in effect. Bacteriological samples were collected during my visit. The laboratory confirmed analysis were unsatisfactory (see attached report). The non coliform of the total coliform of 416 CFU/100 ml was above the recommended level of 200 CFU/100 ml. Satisfactory bacteriological samples are necessary, the colour and turbidity must be corrected and the trihalomethane level must be analysed prior to lifting the boil advisory.

A future plan to have a maintenance worker responsible for weekly bacteriological sampling was decided by Mr. Alec Dick. This will provide baseline data and aid in insuring the water is safe to drink. I had left Mr. Alec Dick water sampling bottles and had couriered 50 additional sample bottles to his office.

I visited the pump house where on reviewing the logbook I noted the colour and the turbidity had been above the recommended maximum levels (Guidelines for Canadian Drinking Water Quality) for some time. As well, at that time, the water leaving the pumphouse was discoloured. The following outlines the properties of colour and turbidity.

- Colour in drinking water is not directly associated with health and its maximum excepted level is 15 True Colour Units.

- Turbidity in water is caused by suspended matter, such as clay, silt finely divided organic and inorganic matter, soluble coloured organic compounds, plankton and other microscopic organisms. Control of turbidity in drinking water is important for both health and aesthetic reasons. Excessive turbidity detracts from the appearance of treated water and has been associated with unacceptable tastes and odours. Turbidity can serve as a source of nutrients for water borne bacteria, viruses and protozoa, which can be embedded in or adhere to particles in the raw water or become trapped within floc formed during water treatment; turbidity can thus interfere with the numeration of microorganisms in finished water, as microorganism may not be detectable or may be grossly underestimated by current detection methods. The adsorptive properties can also lead to a concentration of heavy metal ions and biocides in turbid waters. Turbidity can interfere with the disinfection processes and the maintenance of a chlorine residual. Turbidity has also been related to trihalomethane formation in chlorinated water. The maximum acceptable concentration for turbidity in water entering distribution systems has been set at 1 NTU.

Due to the presence of colour and turbidity in the drinking water it is strongly recommended that the entire water distribution system be assessed by a qualified engineer to correct any deficiencies within this system . The reservoir (dam) not being of sufficient size and the coagulating process in respect to the water's pH should be investigated.

A discussion with one water treatment plant operator had shown that training in confined space entry and the use of protective personal equipment was not given. Entering a confined space without training and the appropriate protective equipment may lead to serious injury or even death. Therefore it is strongly recommended that training in confined space entry and use of personal protective equipment including first aid be given as soon as possible.

If you have any questions please call me at 250-754-4004.

Respectfully;

Joseph Charumski, C.P.H.I.(C)
Environmental Health Officer

c.c. Alec Dick, Maintenance
Mary MacKeown, CHN
Dr. Henderson, MHO
Dan Higashitani, DIAND
Peter Mazey, SEHO
Arlene Paul, CHR

Health Canada
Medical Services Branch
First Nations and Inuit Health
60 Front Street
Nanaimo, British Columbia
V9R 5H7

Ahousaht Band Administration
General Delivery
Ahousaht, British Columbia
V0R 1A0

July 25, 2000

Dear Chief and Council;

Subject: Ahousaht Alternative Drinking Water Supply

It has come to my attention, today, that the water supplied from Ahousaht General Store is from a surface source (creek) which is not treated. This was confirmed by Hugh Clark, Ahousaht General Store. This water is used as drinking while corrective measures are being carried out at the water treatment plant.

All drinking water surface sources should be treated prior to drinking. The water, in this case, which is taken from the Ahousaht General Store and stored in a water tank at the dock should be boiled for 10 minutes at home prior to drinking. In addition, the water storage tank should be cleaned and disinfected with bleach prior to each filling.

The consumer should insure that the water is boiled and stored in a clean sealed container in the refrigeration unit.

It was reported that the elders, single moms and the sick have been receiving approved bottled water from the band. This is commendable on the part of the band, however a less burdensome approach on community members would be to provide bottled water to the entire community.

If there are any questions please call me at 250 754 4004.

Respectfully;

Joseph Charumski, C.P.H.I.(C)
Environmental Health Officer

c.c. Mary Mackeown, CHN
Alec Dick, Maintenance
Peter Mazey, SEHO
Dan Higashitani, DIAND
Arlene Paul, CHR

Health Canada
Medical Services Branch
First Nations and Inuit Health
60 Front Street
Nanaimo, B.C., V9R 5H7

Chief and Council
Ahousaht Band Administration
General Delivery
Ahousaht, B.C., V0R 1A0

July 31, 2000

Dear Chief and Council;

Subject: Ahousaht Drinking Water Supply

Continual monitoring of the community's drinking water system was carried out by the undersigned on July 26, 2000.

At that time, samples were collected from the watershed, the water treatment plant (inlet and outlet), and the clinic. The samples will be analysis for algae , bacteriological (total and faecal coliform) and Trihalomethanes (THM). The results will be distributed to you on our receipt. Further samples are required, THM s, colour, turbidity, and bacteriological to determine the status of the water quality and to determine if it is safe to drink. The alternative source (Ahousaht General Store) should be boiled prior to use or provide approved bottled water until the community's water supply is deemed fit to drink. Mr. Alec Dick will continue to monitor and sample the water.

The water at the clinic had a "Swampy" odour, especially from the hot water. It is recommended that all hot water tanks in the community be flushed. In addition, since the filters had just finished being cleaned the water distribution should be super chlorinated and flushed again.

The water tank on the main dock which is holding the water from Ahousaht General Store had no lid. This holding container should be sealed to protect the water from external contamination , ie., insects and flies.

I will visit the community within a few weeks to further assess the situation.

If you have any questions please call me at 250-754-40004.

Respectfully,

Joseph Charumski, C.P.H.I.(C)
Environmental Health Officer

c.c. Alec Dick, Maintenance
Mary Mackeown, CHN
Pam Frank, Holistic Health
Dr. Henderson, MHO
Peter Mazey, SEHO
Dan Higashitani, DIAND

Health Canada
First Nations and Inuit Health
Environmental Health Services
60 Front Street
Nanaimo, B.C., V9R 5H7

Chief and Council
Ahousaht Band Administration
General Delivery
Ahousaht, B.C., V0R 1A0

August 1, 2000

Dear Chief and Council;

Subject: Bacteriological Analysis-Ahousaht Drinking Water Supply

Attached are the bacteriological analysis of your community's drinking water.

The water leaving the water treatment plant and the water sampled from the clinic were unsatisfactory when assessing the whole system. The noncoliform total coliform exceeded the recommended maximum level of 200 CFU/100ml.

The water from the water tank dock was unsatisfactory. It exceeded all parameters established in the Guidelines for Canadian Drinking Water Quality. The total coliform should not exceed 10 CFU/100 ml, noncoliform total coliform should not exceed 200 CFU/100 ml and the faecal coliform should not exceed 0 CFU/100 ml. Again this water must be boiled prior to drinking as recommended in previous reports.

Algae identification awaiting laboratory analysis. Will distribute results on our receipt.

Further sampling is required to determine the water quality and to help obtain healthy water for the community. Mr. Alec Dick is organizing the sampling regime.

If you have any questions please call me at 250 754 4004.

Respectfully;

Joseph Charumski, C.P.H.I.(C)
Environmental Health Officer

c.c. Alec Dick, Maintenance
Mary MacKweon, CHN
Peter Mazey, SEHO
Ian Mclean, REHO
Dr. Henderson, MHO
Dan Higashitani, DIAND
Arlene Paul, CHR
Pam Frank, Holistic Health

Health Canada
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60 Front Street
Nanaimo, B.C., V9R 5H7

Chief and Council
Ahousaht Band Administration
General Delivery
Ahousaht, B.C., V0R 1A0

August 10, 2000

Chief and Council;

Subject: Algae Identification/ Trihalomethanes Levels Ahousaht Community Drinking Water

Attached are the M.B. Research Labs. results for algae identification and Trihalomethanes levels for your community's drinking water supply.

In respect to the algae, the primary organisms constituting the bloom is not known to have acute toxicity, as confirmed with Wendy Riggs, Senior Microbiologists, M.B. Research Labs. This algae has been associated with the nitrogen content in water sources. As the nitrogen levels lower so should the algae. Certain algae species, however could instill an off taste and an odour to the water. Filtration and chlorination should aid in the removal of the algae. It is recommended that a free chlorine residual of 0.3 mg/l be obtained and maintained throughout the water distribution system.

The Trihalomethanes were in accordance with the Guidelines for Canadian Drinking Water Quality, 6th edition, 1996.

The boil advisory is still in effect until there are three sets of satisfactory bacteriologicals within a thirty day period. Our department received one set of satisfactory bacteriological sampled by Stantec Engineering and are awaiting the results from samples taken today and samples that are to be taken tomorrow. Ongoing bacteriological sampling of the water distribution system is crucial, as it is with any municipal /community drinking water system, and therefore must be conducted on a routine basis.

If you have any questions please call me at 250 754 4004.

Respectfully;

Joseph Charumski, C.P.H.I.(C)
Environmental Health Officer

c.c. Alec Dick, Maintenance
MaryMackweon, CHN
Peter Mazey, SEHO
Ian Mclean, REHO
Dr. Henderson, MHIO
Dan Higashitani, DIAND
Irfan Gehley, DIAND
Tony Brcic, Stanec
Arlene Paul, CHR
Pam Frank, Holistic Health

First Nations and Inuit Health Branch
201D - 60 Front St
Nanaimo BC, V9R 5H7
(250) 754-4004
Fax: (250) 754-0424

September 15, 2000

Chief and Council
Ahousaht First Nation
General Delivery
Ahousaht BC, V0R 1A0

RE: Boil Water Advisory

Just an update on the drinking water supply, as of this date, the boil water advisory is still in effect. From the results sent to me, it appears samples are being taken on a weekly basis. Results are as follows:

Date	Results	Comments
22-Aug-00	8 of 9 samples with extremely high non-coliform (NC) counts over the maximum allowable by the Guidelines for Canadian Drinking Water Quality (GCDWQ)	Unsatisfactory
28-Aug-00	2 of 9 samples (#3 & 5) with extremely high NC counts	Unsatisfactory
30-Aug-00	Sample 5 (R. Atleo) had high NC counts	Unsatisfactory
6-Sep-00	All results met GCDWQ guidelines	Satisfactory
11-Sep-00	Sample 1 [REDACTED] had extremely high counts for Total, Fecal and Non-coliforms s.19(1)	Unsatisfactory

GCDWQ guidelines have maximum acceptable concentrations of 10 Total coliforms per 100 ml sample, 200 Non-coliforms per 100 ml sample and no Fecal coliforms should ever be found in a drinking water sample.

Samples taken from the pump house have been meeting the criteria as set out from the GCDWQ since 28 August, 2000. It appears the houses may be recontaminated from the distribution system.

Recommendations that may remedy the situation would be:

- to put a stand pipe at the end of the distribution lines to prevent stagnant water from accumulating at the end of the lines. Another way to prevent stagnant water would be to loop the system. This would ensure water does not sit at the end of the pipes for long periods of time and allow the re-growth of bacteria.

- please ensure there is a residual chlorine (free available chlorine) concentration of 1.0 ppm at the end of the lines. This will also prevent the growth of bacteria within the distribution system.
- to pig the system. Deposits can accumulate in the water lines and bacteria can harbour within or behind these deposits and build up within the system.
- the old pump house should be disconnected to prevent contamination from the cross connection.

If you have any questions or concerns, or care to discuss the situation further, feel free to call me between 8:00 a.m. and 4:00 p.m., Monday to Friday at the above phone number.

Sincerely,

J. Melissa Daniels, B. Sc., B. Tech.
Environmental Health Officer

cc Maintenance
Water Plant Operators
Public Works
CHR
CHN

First Nations and Inuit Health Branch
 201D - 60 Front St
 Nanaimo BC, V9R 5H7
 (250) 754-4004
 Fax: (250) 754-0424

September 18, 2000

Chief and Council
 Ahousaht First Nation
 General Delivery
 Ahousaht BC, V0R 1A0

RE: Boil Water Advisory - Amendment of letter dated September 15, 2000

Just an update on the drinking water supply, as of this date, the boil water advisory is still in effect. From the results sent to me, it appears samples are being taken on a weekly basis. Results are as follows:

Date	Results	Comments
22-Aug-00	8 of 9 samples with extremely high non-coliform (NC) counts over the maximum allowable by the Guidelines for Canadian Drinking Water Quality (GCDWQ)	Unsatisfactory
28-Aug-00	2 of 9 samples (#3 & 5) with extremely high NC counts	Unsatisfactory
30-Aug-00	Sample 5 (R. Atleo) had high NC counts	Unsatisfactory
6-Sep-00	All results met GCDWQ guidelines	Satisfactory
11-Sep-00	Sample 1 () had extremely high counts for Total, Fecal and Non-coliforms s.19(1)	Unsatisfactory

GCDWQ guidelines have maximum acceptable concentrations of 10 Total coliforms per 100 ml sample, 200 Non-coliforms per 100 ml sample and no Fecal coliforms should ever be found in a drinking water sample.

Recommendations that may remedy the situation would be:

- to put a stand pipe at the end of the distribution lines to prevent stagnant water from accumulating at the end of the lines. Another way to prevent stagnant water would be to loop the system. This would ensure water does not sit at the end of the pipes for long periods of time and allow the re-growth of bacteria.
- please ensure there is a residual chlorine (free available chlorine) concentration of **0.2 - 0.5 ppm** at the end of the lines. This will also prevent the growth of bacteria within the distribution system.

- to pig the system. Deposits can accumulate in the water lines and bacteria can harbour within or behind these deposits and build up within the system.
- the old pump house should be disconnected to prevent contamination from the cross connection.

Just a reminder, when taking samples, please remove the aerator from the tap and the cap of the bottle should not be touched or put face down on the counter while taking the sample. Also ensure the water is purged from the system by running the cold water for approximately two minutes prior to taking the sample.

If you have any questions or concerns, or care to discuss the situation further, feel free to call me between 8:00 a.m. and 4:00 p.m., Monday to Friday at the above phone number.

Sincerely,

J. Melissa Daniels, B. Sc., B. Tech.
Environmental Health Officer

cc Maintenance
Water Plant Operators
Public Works
CHR
CHN

First Nations and Inuit Health Branch
201D - 60 Front St
Nanaimo BC, V9R 5H7
(250) 754-4004
Fax: (250) 754-0424

October 13, 2000

Chief and Council
Ahousaht First Nations
General Delivery
Ahousaht BC, V0R 1Z0

RE: Drinking Water Boil Advisory

Please be advised the boil advisory is still in effect at this time. Results from analysis of the quality of the drinking water have been fluctuating between being satisfactory and unsatisfactory.

s.19(1)

The last set of samples that did not meet the guidelines was on September 27, 2000. The sample from [REDACTED] had more than 500 Non-coliforms per 100 ml sample. The limit is 200 Non-coliforms per 100 ml sample. Since then, the results have been satisfactory. One more good result next week shall take your community off the boil water advisory.

I will be arriving in your community to do house inspections on Monday, October 16, 2000 at approximately 1:00 p.m. If you receive another satisfactory result next week while I am in your community, I can remove the advisory at that time.

If you wish to meet with me while I am in the Community next week that can be arranged. What are your procedures when a sample contains a high number of Non-coliforms, Total Coliforms or faecal Coliforms? Do you flush out the system? Is the chlorine residual being tested at the same time as you take the sample from the houses?

These are all questions that need to be addressed next week. Feel free to call me anytime at (250) 754-4004 between 8:00 a.m. and 4:00 p.m. Monday to Fridays, or on my cell at (250) 741-7620.

Sincerely,

J. Melissa Daniels, B. Sc., B. Tech.
Environmental Health Officer

cc CHR
CHN
Maintenance
Plant Treatment Operators

Page(s) 003366 to\à 003373

Is(are) under consultation

E4380-4-659

D Fyfe

kf

CHEMICAL ANALYSIS REPORT

Date: INTERIM

ASL File No. M1144

Report On: Water Analysis
For Joe Charumaki, EHO

Report To: Health Canada - OHSA (Pacific)
#510 - 1230 Government Street
Victoria, BC
V8W 3Y2

Attention: Mr. Peter Mazey, Senior E.H.O.

Received: August 21, 2000

'01 DEC 21 AM 9:55

ASL ANALYTICAL SERVICE LABORATORIES LTD.

per:

Joanna Patrick, B.Sc. - Project Chemist

Can Dang, B.Sc. - Project Chemist

cc: Health Canada, Nanalino
Mr. Joe Charumaki, E.H.O.

REMARKS

File No. M1144

The water as represented by the samples submitted met the Canadian Drinking Water Guidelines for all parameters analysed. See the attached guidelines or contact ASL if you require any additional information.

DRAFT

RESULTS OF ANALYSIS - Water

File No. M1144

Sample ID	House #133
Sample Date	Ahousaht 00 08 15

Physical Tests

Colour	(CU)	<5
Conductivity	(umhos/cm)	200
Total Dissolved Solids		121
Hardness	CaCO3	87.4
pH		7.89
Turbidity	(NTU)	0.2

Dissolved Anions

Alkalinity-Total	CaCO3	68
Chloride	Cl	5.6
Fluoride	F	<0.02
Sulphate	SO4	22

Nutrients

Nitrate Nitrogen	N	<0.1
Nitrite Nitrogen	N	<0.1

Total Metals

Aluminum	T-Al	0.030
Arsenic	T-As	0.0003
Barium	T-Ba	0.017
Boron	T-B	<0.05
Cadmium	T-Cd	<0.0002
Calcium	T-Ca	33.8
Chromium	T-Cr	<0.001
Copper	T-Cu	0.016
Iron	T-Fe	<0.03
Lead	T-Pb	<0.001
Magnesium	T-Mg	0.75
Manganese	T-Mn	0.002
Mercury	T-Hg	<0.00005
Potassium	T-K	0.50
Selenium	T-Se	<0.001
Sodium	T-Na	4.60
Uranium	T-U	0.00001
Zinc	T-Zn	0.007

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. M1144

Sample ID	Ahousaht Clinic	Ahousaht Store
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Sample Date		
-------------	--	--

Halogenated Volatiles

Bromodichloromethane	0.0066	0.0064
Bromoform	<0.0005	<0.0005
Chloroform	0.0539	0.0521
Dibromochloromethane	<0.0005	<0.0005
Total Trihalomethanes	0.060	0.058

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

DRAFT

Page 3

REGULATORY CRITERIA

File No. M1144

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	1, 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	
Total Metals				
Arsenic	T-As	-	0.025 mg/L	6
Barium	T-Ba	-	1.0 mg/L	
Boron	T-B	-	5.0 mg/L	6
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, 7
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
Uranium	T-U	-	0.10 mg/L	
Zinc	T-Zn	-	5.0 mg/L	1, 3
Halogenated Volatiles				
Total Trihalomethanes		-	0.1 mg/L	6, 8

- 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.
- 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 Interim Maximum Acceptable Concentration (IMAC).
- 7 First drawn water may be high; flush system before sampling (MAC).
- 8 Total Trihalomethane limit expressed as a running annual average of quarterly samples (IMAC).

Page 4

FAX



FAX

analytical service laboratories ltd
SPECIALISTS IN ENVIRONMENTAL CHEMISTRY
1968 Triumph Street, Vancouver, B.C. V5L 1K5
Telephone (604) 253-4188
Fax (604) 253-6700

Attention: **Joe Charumski**
Company: Health Canada - OHSa (Pacific)
Fax #: 12507540424

From: Joanne Patrick
Date: Monday September 18, 2000

The number of pages in this transmission (including this page) is: 6

Regarding:

Hello,

Here are the results for the samples received August 21.

Regards,
Joanne

If you did not receive all the pages of this fax, please contact us at (604) 253-4188

CHEMICAL ANALYSIS REPORT

Date: INTERIM
ASL File No. L9966
Report On: Water Analysis
Report To: Public Works / Gov't Serv. Canada
450 - 1550 Alberni St.
Vancouver, BC
V6G 3C5
Attention: Mr. Danny Higashitani, Water Treatment Engineer
Received: August 15, 2000

ASL ANALYTICAL SERVICE LABORATORIES LTD.
per:

Scott P. Hoekstra, B.Sc. - Project Chemist
Heather A. Ross, B.Sc. - Project Chemist

RESULTS OF ANALYSIS - Water

File No. L9968

Sample ID	Raw Water	Primary Lime Stone	Plate Settler Influent	Plate Settler Effluent	Sand filter Effluent
Sample Date	00 08 13	00 08 13	00 08 13	00 08 13	00 08 13

Physical Tests

Colour (CU)	80	86	0	0	5
Conductivity (umhos/cm)	54	-	-	-	-
Total Dissolved Solids	62	-	-	-	-
Hardness CaCO ₃	17.7	-	-	-	-
pH	6.89	7.92	7.39	7.30	7.15
Total Suspended Solids	7	4	10	8	<3
Turbidity (NTU)	4.3	2.0	3.1	1.8	0.7

Dissolved Anions

Alkalinity-Total	CaCO ₃	18	76	55	67	81
Chloride	Cl	3.5	-	-	-	-
Fluoride	F	<0.02	-	-	-	-
Sulphate	SO ₄	<1	-	-	-	-

Nutrients

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

Bacteriological Tests

Coliform Bacteria - Fecal		<2	-	-	-	<1
Coliform Bacteria - Total		25	-	-	-	<1
Heterotrophic Plate Count ¹		2100	-	-	-	550

< = Less than the detection limit indicated.

Results are expressed as milligrams per litre except where noted.

Coliform results are expressed as Colony Forming Units (CFU) per 100 mL.

Coliform results are expressed as Most Probable Number (MPN) per 100 mL.

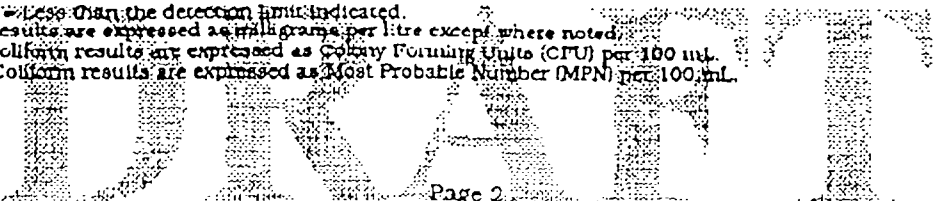
HPC results are expressed as Colony Forming Units (CFU) per mL.

RESULTS OF ANALYSIS - Water

File No. L9966

Sample ID		Raw Water	Primary Lime Stone	Matc Settler Influent	Matc Settler Effluent	Sand filter Effluent
Sample Date		00 08 15	00 08 15	00 08 15	00 08 15	00 08 15
Total Metals						
Aluminum	T-Al	0.185	0.134	2.28	0.66	0.032
Arsenic	T-As	0.0012	0.0010	-	-	-
Barium	T-Ba	0.003	0.001	-	-	-
Boron	T-B	<0.05	<0.05	-	-	-
Cadmium	T-Cd	<0.0002	<0.0002	-	-	-
Calcium	T-Ca	3.96	28.6	-	-	-
Chromium	T-Cr	<0.001	<0.001	-	-	-
Copper	T-Cu	0.005	0.001	-	-	-
Iron	T-Fe	3.95	3.15	1.50	0.53	<0.03
Lead	T-Pb	0.001	<0.001	-	-	-
Magnesium	T-Mg	1.00	1.03	-	-	-
Manganese	T-Mn	0.309	0.414	-	-	-
Mercury	T-Hg	<0.00005	<0.00005	-	-	-
Potassium	T-K	0.61	0.61	-	-	-
Selenium	T-Se	<0.001	<0.001	-	-	-
Sodium	T-Na	2.94	2.92	-	-	-
Uranium	T-U	0.00001	0.00002	-	-	-
Zinc	T-Zn	0.088	0.011	-	-	-
Dissolved Metals						
Aluminum	D-Al	0.008	0.092	0.053	0.054	0.018
Iron	D-Fe	1.91	2.12	<0.03	<0.03	<0.03

<= Less than the detection limit indicated.
 Results are expressed as milligrams per litre except where noted.
 Coliform results are expressed as Colony Forming Units (CFU) per 100 mL.
 Coliform results are expressed as Most Probable Number (MPN) per 100 mL.



RESULTS OF ANALYSIS - Water

File No. L9966

Sample ID	Raw Water	Primary Lime Stone	Plant Secondary Influent	Sand Filter Effluent	
Sample Date	00 08 15	00 08 15	00 08 15	00 08 15	
Organic Parameters					
Total Organic Carbon	C	2.4	10.4	8.8	4.4
UV Absorbance*		0.526	-	-	0.078

< = less than the detection limit indicated.
Results are expressed as milligrams per litre except where noted.
Coliform results are expressed as Colony Forming Units (CFU) per 100 mL.
*Coliform results are expressed as Most Probable Number (MPN) per 100 mL.
*UV Absorbance results are expressed as absorbance per centimeter.

DRAFT

RESULTS OF ANALYSIS - Water

File No. L9968

Sample ID	Treated Water	Distrib. System Band Off	Anderson Creek
Sample Date	00 08 15	00 08 15	00 08 15
Physical Tests			
Colour (CU)	<3	<3	-
Conductivity (umhos/cm)	216	216	-
Total Dissolved Solids	123	124	-
Hardness CaCO3	89.0	86.2	-
pH	7.94	7.80	7.95
Total Suspended Solids	<3	<3	-
Turbidity (NTU)	0.3	0.4	2.3
Dissolved Anions			
Alkalinity-Total CaCO3	70	60	-
Chloride Cl	5.2	5.7	-
Fluoride F	<0.02	<0.02	-
Sulphate SO4	22	22	-
Nutrients			
Nitrate Nitrogen N	<0.1	<0.1	-
Nitrite Nitrogen N	<0.1	<0.1	-
Bacteriological Tests			
Coliform Bacteria - Fecal	<1	<1	-
Coliform Bacteria - Total	<1	<1	-
Heterotrophic Plate Count	0	0	-

< = Less than the detection limit indicated.
 Results are expressed as milligrams per litre except where noted.
 Coliform results are expressed as Colony Forming Units (CFU) per 100 ml.
 HPC results are expressed as Colony Forming Units (CFU) per ml.

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RESULTS OF ANALYSIS - Water

File No. L9968

Sample ID	Treated Water	Distrib. System
Sample Date	00 08 13	Band Off
		00 08 13

Total Metals

Aluminum	T-Al	0.018	0.025
Arsenic	T-As	0.0003	0.0003
Barium	T-Ba	0.017	0.017
Boron	T-B	<0.03	<0.03
Cadmium	T-Cd	<0.0002	<0.0002
Calcium	T-Ca	34.4	33.3
Chromium	T-Cr	<0.001	<0.001
Copper	T-Cu	<0.001	0.003
Iron	T-Fe	<0.03	<0.03
Lead	T-Pb	<0.001	<0.001
Magnesium	T-Mg	0.75	0.74
Manganese	T-Mn	<0.001	0.003
Mercury	T-Hg	<0.00005	<0.00005
Potassium	T-K	0.52	0.52
Selenium	T-Se	<0.001	<0.001
Sodium	T-Na	3.30	4.74
Uranium	T-U	0.00001	0.00001
Zinc	T-Zn	<0.003	0.011

Dissolved Metals

Aluminum	D-Al	0.025	0.026
Iron	D-Fe	<0.03	<0.03

Halogenated Volatiles

Bromodichloromethane	-	0.0079
Bromoform	-	<0.0005
Chloroform	-	0.0331
Dibromochloromethane	-	0.0006

Haloacetic Acids

Bromoacetic Acid	-	<0.002
Bromochloroacetic Acid	-	0.002
Bromodichloroacetic Acid	-	0.002
Chloroacetic acid	-	<0.02
Dibromoacetic Acid	-	<0.002
Dibromochloroacetic Acid	-	<0.002
Dichloroacetic Acid	-	0.018
Tribromoacetic Acid	-	<0.002
Trichloroacetic Acid (TCA)	-	0.022

< = Less than the detection limit indicated.
 Results are expressed as milligrams per litre except where noted.
 Coliform results are expressed as Colony Forming Units (CFU) per 100 mL.

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RESULTS OF ANALYSIS - Water

File No. L9908

Sample ID	Treated Water	Distrib. System Band Off	Anderson Creek
Sample Date	00 08 13	00 08 13	00 08 13
Organic Parameters			
Total Organic Carbon	C 3.2	2.0	2.7
UV Absorbance			

< = Less than the detection limit indicated.
 Results are expressed as milligrams per litre except where noted.
 Coliform results are expressed as Colony Forming Units (CFU) per 100 mL.
 UV Absorbance results are expressed as absorbance per centimeter.

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Appendix 1 - QUALITY CONTROL - Replicates

File No. L9968

Water		Sand Filter Effluent 00 08 13	Sand Filter Effluent QC # 208221
Physical Tests			
Colour	(CU)	5	5
pH		7.15	7.21
Total Suspended Solids		<3	<3
Turbidity	(NTU)	0.7	0.7
Dissolved Anions			
Alkalinity-Total	CaCO ₃	51	50
Bacteriological Tests			
Heterotrophic Plate Count		350	470
Total Metals			
Aluminum	T-Al	0.032	0.030
Iron	T-Fe	<0.03	<0.03
Dissolved Metals			
Aluminum	D-Al	0.010	0.012
Iron	D-Fe	<0.03	<0.03
Organic Parameters			
Total Organic Carbon	C	4.4	4.5
UV Absorbance		0.078	0.080

< = Less than the detection limit indicated.

Results are expressed in milligrams per litre except where noted.
Coliform results are expressed as Colony Forming Units (CFU) per 100 mL.

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Appendix 2 - REGULATORY CRITERIA

File No. L9968

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	1, 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	
Microbiological Tests					
Coliform Bacteria - Fecal		-	0		6
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
Uranium	T-U	-	0.10	mg/L	
Zinc	T-Zn	-	5.0	mg/L	1, 8

- 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.
- 4 1 NTU maximum allowed for water entering distribution systems.
- 5 There may be laxative effect in some individuals when sulphate levels exceed 500 mg/L.
- 6 No sample should contain more than 10 organisms per 100 mL and no consecutive samples should be positive (MAC).
- 7 Interim Maximum Acceptable Concentration (IMAC).
- 8 First draw water may be high, flush system before sampling (MAC).

Appendix 2 - REGULATORY CRITERIA

File No. L9968

Health Canada

Guidelines for Canadian Drinking Water Quality, Sixth Ed., 1990.
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>			
Iron D-Fc	-	0.3 mg/L	1

1 Aesthetic Objective (AO) (taste, odour, appearance, etc.)

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Appendix 3 - METHODOLOGY

File No. L9968

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

Colour in Water

This analysis is carried out using procedures adapted from APHA Method 2120 "Color". Colour (true colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.

Recommended Holding Time:

Sample: 2 days

Reference: APHA

For more detail see ASL "Collection & Sampling Guide"

Conductivity in Water

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

Recommended Holding Time:

Sample: 28 days

Reference: APHA

For more detail see ASL "Collection & Sampling Guide"

Solids in Water

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) and total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter. TDS is determined by evaporating the filtrate to dryness at 100 degrees celsius. TSS is determined by drying the filter at 104 degrees celsius. Total solids are determined by evaporating a sample to dryness at 104 degrees celsius. Fixed and volatile solids are determined by igniting a dried sample residue at 550 degrees celsius.

Recommended Holding Time:

Sample: 7 days

Reference: APHA

For more detail see ASL "Collection & Sampling Guide"

Appendix 3 - METHODOLOGY (cont'd)

File No. L9968

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.

pH in Water

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

Recommended Holding Time:

Sample: 2 hours

Reference: APHA

For more detail see ASL "Collection & Sampling Guide"

Turbidity of Water

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

Recommended Holding Time:

Sample: 2 days

Reference: APHA

For more detail see ASL "Collection & Sampling Guide"

Alkalinity in Water by Colourimetry

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

Recommended Holding Time:

Sample: 14 days

Reference: APHA

For more detail see ASL "Collection & Sampling Guide"

Appendix 3 - METHODOLOGY (cont'd)

File No. L9966

Dissolved Anions in Water by Ion Chromatography

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions are determined by filtering the sample through a 0.45 micron membrane filter and injecting the filtrate onto a Dionex Ionpac AG12A ion exchange column with a carbonate-bicarbonate eluent stream. Anions determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

Recommended Holding Time:

Sample: 28 days (bromide, chloride, fluoride, sulphate)

Sample: 2 days (nitrate, nitrite)

Reference: APHA and EPA

For more detail see ASL "Collection & Sampling Guide"

Fluoride in Water

This analysis is carried out using procedures adapted from APHA Method 4500-F "Fluoride". Fluoride is determined using a selective ion electrode.

Recommended Holding Time:

Sample: 28 days

Reference: APHA

For more detail see ASL "Collection & Sampling Guide"

Coliform Bacteria in Water by Membrane Filtration

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is determined by colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation of the filter with the appropriate growth medium. Positive results require further testing (up to an additional 48 hours) to confirm and quantify the total and fecal coliform. This method is used for non-turbid water with a low background bacteria level.

Recommended Holding Time:

Sample: 1 day

Reference: APHA

For more detail see ASL "Collection & Sampling Guide"

Appendix 3 - METHODOLOGY (cont'd)

File No. L9966

Heterotrophic Plate Count in Water

This analysis is carried out using procedures adapted from APHA Method 9215 "Heterotrophic Plate Count". Heterotrophic plate count (standard plate count) is determined by colony counting using the pour plate method with a 48 hour incubation period. The test measures colonies formed by heterotrophic bacteria.

Recommended Holding Time:

Sample: 1 day

Reference: APHA

For more detail see ASL "Collection & Sampling Guide"

Metals in Water

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 20th Edition 1998 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, using either hotplate or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by atomic absorption/emission spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 8010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Recommended Holding Time:

Sample: 6 months

Reference: EPA

For more detail see: ASL "Collection & Sampling Guide"

Mercury in Water

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 20th Edition 1998 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 procedure involves a cold oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic absorption spectrophotometry (EPA Method 7470A/7471A).

Appendix 3 - METHODOLOGY (cont'd)

File No. L9968

Recommended Holding Time:

Sample: 28 days
Reference: EPA
For more detail see: ASL "Collection & Sampling Guide"

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 ASL "Collection & Sampling Guide"

UV Absorbance

The water samples are filtered through 0.45µm membrane filter paper and the filtrate buffered to pH 7.0. The absorbance is measured at 254nm on a UV/VIS spectrophotometer using deionized/distilled water as the reference (zero point).

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

Appendix 3 - METHODOLOGY (cont'd)

File No. L9968

Reference: BCMELP
For more detail see ASL "Collection & Sampling Guide"

Haloacetic acids in Water

This analysis is based on US EPA Method 552 (Environmental Protection Agency, 1990) and Standard Methods for the Examination of Water and Wastewater Method 6251 (American Public Health Association, 1995). An aliquot of the water sample is acidified and extracted with methyl tertiary-butyl ether. Extracts are methylated and analyzed by capillary column gas chromatography with electron capture detection.

End of Report

Sheet1

Ahousaht WTP - 15 August 2000		
Distribution System (L9968-7)		
27 ml sample settled		
TOTAL CELLS COUNTED		7
TOTAL CELLS PER ML		46
1000X magnification - 100 fields	number counted	cells per ml
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	3	27
Ochromonas/Chromulina spp. (4-5 um)	2	18
TOTAL	5	45
400X magnification - 5 strips		
CHRYSOPHYCEAE		
cf. Ochromonas sp.	2	1
TOTAL	2	1
100X magnification - whole sample		
nothing seen		

Sheet2

Ahousaht WTP - 15 August 2000		
Raw Water (L9968-1)		
27 ml sample settled		
TOTAL CELLS COUNTED	589	
TOTAL CELLS PER ML	13,500	
1000X magnification - 100 fields	number counted	cells per ml
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	9	405
Ochromonas/Chromulina spp. (4-5 um)	24	1080
Ochromonas/Chromulina spp. (6-7 um)	9	405
UNIDENTIFIED cell (8x5 um)	203	9135
UNIDENTIFIED cell (5 um)	47	2115
TOTAL	292	13140
400X magnification - 1 strip		
CHRYSOPHYCEAE		
Dinobryon sp. (cysts)	1	2
Ochromonas spp. (12-15 um)	3	5
Ochromonas spp. (8-10 um)	14	24
Ochromonas sp.	104	177
BACILLARIOPHYCEAE		
Navicula sp. (20-40 um)	1	2
CRYPTOPHYCEAE		
Cryptomonas spp.	64	109
Chroomonas sp.	33	56
Rhodomonas minuta	1	2
CYANOPHYCEAE		
Aphanothece sp. (colonies)	3	5
UNIDENTIFIED	8	14
TOTAL	232	394
100X magnification - whole sample		
CHRYSOPHYCEAE		
Dinobryon bavaricum (11 col, 31 cells)	31	1.2
Dinobryon sociale (cells)	1	
Synura sp. (cols)	31	1.2
BACILLARIOPHYCEAE		
Nitzschia sp. (100 um)	1	0.04
EUGLENOPHYCEAE		
Trachelomonas sp.	1	0.0
TOTAL	65	2.6
ZOOPLANKTON		
Daphnia	5	
copepod?	3	
rotifers	173	

Sheet3

Ahousaht WTP - 15 August 2000		
Plate Settler Effluent (L9968-4)		
27 ml sample settled		
TOTAL CELLS COUNTED		218
TOTAL CELLS PER ML		700
1000X magnification - 100 fields	number counted	cells per ml
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	2	18
Ochromonas/Chromulina spp. (4-5 um)	12	108
Ochromonas/Chromulina spp. (6-7 um)	5	45
UNIDENTIFIED cell (8x5 um)	41	369
UNIDENTIFIED cell (5 um)	4	36
TOTAL	64	576
400X magnification - 2 strips		
CHRYSOPHYCEAE		
Ochromonas spp. (8-10 um)	21	18
CHLOROPHYCEAE		
Chlamydomonas sp.	3	3
CRYPTOPHYCEAE		
Cryptomonas spp.	116	99
DINOPHYCEAE		
Peridinium sp.	1	1
UNIDENTIFIED	6	5
TOTAL	147	125
100X magnification - whole sample		
CHLOROPHYCEAE		
Closterium sp.	1	0.04
EUGLENOPHYCEAE		
Euglena sp.	4	0.16
Trachelomonas sp.	1	
TOTAL	7	0.2
ZOOPLANKTON		
rotifers	28	

Sheet4

Ahousaht WTP - 15 August 2000		
Sand Filter Effluent (L9968-5)		
27 ml sample settled		
TOTAL CELLS COUNTED		
		372
TOTAL CELLS PER ML		
		1,300
1000X magnification - 100 fields		
	number counted	cells per ml
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	15	135
Ochromonas/Chromulina spp. (4-5 um)	27	243
Ochromonas/Chromulina spp. (6-7 um)	13	117
CHLOROPHYCEAE		
Chlamydomonas sp. (5-7 um)	66	594
TOTAL	125	1125
400X magnification - 2 strips		
CHRYSOPHYCEAE		
Ochromonas spp. (8-10 um)	14	12
CHLOROPHYCEAE		
Chlamydomonas sp. (8-10 um)	30	26
CRYPTOPHYCEAE		
Cryptomonas sp. (8-12 um)	45	38
Cryptomonas spp.	114	97
UNIDENTIFIED	7	6
TOTAL	210	179
100X magnification - whole sample		
EUGLENOPHYCEAE		
Euglena sp.	17	0.7
Phacus sp.	2	0.1
Trachelomonas sp.	18	0.7
TOTAL	37	1.5
ZOOPLANKTON		
rotifers	3	