



The Municipality of the Village of Lions Bay

DRINKING WATER QUALITY

ANNUAL REPORT

2006

Village Office

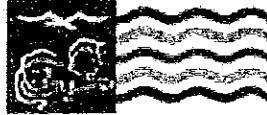


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GENERAL DESCRIPTION

The Village of Lions Bay supplies potable water to approximately 1500 residents with 500 service connections. Water is sourced from two local creeks, treated with chlorine and then distributed via eight storage tanks and thirteen kilometres of water mains to the residents. This report provides an overview of the water quality at the Village of Lions Bay during 2006.

SOURCE WATER

The community's watershed lands include Magnesia Creek drainage (421 hectares), Alberta Creek drainage (51 hectares), Harvey Creek drainage (635 hectares), and Rundle Creek drainage (20 hectares). Water is normally drawn from the intakes on Harvey Creek and Magnesia Creek. Two additional water intakes exist, one at lower Magnesia Creek, and one at Alberta Creek; however, these intakes are considered as 'reserve intakes' and were not used during 2006.

Challenges

The Village draws its water from surface sources that are subject to fluctuating turbidity levels. This fluctuation in raw water turbidity, presents a challenge to ensure that distributed water turbidity and residual chlorine levels, are not adversely affected. Water intakes are typically checked every second or third day, and several times a day when the weather dictates. Chlorine injections sites (Chlorinators) are checked twice daily from Monday to Friday.

Test Results

The Village tests untreated source water for turbidity once daily from Monday to Friday, and performs more extensive testing Quart-yearly for general water chemistry, hardness, metals and contaminants including organic compounds. The results for source water during 2006 are presented and discussed below.

Turbidity

	RAW WATER 2006	
	Harvey Creek	Magnesia Creek
Count	226	225
Maximum Result (NTU)	6.71	3.53
Minimum Result (NTU)	0.17	0.22
Average (NTU)	0.56	0.55
Number of samples < 1 NTU	203	206
Number of samples > 1 NTU but < 5 NTU	21	19
Number of samples > 5 NTU	2	0
Percentage of samples < 1 NTU	89.82%	91.56%
Percentage of samples > 1 NTU but < 5 NTU	9.29%	8.44%
Percentage of samples > 5 NTU	0.88%	0%



The Canadian Drinking Water Guidelines (and the US Environmental Protection Agency) state that the turbidity of an unfiltered raw water supply should generally be around 1 NTU, and should not exceed 5 NTU. As can be seen from the above summary table, raw water turbidity during 2006 was generally acceptable for unfiltered source water, and ranged below 1.0 NTU most of the time. During 2006 Harvey raw water exceeded two times the Canadian Drinking Water Guidelines: On October 16 (6.66 NTU), and on October 30 (6.71 NTU). Currently, the Village is testing the raw water on both Harvey and Magnesia sources with Turbidimeters on line located at the chlorinators, in order to evaluate the feasibility of including Filtration Systems as treatment before disinfection.

Metals and General Chemistry

See results in appendix "C"

WATER TREATMENT

Treatment

Currently no filtration is applied to the water in Lions Bay, disinfection using chlorine is the only treatment applied. The Village maintain two chlorination stations for Harvey and Magnesia creeks using gas chlorine injectors. Turbidity and residual chlorine tests are performed at these locations and downstream of the treated water tanks. There are also two standby water treatment stations, one liquid hypochlorite injector at Brunswick Beach and another one at Alberta Creek; however, these facilities were not operated during 2006.

Challenges

In times of severe weather, the Village water system operators increase the frequency of testing and adjustment of the injector rates in order to compensate for any fluctuating chlorine demand caused by varying turbidity levels. Residual chlorine levels in treated water exiting the storage tanks are tested sometimes three to six times per day to ensure that sufficient chlorine residuals levels are maintained during raw water turbidity variations.

Test Results

The Village tests treated water exiting the storage tanks for turbidity and residual chlorine daily from Monday to Friday. These results are presented and discussed below.



Turbidity

	TREATED WATER 2006	
	HARVEY	MAGNESIA
Count	470	475
Maximum Result (NTU)	15.00	4.72
Minimum Result (NTU)	0.17	0.16
Average (NTU)	0.60	0.49
Number of samples < 1 NTU	434	435
Number of samples > 1 NTU but < 5 NTU	32	40
Number of samples > 5 NTU	4	0
Percentage of samples < 1 NTU	92.34	91.58
Percentage of samples > 1 NTU but < 5 NTU	6.81	8.42
Percentage of samples > 5 NTU	0.85	0.00

The Canadian Drinking Water Guidelines (and the US Environmental Protection Agency) state that the turbidity of an unfiltered treated water supply should generally be around 1 NTU, and should not exceed 5 NTU. As can be seen from the above summary table, treated water turbidity during 2006 was generally acceptable for unfiltered treated water, and ranged around 0.54 NTU most of the time. Peak turbidity exiting the 100,000 gallons Tank at Harvey Chlorinator reached 10.5 NTU on February 27, 9.62 NTU on February 28, 9.28 NTU on March 2, and 15.00 NTU on March 7; however, these peak turbidities did not represent a hazard due to the fact that the water kept good chlorine residuals on those days.

Residual Chlorine

	TREATED WATER 2006	
	HARVEY	MAGNESIA
Count	470	475
Maximum Result (mg/l)	1.41	1.23
Minimum Result (mg/l)	0.00	0.15
Average (mg/l)	0.64	0.64
No. of Samples Outside Limits	18	2
% Samples Outside Limits	3.80	0.42

The generally agreed Minimum Acceptable Residual Chlorine level in treated drinking water is 0.2 mg/l, as recommended by Vancouver Coastal Health. The generally agreed Maximum Acceptable Residual Chlorine level in treated drinking water is 4.0 mg/l as recommended by the US Environmental Protection Agency.

As shown in the above analysis, a small number of samples (around 3.8% in Harvey and 0.42% in Magnesia) had levels less than 0.2 mg/l. This indicates that 96.2% of samples in Harvey and 99.58% of samples in Magnesia had acceptable levels of residual chlorine (greater than 0.2 mg/l but less than 4 mg/l).



When less than 0.2 mg/l chlorine residual is noted in the Distribution System, some hydrants in the system are flushed until a minimum chlorine residual of 0.2 mg/l or more is obtained.

WATER DISTRIBUTION SYSTEM

Storage

Approximately 450,000 imperial gallons of water are consumed per day for the whole system. There are currently 8 water storage tanks throughout the system. These include: Harvey (400,000 IG), Ocean view (100,000 IG), Magnesia (100,000 IG), Upper Bayview Phase 4 (20,000 IG), Upper Bayview Phase 5 (25,000 IG, out of service during 2006), Highway (21,000 IG), South Sunset (40,000 IG), and Brunswick Beach 35,000 IG, out of service during 2006).

Distribution

The Village of Lions Bay's location on the side of a mountain requires that water pressures be controlled with eleven (11) PRV stations.

Approximately 13 kilometres of water mains of a variety of ages and constructed from a variety of materials including asbestos cement, ductile iron, cast iron, and PVC make up the Village's distribution system.

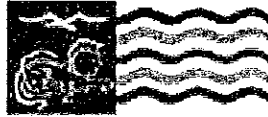
Test Results

Samples are taken daily from Monday to Friday from five quality sampling sites in the middle and end of the distribution system and tested for turbidity and residual chlorine. On Tuesdays, samples from these sites are sent to the laboratory to be tested for Total and Fecal Coliforms.

In addition, metals levels and general chemistry are tested Quarter-yearly at up to twelve locations in the distribution system. The results of the Quarterly samples are presented in appendix "C".

Harvey Turbidity

	W.D.S HARVEY 2006		
	PRV-3	CAFE	KELVIN G.
Count	477	245	245
Maximum Result (NTU)	7.51	1.34	2.26
Minimum Result (NTU)	0.18	0.17	0.17
Average (NTU)	0.47	0.47	0.49
Number of samples < 1 NTU	448	232	224
Number of samples > 1 NTU but < 5 NTU	28	13	21
Number of samples > 5 NTU	1	0	0
Percentage of samples < 1 NTU	93.92	94.69	91.43
Percentage of samples > 1 NTU but < 5 NTU	5.87	5.31	8.57
Percentage of samples > 5 NTU	0.21	0	0



The Canadian Drinking Water Guidelines (and the US Environmental Protection Agency) state that the turbidity of an unfiltered treated water supply should generally be around 1 NTU, and should not exceed 5 NTU. As can be seen from the above summary table, treated water turbidity from Harvey during 2006 was generally acceptable for unfiltered treated water, and ranged around 0.48 NTU most of the time. Peak turbidity reached 1.48 NTU at the General Store/Cafe on January 10, 2.26 NTU at Kelvin Grove on May 11, and 7.51 NTU at PRV-3 on September 20. The PRV-3 result of 7.51 NTU was the only one during this year that exceeded the Canadian Drinking Water maximum turbidity of 5 NTU.

Magnesia Turbidity

	W.D.S MAGNESIA 2006	
	PRV-5	B. B.
Count	471	245
Maximum Result (NTU)	3.37	8.57
Minimum Result (NTU)	0.14	0.22
Average (NTU)	0.55	0.53
Number of samples < 1 NTU	421	226
Number of samples > 1 NTU but < 5 NTU	50	18
Number of samples > 5 NTU	0	1
Percentage of samples < 1 NTU	89.38	92.24
Percentage of samples > 1 NTU but < 5 NTU	10.62	7.35
Percentage of samples > 5 NTU	0	0.41

The Canadian Drinking Water Guidelines (and the US Environmental Protection Agency) state that the turbidity of an unfiltered treated water supply should generally be around 1 NTU, and should not exceed 5 NTU. As can be seen from the above summary table, treated water turbidity from Magnesia during 2006 was generally acceptable for unfiltered treated water, and ranged around 0.54 NTU most of the time. Peak turbidity reached 3.37 NTU at PRV-5 on January 9, and 8.57 NTU at Brunswick Beach on January 19. The Brunswick Beach result of 8.57 was the only one during this year that exceeded the Canadian Drinking Water maximum turbidity of 5 NTU.

Fecal and Total Coliforms

	PRV-3	STORE/CAFE	KELVIN G.	PRV-5	BRUNSWICK B
Count	52	52	52	52	52
Max Result (mg/l)	N	N	N	N	N
Min Result (mg/l)	N	N	N	N	N
Average (mg/l)	N	N	N	N	N
No. Outside Limits	0	0	0	0	0
% Outside Limits	0%	0%	0%	0%	0%

In the Total and Fecal Coliform tests, the result is either Positive (P) or Negative (N), where a Positive result is not acceptable as it indicates the presence of coliforms. There were no Positive results in 2006.



Metals and General Chemistry

See results in Appendix "C"

UPGRADING WORK IN 2006

Panorama Road:

- ❖ Replaced Water Main with Ductile Iron Pipe
- ❖ Installed new Isolation Valves
- ❖ Installed two new Fire Hydrants.

Panorama Place:

- ❖ Replaced Water Main with Ductile Iron Pipe
- ❖ Installed new Isolation Valves
- ❖ Installed one new Fire Hydrant.

UPGRADING WORK PLANNED FOR 2007

Mountain Drive (from Bayview Road to Timbertop Drive):

- ❖ Replace Water Main with Ductile Iron Pipe
- ❖ Install new Isolation Valves
- ❖ Install new Fire Hydrants.

Timbertop Drive:

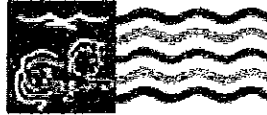
- ❖ Replace Water Main with Ductile Iron Pipe
- ❖ Install new Isolation Valves
- ❖ Install new Fire Hydrants.

OPERATOR TRAINING

The Village's Water Treatment/Distribution System has been evaluated as a level II by the Environmental Operators Certification Program (EOCP). The Operator for the Village's Water System is Alberto Urrutia.

Alberto Urrutia has completed the following courses:

- ❖ Water Treatment 2
- ❖ Confined Space Workshop
- ❖ Water Treatment I



- ❖ Chlorine Handling
- ❖ Utility Management
- ❖ Water Treatment Plant Operation II
- ❖ Water Treatment Plant Operation I
- ❖ Water Distribution System Operation and Maintenance
- ❖ Small Water System Operation and Maintenance
- ❖ Small Water Systems
- ❖ Waterworks Technology.

EOCP Certificates obtained by Alberto Urrutia:

- ❖ Water Distribution Operator-In-Training on July 21, 2004
- ❖ Water Distribution Level 1 on April 6, 2005
- ❖ Chlorine Handler on May 6, 2005
- ❖ Water Distribution Level 2 on July 12, 2006.