



WATER TREATMENT PLANT & DISTRIBUTION SYSTEM



2013 Annual Operations Performance Report

Facility Numbers 529 & 155

**PORT HARDY
WATER SYSTEM
ANNUAL REPORT 2013**



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1. HIGHLIGHTS

Overview

Port Hardy, with a population of about 5,000 people, is located at the northern end of Vancouver Island. In May 2000 the new water treatment plant was commissioned and helped Port Hardy's reputation of poor water quality to one of the best in British Columbia.

Port Hardy's source water is the Tsulquate River. The water from this river is tinted brown from tannins and other leachates. Port Hardy's Water Treatment Plant uses a Dissolved Air Flotation (DAF) system which is very effective in treating highly colored water. Treatment is achieved using ISOPAC 6 and Soda Ash to remove the color, particles, sediment and organics that are present. A filter aid, Hydrofloc 400 is added in trace amounts after the DAF treatment and prior to the filters to improve coagulation of fine particles. Filtration is done through a mixed media consisting silica sand and anthracite. Lime slurry, carbon dioxide and sodium hypochlorite are injected post filtration for alkalinity, pH adjustment and disinfection.

In 2013, the plant continued to produce a very high level of treatment providing excellent water quality to the District of Port Hardy.

In October of 2013, all operational and maintenance duties of the water and wastewater systems were transferred back to the District of Port Hardy from EPCOR Water Services with all staff being retained.

Permit to Operate

The Port Hardy water treatment plant is a Level III facility as deemed by the Environmental Operators Certification Program (EOCP), certification number 529. The distribution system is a Level III system with a certification number of 155.

Certified Operators

The Operational Permit from Vancouver Island Health Authority Operational requires that a certified operator is employed to match the Water Treatment Plant Certification, a level III plant. EPCOR now has two WT Level III Operators on staff and one WT Level IV.

Operator Certification		
Operator	Title	Certification
Dennis Dugas	Capitol Projects Coordinator	WT III, MWWT II, WD IV, WWC I, CH
Joe Jewell	Foreman	WT IV, MWWT II, WD II, CH
Sean Mercer	Foreman	WD III, CCT
Kenn Oliver	Operator	WT III, MWWT III, CH
Justin Reusch	Operator	WT II, WD I, MWWT II
Roland Le Fort	Operator	MWWT II WT I
Cory Henschke	Operator	MWWT I

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Operational Highlights

Water Treatment Plant

Throughout the course of 2013, there were times where due to heavy rains and high river colour events, that the water treatment process was upset. In these events, the plant is taken offline and no water is pumped to the reservoir. Water is only pumped to the reservoirs once the treatment plant's process quality is restored. This will result in lower than desired reservoir levels but quality will not be compromised.

In February and March, there was a higher than usual demand for chemicals to treat the water. This was due to the heavy road traffic through the watershed area. A combination of heavy precipitation and road run off depositing silt and sedimentation caused high turbidity in the source water.

In June, a high water pH was recorded in the reservoir effluent resulting in a violation to permit

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Water Distribution System Highlights

In May, a water main was broken on Trustee Road near the North Island Mall. A positive pressure was kept through the main to prevent a cross contamination issue. Water service to the mall was affected during the repairs. The water main was flushed after the repair and samples were collected the following day.

In September, 14 services were repaired and replaced on Elk Drive. New plastic lines were installed in place of the existing copper lines to the property lines shutoffs. This has decreased the water demand.

Cross Connection Control

A formal Cross Connection Control program was presented to the District of Port Hardy in late 2010. This system was created by Maintenance Tracking Systems Inc (MTS). Currently, backflow preventers are installed in all treatment plants in areas that may be a possible risk. In 2008, all sewage liftstations with wash down hose bibs were upgraded with backflow preventers.

Water Wise Program Continuation

A total of 175 meters are being read including commercial users and multi-family dwellings. All new homes and constructions will be metered as part of this program. Continuing public education around proposed metering/rate changes and general information on water wise initiatives was conducted and will be ongoing until all users are metered.

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2. Raw Water Production and Quality

Month	Raw Production		Dam Height (m)	Colour (TCU)	Turbidity (NTU)	Conductivity μS/cm	pH	Alkalinity (mg/L as CaCO ₃)	Temperature (°C)	Rain (mm) Total/Month
	(ML/day)	Total/Month								
January	5.4	145	0.48	90	1.3	19	6.5	5.2	3.1	100.6
February	4.6	129	0.45	86	2.0	19	6.5	4.2	3.8	170.6
March	4.7	145	0.38	76	1.5	20	6.6	4.4	4.3	91.4
April	4.6	139	0.33	80	1.3	21	6.6	5.0	7.3	111.0
May	4.8	149	0.25	77	0.7	21	6.8	5.60	11.0	53.8
June	4.8	143	0.23	80	1.1	22	6.9	6.00	13.9	35.0
July	5.6	172	0.17	0	0.2	0	0.2	6.47	0.2	0.6
August	5.5	171	0.18	53	1.0	27	7.0	6.50	15.4	70.6
September	4.9	147	0.29	73	1.3	25	6.9	6.50	13.4	165.0
October	4.6	143	0.30	85	0.6	23	6.8	6.20	9.0	72.8
November	4.2	127	0.32	89	0.7	24	6.7	5.50	6.1	110.4
December	4.3	135	0.43	93	0.9	21	6.6	5.00	3.9	194.4
Average	4.8	145	0.32	73	1.05	20	6.2	5.6	7.6	98.0
Total		1743								1176.2

All lab testing performed by plant operators.

Note: Values in this table are a monthly average with the exception of raw production totals.

3. TREATED WATER QUALITY

Month	Clearwell Flow	pH	Turbidity (NTU)	Conductivity μS/cm	Colour (TCU)	Total Hardness (mg/L as CaCO ₃)	Alkalinity (mg/L as CaCO ₃)	Temperature (°C)
	Total/Month							
January	135	7.5	0.10	121	0.6	30	32	3.3
February	126	7.6	0.10	131	0.6	33	35	8.1
March	137	7.5	0.09	121	0.8	31	36	5.0
April	135	7.7	0.09	121	0.7	26	26	8.1
May	138	0.9	0.10	110	7.7	28	28	11.6
June	138	7.7	0.10	106	1.0	27	23	13.9
July	161	7.7	0.08	82	1.0	22	22	15.5
August	159	7.5	0.10	89	1.0	21	20	16.2
September	144	7.5	0.09	113	0.9	24	25	14.0
October	135	7.6	0.10	102	4.5	21	22	9.8
November	122	7.8	0.11	108	1.0	23	22	6.7
December	128	7.7	0.10	103	1.0	22	22	4.4
Average	138	7.1	0.1	109	1.7	26	26	9.7
Total	1,660							

All lab testing performed by plant operators.

Note: Values in this table are a monthly average with the exception of treated production totals.

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4. FILTERED WATER QUALITY

Month	Filter #1		Filter #2		Filter #3		Filter #4		Combined Filter Effluent	
	Turbidity (NTU)		Turbidity (NTU)		Turbidity (NTU)		Turbidity (NTU)		Particle Counts (#/mL)	
	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.
January	0.04	0.29	0.04	0.19	0.03	0.25	0.03	0.19	10	750
February	0.02	0.08	0.04	0.13	0.04	0.09	0.03	0.11	12	749
March	0.04	0.10	0.04	0.11	0.03	0.09	0.03	0.11	21	750
April	0.05	0.11	0.03	0.08	0.03	0.08	0.04	0.11	24	749
May	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	26	750
June	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	10	750
July	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	5	193
August	0.03	0.07	0.04	0.11	0.04	0.10	0.05	0.12	17	10
September	0.04	0.07	0.04	0.08	0.04	0.08	0.04	0.09	18	749
October	0.03	0.07	0.17	0.08	0.03	0.07	0.03	0.07	10	7
November	0.03	0.08	0.04	0.09	0.04	0.08	0.04	0.09	30	750
December	0.03	0.09	0.04	0.08	0.03	0.07	0.03	0.07	14	7
Average	0.04	0.09	0.05	0.09	0.04	0.09	0.04	0.09	16	518
Minimum	0.02	0.04	0.03	0.04	0.03	0.04	0.03	0.04	5	7
Maximum	0.06	0.29	0.17	0.19	0.06	0.25	0.06	0.19	30	750

The table displays the monthly averages and maximum monthly values.
Maximum particle count value stored by the system is 750.

5. CHLORINE, LOG REMOVAL & CCPP

Day	Reservoir Influent	Reservoir Effluent		Log Reduction of <i>Giardia</i> (Disinfection)	Log Reduction of <i>Giardia</i> (Total)	CCPP
	Average Free Chlorine (mg/L)	Free Chlorine (mg/L)	Total Chlorine (mg/L)			
January	1.4	1.0	1.0	2.2	4.7	-6.6
February	1.5	1.0	1.0	2.3	4.8	-5.4
March	1.4	0.9	1.0	2.3	4.8	-6.1
April	1.4	0.9	0.9	2.6	5.1	-5.5
May	1.5	0.9	1.0	3.2	5.7	-4.4
June	1.6	1.0	1.0	3.8	6.3	-4.2
July	1.7	1.0	1.1	4.1	6.6	-5.2
August	1.7	1.0	1.0	4.5	7.0	-6.2
September	1.7	0.9	1.0	4.0	6.5	-6.0
October	1.7	0.9	1.0	3.0	5.5	-5.4
November	1.7	1.0	1.0	2.7	5.2	-4.3
December	1.7	1.0	1.0	2.4	4.9	-4.6
Average	1.58	1.0	1.0	3.1	5.6	-5.3

The table displays the monthly averages.
CCPP – Calcium Carbonate Precipitation Potential
Lab tests performed by plant operators.

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6. DISTRIBUTION WATER QUALITY AND BACTERIOLOGICAL RESULTS

Chatham Avenue						Jokerville					
Sample Date	Free Chlorine (mg/l)	Turbidity (NTU)	pH	Total Coliform cfu/100ml	E.Coli cfu/100ml	Sample Date	Free Chlorine (mg/l)	Turbidity (NTU)	pH	Total Coliform cfu/100ml	E.Coli cfu/100ml
1/08/13	0.71	0.14	7.54	<1	<1	1/08/13	0.49	0.33	7.45	<1	<1
2/06/13	0.76	0.20	7.50	<1	<1	2/06/13	0.83	0.17	7.32	<1	<1
3/05/13	0.75	0.10	7.55	<1	<1	3/19/13	0.57	0.14	7.52	<1	<1
4/03/13	0.26	0.17	8.09	<1	<1	4/03/13	0.50	0.11	7.60	<1	<1
5/08/13	0.52	0.10	8.30	<1	<1	5/14/13	0.41	0.13	7.66	<1	<1
6/04/13	0.49	0.13	8.10	<1	<1	6/11/13	0.44	0.19	7.80	<1	<1
7/02/13	0.22	0.13	7.90	<1	<1	7/17/13	0.41	0.21	7.70	<1	<1
8/13/13	0.34	0.29	8.40	<1	<1	8/20/13	0.29	0.30	7.10	<1	<1
9/10/13	0.20	0.44	8.20	<1	<1	9/17/13	0.20	0.30	7.40	<1	<1
10/08/13	0.20	0.33	8.00	<1	<1	10/16/13	0.14	0.34	7.84	<1	<1
11/26/13	0.27	0.18	9.04	<1	<1	11/05/13	0.26	0.14	8.00	<1	<1
12/03/13	0.21	0.15	8.80	<1	<1	12/03/13	0.33	0.15	7.70	<1	<1
Average	0.41	0.20	8.1	<1	<1	Average	0.41	0.21	7.6	<1	<1
Minimum	0.20	0.10	7.5	<1	<1	Minimum	0.14	0.11	7.1	<1	<1
Maximum	0.76	0.44	9.0	<1	<1	Maximum	0.83	0.34	8.0	<1	<1

Airport Inn						Douglas Street PRV					
Sample Date	Free Chlorine (mg/l)	Turbidity (NTU)	pH	Total Coliform cfu/100ml	E.Coli cfu/100ml	Sample Date	Free Chlorine (mg/l)	Turbidity (NTU)	pH	Total Coliform cfu/100ml	E.Coli cfu/100ml
1/15/13	0.69	0.22	7.85	<1	<1	1/15/13	0.90	0.13	7.49	<1	<1
2/12/13	0.48	0.15	7.91	<1	<1	2/19/13	0.94	0.21	7.95	<1	<1
3/19/13	0.67	0.32	7.80	<1	<1	3/19/13	0.84	0.13	7.66	<1	<1
4/09/13	0.56	0.15	7.87	<1	<1	4/09/13	0.76	0.10	7.84	<1	<1
5/22/13	0.56	0.16	7.83	<1	<1	5/14/13	0.69	0.12	7.61	<1	<1
6/17/13	0.65	0.13	7.80	<1	<1	6/11/13	0.61	0.52	7.90	<1	<1
7/17/13	0.50	0.19	7.50	<1	<1	7/17/13	0.84	0.10	7.60	<1	<1
8/20/13	0.37	0.59	7.90	<1	<1	8/07/13	0.76	0.34	7.40	<1	<1
9/17/13	0.60	0.15	7.60	<1	<1	9/10/13	0.80	0.21	7.50	<1	<1
10/08/13	0.32	0.34	7.56	<1	<1	10/08/13	0.67	0.14	7.84	<1	<1
11/12/13	0.59	0.18	8.15	<1	<1	11/12/13	0.88	0.23	7.67	<1	<1
12/11/13	0.51	0.89	8.10	<1	<1	12/03/13	0.79	0.15	7.70	<1	<1
Average	0.54	0.29	7.8	<1	<1	Average	0.79	0.20	7.7	<1	<1
Minimum	0.32	0.13	7.5	<1	<1	Minimum	0.61	0.10	7.4	<1	<1
Maximum	0.69	0.89	8.2	<1	<1	Maximum	0.94	0.52	8.0	<1	<1

Hospital						Glenlyon Inn					
Sample Date	Free Chlorine (mg/l)	Turbidity (NTU)	pH	Total Coliform cfu/100ml	E.Coli cfu/100ml	Sample Date	Free Chlorine (mg/l)	Turbidity (NTU)	pH	Total Coliform cfu/100ml	E.Coli cfu/100ml
1/15/13	0.85	0.20	7.62	<1	<1	1/08/13	0.78	0.13	7.38	<1	<1
2/19/13	0.83	0.17	7.70	<1	<1	2/19/13	0.82	0.13	7.44	<1	<1
3/05/13	0.76	0.19	7.55	<1	<1	3/12/13	0.56	0.11	7.48	<1	<1
4/09/13	0.57	0.14	7.76	<1	<1	4/16/13	0.71	0.13	7.71	<1	<1
5/08/13	0.60	0.12	7.84	<1	<1	5/22/13	0.69	0.13	7.83	<1	<1
6/17/13	0.74	0.13	8.40	<1	<1	6/17/13	0.62	0.16	7.90	<1	<1
7/17/13	0.69	0.11	7.62	<1	<1	7/17/13	0.72	0.26	7.60	<1	<1
08/20/13	0.47	0.19	7.80	<1	<1	8/13/13	0.66	0.16	7.40	<1	<1
9/03/13	0.40	0.21	7.60	<1	<1	9/17/13	0.60	0.09	7.60	<1	<1
10/08/13	0.53	0.14	7.72	<1	<1	10/16/13	0.64	0.46	7.42	<1	<1
11/05/13	0.64	0.14	8.00	<1	<1	11/26/13	0.67	0.13	7.73	<1	<1
12/11/13	0.72	0.14	7.70	<1	<1	12/11/13	0.58	0.16	7.70	<1	<1
Average	0.65	0.16	7.8	<1	<1	Average	0.67	0.17	7.6	<1	<1
Minimum	0.40	0.11	7.6	<1	<1	Minimum	0.56	0.09	7.4	<1	<1
Maximum	0.85	0.21	8.4	<1	<1	Maximum	0.82	0.46	7.9	<1	<1

The table displays the monthly averages.
Lab tests performed by plant operators.

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Airport Washroom						Ferry					
Sample Date	Free Chlorine (mg/l)	Turbidity (NTU)	pH	Total Coliform cfu/100ml	E.Coli cfu/100ml	Sample Date	Free Chlorine (mg/l)	Turbidity (NTU)	pH	Total Coliform cfu/100ml	E.Coli cfu/100ml
1/15/13	0.67	0.13	7.90	<1	<1	1/08/13	0.68	0.16	7.49	<1	<1
2/06/13	0.64	0.11	7.48	<1	<1	2/12/13	0.55	0.18	7.50	<1	<1
3/12/13	0.46	0.15	7.54	<1	<1	3/05/13	0.67	0.10	7.48	<1	<1
4/03/13	0.50	0.11	7.51	<1	<1	4/16/13	0.43	0.11	7.68	<1	<1
5/14/13	0.31	0.11	7.84	<1	<1	5/22/13	0.41	0.15	7.62	1	<1
6/04/13	0.43	0.11	7.90	<1	<1	6/04/13	0.31	0.19	7.60	<1	<1
7/02/13	0.30	0.14	7.90	<1	<1	7/17/13	0.58	0.13	7.50	<1	<1
8/07/13	0.28	0.38	7.70	<1	<1	8/23/13	0.85	0.16	7.40	<1	<1
9/03/13	0.20	0.12	7.60	<1	<1	9/03/13	0.20	0.15	7.30	<1	<1
10/01/13	0.13	0.11	7.73	<1	<1	10/16/13	0.30	0.31	7.68	<1	<1
11/05/13	0.25	0.25	7.90	<1	<1	11/26/13	0.38	0.12	8.06	<1	<1
12/03/13	0.25	0.17	8.30	<1	<1	12/11/13	0.43	0.13	7.80	<1	<1
Average	0.37	0.16	7.8	<1	<1	Average	0.48	0.16	7.6	<1	<1
Minimum	0.13	0.11	7.5	<1	<1	Minimum	0.20	0.10	7.3	<1	<1
Maximum	0.67	0.38	8.3	<1	<1	Maximum	0.85	0.31	8.1	1	<1

G & N School						Bear Cove					
Sample Date	Free Chlorine (mg/l)	Turbidity (NTU)	pH	Total Coliform cfu/100ml	E.Coli cfu/100ml	Sample Date	Free Chlorine (mg/l)	Turbidity (NTU)	pH	Total Coliform cfu/100ml	E.Coli cfu/100ml
1/15/13	0.66	0.25	7.79	<1	<1	1/08/13	0.55	0.80	7.50	<1	<1
2/12/13	0.63	0.20	7.70	<1	<1	2/12/13	0.32	0.71	7.54	<1	<1
3/05/13	0.72	0.17	7.39	<1	<1	3/12/13	0.52	0.19	7.61	<1	<1
4/16/13	0.56	0.17	7.55	<1	<1	4/09/13	0.50	0.14	7.51	<1	<1
5/22/13	0.44	0.12	7.70	<1	<1	5/08/13	0.56	0.17	8.21	<1	<1
6/11/13	0.62	0.16	7.80	<1	<1	6/04/13	0.23	0.41	7.80	<1	<1
7/17/13	0.47	0.57	7.50	<1	<1	7/02/13	0.43	0.12	7.70	<1	<1
8/20/13	0.18	0.35	7.30	<1	<1	8/07/13	0.58	0.31	8.40	<1	<1
9/10/13	0.50	0.42	7.70	<1	<1	9/03/13	0.10	0.33	7.40	<1	<1
10/01/13	0.68	0.34	7.49	<1	<1	10/16/13	0.40	0.18	7.50	<1	<1
11/12/13	0.42	0.41	8.00	<1	<1	11/05/13	0.40	0.16	7.70	<1	<1
12/11/13	0.67	0.30	7.70	<1	<1	12/03/13	0.55	0.17	7.70	<1	<1
Average	0.55	0.29	7.6	<1	<1	Average	0.43	0.31	7.7	<1	<1
Minimum	0.18	0.12	7.3	<1	<1	Minimum	0.10	0.12	7.4	<1	<1
Maximum	0.72	0.57	8.0	<1	<1	Maximum	0.58	0.80	8.4	<1	<1

Pioneer Inn					
Sample Date	Free Chlorine (mg/l)	Turbidity (NTU)	pH	Total Coliform cfu/100ml	E.Coli cfu/100ml
1/08/13	1.00	0.37	7.32	<1	<1
2/06/13	0.64	0.10	7.43	<1	<1
3/12/13	0.63	0.22	7.50	<1	<1
4/03/13	0.67	0.17	7.35	<1	<1
5/08/13	0.60	0.12	7.84	<1	<1
6/17/13	0.66	0.07	8.30	<1	<1
7/17/13	0.73	0.25	7.50	<1	<1
8/13/13	0.73	0.20	7.20	<1	<1
9/17/13	0.70	0.11	7.60	<1	<1
10/01/13	0.64	0.13	7.35	<1	<1
11/12/13	0.75	0.19	7.59	<1	<1
12/11/13	0.76	0.11	7.60	<1	<1
Average	0.71	0.17	7.5	<1	<1
Minimum	0.60	0.07	7.2	<1	<1
Maximum	1	0.37	8.3	<1	<1

The table displays the monthly averages.
Lab tests performed by plant operators.

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7. CHEMICAL USE

Chemical Usage													
	January	February	March	April	May	June	July	August	September	October	November	December	Total
ISOPAC 6 Coagulant in kg	5953	6027	5324	6050	5092	5088	3251	4553	6698	5769	5762	5842	65408
Soda Ash in kg	3022	2801	2634	2936	2786	2251	1317	1589	2994	2728	2810	2996	30864
Filter Aid (LT20) in kg	0.83	0.92	0.98	0.93	0.92	0.77	0.72	0.65	0.72	0.60	0.64	0.81	9.46
Salt for Chlorine Generator in kg	582	565	618	591	655	670	829	834	733	674	574	616	7943
Liquid Sodium Hypochlorite 12% in kg	180	0	0	0	0	0	80	0	0	0	0	80	340
Line in kg	1873	1624	1979	1543	1692	1496	1028	1428	1783	1585	1321	1394	18745
Carbon Dioxide in kg	3158	2637	3719	3016	2600	2346	2311	1862	1944	1194	1737	1628	28153