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## WATER TREATMENT PLANT & DISTRIBUTION SYSTEM

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## 2012 Annual Operations Performance Report

Facility Numbers 529 & 155





**PORT HARDY  
WATER SYSTEM  
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## 1. HIGHLIGHTS

### Overview

In 1999 the District of Port Hardy signed a long-term agreement with EPCOR to manage the water and wastewater systems and to build a state-of-the-art water treatment plant. The new plant started official operation in May 2000 and helped change Port Hardy's reputation of poor water quality to one of the best in British Columbia.

In 2012, the plant continued to produce a very high level of treatment providing excellent water quality to the District of Port Hardy.

### 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.

<b>Operator</b>	<b>Title</b>	<b>EOCP Certification</b>
Dennis Dugas	Capital Projects Coordinator	WT III, WD IV, WC I, WWT II
Sean Mercer	Foreman	WD III, CCT
Joe Jewell	Foreman	WT IV, WWT II, WD II
Kenn Oliver	Operator	WT III, WWT III
Justin Reusch	Operator	WT II, WD I, WWT II
Roland Le Fort	Operator	WWT II
Cory Henschke	Operator	WWT I

*WT – Water Treatment, WWT – Wastewater Treatment, WD – Water Distribution, WC – Wastewater Collection, OIT – Operator in Training, CCT – Cross Connection Tester*



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## Operational Highlights

### Water Treatment Plant

Throughout the course of 2012, 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 July, the sodium hypochlorite flowmeter failed beyond repair. However, water was continuously disinfected. Chlorine residuals are continuously monitored by a separate analyzer. The flowmeter was replaced and regular operations restored.

In October, on the weekend of the 12<sup>th</sup> and 13<sup>th</sup>, heavy rain falls caused the plant to be upset. Although not a large amount of rain, it was the first after a very dry summer. The result was a river colour peaking at 288 True Colour Units (TCU) and operators remaining at the water treatment plant over the entire weekend, both day and night, working in shifts to monitor and adjust chemical dosing as river conditions fluctuated. Reservoir capacity dipped to critical levels causing a higher effluent turbidity. As a precaution, extra distribution samplings were completed.

### Water Treatment Plant Capital Highlights

In 2012, a new carbon dioxide injection system was commissioned. It was determined that design engineers oversized the system and it cannot be run in an automatic control. Operators have been able to run the system manually to get targeted pH levels in treated water.

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## **Water Distribution System Highlights**

The Port Hardy water distribution system functioned well in 2012 with the exception of some water main breaks and property service breaks

On April 28<sup>th</sup>, a main break was found at the intersection of Beaver Harbour Road and Peel Street. A repair damp was installed to repair the break. No customers were without water during this.

On September 4<sup>th</sup>, a contractor for B.C. Hydro hit and severely damaged the water main on the top of Trustee Road. In total, 8% of the reservoir, approximately 151 cubic meters of water was lost before operators were able to isolate the pipe and make repairs.

In addition, 6 service connections were repaired in 2012.

## **Water Distribution Capital Highlights**

In 2012, approximately 200 meters of water line on Beaver Harbour Road was replaced. Each lot had a water meter installed at the property line as part of this.

Douglas Street PRV station was brought on line this year. This is Port Hardy's first above ground pressure reducing station. This is a major step forward in regards to safety removing the issues of confined space. All repair work can now be completed above ground.

Approximately 120 meters of water line was also replaced on Hastings Street.

### 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 126 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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**Violations of Permit to Operate**

Violation	Determined By	January – December 2012
Low Chlorine Residual (Reservoir)	<0.2 mg/L	0
Low Chlorine Residual (Distribution)	<0.05 mg/L	0
Low Log Removal	<3.0	0
High Turbidity (Filter)	>1 (5%)* or >2 NTU	0
High Turbidity (Reservoir Effluent)	>0.5 (5%)* NTU	0
High Coliforms	TC >0 (10%)** or >10 CFU/100ml	0
	FC >0 cfu/100ml	0

\* - Allowed to exceed limit in the percentage amount of time shown (based on daily averages each month).

\*\* - Allowed to exceed limit in the percentage amount of samples tested each month.

**Variances based on EPCOR control limits**

Variances (within EPCOR operational limits)	Determined By	January – December 2012
Low Chlorine Residual (Reservoir)	<0.3 mg/L	0
Low Chlorine Residual (Distribution)	<0.1 mg/L	0
Low Log Removal	<3.5	0
High Turbidity (Filter)	>0.3 NTU	0
High Turbidity (Reservoir)	>0.5 NTU	0
High Turbidity (Distribution)	>5 NTU	0
High Average Particle Counts	>50/mL >2µm	18
High Coliforms	TC >0 cfu/100ml	0
Reservoir Effluent pH	<7.0 or >8.0	19
Low CCPP	<-10 or >5	25
Colour	>5 TCU	0

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**1. RAW WATER PRODUCTION AND QUALITY**

Month	Raw Production		Dam Height (m)	pH	Turbidity (NTU)	Conductivity (µS/cm)	Colour (TCU)	Alkalinity (mg/L as CaCO <sub>3</sub> )	Temperature (°C)	Rain (mm) Total/Month
	(ML/day)	Total/Month								
Jan	5	145	0.51	6.26	1.23	179	62	5	2.3	437.2
Feb	4	123	0.39	6.28	0.66	18.6	61	4	3.5	100.0
Mar	4	133	0.43	6.32	0.78	21.1	55	4	2.9	213.0
Apr	4	134	0.37	6.49	0.52	20.4	53	5	6.0	75.2
May	5	144	0.24	6.74	0.57	21.6	58	5	9.1	56.8
Jun	5	147	0.28	6.68	0.74	21.0	76	6	11.6	81.2
Jul	5	159	0.20	6.94	0.33	23.6	57	5	14.2	28.2
Aug	5	168	0.17	7.06	0.40	26.8	40	7	14.4	40.2
Sep	5	148	0.17	7.03	0.29	28.1	38	7	11.3	30.6
Oct	5	152	0.33	6.70	1.02	25.8	78	5	8.7	168.6
Nov	5	135	0.43	6.61	1.04	21.9	95	5	6.5	193.2
Dec	5	140	0.40	6.55	0.77	20.5	91	2	3.5	194.0
Average	5	144	0.33	6.64	0.70	22.3	64	5	7.8	134.9
Total		1728								1618.2

All lab testing performed by plant operators.

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

**2. TREATED WATER QUALITY**

Month	Clearwell Fbw	pH	Turbidity (NTU)	Conductivity (µS/cm)	Colour (TCU)	Total Hardness (mg/L as CaCO <sub>3</sub> )	Alkalinity (mg/L as CaCO <sub>3</sub> )	Temperature (°C)
	Total/Month							
Jan	137	7.4	0.14	74	0.7	13	18	3.0
Feb	120	7.4	0.09	81	0.7	18	22	4.4
Mar	126	7.4	0.08	77	0.7	16	20	3.8
Apr	130	7.7	0.10	88	0.8	21	24	6.7
May	137	7.6	0.07	75	0.8	15	18	9.9
Jun	141	7.7	0.08	100	0.8	19	23	12.3
Jul	150	7.6	0.09	90	0.7	23	23	14.9
Aug	160	7.5	0.10	84	0.8	24	21	15.4
Sep	146	7.4	0.10	101	0.7	31	20	12.1
Oct	141	7.3	0.14	118	0.9	26	25	9.3
Nov	119	7.5	0.11	131	0.8	27	33	7.1
Dec	124	7.6	0.11	115	0.7	26	30	4.3
Average	136	7.5	0.10	95	0.8	22	23	8.6
Total	1,631							

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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### 3. 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.
Jan	0.02	0.04	0.03	0.07	0.03	0.08	0.03	0.06	19	173
Feb	0.03	0.07	0.03	0.07	0.06	0.11	0.04	0.07	18	184
Mar	0.02	0.06	0.03	0.06	0.05	0.09	0.03	0.07	21	186
Apr	0.02	0.07	0.03	0.05	0.06	0.11	0.03	0.06	22	138
May	0.03	0.06	0.03	0.05	0.06	0.11	0.03	0.06	18	91
Jun	0.02	0.05	0.03	0.05	0.05	0.09	0.03	0.05	14	97
Jul	0.03	0.04	0.03	0.05	0.06	0.10	0.03	0.06	9	87
Aug	0.03	0.06	0.03	0.07	0.06	0.10	0.03	0.07	8	112
Sep	0.02	0.05	0.03	0.06	0.05	0.10	0.03	0.07	10	188
Oct	0.03	0.11	0.05	0.13	0.08	0.16	0.04	0.10	76	350
Nov	0.03	0.10	0.03	0.09	0.04	0.12	0.03	0.09	26	380
Dec	0.03	0.11	0.04	0.13	0.03	0.09	0.04	0.12	23	385
Average	0.03	0.07	0.03	0.07	0.05	0.11	0.03	0.07	22	198
Maximum	0.03	0.11	0.05	0.13	0.08	0.16	0.04	0.12	76	385

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

### 4. CHLORINE, LOG REMOVAL & CCPP

Month	Reservoir Influent	Reservoir Effluent		Log Reduction of <i>Giardia</i> (Disinfection)	Log Reduction CCPP <i>Giardia</i> (Total)	
	Average Free Chlorine (mg/L)	Free Chlorine (mg/L)	Total Chlorine (mg/L)			
Jan	1.2	1.0	1.1	2.4	4.9	-8.0
Feb	1.3	1.0	1.0	2.8	5.3	-7.6
Mar	1.4	1.0	1.1	2.7	5.2	-7.7
Apr	1.4	0.9	1.0	2.6	5.1	-5.3
May	1.6	1.0	1.0	3.1	5.6	-5.9
Jun	1.6	1.0	1.0	3.3	5.8	-5.4
Jul	1.6	1.0	1.0	4.0	6.5	-5.2
Aug	1.5	1.0	1.0	4.0	6.5	-5.5
Sep	1.6	1.0	1.0	3.7	6.2	-5.8
Oct	1.7	1.0	1.1	3.2	5.7	-7.9
Nov	1.8	1.1	1.1	3.5	6.0	-6.6
Dec	1.8	1.1	1.2	2.9	5.4	-5.5
Average	1.5	1.0	1.0	3.2	5.7	-6.4

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

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**5. DISTRIBUTION WATER QUALITY**

Month	Jokerville			Chatham Ave			Airport Res.		
	Free Chlorine (mg/L)	Turbidity (NTU)	pH	Free Chlorine (mg/L)	Turbidity (NTU)	pH	Free Chlorine (mg/L)	Turbidity (NTU)	pH
Jan	0.6	0.23	7.4	0.7	0.24	7.7	0.5	0.46	7.7
Feb	0.7	0.20	7.60	0.7	0.20	8.1	0.5	0.50	7.9
Mar	0.6	0.30	7.4	0.7	0.10	7.8	0.4	0.50	7.9
Apr	0.6	0.20	7.7	0.7	0.20	7.9	0.3	0.60	7.9
May	0.5	0.17	7.5	0.6	0.13	8.0	0.2	1.21	7.9
Jun	0.5	0.13	7.8	0.5	0.14	8.2	0.1	1.53	7.8
Jul	0.5	0.14	7.7	0.6	0.11	8.2	0.1	1.11	8.0
Aug	0.5	0.13	7.7	0.6	0.13	8.2	0.2	1.60	8.3
Sep	0.5	0.14	7.5	0.5	0.13	7.7	n/a	n/a	n/a
Oct	0.5	0.17	7.7	0.5	0.15	7.6	0.4	0.79	7.6
Nov	0.5	0.33	7.5	0.7	0.20	7.6	0.9	0.71	7.9
Dec	0.8	0.19	7.7	0.9	0.21	7.7	0.6	0.70	7.8
Average	0.6	0.19	7.6	0.6	0.15	7.9	0.4	0.93	7.9

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

**5B. DISTRIBUTION WATER QUALITY (CONTINUED)**

Month	Hospital			Glen Lyon Inn			Airport Inn		
	Free Chlorine (mg/L)	Turbidity (NTU)	pH	Free Chlorine (mg/L)	Turbidity (NTU)	pH	Free Chlorine (mg/L)	Turbidity (NTU)	pH
Jan	0.9	0.22	9.4	0.9	0.12	8.8	0.7	0.30	7.4
Feb	0.8	0.10	7.4	0.8	0.10	7.8	0.7	0.20	7.6
Mar	0.9	0.16	7.0	0.9	0.09	7.0	0.7	0.13	7.2
Apr	0.8	0.20	7.9	0.7	0.20	7.6	0.6	0.10	8.2
May	0.7	0.11	7.6	0.8	0.18	7.6	0.7	0.20	7.7
Jun	0.7	0.08	7.9	0.8	0.13	7.8	0.7	0.53	7.7
Jul	0.3	0.16	7.4	0.8	0.10	7.7	0.6	0.11	7.6
Aug	0.8	0.11	7.7	1.9	0.18	7.5	0.7	0.11	7.9
Sep	0.7	0.05	7.3	1.0	0.13	7.2	0.6	0.11	7.6
Oct	1.1	0.16	7.2	0.8	0.12	7.2	0.7	0.33	7.3
Nov	1.0	0.15	7.8	0.9	0.11	7.6	0.8	0.30	7.5
Dec	1.0	0.13	7.3	1.0	0.27	7.8	0.8	0.22	7.5
Average	0.8	0.13	7.5	0.9	0.15	7.5	0.7	0.21	7.6

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



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5c. DISTRIBUTION WATER QUALITY (CONTINUED)

Month	Bear Cove Tank			Ferry Terminal			Pioneer Inn		
	Free Chlorine (mg/L)	Turbidity (NTU)	pH	Free Chlorine (mg/L)	Turbidity (NTU)	pH	Free Chlorine (mg/L)	Turbidity (NTU)	pH
Jan	0.7	0.17	7.5	0.5	0.29	7.4	0.9	0.17	9.4
Feb	0.8	0.10	7.6	0.6	0.10	7.5	0.7	0.10	7.4
Mar	0.8	0.10	7.4	0.5	0.20	7.4	0.9	0.16	7.1
Apr	0.7	0.20	7.6	0.5	0.20	7.7	0.7	0.20	8.0
May	0.7	0.15	7.5	0.5	0.21	7.5	0.8	0.09	7.4
Jun	0.6	0.20	7.7	0.5	0.14	7.8	0.9	0.13	7.8
Jul	0.7	0.16	7.7	0.6	0.15	7.7	0.3	0.12	7.6
Aug	0.6	0.18	7.6	0.5	0.13	7.6	0.7	0.11	7.9
Sep	0.6	0.18	7.5	0.5	0.15	7.4	0.9	0.09	7.4
Oct	0.5	0.21	7.4	0.3	0.14	7.5	0.7	0.16	7.2
Nov	0.6	0.21	7.7	0.4	0.22	7.3	0.9	0.11	7.6
Dec	0.7	0.25	7.7	0.6	0.18	7.6	0.8	0.16	7.3
Average	0.7	0.18	7.6	0.5	0.18	7.5	0.8	0.13	7.7

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

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6. CHEMICAL USE

Month	ISOPAC 6		Soda Ash	
	Total (kg)	Dose (mg/L)	Total (kg)	Dose (mg/L)
Jan	3806	26.6	2208	15.6
Feb	3204	26.2	1881	15.4
Mar	3113	23.3	1841	13.8
Apr	3329	24.7	2154	16.0
May	3763	26.1	2235	15.5
Jun	6320	42.6	3030	20.4
Jul	4544	28.7	2174	13.8
Aug	3221	19.0	1209	7.1
Sep	2728	18.3	1136	7.6
Oct	7725	50.0	3899	25.3
Nov	8557	63.3	4305	31.9
Dec	6053	43.2	3305	23.6
Average	4697	32.7	2448	17.2
Total	56363		29376	

*Note: The table displays the monthly totals except for the average Annual Total.*

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**6B. CHEMICAL USE (CONTINUED)**

Month	Filter Polymer		Lime		Carbon Dioxide		Chlorine	
	Total (kg)	Dose (mg/L)	Total (kg)	Dose (mg/L)	Total (kg)	Dose (mg/L)	Total (kg)	Dose (mg/L)
Jan	1.179	0.008	466	4.8	1739	12	170	1.21
Feb	0.939	0.008	606	6.8	1806	15	154	1.28
Mar	0.990	0.007	1071	11.1	1990	15	179	1.37
Apr	1.008	0.008	762	8.0	2134	16	183	1.41
May	0.999	0.007	1078	10.5	852	6	227	1.62
Jun	1.266	0.009	978	9.3	2024	14	176	1.25
Jul	0.687	0.004	869	7.7	2220	14	246	1.60
Aug	0.378	0.002	2268	19.0	2355	14	242	1.48
Sep	0.321	0.002	2523	23.5	2500	17	229	1.57
Oct	0.618	0.004	1906	18.7	2516	17	242	1.69
Nov	0.603	0.004	2045	23.4	2829	21	214	1.80
Dec	0.948	0.007	1989	21.4	2381	17	223	1.76
Average	0.828	0.006	1380	13.7	2112	15	207	1.50
Total	9.936		16563		25346		2486	

*Note: The table displays the monthly totals except for the average annual total.*

Filter Polymer – LT 20 is the low dosage polymer used to aid filtration.

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7. BACTERIOLOGICAL DATA

Routine bacteriological tests were performed by BC Centre for Disease Control (BCCDC) Laboratory Services in Vancouver.

Month	Samples Analyzed		Number of Positive Results		
	Raw	Treated	Violations	Positive TC	Positive EC
January	1	11	0	0	0
February	1	11	0	0	0
March	1	11	0	0	0
April	1	11	0	0	0
May	1	11	0	0	0
June	1	11	0	0	0
July	1	11	0	0	0
August	1	11	0	0	0
September	1	11	0	0	0
October	1	11	0	0	0
November	1	11	0	0	0
December	1	11	0	0	0

Total Coliform (TC) and Fecal Coliform (FC) Tests are the routine monthly bacteriological tests performed on samples collected throughout the distribution system.