



**Collingwood Public
Utilities**



**Devils Glen Country Club
Communal Water Treatment Plant
2006
Annual Compliance Report**



**Operated By
Collingwood Public Utilities**

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Definitions

Collingwood Public Utilities	CPU
Ministry of the Environment	MOE
Flow	(m ³ /d) cubic metres per day
Weight	(kg) kilograms
Chlorine Residuals	(mg/l) milligrams/litre
Chlorine dosages	(mg/l) milligrams/litre
Temperature	(°C) degree Celsius
Turbidity	(NTU) nephelometric turbidity unit
Conditions	Visual checks
Bacteriological Sample	Sample count / Safe or adverse
Organic Sample	(mg/l) milligrams/litre (unless expressed otherwise)
Pesticides & PCB	(mg/l) milligrams/litre (unless expressed otherwise)
Inorganic	(mg/l) milligrams/litre (unless expressed otherwise)
Physical	(mg/l) milligrams/litre (unless expressed otherwise)
Maximum allowable concentration	MAC
American Water Works Association.	(AWWA)

Section 1 Drinking Water System General Information

This report has been prepared in accordance with the reporting requirements of the Safe Drinking Water Act 2002 O. Reg. 170/03, s 11 (6,f) , (7) , (8) & 10.

Collingwood Public Utilities is pleased to provide Devils Glen Country Club with this Communal Water Treatment Plant 2006 Annual Compliance Report. CPU's goal is to provide our clients with the cleanest, safest and most dependable supply of potable water possible. The following is general information pertaining to Devils Glen Communal Water treatment Plant:

MOE PLANT CLASSIFICATION	: Water Treatment System Class III
DRINKING-WATER SYSTEM NUMBER	: 260062972
DRINKING-WATER SYSTEM CATEGORY	: Non-Municipal Year-Round Residential
OPERATING AUTHORITY	: Collingwood Public Utilities
PLANT LOCATION	: RR#1, Glen Huron, Part of Lot 7, Concession 11, Clearview Township

Section 1.1 Description of the Drinking Water System

Devils Glen Communal Water Treatment Plant is an enhanced coagulation membrane filtration surface water treatment plant. Surface water is taken from the Mad River through a submerged 3mm screened inlet. Raw water flows by gravity into the raw water well in the Snowmaking Building. The raw water is then pumped by two (2) 25hp vertical turbine pumps (one duty one standby) through a 1.0 micron self cleaning strainer to remove large particulate matter. The raw water pumps generate a pressure of 1300kpa in order to discharge raw water at the treatment facility located at the top of the ski resort.

Raw water entering the treatment facility is dosed with pre-treatment chemicals, namely sulphuric acid for pH adjustment and Aluminum Chloride Hydroxide Sulphate (Sternpac) for coagulation. It should be noted that pH adjustment is necessary to optimize the coagulation process. Following the addition of the above noted chemicals the influent passes through a static mixer before discharging into a flocculation tank. The influent is then retained in the flocculation tank for approximately 15 minutes and mixed slowly to facilitate flocculation. This part of the process releases the dissolved organic matter that is in solution and changes it into a particulate which can be easily removed by the membrane filtration process.

The Zenon membrane filtration system consists eight (8) 500sq/ft modules, one (1) permeate pump, one (1) backpulse pump, one (1) backpulse tank and one (1) air blower. The membranes have a pour size of 0.035 micron and as such remove all particulate matter greater than this. The permeate pump creates a slight vacuum which sucks clean (permeate) water through the membrane leaving the particulate matter in the process tank.

The permeate water is then disinfected by the addition of sodium hypochlorite. The chlorinated permeate water then flows to the two (2) 140 m³ combination chlorine contact chambers/reservoirs. The finished water then flows into two (2) separate distribution systems. One system is fed by gravity and flows to the bottom of the hill to service the lodge and the homes within the resort. The second system is fed by high lift distribution pumps and services the condo corporations at the top of the hill.

The fouling of the membranes is controlled by a regular cleaning cycle that consists of reversing the flow of clean water stored in the backpulse tank back through the membranes under positive pressure. This process concentrates the raw water which in turn is rejected to waste. It should be noted that this reject water is discharged to a septic tank and weeping bed. Air is also used to prevent fouling of the membranes, this is achieved by injecting it at the bottom of the tank thus scouring the membranes with air bubbles as they rise to the surface. This air scouring process also assists in keeping the concentrated solids in suspension, prior to reject.

Devils Glen Communal Water Treatment Plant is continually monitored 24 hours a day 365 days a year. The treated water parameters monitored are Turbidity, Flow, Pressure, Chlorine Residual, Temperature and pH. This is achieved through the SCADA (Supervisory Control And Data Acquisition) system.

Section 2 Compliance Statements

- Collingwood Public Utilities ensures compliance with the ODWS by establishing a sampling schedule based on O. Reg. 170/03. All sampling is performed in accordance with the Ministry of the Environment’s “Guide to Collection and Submission of Samples for Laboratory Analysis”. Compliance is also ensured by having all laboratory samples analyzed by a laboratory accredited by the Canadian Association for Environmental Analytical Laboratories (C.A.E.A.L.) of Canada.
- Collingwood Public Utilities ensures compliance is met with the requirements of the ODWS by operating the water treatment facility so that water intended for human consumption does not exceed the standards described in the ODWS. These standards are defined as Maximum Acceptable Concentration (MAC) standards, and Interim Maximum Acceptable Concentration (IMAC) standards. In the event that ODWS standards are exceeded, CPU will follow the requirements of O. Reg. 170/03 – in notifying the Medical Officer of Health, the MOE and the Owner, perform corrective action as required, and if necessary, post a warning notice in a prominent location.
- Collingwood Public Utilities monitors the chemical parameters (non-health related) that may impair the taste, odour or colour of water or which may interfere with good water quality control practices which are reported as Aesthetic Objectives (AO).
- Collingwood Public Utilities ensures that the water leaving the treatment plant and entering the distribution system is disinfected to meet those requirements described in Ministry of the Environment (MOE) Procedure for Disinfecting Water in Ontario as amended from time to time.
- Collingwood Public Utilities ensures that all chemicals used in the treatment process and all materials contacting the water meet both the American Water Works Association (AWWA) quality criteria as set out in AWWA standards and the American National Standard Institute (ANSI) safety criteria as set out in ANSI standard NSF/60 or NSF/61.
- Collingwood Public Utilities ensures that the Overall Responsible Operator is an operator who holds a valid license that is applicable to *RAB* and that this is the same or higher class than the class determined for the water treatment plant in accordance O Reg. 128/04 as amended from time to time.
- Collingwood Public Utilities exercises due diligence in ensuring that at all times, the works and related equipment and appurtenances used to achieve compliance are properly operated and maintained.

Section 3 Results of External Performance Audits

The following section discusses performance audits conducted by external agencies.

No external audits were performed during this reporting period.

It should be noted that O. Reg. 170/03 of the Safe Drinking Water Act subsection 21-3 states that “If a drinking-water system commences operation or an alteration is made to a drinking-water system, the owner of the system shall ensure that, no later than 30 days after the system commences operation or the alteration is completed, a professional engineer who has experience in sanitary engineering related to drinking-water systems prepares a report that complies with section 21-5”. And that a report was prepared in accordance with this section and a notice was given to the Director.

During this reporting period to our knowledge the professional engineer’s compliance report has not been submitted to the MOE.

Section 4 Treatment Chemicals Used

The following section discusses the chemicals used in the treatment process.

- Sodium Hypochlorite 12% solution
- Aluminum Chloride Hydroxide Sulphate
- Sulphuric Acid 93% solution

The following table shows total chlorine used per month, average post filtration chlorine dosage and average free chlorine residual after contact time. In addition average raw water temperature

Month	Total Chlorine Used (kg)	Ave.(Free) treatment Residual	Ave. Post Chlorine Dose (mg/l)	Ave. Water Temp. °C
January	26.5	1.08	6.70	8.0
February	21.7	1.02	6.46	5.0
March	20.4	0.99	4.90	3.0
April	18.4	0.90	4.78	7.0
May	17.6	1.02	6.73	11.0
June	13.3	0.97	4.85	16.0
July	11.7	0.84	2.62	19.0
August	8.2	0.78	3.00	20.0
September	8.0	0.71	3.50	16.0
October	5.6	0.74	3.37	12.0
November	3.3	0.78	3.30	10.0
December	6.7	1.13	2.40	7.2
Total/ Ave	161	0.91	4.38	11.2
Max	26.5	1.13	6.73	20.0
Min	3.3	0.71	2.40	3.0

The following table shows total coagulant and sulphuric acid usage per month, average coagulant dosage, average raw water turbidity and average finished water turbidity.

Month	Aluminum Chloride Hydroxide Sulphate (litres)	Coagulant dosage mg/l	Ave. Raw Water Turbidity	Ave. Finished Water Turbidity	Sulphuric Acid 93% (litres)
January	210	10.8	1.9	0.08	*
February	210	12.8	2.1	0.08	*
March	400	27.6	6.8	0.05	*
April	874	60.1	4.6	0.05	*
May	690	95.3	3.0	0.05	*
June	610	93.1	3.1	0.04	250
July	706	85.3	11.0	0.05	197
August	703	93.2	3.9	0.04	220
September	693	87.3	3.5	0.04	220
October	470	85.3	6.8	0.04	170
November	193	86.1	5.0	0.05	80
December	485	87.2	1.9	0.07	142
Total/ Ave	520	68.6	4.5	0.05	183
Max	874	95.3	11.0	0.08	250
Min	193	10.8	1.9	0.04	80

* Sulphuric Acid was not used for pH adjustment prior to June 2006 and its use was confirmed by the treatability study

Section 5 Required Reports to the Ministry of the Environment

In general the number of samples collected for analysis exceeded the minimum quantities set out by O. Reg. 170/03 of the Safe Drinking Water Act. The following is a summary of reports made to the MOE under subsection 18 (1) of the Act or 16-4 of Schedule 16 for the period covered by this report.

Samples collected from the distribution system and reported by CPU

Incident Date	Parameter	Result	Unit of Measurement	Corrective action	Corrective action date
July 13 2006	Total Trihalomethanes	0.1455 running average	mg/l	Refer to section 5.1	Aug 1 st 2006 AWQI # 65828
July 31 2006	Total Trihalomethanes	0.14525 running average	mg/l	Resample to confirm the THM results are below 0.100mg/l Refer to section 5.1	Aug 1 st 2006 AWQI # 66549
October 20 2006	Total Trihalomethanes	0.11875 running average	mg/l	Refer to section 5.1	October 23 2006 AWQI # 68619
Note: Incident date is represented by the sample date : Corrective action date is represented by the date the incident was resolved by confirmation of laboratory results					

Samples collected from the distribution system and reported by Devils Glen Staff

Incident Date	Parameter	Result	Unit of Measurement	Corrective action	Corrective action date
February 1 st 2006	Background > 200	> 200	100ml	Flushed Main Resampled Samples collected before and after affected site	Feb 3 2006 AWQI # 62321
February 8 th 2006	Background	> 200	100ml	Flushed Main Resampled Samples collected before and after affected site	Feb 11 2006 AWQI # 62438
Note: Incident date is represented by the sample date : Corrective action date is represented by the date the incident was resolved by confirmation of laboratory results					

Section 5.1 **Explanation of Reports**

There were two (2) exceedances to report in 2006, both where for total trihalomethanes (THMs) running average in the distribution system. The Regulation states that the results for total trihalomethanes based on a running four quarter average must remain under 0.100mg/l.

The plant was commissioned in November of 2005 and sampling showed that THMs were of concern as initial results were in excess of 0.100mg/l. These results were 0.170mg/l in December 2005, 0.140mg/l in February 2006, 0.180mg/l in May 2006 and 0.092mg/l in August 2006. This last result triggered an adverse condition under the regulation as the four quarter running average was 0.1455mg/l which is greater than 0.100mg/l.

On notification from the laboratory on July 13 2006 of this exceedance all necessary Notices of Adverse Test Result forms were submitted to the Ministry of Environment and Medical Officer of Health within the regulated time frame.

A second adverse condition occurred regarding total trihalomethanes on the next quarter sampling. And although the actual result of 0.063mg/l is well under the 0.100mg/l level the four quarter running average of 0.11875mg/l was still in exceedance. Again on notification from the laboratory on October 10 2006 all necessary Notices of Adverse Test Result forms were submitted to the Ministry of Environment and Medical Officer of Health within the regulated time frame.

Section 5.2 **Corrective Actions**

Prior to the first reportable adverse result CPU consulted with the supplier of the coagulant chemical and asked for their assistance in determining if the type of coagulant being used was optimum for the removal of organics. The Supplier's representative conducted jar tests on site and proved that the selected coagulant was appropriate. However, the representative questioned the use of citric acid for pH control and after consulting with his chemist concluded that citric acid was contributing to the THM problem. As a result the use of citric acid ceased and it was replaced with sulphuric acid.

Although THM results improved it was agreed that a treatability study should be conducted to determine the optimum coagulant, acid and chlorine dosage rates to further reduce the potential of THM formation. KMK Consultants Ltd. was appointed by Devils Glen Country Club to undertake the treatability study. The study included jar testing of various combinations of coagulant and pH adjustment chemicals, online testing, and sending samples for laboratory analysis. The study was completed by mid July 2006. At this time another THM sample was collected from the distribution system which produced a result of 0.092mg/l. As a result of the completion of the study and the implementation of the recommendations progress was made and by the final quarter sampling of 2006 a further reduction in THMs to 0.063mg/l was achieved. This is well below the 0.100mg/l as regulated by the Safe Drinking Water Act. The final treatability report was completed on November 28, 2006 and all mitigating measures recommended by the report have been implemented.

Section 6 Summary of Results of the Required Tests

Microbiological Testing done under Schedule 10, 11 or 12 of Regulation 170/03 during the period covered by this annual report for 2006

	Number Of Samples	Range of E. Coli or Fecal Result (min #)-(max#)	Range of Total Coliform Results (min #)-(max#)	Range Of Background Counts (min #)-(max#)	Range of HPC Results (min #)-(max#)
Raw	52	25 (min) – >80(max)	3 (min) - >60(max)		
Treated	52	0 (max)	0 (max)	0 (max)	<10 (max)
Distribution	136	0 (max)	0 (max)	0 min- >200 max	<10 (min) 2000 (max)*

Distribution system microbiological samples are collected by Devils Glen staff and results of analysis are also reported by Devils Glen staff

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this annual report for 2006

	Number of Samples	Range of Results
Turbidity	Continuous analyzers	0.03 min 0.083max
Chlorine	Continuous analyzers	0.36 min. 1.70 max

Summary of Inorganic parameters tested during the period covered by this annual report.

	Date Of Samples				MAC
	Feb	May	August	October	mg/l
Antimony	<0.001	<0.001	<0.001	<0.001	0.006
Arsenic	<0.0006	<0.0006	<0.0006	<0.0006	0.025
Barium	<0.01	<0.01	<0.01	<0.01	1.0
Boron	<0.008	<0.008	<0.008	<0.008	5.0
Cadmium	<0.0005	<0.0005	<0.0005	<0.0005	0.005
Chromium	<0.0006	<0.0006	<0.0006	<0.0006	0.05
Fluoride	<0.05	<0.05	<0.05	<0.05	1.5
Lead	0.0005	0.0005	0.0005	0.0005	0.1 at a point with most residence time in the distribution

					system
Mercury	<0.0001	<0.0001	<0.0001	<0.0001	0.001
Nitrate + Nitrite (as N)	1.51	1.04	0.74	0.61	10.0
Nitrite	<0.05	<0.05	<0.05	<0.05	1.0
Nitrate	1.51	1.04	0.74	0.61	10.0
Selenium	<0.0008	<0.0008	<0.0008	<0.0008	0.01
Sodium	9.57	12.3	11.2	10.3	greater than 20 to be reported
Uranium	0.0002	0.0002	0.0002	0.0002	0.02

Operational testing done under Schedule 24(Organics) of Regulation 170/03 during the period covered by this annual report for 2006.

Note: non- municipal year round residential system collect at least one water sample is taken 60 months and tested for every parameter set out in Schedule 24 listed in the table below

		MAC
	Dec 2005	mg/l
Alachlor	<0.0005	0.005
Aldicarb	<0.00015	0.009
Aldrin +Dieldrin	<0.00007	0.0007
Atrazine	<0.0005	0.005
Azinphos-methyl	<0.002	0.02
Bendiocarb	<0.002	0.04
Bromoxynil	<0.0005	0.005
Carbaryl	<0.005	0.09
Carbofuran	<0.005	0.09
Chlordane(Total)	<0.0007	0.007
Chlorpyrifos	<0.001	0.09
Cyanazine	<0.001	0.01
Diazinon	<0.001	0.02
Dicamba	<0.001	0.12
2,4-Dichlorophenol	<0.0005	0.9
DDT	0.003	0.03
24-D	<0.001	0.1
Dicoflp-methyl	<0.0009	0.009
Dimethoate	<0.0025	0.02
Dinoseb	0.001	0.01
Diquat	<0.005	0.07
Diuron	<0.01	0.15
Glyphosate	<0.01	0.28
Heptachlor + heptachlor epoxide	<0.0003	0.003
Lindane (Total)	<0.0004	0.004
Malathion	<0.005	0.19
Methoxychlor	<0.09	0.9
Metolachlor	<0.00011	0.05

Metribuzin	<0.00025	0.08
Paraquat	<0.001	0.01
Parathion	<0.001	0.05
Pentachlorophenol	<0.0005	0.06
Phorate	<0.0005	0.002
Picloram	<0.05	0.19
PCB	<0.0002	0.003
Prometryne	<0.00025	0.001
Simazine	<0.001	0.01
Temephos	<0.01	0.28
Terbufos	<0.0007	0.001
2,3,4,6-Terachlorophenol	<0.0005	0.1
Triallate	<0.001	0.23
2,4,6,-Trichlorophenol	<0.0005	0.005
Trifluralin	<0.001	0.045
2,4,5-T	<0.001	0.28
Trichlorophenoxy acetic Acid	<0.0002	0.28
Benzo(a)pyrene	<0.00001	0.00001

Trihalomethanes quarterly sample results

	Date Of Samples				MAC
	Feb	May	August	Oct	mg/l
Benzene	<0.0002	<0.0002	<0.0002	<0.0002	0.005
Carbon Tetrachloride	<0.0001	<0.0001	<0.0001	<0.0001	0.005
1,2-Dichlorobenzene	<0.0001	<0.0001	<0.0001	<0.0001	0.005
1,4-Dichlorobenzene	<0.0002	<0.0002	<0.0002	<0.0002	0.001
1,2-Dichloroethane	<0.0002	<0.0002	<0.0002	<0.0002	0.005
1,1-Dichloroethane	<0.0002	<0.0002	<0.0002	<0.0002	0
1,1-Dichloromethylene	<0.0003	<0.0003	<0.0003	<0.0003	0.014
Dichloromethane	<0.0001	<0.0001	<0.0001	<0.0001	0.05
Monochlorobezene	<0.0001	<0.0001	<0.0001	<0.0001	0.08
Tetrachloroethylene	<0.0002	<0.0002	<0.0002	<0.0002	0.03
Total Trihalomethanes					
* Note:	0.140	0.150	0.091	0.063	0.100^a
Trichloroethylene	<0.0002	<0.0002	<0.0002	<0.0002	0.005
Vinyl chloride	<0.00017	<0.00017	<0.00017	<0.00017	0.002
Xylene	<0.001	<0.001	<0.001	<0.001	0.05

^a **Note:** The MAC for Total Trihalomethanes is based on a four (4) quarter running average. The current running average for the Devils Glen system is 0.111 mg/l

Section 7 Items of Significant Investment in the Water System in 2006

The following is a brief description of items of significant expenses and system investment incurred during the period covered by this annual report.

Description	Monetary Expenses Incurred Investment
Treatability Study	\$10,000

This completes the Devils Glen Communal Water Treatment Plant 2006 Annual Compliance Report. It gives CPU great pleasure to provide this report and to reaffirm CPU’s commitment to provide the resort with the cleanest, safest, most dependable supply of portable water for this year and the years to follow. If you have any questions or comments about this report please do not hesitate to contact any of the following personnel.

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