Town of Petrolia
Bright's Grove
Water Treatment Plant

2010
Annual Report

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APPENDICES

LIST OF TABLES

1. INTRODUCTION

1.1 BACKGROUND

The Petrolia WTP is located in the City of Sarnia at Bright's Grove, approximately 20 km from the Town of Petrolia. The municipal street address of the plant is 2701 Lakeshore Road.

The Petrolia Water Treatment Plant (WTP) currently supplies potable water to the Town of Petrolia and other service area municipalities including the Township of Enniskillen, Village of Oil Springs and Township of Dawn-Euphemia. The plant also supplies water to portions of Brooke-Alvinston, Sarnia, St. Clair and Plympton-Wyoming. The total population presently served by the Petrolia WTP is reported at 9639.

The Petrolia WTP provides treatment for water drawn from Lake Huron. The main treatment processes in the plant in 2010 were membrane filtration, fluoridation and chlorination. The permitted capacity for the plant to take water from Lake Huron is 15,586 m^3/d, although the plant is approved for a treatment capacity of 12,000 m^3/d.

This Report is the 2010 Annual Report for the Town of Petrolia Bright's Grove WTP and follows the format presented in Safe Drinking Water Act, O Reg. 170/03.

1.2 MAINTENANCE COSTS

Table 1-1 lists the maintenance costs of the Petrolia Water Treatment Plant.

Table 1-1 Petrolia Water Treatment Plant Maintenance Costs

Item	Cost ($)
Equipment repair and maintenance	61,786
Building Maintenance	12,852
Grounds maintenance	4,294
Data radio & SCADA maintenance	8,281
Intake maintenance	1,983
Effluent pump maintenance	4,386
Total	93,582

1. Expenses shown are preliminary figures only based on information supplied from Manager of Finance for the Town of Petrolia on December 8, 2010.

2. Lowlift pump VFD repairs were completed @ a cost of $2939.

3. HACH completed yearly analyser preventive maintenance & calibration @ a cost of $15666.

4. Marsh completed yearly calibrations @ a cost of $3200.

5. Siemens completed yearly chlorinator preventive maintenance @ a cost of $3046.

6. Atlas Copco completed yearly air compressor preventive maintenance @ a cost of $5206.

7. Harper Detroit Diesel & Albert Generator Service completed generator maintenance @ a cost of $2103.

8. Bluewater Plumbing completed backflow device yearly preventive maintenance & piping repairs @ a cost of $1162.

9. W.J. Barnes completed HVAC yearly preventive maintenance @ a cost of $586.

10. Sentry Fire completed extinguisher yearly maintenance @ a cost of $421.

11. Bomar completed electrical maintenance @ a cost of $2999.

12. Wyoming Tree removed an infected Ash tree @ a cost of $460.

1.3 TERMS AND CONDITIONS OF THE CERTIFICATE OF APPROVAL

Table 1-1 lists the headings of the Terms and Conditions of the CofA.

Table 1-3 Terms and Conditions of the CofA

Section No.	Heading
1	Facility description
2	Definitions & information
3.1 to 3.4	Compliance
3.5	Build operate & maintain in accordance
3.6 to 3.8	Interpretation
3.9 to 3.10	Other legal obligations
3.11 to 3.13	Adverse effects
3.14 to 3.15	Change of Owner
4	Performance
5	Monitoring & recording
6	Operations & maintenance

2. CERTIFICATIONS

This section covers all certifications related to Petrolia WTP and distribution system, including:

- Certificates of approval;
- Permits to take water;
- Facility/distribution system classification; and,
- Operator classification.

2.1 CERTIFICATES OF APPROVAL

Table 2-1 summarizes the Certificates of Approval (CofA), which can be found in **Appendix A**.

Table 2-1 Certificates of Approval

Certificate Type	Certificate Number	Date Issued	Brief Description of Works Approved
Water Treatment Plant	1195-6R8RX3	Dec 7, 2006	Contains several conditions relating to upgrades to plant performance, existing operations, maintenance, monitoring and recording.

2.2 PERMIT TO TAKE WATER

The Permit to Take Water (PTTW) for the Petrolia WTP is summarized in Table 2-2 and attached in **Appendix B**.

Table 2-2 Permit To Take Water (PTTW)

Permit Number	Source	Issued Date	Expiry Date	Permitted Amount of Taking
5412-6RNNF5	Lake Huron	Sept 29, 2007	April 30, 2013	15,586 m3/day

2.3 FACILITY CLASSIFICATION

Details of Petrolia facility certifications are presented in Table 2-3.

Table 2-3 Facility Classification

Facility Type	Facility Name	Facility Level	Certificate No.	Date of Issue
Plant	Petrolia Water Treatment Plant	II	WT #805	November 9, 2005
Distribution	Petrolia Water Distribution System	II	WD #2908	November 1994

2.4 OPERATOR CERTIFICATION

The Petrolia Water Supply System (PWSS) was operated by the Town of Petrolia & Waterworks Environmental Services Inc. Effective November 15, 2010 Ontario Clean Water Agency became the operating authority for the Petrolia Water Treatment Plant and the main transmission line. Staff members responsible for the water supply and distribution system are licensed operators with their certifications presented in Table 2-4.

Table 2-4 Operator Certification

Name	Position	Certificate Level		Certification Number		Expiry Date	
		Plant	Dist.	Plant	Dist.	Plant	Dist.
Marc Trottier	WTP ORO	IV	III	656	3727	10/31/13	12/31/11
Wendy Trottier	WTP OIC	III	TOKEN I	3326	TOKEN I	08/31/11	TOKEN I
Mike Young	WTP Operator	III	III	3977	11744	01/31/12	11/30/12
Sheldon Jones	WTP Operator	I	II	17844	3328	02/28/12	08/31/11
Mike Weber	WTP Senior Operator	III	III	12011	56617	02/12	07/11
Jack Brown	WTP Operator	II	II	62278	11041	02/13	06/13
Troy Simpson	WTP Operator	OIT	OIT	OT66390	OT66391	10/11	10/11
Renee Hornick	WTP ORO	3	3	4206	17076	04/11	07/11

3. WATER FLOWS

This section gives a summary of records made under the permit to take water.

This section also gives a summary and discussion of the quantity of treated water supplied in 2010 compared to the rated capacity specified in the CofA, including monthly average and maximum daily flows.

Finally, this section accounts for the wastewater production from the water treatment process.

3.1 RAW WATER FLOWS

A summary of the daily quantities of water being taken from Lake Huron (i.e., raw water flow rates) are shown in Table 3-1.

The permitted capacity for the plant to take water from Lake Huron is 15,586 m^3/d. The raw water supplied to the treatment system should not exceed this value at anytime.

Table 3-1 shows that the highest maximum day demand of 8478 m^3/d has not exceeded the flow allowed in the PTTW of 15,586 m^3/d.

Table 3-1 Raw Water Flows for 2010

Date	Total (m^3)	Max. Day (m^3/d)
January	128333	5139
February	118526	5257
March	129153	4773
April	133078	5378
May	161435	7218
June	158773	6862
July	172793	8478
August	175756	7451
September	156908	6915
October	156192	6216
November	128687	5188
December	139158	6758
2010 Total/Max	**1758792**	**8478**

3.2

3.3 TREATED WATER FLOWS

The treated water flows for 2010 are shown in Table 3-2.

Table 3-2 shows that the plant's rated capacity of 12000 m^3/d has not been exceeded in 2010. The maximum daily flow was 6979 m3 or 58% of rated capacity.

Table 3-2 Treated Water Flows for 2010

Date	Total(m^3)	Max. Day (m^3/d)	% Max of Rated Capacity
January	112562	4147	35
February	103597	4294	36
March	113271	3854	32
April	117086	4297	36
May	142690	5921	49
June	140235	5593	47
July	154661	6979	58
August	155732	6163	51
September	137971	5696	47
October	136553	5053	42
November	112499	4148	35
December	122652	5383	45
2010 Total/Max	**1549509**	**6979**	**58**

3.4 WASTEWATER FLOWS

Wastewater is generated from flushing & cleaning the strainers & racks. Table 3-3 shows that wastewater production in any given month reached up to 11% of the raw water flows.

Table 3-3 Wastewater Flows for 2010

Date	Total Monthly Wastewater Volume (m^3)	% Wastewater to Raw Flow
January	13533	11
February	12893	11
March	13649	11
April	13521	10
May	15487	10
June	15264	10
July	14708	9
August	16265	9
September	15741	10
October	16555	11
November	13932	11
December	13988	10
2010 Total/Max.	**175534**	**10**

4. CHEMICALS

This section gives a summary of listing treatment chemicals used, including average dosage rates with special reference to any abnormal usage.

4.1 PROPERTIES

Table 4-1 shows the properties of the chemicals used at Petrolia WTP.

Table 4-1 Properties of Chemical Feed Systems

Chemical	Purpose	Concentration (%)	Specific Gravity (g/mL)	Target Dosage (mg/L)
Chlorine gas	❖ Pre-chlorination	100	❖ -	❖ 1.3-2.5 mg/L
Liquid Polymer	❖ Wastewater settling	50	❖ 1.10	❖ 4-25 mg/L
Hydrofluorosilicic acid	❖ Fluoridation	25	❖ 1.204	❖ 0.4 - 0.8 mg/L

4.2 USAGE

Table 4-2 summarizes the annual chemical usage and monthly average dosages.

Table 4-2 Annual Chemical Usage at Petrolia WTP for 2010

Chemical	Volume (L) or Weight (kg)	Range of Monthly Avg. Dosages (mg/L)	Comments of Any Abnormal Usage
Chlorine gas	3124 kg	1.6 to 2.0	Varies with raw turbidity
Liquid Polymer	1752 kg	5.4 to 16.0	Varies with raw turbidity
Hydrofluorosilicic acid	2578 kg	0.3 to 0.4	0.2 mg/l exists naturally in feedwater

5. SAMPLING ANALYTICAL RESULTS

5.1 SAMPLING PROGRAM

5.2 SAMPLING RESULTS

5.2.1 Introduction

Appendix D contains the sampling results for 2010, which are summarized in tables.

5.2.2 Microbiological

The bacteriological data in the raw, treated and distribution water supply are shown in Tables D-5 to D-7.

If the treated or distribution water contains more than 500 colonies per mL on a HPC analysis or more than 200 BKG colonies on a total Coliform membrane filter analysis, then the sample is considered adverse. Moreover, if either the treated or distribution water contains *any* total Coliform (TC) or fecal Coliform (FC), then the sample is considered adverse. The corrective action in all cases is to reanalyze and follow the instructions as directed by the Medical Officer of Health.

The heterotrophic place count (HPC) is an indicator only of the general bacteriological content of the drinking water. High HPC levels are not associated with waterborne disease outbreaks. Proper chlorine disinfection should reduce the HPC levels to less than 10 cfu/ml. HPC levels above 500 cfu/ml although aren't reported as adverse but should be investigated. They aren't a requirement of LCHS (Lambton Community Health Services) & therefore don't result in a boil water advisory.

Out of the 316 samples taken, there was no adverse water sample in 2010 as shown in Table 5-1.

Table 5-1 Adverse Microbiological Samples[1]

Date	Location	Exceedances	Comments
			❖

5.2.3 Turbidity/Disinfection

Raw water turbidity is greatest during the spring run-off and fall turnover when temperatures and flows are low. Based on the online surface scatter turbidity meter data, the raw water turbidity reached as high as 406 NTU, and had an average of 11 NTU.

Filtrate turbidity at Petrolia WTP is measured continuously on the each rack using three separate on-line HACH laser turbidity meters. Grab samples results are recorded on log sheets daily. SCADA captures data every 1 minute. Treated turbidity grab samples ranged from 0.018 to 0.032 with an average of 0.022 NTU.

5.2.4 Distribution Chlorine Residuals

O Reg 170/03 states that a minimum free chlorine residual of 0.2 mg/L or a minimum combined chlorine residual of 1.0 mg/L should be maintained in the water distribution system.

O Reg 170/03 requires and states that the distribution water quality is considered to be adverse if the free chlorine residual is measured to be less than 0.05 mg/L. The corrective action is to restore chlorination immediately and follow the instructions as directed by the Medical Officer of Health.

A statistical analysis of the free chlorine residuals measured in the distribution system is presented in Table 5-2.

Table 5-2 Distribution Free Chlorine Residuals

Location	Sample Count	Minimum	Maximum	Average
Distribution System	312	0.49	1.80	1.19

Table 5-2 shows 0 samples being below 0.2 mg/L.

5.2.5 Wastewater Clarifier Effluent Total Suspended Solids

Table 5-3 shows the results of monthly sampling.

Table 5-3 Wastewater Clarifier Effluent Total Suspended Solids

Location	Sample Count	Minimum	Maximum	Average
Wastewater Clarifier Effluent	12	ND	35	18

5.2.6 Other Parameters

Table 5-4 lists the deviations or exceedances of the other water samples summarized in **Appendix D.**

Table 5-4 Deviations from ODWS and Regulation

Parameter	Location	Limit	Comments
Low Distribution Pressure	Transmission line from Mandaumin to Bright's Grove WTP	>20 psi	Severe weather conditions prevented the operator from getting to the Booster station to rectify a communication fault. During this period the pressure in the system may have been below 20 psi.

6. COMPLIANCE WITH TERMS AND CONDITIONS OF THE CERTIFICATE OF APPROVAL (COFA)

This section provides a statement as to compliance with all of the terms and conditions of the Certificate of Approval (CofA), and a detailed description of the measures taken to ensure compliance with the CofA, including any supporting data or other information.

6.1 STATEMENT AS TO COMPLIANCE WITH TERMS AND CONDITIONS OF COFA

Appendix F contains a checklist of the items that was used to determine compliance with the latest CofA. This checklist includes the requirements of all the Terms and Conditions in this Certificate.

6.2 MEASURES TAKEN TO ENSURE COMPLIANCE WITH TERMS AND CONDITIONS OF COFA

See following tables.

7. NON-COMPLIANCE WITH TERMS AND CONDITIONS OF THE CERTIFICATE OF APPROVAL (COFA)

This section provides details of any non-compliance in 2010 with the Terms and Conditions of the latest Certificate of Approval (CofA), as well as details of how and when the non-compliance was corrected.

Table 7-1 lists the non-compliance items that were extracted from the shaded items in Table F-1 in **Appendix F**.

Table 7-1 Non-Compliance Items in the Terms and Conditions of the CofA

	Description	Resolution
1	The record system did not allow the reader to unambiguously identify the person who made the logbook entry.	This has been resolved with a new logbook to and training to the operator.
2	Plans and drawings are available for the water treatment plant and the booster pumping station but not the elevated tower.	Ongoing.

8. DECLARATION OF COUNCIL RESOLUTION

8.1 DECLARATION

DECLARATION	
I, the undersigned, hereby declare that, to the best of my knowledge, the information contained in this report and the information in support of this report is complete and accurate in every way.	
Name	**Title**
Marc Trottier	Waterworks Environmental Services Inc
2435 Lisa Crescent Bright's Grove, Ontario N0N 1C0	Tel: (519) 331-1383 Fax: (519) 869-6679 E-mail: marc@waterworksmw.com
January 18, 2011	

8.2 COUNCIL RESOLUTION

Note: The author of this report requests that this report be presented to council & a motion to accept the report is included in the official minutes. Please sign this declaration & return a copy to the WTP ORO.

COUNCIL RESOLUTION	
I, the undersigned, hereby declare that this report has been presented to council.	
Name	**Title**
Address	**Contact Numbers**
Town of Petrolia 411 Greenfield Street Petrolia, Ontario N0N 1R0	Tel: (519) 882-2350 Fax: (519) 882-3373
Date	**Signature**

9. REFERENCES

MOE, 2002 Ministry of the Environment. 2002. Safe Drinking Water Act.

KMK, 2001 KMK Consultants Limited. February 2001. Petrolia Water Treatment Plant, First Engineers' Report.

KMK, 2004 KMK Consultants Limited. January 2004. Town of Petrolia, Petrolia Water Treatment Plant Design Report. Membrane Filtration Option to Meet Ontario's New Drinking Water Regulations.

MOE, 2010 Ministry of the Environment. 2010. Ontario Drinking Water Systems Regulations.

APPENDICES

APPENDIX A

CERTIFICATES OF APPROVAL

APPENDIX B

PERMIT TO TAKE WATER

APPENDIX C

SAMPLING PROGRAM

APPENDIX C

Table C-1 Sampling Protocol

Parameter	Frequency Required	Additional Frequency	Chemicals Analyzed
Raw Water			
Microbiological	Weekly	-	Table A (excluding HPC or BKG)
Turbidity	Continuous	Daily (On-line Reading)	Turbidity
pH	Continuous	Daily (Grab sample measurement)	pH
Temperature	Continuous	Daily (Grab sample)	Temperature
Treated Water			
Microbiological	Weekly	-	Table A
Turbidity	Continuous	Daily (On-line Reading)	Turbidity
Chlorine	Continuous	Daily (Grab sample measurement – free and total)	Free Chlorine
Volatile Organics	Quarterly	-	Table B
Inorganics	Annually	-	Table C
Nitrates/Nitrites	Quarterly	-	Nitrates/Nitrites
Pesticides & PCB	Quarterly	-	Table D
Fluoride	Continuous	Daily (Grab sample measurement)	Fluoride
pH	Continuous	Daily (Grab sample measurement)	pH
Distribution Water			
Microbiological	Weekly (Total of 15 Monthly)[1]	Weekly (Total of 24 Monthly)[1]	Table A
Chlorine	Grab samples simultaneous to microbiological samples	-	Free Chlorine
Volatile Organics	Quarterly (THMs at a point reflecting maximum residence time in the distribution system)	-	Only THMs
Inorganics	Annually (Lead at a point reflecting maximum residence time in the distribution system)	-	Only Lead
Backwash/Wastewater Effluent to Lake Huron			
Total Suspended Solids	Monthly (Composite)	-	Total Suspended Solids

APPENDIX C

Parameter	Frequency Required	Additional Frequency	Chemicals Analyzed
Note:			
1. A minimum of 8 samples, plus an additional 1 sample per 1,000 population, shall be taken monthly, with at least 1 sample taken every week. Given a population of 7,000 this equals to a minimum of 15 samples.			

Table C-2 Tables 1 & 2, Schedules 23 & 24 Ontario Drinking Water O.Reg 170/03

Table 1 - Microbiological		
Total Coliforms	*Escherichia coli* or fecal coliforms	Heterotrophic plate count or total coliform background count by membrane filter analysis.
Table 2 Schedule 24 – Volatile Organics		
Benzene	1,1-Dichloroethylene	Toluene
Carbon Tetrachloride	Dichloromethane	Trihalomethanes
1,2-Dichlorobenzene	Ethylbenzene	Trichloroethylene
1,4-Dichlorobenzene	Monochlorobenzene	Vinyl chloride
1,2-Dichloroethane	Tetrachloroethylene	Xylene
Table 2 Schedule 23 – Inorganics		
Arsenic	Copper	Mercury
Barium	Fluoride	Nitrite
Boron	Iron	Nitrate
Cadmium	Lead- O.Reg 170/03 (Sched 15.1)	Selenium
Chromium	Manganese	Uranium
Table 2 Schedule 24 – Pesticides and PCBs		
Alachlor	DDT	Paraquat
Aldicarb	2,4-D	Parathion
Aldrin+Dieldrin	Diclofop-methyl	Pentachlorophenol Phorate
Atrazine	Dimethoate	Picloram
Azinphos-methyl	Dinoseb	PCB
Bendiocarb	Diquat	Prometryne
Bromoxynil	Diuron	Simazine
Carbaryl	Glyphosate	Temephos
Carbofuran	Heptachlor+Heptachlor	Terbufos
Chlordane(Total)	epoxide	2,3,4,6-Tetrachlorophenol
Chlorpyrifos	Lindane(Total)	Triallate
Cyanazine	Malathion	2,4,6-Trichlorophenol
Diazinon	Methoxychlor	Trifluralin
Dicamba	Metolachlor	2,4,5-T
2,4-Dichlorophenol	Metribuzin	

APPENDIX D

SAMPLING RESULTS

APPENDIX D

SAMPLING RESULTS

This Appendix contains the following tables:

Table No.	Title
D-1	Legends for Tables F-2 to F-5
D-2	Results of Analyses of Water
D-3	Semi-Volatile Organics of the Treated Water (MOE Schedule 2)
D-4	Volatile Organics of the Treated Water (MOE Schedule 2)
D-5	Pesticides & Herbicides of the Treated Water (MOE Schedule 2)
D-6	Organochlorinated Pesticides of the Treated Water (MOE Schedule 2)
D-7	Chemical/Physical Characteristics of the Distribution Water
D-8	Raw Water Bacteriological Data (MOE Schedule 1)
D-9	Treated Water Bacteriological Data (MOE Schedule 1)
D-10	Distribution Water Bacteriological Data (MOE Schedule 1)
D-11	Non-Health Related Chemical/Physical Characteristics for the Treated Water

Table D-1 Legends for Tables D-2 to D-13

Legend	Definition
AO	Aesthetic Objective
Average	Refers to the Average value measured
D	Deteriorating
Exceeds	Refers to the number of exceedances detected for the sample period described
Maximum	Refers to the maximum value measured
Minimum	Refers to the minimum value measured
NA	Not Applicable
ND	Not Detected
NT	Not Tested
OG	Operational Guideline
S	Safe
SC	Samples Collected
US	Unsafe

APPENDIX D

Table D-2 Results of Analyses of Raw Water

Parameter	Units	Criteria	2010				
			SC	Minimum	Maximum	Average	Exceeds
Inorganics							
Colour	TCU						
Conductivity	uohm /cm						
Alkalinity (Total as CaCO3)	mg/L						
Dissolved Chloride (Cl)	mg/L						
Nitrite (N)	mg/L	1	4	ND	ND	ND	
Nitrate (N)	mg/L	10	4	.258	.394	.318	
Nitrate + Nitrite	mg/L	10	4	.258	.394	.318	

Table D-2 Results of Analyses of Treated Water

Parameter	Units	Criteria	2010				
			SC	Minimum	Maximum	Average	Exceeds
Inorganics							
Colour	TCU						
Conductivity	umho /cm						
Alkalinity (Total as CaCO3)	mg/L						
Dissolved Chloride (Cl)	mg/L						
Nitrite (N)	mg/L	1	4	ND	ND	ND	
Nitrate (N)	mg/L	10	4	0.254	0.918	0.491	
Nitrate + Nitrite	mg/L	10	4	0.262	0.918	0.493	

APPENDIX D

Table D-3 Semi-Volatile Organics of the Treated Water (MOE Schedule 2)

Parameter	Units	Criteria	2010				
			SC	Minimum	Maximum	Average	Exceeds
Semivolatiles							
2,3,4,6-Tetrachlorophenol	ug/L	100	4	ND	ND	ND	
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	ug/L	280	4	ND	ND	ND	
2,4,6-Trichlorophenol	ug/L	5	4	ND	ND	ND	
2,4-Diclorophyoxy acetic acid(2,4-D)	ug/L	100	4	ND	ND	ND	
2-4-Dichlorophenol	ug/L	900	4	ND	ND	ND	
Alachlor	ug/L	5	4	ND	ND	ND	
Aldicarb	ug/L	9	4	ND	ND	ND	
Atrazine	ug/L	2.5	4	.01	.01	.01	
Desethyl-atrazine	ug/L	2.5	4	.01	.01	.01	
Atrazine + Desethyl-atrazine	ug/L	5	4	.01	.03	.02	
Bendiocarb	ug/L	40	4	ND	ND	ND	
Bromoxynil	ug/L	5	4	ND	ND	ND	
Carbaryl	ug/L	90	4	ND	ND	ND	
Carbofuran	ug/L	90	4	ND	ND	ND	
Chlorpyrifos	ug/L	90	4	ND	ND	ND	
Cyanazine	ug/L	10	4	ND	ND	ND	
Diazinon	ug/L	20	4	ND	ND	ND	
Dicamba	ug/L	120	4	ND	ND	ND	
Diclofop-methyl	ug/L	9	4	ND	ND	ND	
Dimethoate	ug/L	20	4	ND	ND	ND	
Dinoseb	ug/L	10	4	ND	ND	ND	
Malathion	ug/L	190	4	ND	ND	ND	
Metolachlor	ug/L	50	4	ND	ND	ND	
Metribuzin	ug/L	80	4	ND	ND	ND	
Ethyl Parathion	ug/L	50	4	ND	ND	ND	
Pentachlorophenol	ug/L	60	4	ND	ND	ND	
Phorate	ug/L	2	4	ND	ND	ND	

APPENDIX D

Parameter	Units	Criteria	2010				
			SC	Minimum	Maximum	Average	Exceeds
Picloram	ug/L	190	4	ND	ND	ND	
Prometryne	ug/L	1	4	ND	ND	ND	
Simazine	ug/L	10	4	ND	ND	ND	
Terbufos	ug/L	1	4	ND	ND	ND	
Triallate	ug/L	230	4	ND	ND	ND	
Trifluralin	ug/L	45	4	ND	ND	ND	
Benzo(a)pyrene	ug/L	0.01	4	ND	ND	ND	

Table D-4 Volatile Organics of the Treated Water (MOE Schedule 2)

Parameter	Units	Criteria	2010				
			SC	Minimum	Maximum	Average	Exceeds
Volatiles							
1,1-Dichloroethylene (vinylidene chloride)	ug/L	14	4	ND	ND	ND	
1,2-Dichlorobenzene	ug/L	200	4	ND	ND	ND	
1,2-Dichloroethane	ug/L	5	4	ND	ND	ND	
1,4-Dichlorobenzene	ug/L	5	4	ND	ND	ND	
Benzene	ug/L	5	4	ND	ND	ND	
Bromodichloromethane	ug/L		4	2.5	4.4	3.175	
Bromoform	ug/L		4	ND	ND	ND	
Carbon Tetrachloride	ug/L	5	4	ND	ND	ND	
Chlorobenzene	ug/L	80	4	ND	ND	ND	
Chloroform	ug/L		4	3.1	8	5.7	
Dibromochloromethane	ug/L		4	1.5	2.3	1.95	
Methylene Chloride	ug/L	50	4	ND	ND	ND	
Tetrachloroethylene	ug/L	30	4	ND	ND	ND	
Toluene	ug/L		4	ND	ND	ND	
Trichloroethylene	ug/L	50	4	ND	ND	ND	
Vinyl Chloride	ug/L	2	4	ND	ND	ND	
Total Trihalomethanes	ug/L	100	4	7.3	14	9.85	

APPENDIX D

Table D-5 Pesticides & Herbicides of the Treated Water (MOE Schedule 2)

Parameter	Units	Criteria	2010				
			SC	Minimum	Maximum	Average	Exceeds
Semivolatiles							
Temephos	ug/L	280	4	ND	ND	ND	
Herbicides							
Diquat	ug/L	70	4	ND	ND	ND	
Glyphosate	ug/L	280	4	ND	ND	ND	
Paraquat	ug/L	10	4	ND	ND	ND	
NP Pesticides/Herbicides							
Diuron	ug/L	150	4	ND	ND	ND	
Guthion	ug/L	20	4	ND	ND	ND	

APPENDIX D

Table D-6- Organochlorinated Pesticides of the Treated Water (MOE Schedule 2)

Parameter	Units	Criteria	2010				
			SC	Minimum	Maximum	Average	Exceeds
OC Pesticides							
a-Chlordane	ug/L	1	4	ND	ND	ND	
Aldrin	ug/L	0.2	4	ND	ND	ND	
Aldrin + Dieldrin	ug/L	0.7	4	ND	ND	ND	
Chlordane (total)	ug/L	7	4	ND	ND	ND	
DDT + Metabolites	ug/L	30	4	ND	ND	ND	
Dieldrin	ug/L	0.5	4	ND	ND	ND	
g-Chlordane	ug/L	2	4	ND	ND	ND	
Heptachlor	ug/L	1	4	ND	ND	ND	
Heptachlor + Heptachlor epoxide	ug/L	3	4	ND	ND	ND	
Heptachlor epoxide	ug/L	2	4	ND	ND	ND	
Lindane	ug/L	4	4	ND	ND	ND	
Methoxychlor	ug/L	900	4	ND	ND	ND	
o,p-DDT	ug/L	5	4	ND	ND	ND	
Oxychlordane	ug/L	4	4	ND	ND	ND	
p,p-DDD	ug/L	15	4	ND	ND	ND	
p,p-DDE	ug/L	5	4	ND	ND	ND	
p,p-DDT	ug/L	5	4	ND	ND	ND	
PCBs							
Aroclor 1016	ug/L	-	4	ND	ND	ND	
Aroclor 1221	ug/L	-	4	ND	ND	ND	
Aroclor 1232	ug/L	-	4	ND	ND	ND	
Aroclor 1242	ug/L	-	4	ND	ND	ND	
Aroclor 1248	ug/L	-	4	ND	ND	ND	
Aroclor 1254	ug/L	-	4	ND	ND	ND	
Aroclor 1260	ug/L	-	4	ND	ND	ND	
Total PCB	ug/L	3	4	ND	ND	ND	

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Table D-7 Chemical/Physical Characteristics of the Distribution Water

Parameter	Units	Criteria	2010				
			SC	Minimum	Maximum	Average	Exceeds
Lead	ug/L	10					
Trihalomethanes	ug/L	100 (MAC)	4	7.3	14	9.8	

Table D-8 Raw Water Bacteriological Data

	Total Coliform (org/100 mL)					Fecal Coliform/*Escherichia coli* (org/100 mL)				
2010 Year	**SC**	**0**	**< 200**	**> 200**	**> 300**	**SC**	**0**	**< 200**	**> 200**	**> 300**
January	4	4	0	0	0	4	4	0	0	0
February	4	3	1	0	0	4	4	0	0	0
March	5	1	4	0	0	5	5	0	0	0
April	4	1	3	0	0	4	4	0	0	0
May	5	4	1	0	0	5	5	0	0	0
June	4	3	1	0	0	4	3	1	0	0
July	4	4	0	0	0	4	4	0	0	0
August	5	3	2	0	0	5	3	2	0	0
September	4	3	1	0	0	4	3	1	0	0
October	4	3	1	0	0	4	4	0	0	0
November	5	2	3	0	0	5	2	3	0	0
December	4	2	2	0	0	4	4	0	0	0
TOTAL	**52**	**33**	**19**	**0**	**0**	**52**	**45**	**7**	**0**	**0**

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Table D-9 Treated Water Bacteriological Data

	Total Coliform			Fecal Coliform/ *Escherichia coli*			HPC or BKG			
2010 Year	**SC**	**S**	**US**	**SC**	**S**	**US**	**SC**	**S**	**US**	**D**
January	4	4	0	4	4	0	4	4	0	0
February	4	4	0	4	4	0	4	4	0	0
March	5	5	0	5	5	0	5	5	0	0
April	4	4	0	4	4	0	4	4	0	0
May	5	5	0	5	5	0	5	5	0	0
June	4	4	0	4	4	0	4	4	0	0
July	4	4	0	4	4	0	4	4	0	0
August	5	5	0	5	5	0	5	5	0	0
September	4	4	0	4	4	0	4	4	0	0
October	4	4	0	4	4	0	4	4	0	0
November	5	5	0	5	5	0	5	5	0	0
December	4	4	0	4	4	0	4	4	0	0
TOTAL	**52**	**52**	**0**	**52**	**52**	0	**52**	**52**	0	0
Notes:										

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Table D-10 Distribution Water Bacteriological Data

2010 Year	Total Coliform			Fecal Coliform/ *Escherichia coli*			HPC or BKG			
	SC	S	US	SC	S	US	SC	S	US	D
January	20	20	0	20	20	0	20	20	0	0
February	20	20	0	20	20	0	20	20	0	0
March	25	25	0	25	25	0	25	25	0	0
April	20	20	0	20	20	0	20	20	0	0
May	25	25	0	25	25	0	25	25	0	0
June	20	20	0	20	20	0	20	20	0	0
July	20	20	0	20	20	0	20	20	0	0
August	25	25	0	25	25	0	25	25	0	0
September	20	20	0	20	20	0	20	20	0	0
October	20	20	0	20	20	0	20	20	0	0
November	25	25	0	25	25	0	25	25	0	0
December	20	20	0	20	20	0	20	20	0	0
TOTAL	**260**	**260**	0	**260**	**260**	0	**260**	**260**	0	0

Notes:

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Table D-11 Non-Health Related Chemical/Physical Characteristics for the Treated Water

Parameter	ODWS (mg/L unless noted)	2010				
		SC	Minimum	Maximum	Average	Exceedances
Alkalinity (as $CaCO_3$)	30-500 (OG)	1	72	72	72	
Copper (ug/l)	----					
Iron (ug/l)	----					
Free Cyanide	0.2					
Manganese (ug/l)	0.05 (AO)					
pH	6.5-8.5 (OG)	365	7.28	7.99	7.77	
Sodium (ug/l)	20000 (OG)					
Temperature	15 (OG)	365	1	22	11	
Toluene (ug/l)	----					

APPENDIX D

APPENDIX E

CORRESPONDENCE

APPENDIX F

COMPLIANCE CHECKLIST

APPENDIX F

Table F-1 Terms and Conditions of the C of A

CofA No.	Description	Findings
	FACILITY DESCRIPTION	
1	Has any of the description changed?	No
	GENERAL	
3.1	Has Owner followed SDWA & Regs	No – Reg 128/04 logbook entry
3.1	Has the WTP operating authority of record followed SDWA & Regs?	Yes
3.12	All reasonable steps taken to minimize or eliminate adverse effects to the environment?	Yes
3.14	Has Owner notified the MOE Director of any change of ORO or operating authority?	Yes
3.2	The Owner is severely liable to comply with all conditions of the C of A.	Owner complied with conditions of C of A or SDWA.
3.3	Any person authorized to carry out work or operate drinking water system has been informed of SDWA & Regs.	Yes
3.4	Copy of C of A available for reference by all persons responsible for the operation of drinking water system?	Yes
3.5	Drinking water system designed, developed, built, operated & maintained in accordance with part 1 of C of A & schedule A?	Yes
3.12	All reasonable steps taken to minimize or eliminate adverse effects to the environment?	Yes
3.18	Records maintained for at least 5 years?	Yes
	PERFORMANCE	
4.1	System shall not be operated to exceed the rated capacity: 12000 m3/day with 3 membrane trains & 76 modules/train	No exceedances
4.2	Exceedances under emergency conditions?	No

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CofA No.	Description	Findings
4.4	Annual average concentration of suspended solids in the effluent discharged from the backwash wastewater facility not to exceed 25 mg/l.	Average below 25 mg/l SS.
MONITORING & RECORDING		
5.1	Sufficient number of flow measuring devices to permit continuous measurement & recording of flows?	Yes
5.2	Records maintained where measured flow rate exceeds the maximum flow rate for drinking water system?	No exceedances
5.3 & 5.4	All flow measuring devices checked & calibrated in accordance with manufacturer's instructions or minimum once yearly?	Yes
5.5 & 5.6	Quarterly composite sampling for TSS from wastewater settling tank discharge?	Yes. Monthly composite sampling program.
OPERATIONS & MAINTENANCE		
6.1	All chemicals & materials used in the operation of the drinking water system that come into contact with the water within the system shall meet all applicable standards set by AWWA & ANSI for NSF/60 & NSF/61?	Yes
6.2	Most current chemical & material product registration documentation from an accredited testing institution shall be available at all times for each chemical & material used in the operation of the drinking water system as per 6.1?	Yes
6.4	An up to date operations manual shall be maintained & available for reference by all persons responsible for all or part of the operation of the drinking water system?	Yes
6.5	Operations manual includes requirements of the C of A & associated procedures, operation & recommended maintenance, procedures for monitoring & recording process parameters, procedures for operation & maintenance of monitoring equipment, contingency plans & procedures to deal with emergencies, upset & equipment breakdown, complaint	Yes

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CofA No.	Description	Findings
	procedure relating to drinking water system & recording of nature of complaint & follow-up investigation & corrective action.	
6.7	Up to date process flow diagrams & P & ID diagrams.	Yes
6.8	As built drawings within one year of facility completion onsite?	Yes for the WTP and Booster station but not the water tower.