

2005 ANNUAL COMPLIANCE REPORT

OPERATION & MAINTENANCE
OF
MEADOW LANE
WATER SYSTEM

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1.0 INTRODUCTION

The Meadow Lane water system is a privately owned and operated water system by the Meadow Lane Cabin Committee with approximately 20 service connections.

The Meadow Lane water treatment system was constructed in late 2004 and commissioned on March 29, 2005. The system receives its raw water from one well on the site. The facility meets the definition of " Non Municipal, Year Round Residential Drinking Water System" serving the community. The Meadow Lane Cabin Committee, retained the services of Oweson Water Services (OWS), a division of Oweson Limited, to operate this facility which includes the preparation of the Annual Compliance Report. The Water Works number for Meadow Lane is 260048607.

The objective of this report is to comply with the mandatory requirements for an Annual Report under Section 11.0 of Ontario Regulation 253/05. The annual report covers the period from April 1, 2005 to December 31, 2005.

The report outlines and includes the following recommendations of which the Owner/Operating Authority should undertake in order to comply with the regulations and continue to provide a safe drinking water quality to the community.

- Brief description of the water treatment system
- Summary of the reports and notices submitted to the Ministry of the Environment (MOE)
- Summary of the treated water quality monitoring
- Summary of chemicals used
- Summary of water usage
- Summary of any corrective actions for adverse results
- Water treatment system repairs and improvements on the water treatment system

2.0 DESCRIPTION OF WATER WORKS

The Meadow Lane water system consists of one well with a reported design rated capacity of 0.53 L/s (7 IGPM). The treatment system includes the injection of sodium hypochloride prior to entering an inground reservoir which provides some contact time. The pumphouse is equipped with duty and standby high lift vertical turbine pumps with a rated capacity of 1.5 L/s to maintain pressure in the distribution system. The high lift pump is controlled by three (3) pressure tanks complete with a pressure switch and a pressure gauge. Disinfection is achieved by using 6% sodium hypochloride.

The system is equipped with one raw water flow meter that records the volume of water taken from the well chlorinated and provided to the reservoir. The reservoir is equipped with a miltronics unit which measures the depth of water in the reservoir complete with alarms. Refer to **Figure 1** overleaf for a schematic process flow diagram.

Currently this system is not required to have either a Certificate of Approval (CofA) or a Permit To Take Water (PTTW).

3.0 LIST OF REPORTS AND NOTICES SUBMITTED TO DIRECTOR - MINISTRY OF THE ENVIRONMENT

Table 1 shows all reports and notices that were submitted to the Ministry of Environment between January 1, 2005 and December 31, 2005.

TABLE 1
List of Reports and Notices Submitted
to the Ministry of the Environment
January 1, 2005 to December 31, 2005
Meadow Lane Water System

Title Of Report or Notice	Date
Part I, II, III Form 6	March 29, 2005
AWQI 53311 Part I, 2(a), 3	March 29, 2005
AWQI 53311 Part 2(b)	April 5, 2005
AWQI 55048 Part 2(a), 2(b), 3	June 1, 2005
AWQI 59146 Part I, 2(a), 3	September 14, 2005
AWQI 59146 Part 2(b)	September 18, 2005
Part III Form 2	February 28, 2006

Starting March 29, 2005, Oweson Water Services, a division of Oweson Ltd., began operation of this facility. Refer to **Appendix E** for various correspondence from the MOE.

Part III, Form 2 entitled, "Annual Report", is submitted to the MOE electronically. Refer to **Appendix D**.

4.0 SUMMARY OF WATER QUALITY MONITORING

4.1 Water Treatment Equipment Operation Monitoring as per Schedule 8, O. Reg. 253/05

4.1.1 Chlorine Residual - POE

In the year 2005 (from April 1, 2005 to December 31, 2005), a total of 275 samples were collected and analyzed for free chlorine residual at the Point of Entry for treated water. **Table 2** below shows the monthly Minimum and Maximum Free Chlorine Residual values. The chlorine residual values were analyzed by using grab samples. The chlorine residuals ranged from a minimum of 0.30 mg/L to a maximum of 2.54 mg/L.

Table 2
Summary of Water Quality - Free Chlorine POE (Online)
January 1, 2005 to December 31, 2005
Meadow Lane Water System

Date	No. of Samples	Chlorine Residual (mg/L)	
		Minimum (mg/L)	Maximum (mg/L)
January	0	-	-
February	0	-	-
March	0	-	-
April	30	0.30	1.89
May	31	0.97	2.00
June	30	0.75	1.70
July	31	1.12	2.03
August	31	0.72	2.54
September	30	1.18	2.18
October	31	1.01	2.14
November	30	0.67	1.33
December	31	0.44	1.92
Total	275		
Min. (mg/L)		0.30	
Max. (mg/L)			2.54

4.1.2 Chlorine Residual - Distribution

In the year 2005 (from April 1, 2005 to December 31, 2005), a total of 275 grab samples were collected in the distribution system. **Table 3** below shows the monthly minimum and maximum residual chlorine values. The chlorine residuals ranged from a minimum of 0.25 mg/L to a maximum of 2.64 mg/L.

Table 3
Summary of Water Quality - Free Chlorine Distribution
January 1, 2005 to December 31, 2005
Meadow Lane Water System

Month	No. of Samples	Minimum (mg/L)	Maximum (mg/L)
January	0	-	-
February	0	-	-
March	0	-	-
April	30	0.25	1.54
May	31	0.81	1.72
June	30	0.28	1.32
July	31	0.94	1.90
August	31	0.90	2.64
September	30	1.17	2.18
October	31	0.54	2.09
November	30	0.64	1.36
December	31	0.27	1.48
Total	275		
Min. (mg/L)		0.25	
Max. (mg/L)			2.64

4.1.3 Turbidity

The treated water turbidity was measured by a portable turbidity analyzer. One grab sample was collected every day and analyzed for turbidity from the Point of Entry (POE). **Table 4** below shows the minimum and maximum turbidity values for treated water.

Table 4
Summary of Water Quality - Turbidity (NTU)
January 1, 2005 to December 31, 2005
Meadow Lane Water System

Month	POE Result		
	#	Min.	Max.
January	0	-	-
February	0	-	-
March	0	-	-
April	29	0.50	0.88
May	31	0.43	0.85
June	30	0.39	10.1
July	31	0.26	0.74
August	31	0.31	0.69
September	30	0.29	0.70
October	31	0.24	0.60
November	30	0.26	0.52
December	31	0.29	0.70
Total	274		
Min. (mg/L)		0.24	
Max. (mg/L)			10.10

The turbidity for the treated water ranged from a minimum of 0.24 NTU to a maximum of 10.10 NTU. On June 1, 2005 the site around the reservoir and the treated main from the reservoir to the pumphouse was graded with heavy equipment. It is suspected that the vibration from the heavy equipment caused all flocced material in the reservoir to become resuspended.

The Ontario Drinking Water Quality Standards (ODWQS) have set a Maximum Acceptable Concentration (MAC) of 1 NTU for treated water leaving the POE.

Only one (1) turbidity exceedance was observed during the year 2005 in the treated water samples.

4.2 Microbiological Sampling as per Schedule 11 O. Reg. 253/05

4.2.1 Distribution System

Schedule 11 of Ontario Regulation 253/05 requires that at least one (1) distribution sample is collected weekly and tested for E.Coli, Total Coliform and Heterotrophic Plate Count (HPC). In 2005, a total of 42 distribution samples were collected and analyzed for Total Coliform, E.Coli and HPC. The distribution sample collected on September 12, 2005 indicated a total coliform of 1 cfu/100mL. Resampling indicated safe results. **Appendix A** provides a summary of the weekly microbiological water quality results for the year.

4.2.2 Raw Water Samples

Schedule 11 of Ontario Regulation 253/05 requires that at least one (1) raw water sample be collected monthly and tested for E.Coli and Total Coliforms. In 2005, a total of 10 raw water samples were collected and tested for Total Coliform and E.Coli. Refer to **Appendix A**.

4.2.3 Point of Entry Samples

Schedule 11 of Ontario Regulation 253/05 does not require that a treated water sample be collected from the Point of Entry. The Operating Authority (AO) does this as a Best Management Practice. A total of 41 samples were collected and analyzed for Total Coliform, E.Coli. and for HPC. No exceedances were found. Refer to **Appendix A**.

Microbiological sampling results for the distribution, raw and treated water are summarized in **Table 5**.

All microbiological analysis results were analyzed by SGS Lakefield Research at their London laboratory. SGS is an accredited lab.

4.3.3 Organics

Schedule 13-4 of Ontario Regulation 253/05 requires that at least one water sample is taken every 12 months and tested for organics as per Schedule 24 if the raw water source is either surface water or GUDI. All organic parameters, as per Schedule 24, were sampled and analyzed on September 16, 2005 and were found to be within compliance. Organics are required to be sampled and analyzed again before September 16, 2006. Refer to **Appendix B**.

4.3.4 Trihalomethanes (THMs)

Schedule 13-6 of Ontario Regulation 253/05 requires that at least one distribution sample is taken every three months and tested for Trihalomethanes (THMs). In the year 2005, samples were collected during the months of March, June, September and December. The Ontario Drinking Water Quality Standard (ODWQS) have set a Maximum Allowable Concentration (MAC) of 100 µg/L for this parameter and is expressed as a running annual average. In the year 2005, the average THM was found to be 64.4 µg/L. Please refer to **Table 6** below for a Summary of Trihalomethanes and **Appendix B** for analytical results. The sample collected in March 2005 was collected shortly after construction was complete and the system was in the final stages of being disinfected (super chlorinated) before being put into service. It is suspected that this elevated result is an isolated incident.

In 2006, THMs should be sampled and analyzed in March, June, September and December.

Table 6
Summary of Trihalomethanes (THMs)
January 1, 2005 – December 31, 2005
Meadow Lane Water System

Sample Location	Sample Date	Result (µg/L)
#130	March 16, 2005	207
#131 Poplar	June 17, 2005	11.3
#131 Poplar	September 20, 2005	21.6
#131 Poplar	December 20, 2005	17.6
Annual Average		64.4

4.3.5 Nitrate and Nitrite

Schedule 13-7 of Ontario Regulation 253/05 requires that at least one water sample is taken every three months and tested for nitrate and nitrite. Samples were collected during the months of March, June, September and December. The analytical results were found to be in compliance. Refer to **Appendix B**. In 2006, samples should be collected in March, June, September and December.

4.3.6 Sodium

Schedule 13-8 of Ontario Regulation 253/05 requires that at least one water sample is collected every 60 months and tested for sodium. The Ontario Drinking Water Quality Standards (ODWQS) have set a Maximum Acceptable Concentration (MAC) of 200 mg/L for sodium and requires the Medical Officer of Health be notified if the concentration exceeds 20 mg/L. This sample was collected March 8, 2005 was found to have a concentration of 218 mg/L. Both the Medical Officer of Health (MOH) and the Spills Action Centre (SAC) were notified. Sodium should be collected and analyzed again before March 8, 2010. Refer to **Appendix B**. Sodium is naturally occurring.

4.3.7 Fluoride

Schedule 13-9 of Ontario Regulation 253/05 requires that a water sample be collected and analyzed every 60 months for fluoride. The ODWQS have set a MAC of 1.5 mg/L. A sample was collected and analyzed on March 8, 2005 and was found to have a concentration of 0.7 mg/L which is in within compliance. The sample should be collected and analyzed again before March 8, 2010. Refer to **Appendix B**.

5.0 WATER USAGE

Table 7 below shows the summary of water usage for the year 2005 recorded by the water meter installed at this facility. This table includes monthly water consumption and average day. From April 1, 2005 to December 31, 2005 the raw water meter recorded a total flow of 549 m³ with an average day demand of 2.0 m³.

Table 7
Summary of Water Usage
January 1, 2005 to December 31, 2005
Meadow Lane Water System

Month	Quantity of Water (m³)	Average Day (m³)
January	-	-
February	-	-
March	-	-
April	43.6	1.5
May	22.4	0.7
June	25.9	0.9
July	74.7	2.4
August	114.5	3.7
September	95.9	3.2
October	80.7	2.6
November	18.0	0.6
December	73.3	2.4
Total (m³)	549	
Average Day (m³)		2

The water meter came factory calibrated and did not require calibration in 2005. The meter should be calibrated in 2006. The existing water meter is on the raw water side of the reservoir and not the treated. During time of low demand there may be days when the well pump is not required to run but the high lift pump is required to run to maintain proper pressure and flow in the distribution system. The flow data represents the amount of water pumped from the well, chlorinated and provided to the reservoir and not the demand of the distribution system.

6.0 MONTHLY MONITORING OF CHEMICALS

The only chemical used in the Meadow Lane water system is 6 % sodium hypochlorite (NaOCl) for disinfection which is NSF 60 approved. Refer to **Appendix C**.

Table 8 below shows the monthly summary of sodium hypochlorite chemical used and the average dosage applied. Considering the volume of water disinfected, the average dosage is high but comparable to other ground water systems in this area.

Table 8
Summary of Disinfectant Chemical Used
January 1, 2005 to December 31, 2005
Meadow Lane Water System

Month	Volume of NaOCl used (Litres)	Average Dosage Applied (mg/L)	Flow
January	-	-	-
February	-	-	-
March	-	-	-
April	6	8.89	43.6
May	10	29.90	22.4
June	10	25.86	25.9
July	28	26.43	74.7
August	40	24.63	114.5
September	28	20.58	95.9
October	27	23.81	80.7
November	5	17.63	18
December	19	18.03	73.3
Total (m³)	173		549
Average Day (m³)		22.22	

7.0 COMPLIANCE OF WATER SYSTEM

During the year 2005, three (3) adverse water quality incidences were reported to both the Ministry of Health and the Spills Action Centre (SAC). In March 2005, AWQI 53311 was issued for sodium. In June AWQI 55048 was issued for turbidity and in September AWQI 59146 was issued for a total coliform count. Resampling for AWQI 55048 and 59146 indicated safe resample results while resampling for AWQI 53311 confirmed a high natural occurring sodium concentration within the source.

8.0 WATER TREATMENT SYSTEM IMPROVEMENTS AND REPAIRS

The Meadow Lane Water system was commissioned in March 2005 and the system has been operated by a licenced operator since April 1, 2005.

On December 20, 2005 the distribution system was upgraded to include: a blowoff at both remote deadends of the distribution system and a sample station was installed.

The alarms were tested on a monthly basis.

9.0 CONCLUSIONS

1. In the year 2005, three (3) adverse results were reported to the MOH and the SAC.
2. The 2005 average demand was approximately 2.0 m³/day .
3. The only treatment chemical used in the system was sodium hypochlorite for disinfection and 173 L was used with an average dosage of 22.22 mg/L.
4. Calibration and routine preventative maintenance was performed on the water system.
5. The installation of two (2) blowoffs allowed the water system to be systematically flushed during 2005.
6. All bacteriological sampling and testing was performed in access of Schedule 11 of O. Reg.253/05.
7. All chemical sampling and testing was performed as per Schedule 13 of O. Reg. 253/05.
8. The annual average for THMs in 2005 was 64.4 µg/L.
9. No Certificate of Approval or Permit to Take Water, are required for this facility.

10.0 RECOMMENDATIONS

1. The Owner shall ensure that all users of the system are aware that an Annual Report was prepared and available for public review free of charge.
2. The water meter should be calibrated during, 2006.
3. The distribution system should be systematically flushed in the fall of 2006.
4. Bacteriological and chemical sampling should continue as per Schedules 11 and 13 respectively of O. Reg. 253/05.
5. A magmeter should be installed on the treated water side of the reservoir to measure the flow into the distribution system.

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REFERENCE

1. Ontario Ministry of the Environment, Ontario Regulation 170/03 under the Safe Drinking Water Act, 2002 and as amended to O. Reg. 253/05.

2. Safe Drinking Water Act.

Appendix A

Weekly Summary of Water Quality – Bacteriological

Appendix B

Chemical Sampling and Testing Results

Appendix C

NSF 60

Appendix D

Part III Form 2

Appendix E

Selected Ministry of the Environment Correspondence