

**2005 ANNUAL COMPLIANCE REPORT  
OPERATION AND MAINTENANCE**

**Leith Water System  
Municipality of Meaford**

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## 1.0 INTRODUCTION AND BACKGROUND

The purpose of the 2005 Annual Compliance Report is to document the operation and maintenance data of the Leith Water Treatment Plant and water distribution system. This is for review by the Ministry of the Environment in compliance with the Certificate of Approval and O.Reg. 170/03. Refer to **Appendix E** for a copy of the C of A.

The 2001 population equivalent for the water system was approximately 180 persons based on three (3) persons per home. The 20-year design population equivalent is 193.

The plant was operated in 2005 by Mr. Harry Wright, who has a Class II Water Distribution license, Mr. Randy Carriere, who has a Class I Water Distribution Licence and a Class 2 Water Treatment Subsystem License, Mr. Mike Doucette, who has a Class I Water Treatment Subsystem License and Mr. Lloyd Adams, who has a Class I Water Treatment Subsystem License and a Class 2 Water Distribution and Supply Subsystem License. The system was operated under the supervision of Mr. Kyle Snell, who holds a Class IV - Water Treatment Subsystem License, Class III - Water Distribution & Supply Subsystem License.

As of December 6, 2005, the Leith Water Treatment Plant was shut down and the Leith distribution system was connected to and is being supplied by the City of Owen Sound Water System. No further Annual Reports will be submitted by Oweson Water Services for the Leith Water Treatment System.

## **2.0 DESCRIPTION OF WATER SYSTEM**

### **2.1 Water Treatment Plant**

The Leith Water Treatment Plant has a rated design capacity of 249 m<sup>3</sup>/day or 38.1 IGPM. The raw water source for the water treatment plant is Georgian Bay. Normally the raw water turbidity is low, ranging from 1 to 5 NTU. However, in the spring and fall and after a heavy rainfall, raw water turbidity generally increases up to approximately 20 NTU. In the year 2000, levels as high as 152 NTU were reached.

The water treatment plant is a prefabricated treatment plant (Ecodyne Model Monoplant) consisting of flash mixing, coagulation, up-flow clarification and dual media filtration. The raw water is pumped into the package water treatment units by two (2) (1 + 1) low lift submersible pumps. The filtered water is chlorinated and chlorine contact storage is provided in two (2) 36 m<sup>3</sup> capacity filtered water storage tanks. The water from the water storage tank is pumped into the water distribution system by three (3) high lift pumps (two (2) working and one (1) standby), which float on pre-charged pressure tanks. The plant also has a standby diesel generator to operate the plant in the event of a power outage. Refer to **Figure 1**.

The chemical treatment system at this plant is comprised of liquid polyaluminum chloride (PaCl), which serves as a coagulant to enhance the removal of colloidal turbidity. Also, sodium hypochlorite (NaOCl) is injected into the filter effluent line and/or plant effluent water.

### **2.2 Water Distribution System**

The water service area for Leith, until December 5, 2005, was supplied with potable water by utilizing three (3) high lift pumps at the water treatment plant building. The watermain pipe size is 75 mm .

As of December 6, 2005, the Leith distribution system was connected to the City of Owen Sound distribution system by way of a 300 mm dia. 3900 m trunk watermain. The Leith Water Treatment Plant was disconnected from the distribution system and was mothballed.

### **3.0 SUMMARY OF WATER QUALITY MONITORING**

#### **3.1 Bacteriological**

Raw water is monitored for E. Coli and Total Coliform. Treated water from the Point of Entry (POE) and the distribution system are analyzed for Total Coliform, E. Coli and Heterotrophic Plate Count (HPC). This is summarized in **Table 1**.

Regulation 170/03 amended to 253/05 requires one raw water sample. Also, under Reg. 253/05, the number of distribution samples was reduced from two (2) per week to one (1) per week. All treated water samples were within compliance. All bacteriological samples were analyzed by SGS Lakefield Research.

#### **3.2 Turbidity and Chlorine Residual**

Water quality monitoring results for turbidity and chlorine residuals are summarized in **Table 2** provided in **Appendix B**.

At the plant and in the distribution system, there were no adverse free chlorine residuals (<0.05 mg/L or > 4 mg/L). All analytical results were within compliance. Refer to **Table 2**. Since June 2003, the free chlorine has been checked in the distribution system daily and all results were found to be >0.2 mg/L.

#### **3.3 Quarterly Monitoring, ODWQS Schedule 13**

Under Schedule 13 of Regulation 170/03, every three (3) months (quarterly), a sample is to be collected and analyzed for nitrites (NO<sub>2</sub>), nitrates (NO<sub>3</sub>) and trihalomethanes (THM). The NO<sub>2</sub> and NO<sub>3</sub> samples are collected at the POE while the THMs are collected from the distribution system at a point that reflects the maximum residence time. The quarterly monitoring results for NO<sub>2</sub>, NO<sub>3</sub> and THM's are provided in **Appendix D**. All are within compliance. No further samples for NO<sub>2</sub>, NO<sub>3</sub> and THM's will be collected. The THM samples were taken as required by the Ministry of Environment. The annual average of THM's in the Leith distribution system was 28.9 µg/L which is within compliance. The annual average MAC set by ODWQS is 100 µg/L and is expressed as a running annual average.

### **3.4 Annual Monitoring, ODWQS Schedule 13**

Schedule 13 requires that inorganics, organics and lead be sampled and analyzed annually.

The inorganics are to be analyzed for all parameters listed in Schedule 23 and are to be collected at the POE. This was completed in September 2005 and there were no exceedances. Refer to **Appendix D**. No further samples will be collected from the Leith Water Treatment Plant.

The organics are to be analyzed for all parameters listed in Schedule 24 and are to be sampled from the POE. This was completed in September 2005 and there were no exceedances. Refer to **Appendix D**. No further samples will be collected from the Leith Water Treatment Plant.

A lead (Pb) sample is to be collected from the distribution system from a location that represents the maximum residence time. This was completed and Pb did not exceed its respective MAC. Refer to **Appendix D**.

### **3.5 Every 60 Month Monitoring, ODWQS Schedule 13**

Schedule 13 requires that sodium (Na) and fluoride (F) be collected and analyzed once every 60 months (once every five (5) years). Both of these samples are to be collected at the POE.

The sodium sample was collected on November 15, 2001. The MAC is 200 mg/L. However, the Ontario Drinking Water Quality Standards (ODWQS) requires the Medical Officer of Health to be notified of any sample exceeding 20 mg/L. There was no detectable level of sodium, which is within compliance. Refer to **Appendix J**. No further samples will be collected from the Leith Water Treatment Plant.

The fluoride sample was collected on January 21, 2002. The MAC is 1.5 mg/L. There was no detectable level of fluoride found at Leith, which is within compliance. Refer to **Appendix J**. No further samples will be collected from the Leith Water Treatment Plant.

### **3.6 Monthly Monitoring of Treated Filter Backwash Water Discharge (TSS)**

The Certificate of Approval (C of A) requires that samples of treated filter backwash waste discharged into the Bay be sampled and analyzed on a once per month basis for Total Suspended Solids (TSS) concentrations. The annual average TSS concentration should not exceed 25 mg/L. **Table 3** provides TSS analysis results.

The TSS concentration did not exceed the specified annual average limit of 25 mg/L. The annual average TSS for 2005 was 19 mg/L, which is within the Certificate of Approval criteria. Refer to **Appendix G** for sampling analytical results. No further samples will be collected from this facility.

### **3.7 Monthly Monitoring of Aluminum Residual**

Samples of filtered water were analyzed for total aluminum residual voluntarily. All samples were lower than 0.1 mg/L, which is the Operational Guideline (OG). Refer to **Appendix G** for analytical results. No further samples will be collected from this facility.

All physical /chemical samples were analyzed by Caduceon Environmental Laboratories.

**4.0 WATER USAGE**

The treated water quantity supplied to the distribution system is provided in **Table 3** below:

**TABLE 3**  
**Summary of Water Use: 2005**

Item	Amount (m <sup>3</sup> )				
	2003	2004		2005	
		POE	Raw***	POE	Raw***
Annual Treated Water Supplied to Distribution System **	16,857	18,295	17,084.0	16,443.7	16,799.9
* Maximum Day Treated Water Supplied (October 5, 2003)	92	151	139.0	210.3	244.5
Average Day Treated Water Demand	46.2	50.1	46.8	46.9	47.4

\*\* Does not include water used for backwash.

\*\*\* The raw water meter was installed and functional by July 10, 2003. Previously, there is no data.

The 2005 maximum day water consumption of 244.5 m<sup>3</sup> and took place in June, which is below the rated capacity of 249 m<sup>3</sup>/day. The average day demand was 47.4 m<sup>3</sup> which is consistent with 2004. Refer to **Appendix K** for a Water Meter Calibration Report.

## **5.0 COMPLIANCE WITH TERMS AND CONDITIONS OF THE CERTIFICATE OF APPROVAL AND REGULATION 170/03**

### **5.1 General Compliance**

There were no Adverse Water Quality Incidents (AWQI) reports encountered at the Leith water system during the 2005 calendar year.

From January 1, 2005 to December 31, 2005, the raw water meter recorded a total of 16,799.9 m<sup>3</sup>, with an average day demand of 47.4 m<sup>3</sup> and a maximum day demand of 244.5 m<sup>3</sup>, which occurred in June 2005. From January 1, 2005 to December 31, 2005, a total of 16,443.7 m<sup>3</sup> of water was treated and provided to the distribution system, as can be seen in **Appendix B**. The system averaged 46.9 m<sup>3</sup> per day and had a maximum day demand of 210.3 m<sup>3</sup>/day. The Leith Water System has a Permit to Take Water (PTTW) which allows for a maximum day withdrawal of 249 m<sup>3</sup>/day and the CofA has a rated capacity of 2.9 L/s (250 m<sup>3</sup>/day. Even though the maximum day demand does not exceed either the rated capacity of the CofA or the PTTW, it is a little higher compared to 2004 when the maximum day demand was 151 m<sup>3</sup> and 2003 which was 92 m<sup>3</sup>. Neither the PTTW nor the CofA were exceeded and the average day flow was consistent with historical values. Refer to **Appendices A** and **F** for a copy of the Annual Record of Water Taking and the PTTW respectively.

The water meters were calibrated in April 2005 and were found to be acceptable. Refer to **Appendix L**.

The Leith Water System required 331 litres (L) of sodium hypochlorite (NaOCl) at an average dosage of 2.55 mg/L. The system also required 161.58 L of PACl at an average dosage of 5.3 mg/L. Refer to **Table 4** for a monthly break down of volume and dosages. Both the volumes used and average dosages are consistent with 2004 values. NaOCl is added to disinfect the water provided to the distribution system. PACl is a pre-hydrolyzed metal solid used as a coagulant.

### **5.2 Regulation 170/03, Section II - Annual Reports**

Part III - Form 2 was submitted electronically (see **Appendix I**).

Oweson submitted one Part III Form 2 for the Leith Water Treatment Plant while the Municipality of Meaford submitted a second Part III Form 2 for the portion of the year when the supply changed from the Leith Water Treatment Plant to the trunk watermain from the City of Owen Sound. No further Part III Form 2's will be submitted for the Leith Water Treatment Plant. All subsequent Part III Form 2's will be for the trunk watermain.

**Section 11 (6) (a) of O.Reg. 170/03**

Refer to Section 2.0 of this report, titled Description of Water System in this report.

**Section 11 (6) (b) of O.Reg. 170/03**

Refer to Section 5.0 of this report.

**Section 11 (6) (c) of O.Reg. 170/03**

Refer to **Tables 1 through 7** of this report.

**Section 11 (6) (d) of O.Reg. 170/03**

Refer to **Table 5** of this report.

**Section 11 (6) (e) of O.Reg. 170/03**

During December 2005, the Leith Water Treatment Plant was shut down. The distribution system was connected to the City of Owen Sound and was upgraded to include a rechlorination station and a booster pumping station. The facility is now operated by the Municipality of Meaford.

**Section 11 (6) (f) of O.Reg. 170/03**

This report was prepared as per Schedule 22 of Regulation 170/03 and a copy of the report can be viewed at either the offices of Oweson Ltd. at 945 3<sup>rd</sup> Avenue East, Suite 230, Owen Sound, Ontario, N4K 2K8, or at the Municipality of Meaford at 12 Nelson Street East, Meaford, Ontario, N4L 1A1.

**Section 11 (9.1) of O.Reg. 170/03**

Once the report has been presented to the Owner (Municipality of Meaford), the Owner will take all reasonable steps to notify all users of the system that the report is complete and where it may be viewed.

**Section 11 (11) of O.Reg. 170/03**

1. There are no known private or designated facilities served by this system.
2. There are no known children's camps served by this facility.
3. There are no known seniors residences served by this facility.

**5.3 2005 Maintenance and Repairs**

The following maintenance and repairs were undertaken in 2005:

- The clear wells were visually inspected during 2005.
- The PACL tank was drained and cleaned.
- A new low lift pump was purchased (2002) and is stored at the Municipality in the event that one of the two (2) low lift pumps malfunctions.
- The distribution system was flushed twice during 2005 and as required to maintain adequate chlorine residuals.

## **6.0 PUBLIC RELATIONS**

The Municipality of Meaford initiated a Class Environmental Assessment to upgrade the Leith Water Works to meet the requirements of the Regulation. The Municipality prepared a Problem Definition and the various Alternative Solutions to meet the requirements of the Regulation, which were presented to the residents on July 22, 2003. Before the public meeting, the Municipality consulted with the residents of Grey County Road 15 as prospective water users of the Leith Water Works using a survey questionnaire.

The preferred alternative for the Leith Water Works was to connect the Leith water distribution system to the Owen Sound water treatment plant to obtain a portable water supply. The preferred alternative was complete and operational by December 6, 2005.

The Annual / Summary report is available to the public at the Municipal office.

## **7.0 RESPONSE TO INSPECTION REPORTS**

The Leith Water System was inspected in February 2005 for the calendar year 2004. The Municipality and Oweson Water Services were presented with the Inspection Report on April 1, 2005. The Report contained an "Actions Required" section that identified six (6) issues and a "Recommend Actions" section that identified seven (7) issues. On April 30, 2005, the Ministry of the Environment (MOE) received a Report of Compliance for the six (6) Actions Required and a second Report of Compliance for the seven (7) Recommended Actions. Refer to **Appendix H** for this correspondence.

## 8.0 CONCLUSIONS

1. Based on the information provided in this report, it can be concluded that the operation of the water works in 2005 was satisfactory but difficult in the spring. The operation was generally in compliance with the Certificate of Approval requirements.
2. Quarterly sampling for THM's, nitrate and nitrite was carried out in accordance with Ministry of Environment requirements.
3. The chlorine residual, treated water turbidity and the bacteriological quality of the water generally met all the Drinking Water Standards for 2005.
4. The existing per capita water demand in 2002 was 286 L/cap/day , 257 L/cap/day in 2003, 251 L/cap/day in 2004 and in 2005 it was 250 L/cap/day, which is a reasonable rate of consumption.
5. In 2002, maximum day demand was 132 m<sup>3</sup>/day, 92 m<sup>3</sup>/day in 2003, 151 m<sup>3</sup>/day in 2004 and 210.30 m<sup>3</sup>/day in 2005 . All are below the design capacity of the treatment plant.
6. The 2005 annual sampling for lead showed the parameter to be within compliance.
7. The facility was shut down on December 5, 2005.
8. The distribution system was connected to the City of Owen Sound by way of a 300 mm dia. 3900 m trunk watermain.
9. The distribution system was upgraded to include a rechlorination facility and a booster pumping station.
10. As of December 2005, the Municipality of Meaford is the Operating Authority for this system.
11. No further Annual Reports will be submitted for the Leith Water Treatment Plant.

Respectfully submitted

OWESON WATER SERVICES  
*(a Division of OWESON LTD.)*

MUNICIPALITY OF MEAFORD

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Geoff Aitken, A. Sc. T.  
Compliance Manager

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Wally Reif, Mayor

GWA/tah

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David Free, CAO

APPENDIX A  
Record of Raw Water Taking

APPENDIX B  
Monthly Breakdown of Treated Water Flow

APPENDIX C

Annual Summary Tables for:  
Distribution System Bacteriological Data  
Treated Water Bacteriological Data  
Raw Water Bacteriological Data

APPENDIX D  
Quarterly Analysis of Water Samples

APPENDIX E  
Certificate of Approval

APPENDIX F  
Permit to Take Water

APPENDIX G  
Monthly TSS & Aluminum Analysis Results

APPENDIX H  
Selected Correspondence

APPENDIX I  
Part III - Form 2  
(submitted electronically)

APPENDIX J

60 Month Sampling (Sodium and Fluoride)

APPENDIX K

Water Meter Calibration Report