

**2005 ANNUAL COMPLIANCE REPORT**

**OPERATION AND MAINTENANCE**

**Kimberley-Amik-Talisman  
Water System**

**Municipality of Grey Highlands**

Project No.: 402702

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## 1.0 INTRODUCTION

The Kimberley-Amik-Talisman (hereinafter referred to as KAT) Water System is owned by the Municipality of Grey Highlands

The KAT water treatment system was constructed to receive water from two (2) raw water springs. The facility meets the definition of "Large Municipal, Residential Drinking Water System" serving the community. The Municipality of Grey Highlands retained the services of Oweson Water Services (OWS), a division of Oweson Limited, to prepare the Annual Compliance Report for the KAT Water Treatment Plant. The KAT Water Treatment Plant number is 220007070 and the water treatment is operated by licenced operators employed by the Municipality of Grey Highlands. Until November 30, 2005 the operators worked under the supervision of Mr Maurice Dempster, Manager of Water and Sewage Systems, who has a Class III Water Treatment Licence and a Class II Water Distribution Licence. Since December 1, 2005 supervision has been provided by Oweson Water Services.

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 January 1, 2005 to December 31, 2005 and is prepared with data provided by Mr Maurice Dempster, of the Municipality of Grey Highlands.

The report includes the following, besides outlining the recommendations that the Owner should undertake to comply with the regulations and continue to provide a safe drinking water quality to the community.

- Brief description of the water treatment plant and water distribution system
- Summary of the treated water quality monitoring
- Summary of chemicals used
- Summary of water usage
- Summary of the Ministry of the Environment's Inspection Report
- Water treatment system repairs and improvements on the water treatment system
- Conclusions and recommendations

Part III Form 2, attached in **Appendix G**, was submitted electronically.

## **2.0 DESCRIPTION OF FACILITIES**

### **2.1 Water Treatment Plant**

The water treatment plant has been designed to have a capacity of 1,185 m<sup>3</sup>/day or 260 IGPD. The water source for the water treatment plant is two springs, namely Spring No. 1 and Spring No. 2. The springs appear to be greatly influenced by rainfall and snow melt events which appear to increase turbidity ranging from a low value of 0.3 NTU to a higher value of 72 NTU at certain times of the year. The colour of the raw water also changes significantly in a short period of time and generally a change in colour is not accompanied with abrupt change in turbidity. It is identified that the sink holes and the bedrock fractures provide a silt laden run-off water with direct access to the aquifer and thereby increases the turbidity in the raw water.

The Kimberley-Amik-Talisman water treatment plant comprises of three pre-sedimentation tanks (raw water storage tank), low lift pumps, two adsorption clarifiers, two rapid gravity mixed media filters and two cell clear water reservoirs.

The chemical treatment system at this plant comprises of treatment by polyaluminum chloride (main coagulant), polymer (coagulant aid), sodium hypochlorite system for chlorination, sulphuric acid and soda ash systems for pH correction, powdered activated carbon system for removal of pesticides and insecticides in the raw water, sodium metabisulphite for dechlorination of filter backwash waste water prior to discharge into the ditch.

The Ministry of the Environment has issued a Certificate of Approval No. 2982-5VMT3J for this facility dated February 2, 2004, which is included in **Appendix A** of this report. An Amended Permit to Take Water No. 94-P-0002, was also issued by the Ministry of the Environment on August 27, 2003. This permit is valid up to August 31, 2008 and is enclosed in **Appendix B**.

### **2.2 Water Distribution System**

The water service area for Kimberley-Amik-Talisman is supplied with potable water by way of the gravity watermain and a pumped watermain. The pumped watermain supplies water to the water service area above the geodetic elevation of approximately 300 m. The remaining area of Amik-Talisman-Kimberley is supplied water from the 200 mm diameter gravity watermain. The watermains have been sized to carry the fire flows and therefore fire hydrants have been provided on the pumped watermain as well as the gravity watermain at specified spacing as per Ministry of the Environment Guidelines. Due to the steep slopes on which the watermain has been constructed, the water distribution area for Kimberley-Amik-Talisman is provided with four pressure reducing valve chambers to prevent the over-pressurization of low elevation areas of the water service area.

The pumped watermain is supplied water by way of four high lift pumps.

### 3.0 SUMMARY OF WATER QUALITY MONITORING - WATER TREATMENT PLANT AND WATER DISTRIBUTION SYSTEM

#### 3.1 Bacteriological

Water quality monitoring results for total coliform and fecal coliform for raw water, Point of Entry (POE) water and water for the distribution system are summarized in **Table 1**. The weekly data summary for all bacteriological sampling can be found in **Appendix C**. One (1) exceedance in total coliform in the distribution samples were reported on September 26, 2005. Resampling on September 28, 2005, indicated safe results.

**Table 1**

**Summary of Water Quality Monitoring 2005: Bacteriological**

Sample	Total Coliform			E Coli			HPC and/or Background Count		
	Total No. of Samples	No. Unsafe >0	No. Safe <0	Total No. of Samples	No. Unsafe >0	No. Safe <0	Total No. of Samples	No. Unsafe	No. Safe
Raw	51	51	0	51	47	4	1	0	1
Treated (POE)	51	0	51	51	0	51	51	0	51
Distribution	105	0	105	105	0	105	105	1	104

#### 3.2 Turbidity and Chlorine Residual

Water quality monitoring results for turbidity and chlorine residual are summarized in **Table 2** and **Table 3**, respectively.

There were no turbidity exceedances greater than 1.0 NTU that were reported to the Ministry of Environment and the Ministry of Health during the 2005 operating year. The criteria for turbidity for filter performance as per the Procedure for Disinfection of Drinking Water in Ontario is less than 0.5 NTU filtered water turbidity, for 95% of the readings every month. (Although only samples exceeding the 1.0 NTU criteria are considered adverse.) A review of **Table 2** shows that this criteria was met.

From January 1, 2005 to December 31, 2005, a total of 365 samples were collected from the POE and analyzed for free chlorine residual. The free chlorine residuals from the POE had an annual average of 1.20 mg/L, and none were less than 0.2 mg/L. Of the 365 free chlorine residuals measured on the distribution system, none were less than 0.05 mg/L. All residuals were within compliance. Refer to **Table 3**. The above

assessment does not include the residuals measured during watermain flushing. However, **Appendix E** contains the watermain flushing records for 2005, including the free chlorine residuals data.

### **3.3 Annual Monitoring**

Schedules 13-2, 13-3, and 13-4 of Ontario Regulation 253/05 require that at least one water sample be taken every 12 months to test for Inorganics, lead and organics, if the system obtains water from a raw water supply (surface water). Since the KAT Water System receives its raw water from two springs (surface water), treated water samples were collected on February 7, 2005 and August 15, 2005 and analyzed for Inorganics, lead and organics. All parameters were found to be within compliance. Refer to **Appendix D**.

### **3.4 Quarterly Monitoring**

Schedule 13-6 of Ontario Regulation 253/05 requires that at least one distribution sample is taken every three months from a point in the drinking water system's distribution system or plumbing that is connected to the drinking water system and tested for Trihalomethanes (THMs), Nitrate and Nitrite. In the year 2005, samples were collected during the months of February, May, August and November. The Ontario Drinking Water Quality Standard (ODWQS) have set a Maximum Allowable Concentration (MAC) of 100 µg/L for THMs and is expressed as a running annual average. In the year 2005, the average THM was found to be 24 µg/L. Nitrate/Nitrite results from quarterly sampling were found to be within compliance. Please refer to the **Table 4** below on the Summary of Trihalomethanes and **Appendix D** for analytical results.

**TABLE 4**  
**Summary of Trihalomethanes (THMs)**  
**January 1, 2005 – December 31, 2005**  
**Kimberley-Amik-Talisman Water System**

<b>Sample Location</b>	<b>Sample Date</b>	<b>Result (µg/L)</b>
235274 Grey Road 13	Feb. 7, 2005	21
Ski & Sea	May 9, 2005	40
Kimberley Library	August 8, 2005	15
235255 Grey Road 13	November 7, 2005	19
<b>Annual Average</b>		<b>24</b>

### **3.5 Sodium and Fluoride**

Schedules 13-8 and 13-9 of Ontario Regulation 253/05 requires that at least one water sample is collected every 60 months and tested for sodium and fluoride. 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. Since a sample was collected and tested for Sodium and Fluoride on February 4, 2002, a sample is required to be collected and tested on or before February 4, 2007.

### **3.6 Monitoring of Treated Filter Backwash Water Discharge**

The Certificate of Approval requires that composite samples of treated filter backwash waste, which is discharged into the ditch, are sampled and analyzed on a quarterly basis for suspended solids (TSS) concentrations, and the annual average suspended solids concentrations should not exceed 25 mg/L. Although the Certificate of Approval requires quarterly sampling and analysis for suspended solids in the treated filter backwash waste, sampling was carried out every month. **Table 5** provides a summary of the monitoring of the treated filter backwash water discharge to the ditch. All samples analyzed for suspended solids were less than 25 mg/L. The annual average was 5.8 mg/L which is within compliance. The Free Chlorine was also analyzed in the treated filter backwash water and the annual average was found to be 0.014 mg/L.

**TABLE 5  
 Summary of Monitoring  
 Treated Filter Backwash Wastewater to Ditch: 2005**

<b>Month</b>	<b>Suspended Solids Concentration (mg/L)</b>	<b>Free Chlorine (mg/L)</b>
January	<2	0.02
February	3	0.01
March	3	0
April	15	0.01
May	19	0
June	2	0.01
July	13	0.04
August	4	0.01
September	2	0.02
October	<2	0.01
November	3	0.02
December	<2	0.01
<b>Annual Average</b>	<b>5.8 mg/L</b>	<b>0.014</b>

### **3.7 Monitoring of Water for Corrosiveness**

As recommended by the Ministry of the Environment, sampling of the treated water for hardness, alkalinity, total dissolved solids, pH and Langelier Index were taken. **Table 6** provides a summary of the monitoring of these parameters.

The results indicate a non-corrosive water (i.e. Langelier Index >0).

**TABLE 6**  
**Treated Water Corrosivity Analysis**  
**Year 2005**

Month	Alkalinity (mg/L as CaCO <sub>3</sub> )	pH (units)	Total Dissolved Solids (mg/L)	Ca (mg/L)	Langelier Index @ 20°C
June	284.5	8.18	350	75.1	0.465
July	291	8.07	337	79.2	0.40
August	285	8.05	323	77.7	0.36
October	277	8.14	320	67.1	0.37
November	258	8.08	314	54.6	0.19
December	220	8.05	266	60.0	0.14

\* These samples were not taken until the last half of the year and are now taken monthly.

### **3.8 Monitoring of Chloramines**

As required by the Certificate of Approval, the chloramine levels of the treated water were monitored monthly and analyzed on-site by the operators. See **Table 7** for the summary of the year 2005 chloramine results. The chloramine values range from 0.01 and 0.02. These values appear low and Owen Water Services shall review sampling and analysis procedures with the operators.

**TABLE 7**

**Kimberley-Amik-Talisman Water Treatment Plant  
On-Site Treated Water  
Chloramine Analysis: Year 2005**

<b>Month</b>	<b>Chloramine Concentration (mg/L)</b>
January	0.01
February	0.01
March	0.01
April	0.01
May	0.02
June	0.01
July	0.01
August	0.01
September	0.01
October	0.01
November	0.01
December	0.01

#### **4.0 WATER USAGE**

The Certificate of Approval issued by the Ministry of the Environment specifies that the drinking water system shall not be operated to exceed a maximum daily volume of 1185 m<sup>3</sup>/day. **Table 8** shows the monthly summary of water usage for the year 2005 observed from the flow meter readings installed at this facility. This table also includes monthly Average Day and Maximum Day flows. The maximum day flow occurred in June 2005 and was observed to be 338.8 m<sup>3</sup>/day. The maximum daily flow in August 2005 of 3,566 m<sup>3</sup>/day did not actually occur and was a SCADA system error due to the calibration of the computer system that took place that day, and is not an accurate reflection of the flow on that day.

## 5.0 CHEMICAL CONSUMPTION

The chemicals used in the KAT Water System includes sodium hypochlorite for disinfection, poly aluminum chloride for coagulation and polymer to aid coagulation. The yearly consumption of these chemicals and the annual average dosage applied are provided in **Table 9**.

**TABLE 9**  
**Summary of Chemical Consumption**  
**Kimberley-Amik-Talisman Water System**  
**Municipality of Grey Highlands**

Chemical	2005	
	Yearly Consumption	Average Dosage (mg/L)
Sodium Hypochlorite (Litres)	900	2.12
Polymer (kg)	10	0.034
Polyaluminum Chloride (Litres)	2,963.5	21.86
Soda Ash	NIL	---
Sulphuric Acid	NIL	---
Powdered Activated Carbon	NIL	—

## **6.0 NON-COMPLIANCE IN THE REPORTING PERIOD**

One (1) distribution background sample was reported in 2005. On September 26, 2005 a background level of 780 cfu/100 mL was indicated. Resampling took place on September 28, 2005 and indicated safe results.

## **7.0 CALIBRATION, ROUTINE AND PREVENTATIVE MAINTENANCE**

- ▶ The residual chlorine analyzers and the turbidity analyzers were checked regularly as recommended by the manufacturer and on an as-needed basis and calibrated as required.
- ▶ All primary flow devices such as raw water flow, filter effluent flow, pumped distribution flow, were calibrated in May of 2005.
- ▶ The metering pumps were rebuilt regularly to maintain full flow capacity.
- ▶ The raw water tanks were cleaned out in the spring of 2005.
- ▶ Filter backwash waste treatment tank was cleaned as required, or once every four (4) weeks.
- ▶ The clearwells were cleaned out in April 2005.
- ▶ Fire hydrants were flushed at dead ends.
- ▶ All watermain valves were exercised once during 2005.
- The V-notch weir was read regularly in 2005.
- The drain lines for both springs were flushed out in the spring and fall of 2005.
- No watermain breaks occurred during 2005.
- Replaced gravity flow meter in clearwell in 2005. The flow meter went off-line on January 7, 2005 and was replaced on October 5, 2005.

## **8.0 MINISTRY OF ENVIRONMENT INSPECTION: 2005**

The Ministry of the Environment indicated in the 2005 Inspection Report a list of non-compliance and best practice items, which are addressed in Section 11. Refer to **Appendix F** for the Inspection Report, and related correspondence responding to the Inspection Report.

The Inspection Report included a summary of non-compliance issues and actions required as well as Best Practice recommendations.

The following actions were required by the Inspection Report:

1. The owner must include the following in their Operations & Maintenance Manual:
  - a) a procedure for documenting and dealing with consumer complaints,
  - b) a sampling plan that includes raw, treated and distribution water sampling,
  - c) an up-to-date schematic/drawing of the overall treatment process.
2. The annual report must include all sample analysis results (including chloramines) and a summary of all non-compliance.
3. The owner is required to install and have operational all-flow measuring devices per Certificate of Approval No. 2982-5VMT3J, Condition 5.1, by July 30, 2005, however, this deadline was missed. The owner must also have readily available a backup flow meter at the water treatment plant for raw and treated water. There is no backup flow meter available on-site at the treatment plant for raw and treated water.

The actions are required to be taken within three (3) months of the issuance of the Inspection Report.

The following Best Practice recommendations were also made by the Ministry of the Environment:

1. It is recommended that the owner, for ease of reviewing, improve on the Table of Contents in chronological order of information in the binder provided for public viewing.
2. It is recommended that the owner sample treated water on a monthly basis for hardness, alkalinity, total dissolved solids and pH for the calculation of a Langelier Index value. This is now being performed on a monthly basis.

3. It is recommended that the owner include in their Operation & Maintenance Manual a section for their sampling plan. This has been done.
4. It is recommended that the owner be diligent in the pursuit of water loss in the Kimberley-Amik-Talisman distribution system. The operators have been instructed to monitor flows, in order to observe an abnormal readings.
5. The owner is reminded to continue to become familiar and comply with the August 1, 2004 Certification of Drinking Water System Operators and Water Quality Analysts Regulation, also known as O.Reg. 128/04.
6. It is recommended that the owner review and check completeness of their annual report with their consultant prior to the report being submitted. This is no longer an issue.

## **9.0 CALCULATION OF UNCOMMITTED HYDRAULIC RESERVE CAPACITY**

Uncommitted hydraulic reserve capacity will be presented to the Municipality in a separate letter report in March 2006.

## 10.0 CONCLUSIONS

1. Zero (0) adverse results with respect to turbidity on the treated water for the Kimberley-Amik-Talisman Water Treatment Plant (i.e. turbidity results >1 NTU) were reported in the year 2005. The operational criteria under Regulation 253/05 of less than 0.5 NTU filtered water turbidity for 95% of the readings every month, was met.
2. There was one (1) distribution background of 780 cfu/100 mL on September 26, 2005. The system was resampled on September 28, 2005 and indicated 0 cfu/100 mL.
3. The filter backwash waste treatment supernatant is monitored for total suspended solids every month although the Certificate of Approval indicates that it is only required to be carried out on a quarterly basis. The annual average total suspended solids in 2005 was 5.8 mg/L which is within compliance. The annual average Free Chlorine in the treated filter backwash water was found to be 0.014 mg/L.
4. The 2005 average day demand was 146.8 m<sup>3</sup>/day.
5. In 2005, maximum day demand was 339 m<sup>3</sup>/day which is 29% of the design capacity of the treatment plant (1,185 m<sup>3</sup>/day). The maximum daily flow in August 2005 of 3,566 m<sup>3</sup>/day did not actually occur and was a SCADA system error, due to calibration of the computer system.
6. The water works used 900 L of sodium hypochlorite with an average daily dose of 2.12 mg/L, 2,963 L of poly-aluminum chloride with an average daily dose of 21.86 mg/L, and 10 L of polymer with an average daily dose of 0.0034 mg/L during 2005.
7. Calibrations and routine preventative maintenance were performed on the water system.
8. The 2005 Ministry of the Environment's Inspection Report, (enclosed in **Appendix F**), included actions required and Best Practice Recommendations (BPR). The recommendations made in this report pertain to these recommendations.
9. The gravity flow meter was off-line between January 7, 2005 and October 5, 2005. Flows for these months were estimated from 2004 flows.

## 11.0 RECOMMENDATIONS

1. The Municipality should improve on the Table of Contents and chronological order of information in the binder provided for public viewing.
2. The Municipality shall test to determine the corrosivity of the water in order to prevent corrosion of the distribution system. It is recommended that monthly samples of the treated water be tested to determine the Langelier Index.
3. The Municipality should become familiar and comply with the August 1, 2004 Certification of Drinking Water System Operators and Water Quality Analysts Regulations, also known as O.Reg. 128/04.

Respectfully submitted:

OWESON WATER SERVICES  
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**Appendix A**

**Certificate of Approval (2982-5VMT3J)**

**Appendix B**

**Permit to Take Water (94-P-0002)**

**Appendix C**  
**Weekly Bacterial Sampling**

**Appendix D**  
**Annual Monitoring Results**

**Appendix E**

**Watermain Flushing Records**

**Appendix F**

**Ministry of the Environment Inspection Report and Correspondence Responding to Report**

**Appendix G**

**Part III Form 2 (submitted electronically)**