

# *Township of Emo*

*Water Treatment and Distribution*

## *Quality Management Operational Plan*



PO Box 520  
33 Front Street  
Emo ON  
P0W 1E0

## Table of Revisions

<b>Date</b>	<b>Description of Revision</b>
<b>February 2010</b>	<b>Implemented recommendations from MOE</b>
<b>July 2011</b>	<b>Compliance Audit-Corrective Actions Addressed</b>
<b>June 10, 2013</b>	<b>SAI Compliance Audit – External Review</b>
<b>June 26, 2013</b>	<b>SAI Compliance Audit – External Audit</b>
<b>August 23, 2013</b>	<b>SAI Compliance Audit – Corrective Actions Addressed</b>
<b>January 6-10,2014</b>	<b>Travis Rob – Reviewed Operational Plan</b>
<b>January 15, 2014</b>	<b>Travis Rob – Staff Interviews</b>
<b>January 20, 2014</b>	<b>Travis Rob – Internal Audit Completed</b>
<b>September 16,2014</b>	<b>SAI Compliance Audit—External Audit</b>
<b>January 7, 2015</b>	<b>SAI Compliance Audit—Corrective Actions Addressed</b>
<b>January 23, 2015</b>	<b>Revised by ORO Ed Bullied, QMS Representative</b>
<b>June 22, 2015</b>	<b>SAI Compliance Audit—External Audit</b>
<b>November 23, 2015</b>	<b>Revised by ORO Ed Bullied, QMS Representative</b>
<b>March 3, 2016</b>	<b>Internal Audit Chrystal Grey</b>
<b>April 14, 2016</b>	<b>Management Review</b>
<b>April 22, 2016</b>	<b>Revised by ORO Ed Bullied, QMS Representative</b>
<b>February 7, 2017</b>	<b>SAI Compliance Audit – External Audit</b>
<b>February 21, 2017</b>	<b>Revised by Ed Bullied, QMS Representative</b>

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## **1. Introduction**

This Operational Plan is the first step in establishing a Quality Management System for the Township's Water Treatment System. It is mandatory that all owners, administration, and staff become completely familiar with and endorse this document. The twenty chapters here within address all of the requirements necessary to successfully operate and maintain our Water Treatment System. Supporting documents which complete the Management System are referred to throughout, especially in areas of operational and maintenance procedures.

This Operational Plan clearly defines policy, roles, responsibility, and areas of authority. It is very informative, describing the water source, treatment process, distribution system, and potential risks and hazards. It is very helpful as a working document, listing emergency contacts, contractors, suppliers, spare operators etc. It also identifies supporting documents as crucial to the Management System and gives their exact location for quick and easy access.

## **2. Quality Management System & Policy**

The Town of Emo is committed to managing the treatment and supply of clean, safe drinking water to all of its customers and commits to consistently meeting all applicable legislation and all current regulatory requirements and customer needs. To achieve these goals the Town of Emo commits to:

- Managing water quality from source to customer
- Regular monitoring and testing of water to meet or exceed current guidelines as established in the Safe Drinking Water Act
- Providing consistent and relevant training to operators to meet or exceed current training guidelines
- Investing capital monies to provide upgrades and rehabilitations to treatment and distribution systems
- Continuing to establish and upgrades current practices and policies

Providing Water Treatment Plant Annual Reports as per Ministry of the Environment forms to be available to all customers in hard copy or on the town's website. These reports provide the customer with an annual overview of the Town water supply system.

The Town of Emo will establish and maintain a Drinking Water Quality Management System that will be regularly reviewed, improved and upgraded by management and employees involved in the supply of drinking water. The highlights of this Operational plan for this Quality Management system will be readily available in hard copy at the WTP/Town Office or it can be accessed on the Town of Emo website ([www.emo.ca](http://www.emo.ca)). The Drinking Water Quality Management System will be implemented by the Town to effectively minimize and manage potential risks to the drinking water quality and safety.

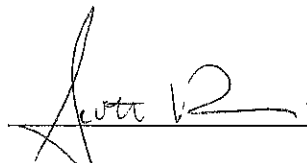
### 3. Commitments and Endorsement

The Owners and Management of The Township of Emo's Water Treatment and Distribution System support and endorse the contents, implementation, and maintenance of this Drinking Water Quality Management System. This endorsement extends beyond agreement in principle to providing resources for and active participation in the maintenance and improvement of this complete document.

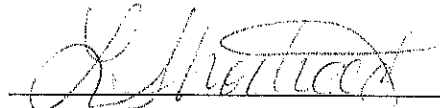
**Endorsed by:**



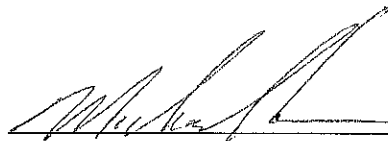
Mayor (Jack Siemens)



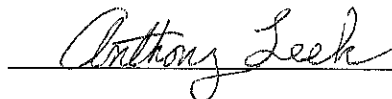
Councillor (Scott Kinnear)



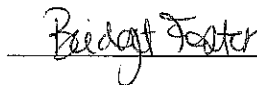
Councillor (Lori Ann Shortreed)



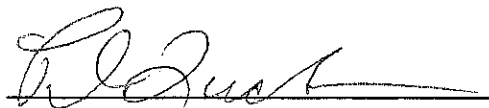
Councillor (Michael Loney)




Councillor (Anthony Leek)



CAO/Clerk-Treasurer (Bridget Foster)



Public Works Supervisor (Peter McQuaker)



DWQMS representative and ORO (Ed Bullied)

#### **4. Designated Quality Management System Representative**

The Township of Emo, has appointed Ed Bullied as the DWQMS Representative for the Township of Emo Water Treatment Plant and Distribution System. He is also the ORO.

##### **The responsibilities of the QMS Representative:**

- Ensure current documentation is used.
- Ensure that the processes and procedures required by the QMS are implemented and maintained current
- Report to top Management on the performance of the QMS and any need for improvement
- Promote awareness of the QMS to all Personnel and Management
- Ensure that all personnel are aware of all applicable current regulatory requirements as they pertain to the operation of the Water Treatment System.

## **5. Documents and Records Control**

### **➤ 1.0 Procedure Description**

This procedure defines the processes in place to ensure control of all documentation and records affecting the Township of Emo DWQMS. This is necessary to ensure that creating; revising, approving and releasing documents are completed in a consistent manner to make certain they are retrievable, current and accurate.

### **➤ 2.0 Reason for Procedure**

To ensure control of documentation and records which affect the Township of Emo DWQMS.

### **➤ 3.0 Responsibility**

The designated QMS Representative, (or the alternate), shall be responsible for the control of all QMS documents. All documents must meet the approval of the QMS Representative before initial or revision issuance. The designated ORO/QMS Representative, (or the alternate), shall be responsible for the control of all documents and records and records pertaining to the Water Treatment Plant. All documents created or revised must meet the approval of the ORO/QMS Representative before initial or revision issuance. The presence of a signature from the ORO/QMS Representative, (or the alternate) on the front page of the document indicates this approval.

### **➤ 4.0 Procedure**

All Records Reports and Documents shall be retained for at least the time frame as mandated by Regulation 170/03, Section 13, Page 22. The Regulation essentially states that all records compiled daily, weekly, and monthly must be kept for 2 years. Records compiled quarterly and annually must be kept for 6 years. Records compiled at a frequency greater than 1 year, including Engineers Reports, must be kept for 15 years. Drawings, Blueprints, and Equipment Manuals must be kept and maintained current indefinitely, or until they become redundant. Electronic files are backed up daily to a thumb drive.

**Documents and records location:**

• **QMS Operational Plan**

On computer file at the Township office and WTP

Paper copy at the Township office and WTP office file cabinet marked QMS files

• **Engineers Reports**

Township and WTP file cabinet

• **Annual and Summary Report**

Township and WTP file cabinet

• **Monthly Plant Data Reports**

WTP file cabinet

• **System Certificate of Classification**

Posted on the wall of the WTP office

Photocopies in the Township office file cabinet

• **Operator Certificates of Qualification**

Posted on the wall of the WTP office

Photocopies in the Township office file cabinet

• **Standard Operational Procedures Water Treatment and Distribution**

Standard Operation & Maintenance Binder in the WTP office bookcase

On computer file at the Township office and WTP

• **Engineering and Equipment Manuals**

WTP bookshelf above the desk

• **As Built Drawings and Blue Prints**

WTP Blue Print Hanger, Equipment Details in Equipment Manuals

• **Regulations**

Contained in the Standard Operational Procedures binders

• **Lab Sample Reports**

Township office and WTP file cabinet

• **Chain of Custody carbon copies**

WTP file cabinet

• **Daily Log Books**

Current year on the WTP desk, previous years in the desk drawer

• **QMS Forms**

Minutes, Audits, check lists and reports at WTP filling cabinet

- **Training Records**  
WTP filling cabinet

All original documents and records for the Water Treatment Plant are kept in the Water Treatment Plant and electronic files are kept on the computer located in the Water Treatment Plant office. Currently all relevant documents are retained. A review and update of all documents, policies and procedures will be conducted annually, or on as needed basis to ensure that they are up to date and relevant. All redundant QMS documents are disposed of by the QMS Representative by shredding.

Hard copies of the document and procedures are printed and kept in binders located in the water plant office and also the filling cabinet. Relevant operating staff are the only ones that have access to the WTP and it's associated documents and procedures. If operating staff need to remove any documents, policies, maintenance manuals, training binders etc. a note will be made in the daily log book of what was taken and who has taken it.

**Schedule "C"**

Subject System Description Form			
Municipal Residential Drinking Water System			
Owner of Municipal Residential Drinking Water System:		The Corporation of The Township of Emo	
Name of Municipal Residential Drinking Water System:		Emo Drinking Water System	
Subject Systems			
	Name of Operational Subsystems (if applicable)	Name of Operating Authority	DWS Number
<input type="checkbox"/>	Check here if the Municipal Residential Drinking Water System is operated by one operating authority. Enter the name of the operating authority in adjacent column.	The Corporation of The Township of Emo	210000657
Operational Subsystem 1:			
Operational Subsystem 2:			
Operational Subsystem 3:			
Operational Subsystem 4:			
Add attachments if there are additional 'Operational Subsystems			
Contact Information			
Name	Title	Phone Numbers	Email Address
Ed Bullied	ORO/OIC	807-275-8682	emowtp@bellnet.ca
Jason Smith	OIC	807-275-8686	emowtp@bellnet.ca
Travis McCormick	OIT	807-276-5591	emowtp@bellnet.ca

## 6. Drinking Water System

### **Owner and Operating Authority of the Emo Drinking Water System is The Township of Emo**

**The Treatment process and Distribution System are described in detail in the Standard Operational Procedures Binders. Included in these are plant history, equipment data, operating procedures and emergency response procedures. The following chapter briefly outlines the process. For detailed information and instruction refer to the SOP binders or view on computer file The Corporation of the Township of Emo.**

Raw water from the river enters the raw water well through the intake structure and piping. The level of the raw water well is always the same as the level of the river. One of the two low lift submersible pumps is selected as duty, the other as standby. Water is pumped to the treatment process equipment at a controlled rate. The raw water meter mounted immediately inside the plant produces a 4 to 20 MA signal to PLC and SCADA, a raw water digital meter. The flow rate is adjusted manually at the raw water control valve hand wheel gear drive.

Aluminum sulphate (alum) is injected into the raw water line immediately after the control valve. The alum dosage is predetermined and matched accurately to the raw water flow rate and the turbidity. This mixture then passes through the flash mixer (duty) or the static mixer (standby). The mechanical, propeller type mixer is always selected as duty, the static mixer by-pass arrangement is designed to be a standby or emergency feature only. Contact time in the flash mixer is 4 minutes at maximum rated flow. The alum acts as a coagulant, neutralizing the electrical charges of the suspended particles allowing particles to join together or flocculate. The short period of rapid mixing is sufficient to ensure that all particles have been in contact with the alum. Note: the PH of pure alum is 4.0, when added to the raw water in optimum dosage the PH should be approximately 5.8.

Activated silica (polymer) is injected into the raw water as it leaves the mixing process. The polymer is a coagulant aid, increasing the quantity and quality of the floc particles.

After the rapid mixing process the water enters the vacuum chamber tank. Here the water is held under vacuum and released or discharged into the flocculation/sedimentation tank by intermittent and controlled pulses. An electrically operated solenoid valve controlled by a timer opens and closes to release and hold the vacuum. One of the two vacuum pumps (duty and standby) runs continuously producing the vacuum.

In the flocculation/sedimentation tank (clarifier) this gentle rolling mixing action produced by the pulsed discharges of raw water allows the floc particles to grow in

size becoming heavier, forming a floc bed or blanket. When all aspects of the process are optimized this floc bed should have a clearly defined surface, be well settling and rise to approximately 1.5 meters from the floor of the clarifier.

As water passes through, floc bed particles attach to other floc particles become heavier and fall out of suspension. As water rises to the top of the clarifier it passes through angled settling tubes which increase the distance of travel causing more particles to fall out of suspension. The clarified (clear) water at the top of the clarifier is discharged onto the top of the sand anthracite filters by two collection pipes. As the floc bed rises some of the floc enters the sludge extraction well and is trapped. This excess sludge is extracted at regular intervals (timed) to maintain an equilibrium level.

The water then passes through the 30" of sand and anthracite in the filters. Both filters are normally used at the same time. Each filter has a design filtration rate of 19.6 m<sup>3</sup>/hr which is approximately the typical plant flow. So typically they are operating at 1/2 capacity.

As the filter becomes dirty or plugged it takes more head pressure on the top of the filter to maintain the same flow through the filter. This causes the water on the top of the filter to rise (loss of head). When it reaches a predetermined level the filter undergoes an automatic backwash. Note: it is operator policy to backwash the filters manually before the automatic backwash point is reached, refer to filter backwash procedures.

On line continuous operating turbidity monitors are tapped into each filter effluent pipe. These monitors provide a continuous display of the filters effluent turbidity. They are set to alarm and shut down the treatment process at predetermined high turbidity levels.

Immediately downstream from the turbidity monitor taps are the chlorine injection points, one in each filter effluent pipe.

The gaseous chlorine and water solution must be sufficient enough to properly disinfect the water and to maintain a high enough free chlorine residual throughout the clearwells and still achieve at least 0.05 mg/l free chlorine at the end of the distribution system. Refer to chlorine disinfection procedures.

When the alum is added to the raw water back at the flash mixing stage the resulting PH of the water will be approximately 5.8 optimum. The last stage of the chemical treatment process is the addition of soda ash to correct the PH, optimum is 7.0 to 7.8. A soda ash water slurry is gravity fed into the common clearwell discharge header from one of two volumetric feeders (one duty and one standby).

It is standard procedure to discharge equally into all three storage reservoirs at the same time.

An online chlorine analyzer and PH monitor are tapped into the treated water distribution header just prior to the water entering the distribution system. These

monitors provide a continuous display or record (PH) as well as alarm at predetermined high and low levels.

### **Source Water**

The raw water source for the Town of Emo is obtained from the Rainy River which is part of the Winnipeg River (Arctic) watershed. Rainy River is a boundary-water bordered by Ontario and Minnesota.

The Rainy River which starts at Rainy Lake and ends at the Lake of the Woods is approximately 120 km's in length. The depth of the river ranges from 1.5 meters to 12 meters with an average depth of approximately 6 meters. Raw water quality can be characterized as having high levels of turbidity 1.3 to 187 NTU's. Bacteriological results range from 0 cfu to 260 cfu for E.coli and from 23 cfu to >2450 cfu for Total Coliforms.

#### **Raw Water Characteristics**

	Temperature	pH	Turbidity
Average	10.10	7.04	6
Range	1.2-24.1	6.2-7.8	1.0-282

These results were taken over a 5-year period from 2008 to the end of 2012.

### **Events**

During spring break-up of the Rainy River along with the run-off, turbidity levels rise very high. This can be corrected with making the appropriate physical or chemical adjustments to the treatment process.

### ***Threats***

Upstream of the intake, is 2 paper mills, residential (Fort Frances and Int'l Falls), agricultural activities and wildlife.

Potential sources of raw water contaminants include spills from the highway or rail mishaps, spills from the mills, high rainfall causing run-off or agricultural land, and sewage spills from the US side of the river and Fort Frances waste water system .

As there is only a single intake line, there is a risk of a collapsed or plugged intake line.

### ***Operational Challenges***

The Rainy River provides a good supply of source water. The most significant challenge related to source water is the quick change in turbidity due to rain, high winds and run-off.

### ***Distribution System***

The distribution system for the Town of Emo serves a population of 975 and is pressurized by three duty vertical variable speed high lift pumps for domestic demand three 20 HP with a rated capacity of 20.01 L/s at a TDH of 47.0m. One vertical turbine fire pump 50 Hp with a rated capacity of 37.85 L/s at a TDH of 67.05m. Under normal demand only one pump is required to provide adequate pressure to the system which is 67 psi. If pressure should and there is a demand for more flow second pump will cut in and a third if demand is not met.

Water is stored at the plant in a 727 m<sup>3</sup> a to a water depth of 2.5 m three cell reservoir which is about 48 hours of storage. There are no additional

water storage facilities in the Town of Emo.

The distribution network consists of approximately 14 km's of piping fed from the Water Treatment Plant and consists of cast iron, ductile iron and PVC, HDP the sizes range 50 mm to 300 mm. Within the system there are 131 main line valves and 84 fire hydrants and 84 hydrant valves.

### ***Barriers to Microbiological Pathogens***

The following processes remove potentially pathogenic organisms:

1. Coagulation / Flocculation / Sedimentation
2. Filtration
3. Chlorination (primary disinfection)
4. Distribution system chlorine residual (secondary disinfection)

### ***Analyses***

Ontario Regulation 170/03 and the current Certificate(s) of Approval issued by the Ministry of Environment (MOE) dictate the sampling and monitoring requirements for this system. Water quality is tested throughout the treatment process and from dedicated locations throughout the distribution system.

## **Chemical/Sewage Spill in the River.**

### **This plan will deal with spills that have not yet entered our intake structure:**

- The raw water source (river) is at risk for both chemical and raw sewage spills at several upstream locations: highway and railroad bridges, paper mills, sewage treatment plants and numerous tributaries on both sides of the river.
- All chemical and sewage spills are required to be reported to the SAC office immediately. The SAC office will then notify the water treatment plant and/or operators on call. Those reporting the spill are also required to notify all Treatment Plants downstream. **Sac—1-800-268-6060**
- Historically the Fort Frances and International Falls Sewage Treatment Plants have breached during and following extreme rain storms. Under these conditions, operators have had to deal with extreme raw water turbidity as well as the sewage plant effluents. Although, to date (recent history), there have been no unmanageable emergencies, operators shall not take these spills lightly.

### **In the event of chemical/sewage spill in the river:**

- 1) It is treatment plant policy to maintain reservoirs as near as possible to full capacity at all times to reduce potential shortages due to unexpected shutdowns;
- 2) Document the notification from the SAC office as well as the notification from the spill reporter, time and location of spill, type and quantity of spill and expected duration;
- 3) Immediately contact the local MOE and MOH offices. **Follow their instructions. MOE—1-807-468-2727, MOH—274-9827**
- 4) If the spill is sewage plant effluent, the treatment process can probably be left online (MOE and MOH instructions), but will require close monitoring and increased disinfection. Keep in mind that any spill in the Fort Frances area will take approximately 5 hours to get to Emo. River velocity=4 mph;
- 5) If the spill is hazardous chemical, the operator may be instructed to shut down the treatment process for an extended period of time. If instructed to shut down the process, also shut off the gate valve between the intake and the raw water well;
- 6) Emergency water usage restrictions shall be imposed unless the emergency is expected to pass in a few hours. Residents will be informed of the restrictions

firstly by radio broadcasts and followed by door to door hand outs.  
Unnecessary municipal equipment will be shut off (assuming a full reservoir and average daily flows, the reservoir will be empty in less than 40 hours).  
Lower the distribution pressure to at least 50 PSI.

- 7) Contact municipal officials and the fire department.
- 8) If the length of the shutdown is not known and after instruction from MOE and MOH, make arrangements with Asselin Transport, of Fort Frances, to prepare for emergency transport of water; **Asselin Transport 274-5859**
- 9) If transporting water is required, ensure all provisions of the AWWA Standard for Disinfection of Water Shortage Facilities C652-11 are followed;
- 10) Note: transporting water will have *its* limitations - further reductions in distribution pressure and more stringent usage restrictions will be required to maintain even minimal services;
- 11) Follow this step only under the strict guidance of the MOE and MOH. When the threat of contamination is over or gone past, before the process is restarted, the intake structure may have to be back flushed if there is a possibility the intake line is contaminated. Install a pump slightly upstream from the intake and pump directly into the raw water well. After the level of the well has rose at least a foot, slowly open the intake valve. Continue pumping into the raw water well until there has been a complete change of water in the intake line.
- 12) Follow all further instructions of the MOE and MOH. Document the entire incident including all pertinent information.

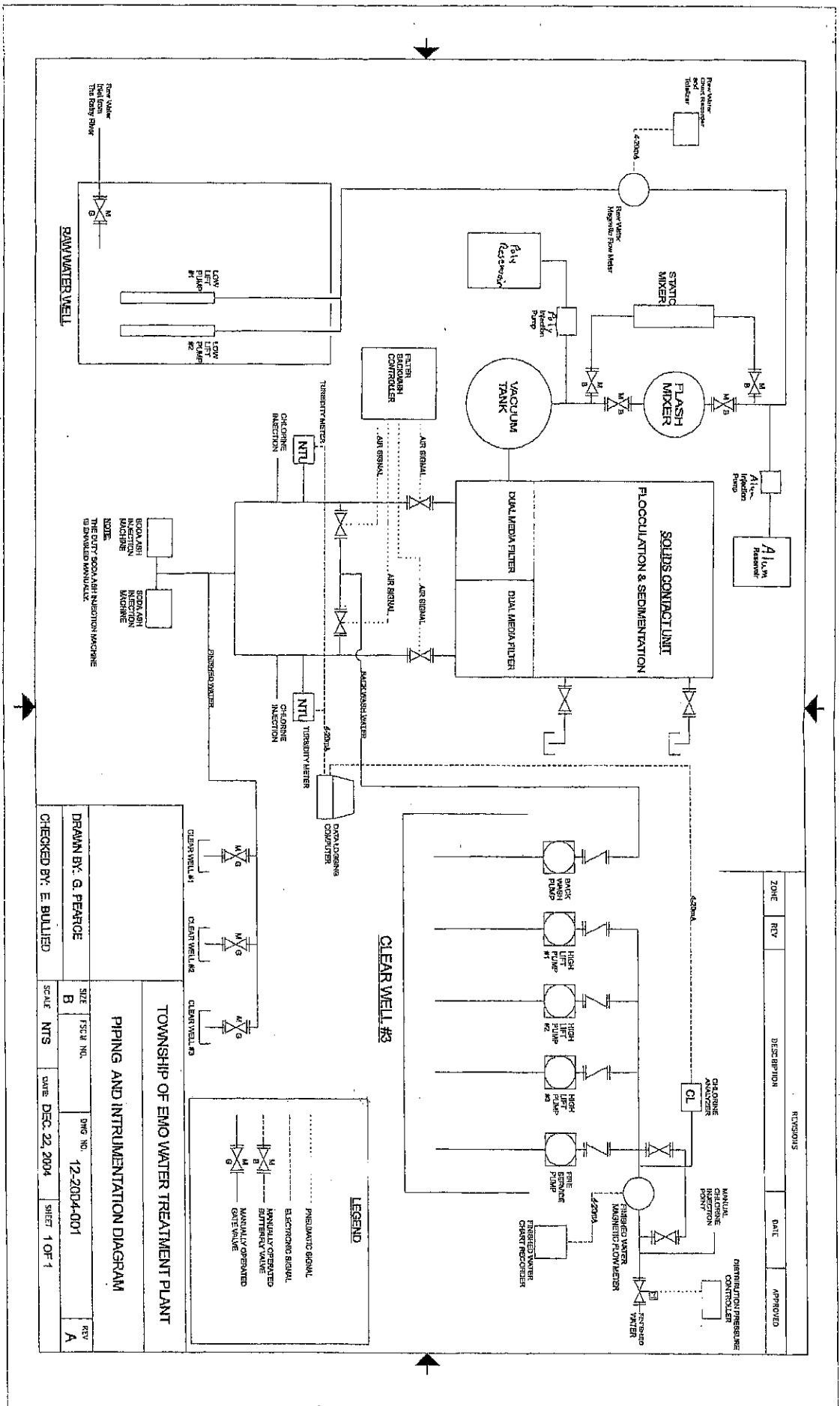
## Clarifier/Filters Upset

Diligent daily monitoring and adjusting of the treatment and filter process will reduce or eliminate the need for emergency action due to fluctuations in the raw water. If the clarifier process is upset and consequently The filter process also, the turbidimeters on the filter effluent will alarm at 0.8 NTU. If not corrected, the treatment process will shut down automatically when the turbidity remains over 1.0 NTU for ten minutes. The process will upset for several reasons: raw water turbidity high, raw water flow rate increases dramatically, loss of chemical feed (alum and polymer), loss of vacuum pulsation, and loss of rapid mixing. The raw water turbidity is relatively predictable and operators should respond in advance of turbidity problems when The river is becoming riled up because of heavy rains or run-off.

### **In the event of clarifier/filter upset:**

1. Quickly look at the top of the clarifier and the filter effluent turbidimeters. If the clarifier has already turned dark and filter effluent turbidity is over 0.8 NTU, the situation will not be rectified for several hours;
2. Shut the filters off, the clarifier effluent will now be discharging to waste. If the process has already shut down because of high turbidity, restart it in the manual mode with the filters off;
3. Turn off the chlorinator and the soda ash feeder;
4. If the problem is loss of chemical feed, loss of vacuum pulsation, loss of rapid mixing, then connect and/or start the standby equipment. If the problem is an **extreme** increase in the raw water flow rate, readjust the control valve back to The original flow rate;
5. Turn up the alum and polymer feed rates by at least 40 % to correct the treatment process as quickly as possible;
6. If the problem is high raw water turbidity, shock the clarifier with high alum and polymer dosage, the same as in step 5. If the raw water turbidity is extreme, > 50 NTU, be aggressive and turn up the chemical by 100 %;
7. Monitor the turbidity on the top of the clarifier at the overflow to waste weir every half hour,

8. If the reservoir level is critical, attempt to put the filters back online when the clarifier turbidity is <3NTU. If the level is not critical, allow the clarifier more time to clean up the other filter online and initiate a backwash.
9. Turn the cleanest filter back online and immediately initiate a backwash. When the backwash is over, immediately turn the other filter online and initiate a backwash.
10. Monitor the effluent of the first filter. If the turbidity exceeds 1.0 NTU for 10 minutes and shows no sign of improving then shut that filter off and backwash again after the second filter has finished backwashing. Continue in this manner until filter effluent turbidity is satisfactory.
11. Turn the treatment process back to the automatic mode.
12. Turn chlorinator and soda ash feeder back on. Increase chlorine feed rate, depending on the length of time effluent turbidity was higher than normal. Check the trend in the chlorine residual;
13. If the problem was caused by other than high raw water turbidity, then turn the alum and polymer feed rate back to normal, slowly over several hours. Do not reduce the chemicals too drastically until the clarifier effluent turbidity is < 1.0 NTU and the floc bed rises to the first sample top;



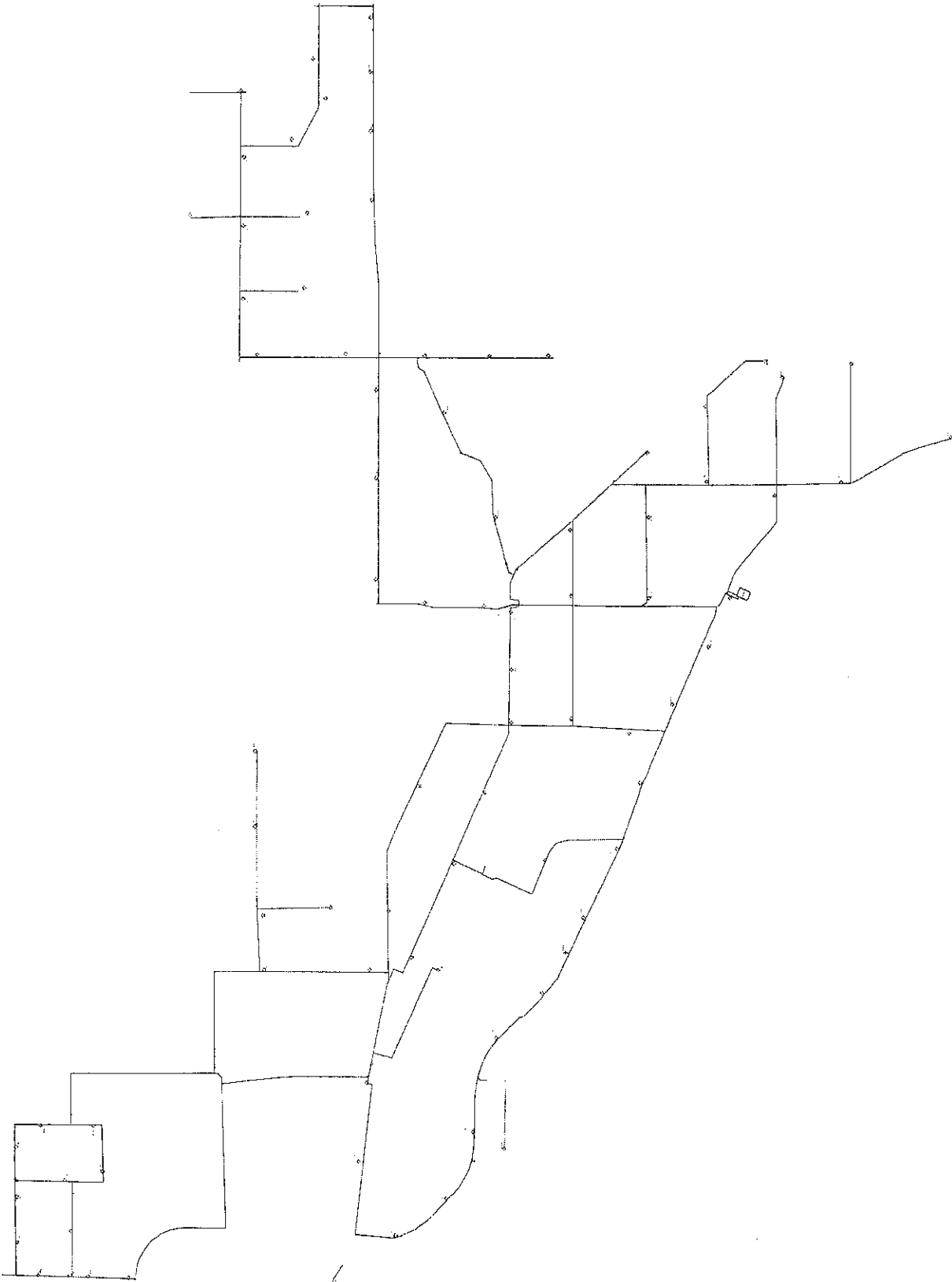
ZONE	REV	DESCRIPTION	DATE	APPROVED

TOWNSHIP OF EMO WATER TREATMENT PLANT	
PIPING AND INSTRUMENTATION DIAGRAM	
SIZE	DWG NO.
B	12-2004-001
SCALE	DATE
NTS	DEC. 22, 2004
	SHEET 1 OF 1
REV	
A	

ZONE	REV	DESCRIPTION	DATE	APPROVED

LEGEND	
	PNEUMATIC SIGNAL
	ELECTRONIC SIGNAL
	MANUALLY OPERATED BUTTERFLY VALVE
	MANUALLY OPERATED GATE VALVE

Uncontrolled Printed Copy April 2016 Version 5.5



LEGEND



**S. BURNETT & ASSOCIATES**  
 ENGINEERS AND ARCHITECTS  
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 Minneapolis, MN 55402  
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DRAWN BY: J.W. PROJECT NO: S.B. 11-004  
 CHECKED BY: J.W. DATE: 11-05-11

TOWNSHIP OF EMCO  
 ASSET LOCATION MAP  
 WATER DISTRIBUTION NETWORK

NO.	DATE	ISSUE / REVISION	NO.	DATE	ISSUE / REVISION	NO.	DATE	ISSUE / REVISION
1	11-05-11	Issue						

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## **7. Risk Assessment (covered under section 8)**

### **8. Risk Assessment and Outcomes**

The Corporation of The Township of Emo has established, implemented and maintains this procedure to determine what potential hazards and critical control points exist in the Water Treatment and Distribution System.

The Risk Assessment procedure is conducted annually, prior to the DWQMS annual management review or more frequently if a significant process change or upgrade has occurred. The hazard analysis must be conducted a minimum of every thirty six months.

The process for hazard analysis includes an assessment of each process step and/or activity and identification of hazards that are potentially present or possible at each process step and/or activity.

Once hazards are identified, the next step is determination of critical control points (CCPs). This process involved a risk assessment by prioritizing hazards and identifying points where control may be exerted to eliminate or minimize those hazards, (for example, by determining which are CCPs).

The risk assessment was performed by rating the likelihood, severity and detectability of each hazard at each relevant process step or activity on a scale of 1 to 5. The values for each of these factors were added together to give a risk priority number.

**Likelihood** is probability/likelihood of a hazard or hazardous event occurring.

**Severity or Consequence** is the potential impact to health or impact on operations if the risk is not controlled (assumes control measures do not work).

**Detectability** is a measure of the ability to detect the presence of certain hazards. Hazards, which could be easily and quickly detected, were given a low value. Hazards that are hard to detect or undetectable are given a high value. The risk is greater as appropriate responses cannot be taken to control or mitigate the risk.

**The rating system is defined on the following page:**

**Risk Assessment and Outcomes Con't:**

<b>Description</b>	<b>Likelihood of Hazard Occurring</b>	<b>Rating</b>
Rare	May occur in exceptional circumstances, or has not occurred	1
Unlikely	Could occur at some time, historically has occurred annually or less than annually.	2
Possible	Has occurred once or more per year.	3
Likely	Has occurred on a monthly to quarterly basis.	4
Very Likely	One or more occurrences on a monthly or more frequent basis	5

<b>Description</b>	<b>Severity of Hazard Occurring</b>	<b>Rating</b>
Insignificant	Insignificant impact, little disruption to normal operation.	1
Minor	Minor impact for small population, some manageable operation disruption, some increase in operational requirements.	2
Moderate	Minor impact for small population, significant modification to normal operation but manageable. Increased monitoring and operational requirements.	3
Major	Major impact for small population, systems significantly compromised and abnormal operation if at all.	4
Catastrophic	Major impact for large population, complete failure of all systems.	5

<b>Description</b>	<b>Detectability of Hazard</b>	<b>Rating</b>
Very Detectable	Very easy to detect, instantaneous, ALARM monitored	1
Moderately Detectable	Moderately detectable, alarm present , may require operator to walk by and notice alarm; problem is indicated promptly by lab test results.	2
Normally Detectable	No alarm present, visually detectable on rounds or regular maintenance.	3
Poorly Detectable	Poorly detectable, visually detectable but not inspected on a regular basis; would not be detected before a problem was evident; lab tests that are not done on a regular basis.	4
Undetectable	Undetectable, cannot detect.	5

### **Risk Assessment and Outcomes Con't:**

Included in the following pages is a chart that identifies the process and activity hazards related to the Water Treatment & Distribution System along with the outcome of the risk assessment, and finally the identification of which of these are identified as critical control points.

Critical control points identified in the table that follows have controlled conditions that are established, implemented and maintained that include:

- a) Critical limits
- b) The availability of information to operations personnel that outlines the critical limits
- c) The availability and awareness of Standard Operating procedures (SOPs), which include recovery procedures, as necessary, and
- d) The reliability and redundancy of equipment, as appropriate to the identified risks and nature of the Water Treatment Plant.

All actions performed in the WTP are recorded in the daily log book. Reporting of any adverse outcomes, the operator is to follow the adverse protocol outlined in O Reg. 170. The operator will also report to the ORO his/her findings and outcomes related to the problem, and the ORO will communicate what is relevant to the PWS and CAO. If any maintenance or repairs are done to any piece of equipment the operator will also update the corresponding binder.

Element Or Process Step	Description Hazard	Potential Results of Hazard	Comments	Available Monitoring & Control Measures	Emergency Procedure or Contingency Plan	Likelihood	Severity	Detectability	Risk Priority Number	CCP?	Control Procedure
Source Water	Rail Car Derailment or Highway Accident - spill of chemical or contamination	Chemical contamination of source water		Notification from MOE Spills Action Centre of spill and potential for contamination of source water	Stop producing water until plume passes, supply from storage, implement water restrictions if necessary, haul water	1	2	3	6	NO	
Source Water	Discharge of inadequately treated sewage from Fort Frances, International Falls Sewage Treatment Plant.	Biological contamination of source water	An upstream process to be captured under Source Water Protection	Conventional Water Treatment Operations. Weekly Bacteriological Testing of RAW Water Source	Discuss with Ministry of Health re: source of e.coli	2	1	5	8	YES	Standard Operating and Maintenance Binder
Source Water	Collapse or Breakage of single intake pipe	Quantity/Quality		Pump shut down on low level in pump well; Loss of raw water flow signal	Supply water from storage, notify residents of strict water restrictions	1	3	1	5	NO	Standard Operating and Maintenance Binder
Source Water	Spill of chemical from I Falls Paper Mill	Chemical contamination of source water		Notification from MOE Spill Action Centre of spill and potential for contamination of source water	Stop producing water if necessary. Supply from storage. Water restrictions if necessary. Haul Water.	1	2	3	6	NO	
Treatment	Loss of coagulant-plugging of lines, pump failure, clogging of screens	Biological & Chemical contamination	Crypto/Giardia not removed without coagulant	On-line Filter Effluent Turbidimetre	Change feed pump, clean lines, plant will automatically shut down at 1.0 ntu	2	2	2	6	NO	Standard Operating and Maintenance Binder
Treatment	Loss of polymer-plugging of lines, pump failure, clogging of screens	Shorter filter runs		High level alarm at filter; Visual inspections throughout the day	Repair polymer feed system.	2	2	2	6	NO	Standard Operating and Maintenance Binder

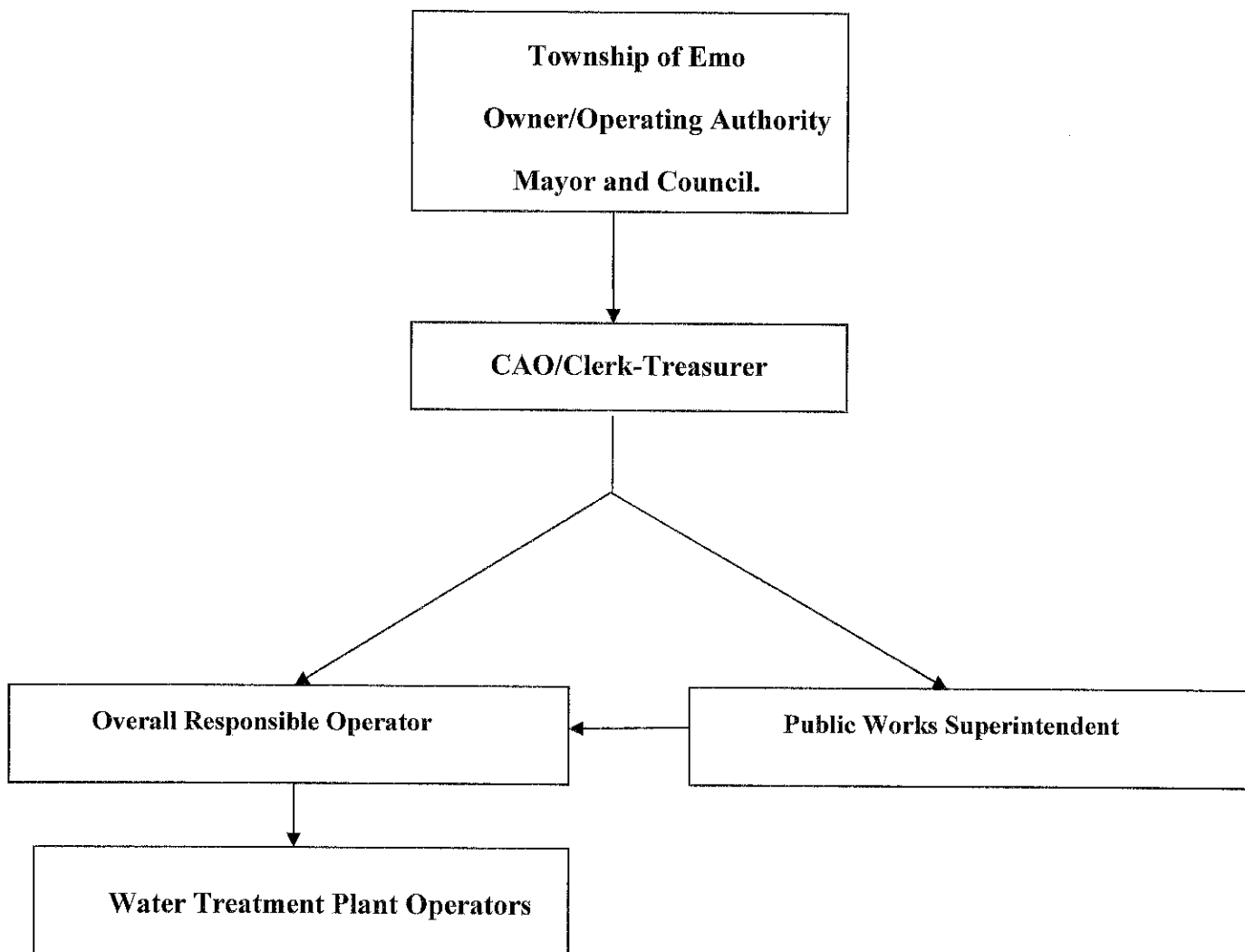
Element or Process Step	Description of Hazard	Potential Result of Hazard	Comments	Available Monitoring & Control Measures	Emergency Procedure Contingency Plan	Likelihood	Severity	Detectability	Risk Priority Number	CCP?	Control Procedure
Treatment	Filter Breakthrough, filter underdrain failure	Biological contamination		On-line Filter Effluent Turbidity set at .08 NTU	Shut down filter; take it out of service	1	2	1	4	NO	Standard Operating and Maintenance Binder
Treatment	Backwash pump failure (only one pump)	Quantity/Quality		Shut down of filters on high turbidity, alarms	Spare motor & spare parts for pump at WTP	1	2	3	6	NO	
Primary Disinfection	Chlorine failure	Biological contamination	Bacteria and viruses not inactivated without chlorine	On-line Chlorine analyzer. Alarm low point set at .80 mg/l	Automatic switchover to standby chlorinator & spare parts to make repairs.	2	3	2	7	NO	Standard Operating and Maintenance Binder
Reservoir	Loss of structural integrity of reservoir-leakage into reservoir	Biological contamination Chemical contamination		On-line Analyzer alarm Low set at .80 mg/l High set point at 3.0 mg/l	Use of other two clear wells still available. Shut down clear well with leak. By pass to other 2 clear wells and perform repair on affected clear well.	1	2	2	5	NO	
Distribution	Loss of free chlorine residual below .05 mg/l	Biological contamination		Daily residual testing at far end of system, weekly monitoring at locations in town	Flush system until .20 mg/l; increase chlorine dosage at WTP	1	4	3	8	Yes	See O Reg.170/03 requirements for corrective actions.
Distribution	Loss of pressure-water main break	Biological and chemical contamination		Customer complaints, low/high pressure alarms at WTP	Follow; Procedure for water main break repair.	3	2	1	6	NO	Standard Operating and Maintenance Binder
Distribution	High lift pump failure	Quantity/Quality		Low pressure	Back-up pumps	1	2	2	5	NO	

## 9. Organizational Structure, Roles, Responsibilities, and Authority

### Overall Responsible Operator (ORO) and DWQMS Representative

The ORO is responsible for the day to day operations of the Township of Emo Drinking Water System. The ORO supervises any operators of the system. The ORO works hand in hand with the Superintendent of Public Works and the Clerk Treasurer. The ORO provides reports to Top Management both, orally and written, daily, if necessary and represents the Water System at Public Works meetings and Council meetings. The ORO initiates Operational Reviews, Management Reviews and Internal and External Audits. The ORO is the only person who may make changes to, or dispose of, documents and records.

#### - Organization Chart -



### ***Township of Emo, Mayor and Municipal Council. (Owner)***

The Township of Emo, which is represented by an elected Mayor and Council, is responsible for ensuring a safe and reliable supply of drinking water to the customers of the Township of Emo Water System. The Mayor and Council have the authority to manage or delegate the management of municipal assets to qualified staff. The owner will approve expenditures and user fees. The Mayor and Council will participate in on-going issues with the water system including long range planning, budgeting, and compliance issues.

### ***CAO/Clerk-Treasurer (top management)***

The CAO/Clerk-Treasurer is responsible for reporting to the Mayor and Council on the oversight of the Township of Emo Water System. The CAO/Clerk-Treasurer will provide direction and guidance to the Superintendent of Public Works and the Chief Water Plant Operator who is also the Overall Responsible Operator (ORO), regarding issues that are relevant to the overall operation of the water system. The CAO/Clerk-Treasurer is authorized by Mayor and Council to ensure that staff is in place to guarantee that the Township of Emo Water Treatment System is supplying safe and reliable drinking water and is in compliance with regulations.

### ***Superintendent of Public Works***

The Superintendent of Public Works is responsible to ensure that operations within the Township of Emo Water Treatment System are being performed to guarantee safe, reliable drinking water. The Superintendent of Public Works will work closely with the Chief Operator and the Clerk Treasurer on all issues pertaining to the water system.

### ***Overall Responsible Operator (ORO) and DWQMS Representative***

The ORO is responsible for the day to day operations of the Township of Emo's Water System. The ORO supervises any operators of the system. The ORO works hand in hand with the Superintendent of Public Works and the CAO/Clerk-Treasurer. The ORO provides reports to top Management both, orally and written, daily, if necessary and represents the Water System at Council meetings. The ORO initiates Operational Reviews, Management Reviews, and Internal and External Audits. The ORO is the only person who may make changes to, or dispose of, documents and records. The ORO must maintain a minimum Class 2 Water Treatment Certification to fulfill the required responsibilities.

The ORO is authorized to make any process adjustments to ensure the supply of safe and adequate drinking water. Authorization includes purchasing of process

chemicals, lab supplies, testing services, and equipment parts. The ORO is also authorized to direct the duties of the plant operators and supervise any on site contractors.

The Overall Responsible Operator (ORO), is responsible for the daily operation and maintenance of the water distribution system. This includes ensuring a safe and adequate supply of water for all customers. The ORO directs operators and contractors in the repair and maintenance of all aspects of the distribution system, which includes hydrants, main valves, services and shut offs. Recording of daily activities, following current regulations and reporting of normal and abnormal conditions to Manager are included in the duties. The ORO must maintain a Level 1 Water Distribution Certificate.

The ORO has authorization to take control of emergency situations (ex. water main break) and use whatever equipment is necessary to complete repairs in a safe and efficient manner.

The Emo WTP is normally staffed from 7:00 a.m. to 3:30 p.m. daily. On weekends and statutory holidays an operator visits the plant to do operational checks and any plant duties that are necessary. The water plant has alarm systems built in that will shut the plant down if the following critical alarms take place:

- Filter turbidity reaches .80 NTU.
- If the chlorine residual falls below 1.0 mg/l.

A stand-by power source is available. If any power disruption occurs, the generator starts automatically to provide power back-up.

Fire pump is manually turned on and off.

All the alarms are responded physically to the WTP.

#### ***Operator in Charge (OIC)***

Must have a minimum Class I Water Treatment Certificate. Identified on daily log sheet as OIC. Makes data entries in logbooks and on log sheets. Performs all on site water tests and makes and records all process adjustments.

#### ***Operator***

All operators are responsible for maintaining required Ministry of the Environment Certification for Water Treatment and Water Distribution Systems. Operators are required to carry out the daily duties for the treatment and distribution processes to ensure operations are completed in compliance and if a non-compliance incident occurs it must be acted upon and reported. Operators are authorized to collect samples, perform testing, adjust treatment processes with direction from the Chief Operator and perform maintenance on the treatment and distribution system in accordance with standard operating procedures to ensure a safe and adequate water supply.

## **10. Competencies**

### **Overall Responsible Operator (ORO)**

- WT Class II or higher
- WD Class I or higher
- WHMIS
- Confined Space Entry
- Mechanical Aptitude
- Basic Lab skills
- Internal Auditor Training
- First aid
- Safe Guarding Drinking Water
  
- SCBA Training

### **WTP Operator**

- OIT Certification or higher
- WHMIS
- Mechanical aptitude
- First Aid
- Safe Guarding Drinking Water
  
- SCBA Training

## **Competencies Continued**

All operators will have an understanding of the complete water treatment process. They will understand the purposes and operational aspects of the treatment process from source to consumer. They will be provided with QMS training and have knowledge of all regulations and access to Reg. 170. Operators will have the opportunity to comment and make suggestions for improvement of the Drinking Water System and the DWQMS. All training documents for all operators are kept at the WTP, as well as CEU's accumulated to date and when they need updating. Frequency for both mandatory training and township selected training is all on file at both the WTP and Municipal Office.

## 11. Personnel Coverage

The WTP operators work daily from 7:00am until 3:30pm. There are two operators on duty with the exception of vacation, days off, etc.

The #1 Operator (OIC) looks after the daily process operations like raw and treated water testing, flow totals, pump logs, filter backwashing, chemical totals and makes all entries on daily log sheets and in plant diary.

The #2 Operator assists in equipment maintenance and repair, and assumes the duties of the #1 Operator in his absence.

The Chief Operator (ORO) oversees the day-to-day operation of the plant and designates OIC.

The plant is equipped with alarms on all plant process equipment. Alarms are monitored via telephone lines which contacts the Operator that is on call. Alarms to the on call Operator are specific, they are all Water Plant alarms, and so the operator must respond immediately to the plant. Although response time is stated at 30 minutes, a time of 5 – 15 minutes is the norm.

In the event of an emergency, all available operators report to the water plant immediately and wait for instructions.

Operators are on call daily from 3:30 pm → 7:00 am, seven days a week from Monday to Monday. All operators are on a scheduled rotation. The operator on call also works the weekend and is the backup ORO.

**In the Event of All Staff Operators Absence:**

1. The Supervisor of Public Works shall be notified immediately by the designated ORO of pending absences. If neither the ORO or OIC are able to notify the supervisor due to an emergency, the Township of Emo's Administrator/Clerk Treasurer shall notify that person.
2. The Supervisor shall contact the Rainy River Water Treatment Plant and arrange for qualified operators to tend to the Emo Water Treatment Plant.
3. The Supervisor shall ensure the alarm system is reprogrammed to communicate with the emergency operator.
4. The Supervisor shall provide any assistance and information required by the emergency operator.
5. The MOE shall be informed of the situation. **MOE—1-807-468-2727**

**Contacts:**

Rainy River Water Treatment Plant – (807)-852-4485

Bob Jensen- Rainy River WTP ORO – (807)-275-6450

Emergency on Call Number (807)-275-8761 or (807)-852-3244

## 12. Communications

Communications throughout the Emo Water Treatment System are as follows:

The ORO as Chief operator and QMS representative will keep Top Management and the Owner informed of all operational aspects of the water system. Since the Municipality is the Owner, Council is informed about any water issues at the Council meetings that are held on the second and fourth Tuesdays of every month. The Mayor chairs the Council meetings and the Public Works Superintendent is also in attendance. Monthly water reports are presented at these meetings and any water issues that may arise are discussed with the Owner, Top Management, Superintendent, and the ORO.

Operators discuss issues with the ORO on plant operations and the ORO discusses any relevant issues with the Superintendent of Public Works on a daily basis. If necessary, discussions with the CAO/Clerk-Treasurer may take place and the CAO/Clerk-Treasurer may inform the Mayor and Council.

Suppliers are notified by telephone that all supplies (chemicals, parts, that effect drinking water) must be NSF and/or ANSI certified. MSDS sheets are also required, and are kept in the MSDS Station outside of the WTP office.

If the public needs to be notified (boil water advisory, water restrictions, emergency repairs), the office of the CAO/Clerk-Treasurer will implement the necessary communications.

If the public has any concerns or complaints they may either call the WTP or the town office to talk to either the ORO, Public Works Supervisor, or the CAO, if these people are not readily available the secretary will take a message and relay it on to the appropriate person. All complaints are also documented in a note book marked for complaints only. A copy of all annual reports are kept on the counter of the municipal office for anyone to look through.

Copies of the DWQMS Operational Plan will be available at the Town Office, Emo Water Treatment Plant and on the Township of Emo website.

**13.**

**Essential Supplies and Services**

Chlorine	<u>Brenntag Canada Inc.</u> 681 Plinquet Street, Winnipeg, MB. R2J 2X2 204 – 233 – 3416  Order chlorine two –three times a year
Soda Ash	Ordered when down to last ten bags
Clear Flocc CP-1065 (polymer)	<u>Cleartech</u> 340 Saulteaux Crescent, Winnipeg, MB. R3J 3T2 800 – 387 – 7503  Order when down to quarter tub usually every 2-3 years
Calibrations	<u>Lakeside Process Controls</u> 1165 Russell Street, Thunder Bay, ON P7B5M6 1-807-624-2792
Aluminum Sulphate (Alum)	<u>General Chemical</u> 145 McDougall Street, Thunder Bay, ON. P7B 6T9 807-345 – 7643 After hours call 807 – 345 – 5518  * When Big wood Alum Tank has 2ft remaining contact Randy White/Brad Webb Fort Frances WTP to share a load 274-2325

Accredited Laboratory Services	<u>ALS Laboratory Group</u>
	1081 Barton Street, Thunder Bay, ON. P7B 5N3
	807 – 623 – 6463      Fax 807 – 623 – 7598
Alum & Poly Pump parts	<u>Metcon Sales &amp; Engineering</u>
	48 Squire Street, Thunder Bay, ON. P7B 4A8
	807 – 683 – 0976
Selog Nordeck Inc.	150 Armstong Ave., Unit #4 Georgetown, ON. L7G5G8
	1-905-873-7373
<u>Ontario One Call</u>	1-800-400-2255
	Emo ID# 28944
<u>Hydro One</u>	1 – 800 – 434 – 1235
<u>Asselin Vacuum Truck</u>	274-6255
<u>Harold McQuaker Ent.</u> (backhoe services)	482-2844 cell # 275-8483

All suppliers shall be selected on their ability to consistently meet the requirements of the Township of Emo. Performance (delivery, acceptance rate, responsiveness) will be evaluated to ensure adherence to the township's purchasing policies.

All chemicals will be ANSI/NSF CERTIFIED

Lab services will be provided by only ACCREDITED labs.

Calibrations services shall be provided by certified technicians and a report issued following any calibration made.

All excavation/construction services shall be provided by bonded and insured contractors with all the necessary licences.

All chemicals and materials used in the alteration or operation of the drinking water system that come into contact with water within the system shall meet all applicable standards set by both the American Water Works Association (“AWWA”) and the American National Standard Institute (“ANSI”) safety criteria standards NSF/60, NSF/61 and NSF/372.

In the event that the standards are updated, the owner may request authorization from the Director to use any on hand chemicals and materials that previously met the applicable standards.

The requirement for the owner to comply with NSF/372 shall come into force no later than September 17 2018.

The most current chemical and material product registration documentation from a testing institution accredited by either the Standards Council of Canada or by the American National Standards Institution shall be available at all times for each chemical and material used in the operation of the drinking water system that comes into contact with water within the system.

Conditions previously mentioned do not apply in the following:

Water pipe and pipe fittings meeting AWWA specifications made from ductile iron, cast iron, PVC, fibre and/or steel wire reinforced cement pipe or high density polyethylene;

Articles made from stainless steel, glass, HDPE, or Teflon;

Cement mortar for watermains lining and for water contacting surfaces of concrete structures made from washable aggregates and Portland cement;

Gaskets that are made from NSF approved materials;

Food grade oils and lubricants, food grade anti-freeze, and other food grade chemicals and materials that are compatible for drinking water use; or

Any particular chemical or material where the owner has written documentation signed by the Director that indicates that the Ministry of the Environment and Climate Change is satisfied that the chemical or material is acceptable for use within the drinking water system and the chemical or material is only used as permitted by the documentation.

## **14. Review and Provision of Infrastructure**

An infrastructure review will be conducted annually by the ORO. The review will look at MOE inspection reports, flow and process trends, water quality reports, maintenance records and the complaints file. Staff input will also be considered and a report will be presented to top management and the owner.

## **15. Infrastructure Maintenance, Rehabilitation and Renewal**

Once a year, prior to the preparation of annual budgets, the Chief Operator shall prepare a summary of the infrastructure maintenance, rehabilitation and renewal programs for the Emo water system. The summary shall be provided to the Owner. The summaries will be compared from year to year to determine the effectiveness of the program.

The maintenance summary includes both the treatment and the distribution systems including:

hydrant maintenance,

flushing mains,

exercising valves, and

preventative maintenance of treatment plant process equipment

Machinery and equipment maintenance is as per the manufacturer's recommendations. Equipment manuals are kept in the WTP office area. All maintenance and repairs are recorded in the daily log book. All calibrations are kept in a file. A reasonable supply of parts is stocked at the WTP including distribution parts and repair kits.

## 16. Sampling, Testing and Monitoring

The Emo Water Treatment Plant has a sampling program based on the requirements set out in Ontario Regulation 170/03 and our current ECA.

- Daily grab samples are taken for raw water PH and TUBIDITY, treated PH and TURBIDITY, clarifier PH and TURBIDITY.
- We have online monitoring for filter effluent turbidity, cl2 residual on treated water leaving the plant.
- A distribution sample for free chlorine is taken daily (365 days per year). Samples are typically taken from the municipal garage which is at the longest dead end run in the distribution. Results are kept in the daily log sheet at the WTP.
- Weekly distribution samples are taken and sent to an accredited lab. These samples are sent by courier or mail in order for them to get to the lab in appropriate time.
- Sampling Points:
  - Rainy River raw- taken at water entrance point into WTP located in the south wall of clarifier room. The time of sampling is recorded.
  - Treated water leaving WTP located on the north side of plant in the office at the sink.
  - Two samples are taken in the distribution primarily from the municipal garage and the Emo Inn. Cl2 residual and time are recorded on the chain of custodies which are kept in the filing cabinet in the WTP office.
- Raw samples are tested for Total Coliforms by P/A-24 "Plus"(TC,EC)
- Treated samples are tested for P/A-24 (T/C,E/C) and Het. Plate Count (HPC)
- Distribution samples are also tested for P/A-24 (T/C,E/C) and one of the two are tested for HPC.

## **Sampling, Testing and Monitoring Continued**

- Quarterly and annual samples are sent as per regulations. Samples for THM's are taken from Municipal Garage because it is at the end of the distribution system.
- Electronic files are backed up daily to a thumb drive. All recordings are monitored for trends by the operator on duty as well as the ORO. All paper copies are kept at the WTP in a file unless it is in use as it will hang readily accessible to the operators in the office of the WTP.
- The Owner and Operating Authority receives all sample results and are verbally and or written notifications of any adverse results.

## 17. Measurement and Recording Equipment Calibration and Maintenance

### *On-Line Measurement*

At present our on-line measurement devices consist of, 2 filter effluent turbidity meters, and treated water “free” chlorine residual analyzer. Turbidity and chlorine analyzers as well as bench top equipment are calibrated yearly by Lakeside Process Controls Ltd. This certified person contacts the ORO prior to our annual calibration with a confirmed date. **Lakeside Process Controls Ltd—1-807-624-2792**

### *Laboratory Sampling*

A competent certified operator performs all in-house sampling. Results are recorded on a daily log sheet and monitored by plant operators.

An accredited laboratory performs all off site lab work. Bacteriological and chemical results from the accredited lab are emailed to the Water Plant printed and transferred electronically to USB backup and filed in a cabinet at the WTP.

Distribution chlorine levels are checked daily at the Emo Municipal Garage, and weekly at the two bacteriological sample sites. Results from the daily tests are recorded on the WTP log sheet. Results from the weekly tests are recorded on the lab chain of custody forms. **ALS—1-807-623-6463**

Copies of all bacteriological and chemical analytical results are provided to members of the public upon request. Furthermore, all results are summarized in tables at the end of the year and are discussed in the water plant annual compliance report. This report is also available to the public at the Emo Municipal Office.

## 18. Emergency Management

Detailed documented procedures for emergency situations, which could result in adverse water quality in the Drinking water supply system, are located in the **Water Treatment Plant Operations Manual** along with adverse water quality reporting procedures. The manuals are located at the Township of Emo Water Treatment Plant.

### *Potential Emergencies*

- **Power Failure—Hydro Outage, Generator Failure, Transformer Failure**  
The Water Plant is serviced with a 600 volt, 3 phase, 200 amp electrical supply. A 9 KVA transformer supplies power to Service Panel A, which powers all the plant controls, alarms and chemical feeders. A 15 KVA transformer supplies power to Panel B which powers all the Plants services, lighting, heating and accessories. The Electrical service is backed up with a 125 kw generator complete with 200 amp transfer switch, all fully automatic. Any total or partial disruption in the electrical supply will cause the generator to start and the transfer switch to operate re-powering the plant.  
The short interruption in service (several seconds) will do no harm and will not initiate an alarm.

### **Hydro Outage:**

- If an alarm has not been received, it is safe and reasonable to assume that the generator has started and is powering the plant. It is not necessary to immediately check the plant;
- If the outage occurs during regular working hours it is an excellent opportunity to monitor the generator performance. Operators are to make every effort within reason to do this;
- If the outage occurs after hours, check the plant and generator at your convenience only;
- Record generator oil pressure, oil temperature, water temperature, fuel level and running hours on the log sheet. Lift the floor drain plates at the washroom or just below the SCBA cabinet to observe the discharge of cooling water from the generator;
- If the outage duration is unknown and continues for several hours, phone Hydro One at 1-888-664-9376 for an estimated outage time;
- Monitor each situation closely, verifying that the generator is performing properly and that the hydro service has been restored.

### Generator Failure:

- For information on the generator set refer to the Generator and Transfer Switch Manual or contact Cummins Mid Canada in Kenora at 1-807-548-1941;
- One of the alarms named above will have been initiated notifying the operator in charge or on call, Generator Failure loss of power;
- Under this condition the distribution pressure will drop rapidly. Immediately close the butterfly valve downstream from the distribution flow meter and all service water taps in the building. These actions will prevent or reduce the backflow of the distribution system into the plant which is the lowest point of the system;
- If the pressure has fallen below 13.8 psi, this indicates the highest elevations of the system has already started to dewater;
- MOE and MOH must be notified immediately when the pressure has dropped below 20 psi; **MOE—1-807-468-2727, MOH—274-9827**
- Service cannot be restored until a boil water advisory has been issued and the consumers properly notified. Use fire department personnel or any other volunteers available to assist in notifying consumers;
- Notify the Fire Department, Public Works Superintendent and Municipal Officials;
- While the boil water advisory is being put into place, try to restart the generator
- Shut off the Treatment Process Controller, Breakers to Pumps;
- At the Transfer Switch turn the controller to test. If the controller is working the generator should turn over. If the batteries are low you should hear the starter solenoid engaging (clicking). If the batteries are low or dead they should be replaced;
- If this is not the problem, contact a diesel mechanic as well as an electrician;
- After power has been restored, and the boil water advisory is in place, repressurize the distribution system, referring to the procedures for loss of distribution pressure;
- Record the failure and necessary repairs and procedures in the daily journal, as well as the generator log sheet.

### **Transformer Failure 9 KVA Panel A:**

- If this transformer fails completely there will be no power to the treatment process, chemical feeders, instruments and most importantly the distribution pumps control circuit causing all distribution pumps to stop;
- The loss of power will cause will initiate an alarm with more alarms to follow;
- If the operator attends to the plant before the pressure has dropped to the critical 20 psi., turn distribution pump #4 to manual or hand. This will maintain system pressure until repairs are made.
- If the distribution pressure has dropped below 20 psi., refer to procedures for generator failure and loss of distribution pressure.
- Contact an electrician immediately. If the breaker at the MCC for the transformer has tripped, DO NOT RESET, as more damage may be done to the transformer, including starting a fire. Often only one phase of the transformer will be damaged and service can be restored temporarily at 2/3 capacity.
- If the transformer is completely destroyed, a temporary line from panel B can be install to feed panel A.

### **Transformer Failure 15 KVA Panel B:**

- If this transformer fails, there will be no heating and lighting. Contact an electrician immediately. DO NOT RESET the breaker at the MCC.
- A temporary line from panel A can be installed to feed panel B temporarily. At panel B, shut off all non-essential services to ease the load on the 9 KVA transformer.

- **Chlorinator Failure—Standard Operating and Maintenance Procedures**

The chlorine feed system can fail for several reasons, electrical failure (process start up relay), loss of injector water supply (solenoid valve), pressure relief valve rupture, roto meter failure, automatic tank change over failure, piping to injection points ruptured.

Theoretically, when the chlorinator fails the chlorine residual of the reservoirs will decrease by approximately 0.1 mg/l per hour, assuming a full reservoir and typical process flow of 20 m<sup>3</sup>/hr. if the original chlorine residual was 1.3 mg/l the reservoir chlorine level would be at the alarm state of 1.0 mg/l within three hours.

**In the Event of Chlorinator Failure:**

1. Immediately shut the treatment process off. Check the trend on the chlorine analyzer from the SCADA system. How long has chlorination been off?
2. If repairs to the chlorination equipment are required, all safety procedures shall be followed including phoning for qualified help.
3. Re-establish chlorination, either by repairing the existing controls, switching tanks, etc. or reconnect the standby gas chlorinator equipment.
4. If the Gas chlorination equipment cannot be repaired or reconnected, set up the hypochlorinator equipment and connect to the filter effluent pipes (several taped points available). Fresh sodium hypochlorite is available at the Barwick Water Treatment Plant.
5. Sodium hypochlorite is a 12% solution; every litre contains 120,000 mg of available chlorine. To achieve a dosage of 3 mg/l at 20 m<sup>3</sup>/hr flow rate, the hypochlorinator must be set to deliver 8 ml/min. This will take approximately ½ litre per hour. If the reservoir chlorine level has dropped to 1.0 mg/l, overdose to about 4 or 5 mg/l to correct the reservoir as soon as possible.

**Do the Math!!**

6. Steps 4 and 5 are to be done carefully as it is dangerous to mix sodium in an area with a acidic product like alum.
7. Restart the treatment process when chlorination has been restored.
8. While repairs are being made, dispatch someone to check chlorine residuals at the ends of the distribution. Keep in mind that under normal flow conditions it takes 8 hours for complete change of water in the distribution system, although different times of the day and different areas have different flow rates.
9. If the chlorine residual at the end sample points have fallen to <0.05 mg/l, the Ministry of the Environment and Ministry of Health must be contacted.
10. Immediately flush the watermains using an 1 ½ “ valve and hose until the residual is at least 0.2 mg/l. See Reg. 170/03, Schedule 17.
11. Under these conditions, it is policy to flush the watermains regardless if the

residuals are > 0.05 mg/l. If the reservoir residual has fallen to 1.0 mg/l, this will probably not be adequate to carry to the end of the distribution under normal flow conditions.

12. Follow the direction of the M.O.E. and M.O.H. if the chlorine residuals are adverse.
13. Repairs –Refer to Wallace & Teirman(1-403-259-8333) manuals or call the contact number in the O&M manuals supplied from the Water Plant upgrade 2015.
14. Note: If the reservoir cl<sub>2</sub> level has fallen to the alarm stage, the disinfection (CT) level will still be adequate for water entering the distribution system. Provided the reservoir level is above the calculated requirement.

- **Chemical/ Sewage spill in the river—Standard O&M Procedures**

**This plan will deal with spills that have not yet entered out intake structure:**

- The raw water source (river) is at risk for both chemical and raw sewage spills at several upstream locations: highway and railroad bridges, paper mills and sewage treatment plants;
- All chemical and sewage spills are required to be reported to the SAC office immediately. The SAC office will then notify the water treatment plant and/or operators on call. Those reporting the spill are also required to notify all water treatment plants downstream.
- Historically the Fort Frances and International Falls Sewage Treatment Plants have breached during and following extreme rain storms. Under these conditions, operators have had to deal with extreme raw water turbidity as well as the sewage plant effluents. Although, to date (recent history), there have been no unmanageable emergencies, operators shall take these spills lightly.

**In the event of chemical/sewage spill in the river:**

1. In the treatment plant policy to maintain reservoirs as near as possible to full capacity at all times to reduce potential shortages due to unexpected shut downs.
2. Document the notification from SAC office as well as the notification from the spill reporter, time location of spill, type and quantity of spill and expected duration.
3. Immediately contact the local MOE and MOH offices. Follow there instructions. **MOE—1-807-468-2727, MOH—274-9827**

4. If the spill is sewage plant effluent, the treatment process can probably be left online (MOE and MOH instructions), but will require close monitoring and increased disinfection. Keep in mind that any spill in the Fort Frances area will take approximately 5 hours to get to Emo. River velocity = 4 mph.
5. If the spill is hazardous chemical, the operator may be instructed to shut down the treatment process for an extended period of time. If instructed to shut down the process, also shut off the gate valve between the intake and the raw water well.
6. Emergency water usage restrictions shall be imposed unless the emergency is expected to pass in a few hours. Residents will be informed of the restrictions firstly by radio broadcasts and followed by door to door notice handouts. Unnecessary municipal equipment will be shut off (assuming a full reservoir and average daily flows, the reservoirs will be empty in less than 40 hours). Lower the distribution pressure to at least 50 psi.
7. Contact municipal officials and the fire department.
8. If the length of the shutdown is not known and after instruction from the MOE and MOH, make arrangements with Asselin Transport (274-6255), of Fort Frances to prepare for emergency transport of water.
9. If transporting water is required, ensure all provisions of the AWWA Standard for Disinfection of Water Storage Facilities C652-11 are followed.
10. Note: transporting water will have its limitations-further reductions in distribution pressure and more stringent usage restrictions will be required to maintain even minimal services.
11. Follow this step only under the strict guidance of the MOE and MOH. When the threat of contamination is over or gone past, before the process is restarted, the intake structure may have to be back flushed if there is a possibility the intake line is contaminated. Install a pump slightly upstream of the intake and pump directly into the raw water well. After the level of the well has rose at least a foot, slowly open the intake valve. Continue pumping into the raw water well until there has been a complete change in water in the intake line.
12. Follow all further instructions of the MOE and MOH. Document the entire incident including all pertinent information.

- **Clarifier/Filter upset—Standard O&M Procedures**

Diligent daily monitoring and adjusting of the treatment and filter process will reduce or eliminate the need for emergency action due to fluctuations in the raw water. If the clarifier process is upset and consequently the filter process also, the turbidimeters on the filter effluent will alarm at 0.8 NTU. If not corrected the treatment process will shut down automatically when the turbidity remains over 1.0 NTU for 60 seconds.

The process will upset for several reasons: raw water turbidity high, raw water flow rate increase dramatically, loss of chemical feed (alum and polymer), loss of vacuum pulsation, and loss of rapid mixer. The raw water turbidity is relatively predictable and operators should respond in advance of turbidity problems when the river is becoming riled up because of heavy rains or run-off

**In the event of clarifier/filter upset:**

1. Quickly look at the top of the clarifier and filter effluent turbidimeters. If the clarifier has already turned dark and filter effluent turbidity is over 0.8 NTU, the situation will not be rectified for several hours.
2. Shut the filters off, the clarifier effluent will now be discharging to waste. If the process has already shut down because of high turbidity, restart it in the manual mode with filters off.
3. Turn off the chlorinator and the soda ash feeders.
4. If the problem is loss of chemical feed, loss of vacuum pulsation, loss of rapid mixing, then connect and /or start the standby equipment. If the problem is in extreme increase in raw water flow rate, readjust the control valve back to the original flow rate.
5. Turn up the alum and polymer feed rates by at least 40% to correct the treatment process as quickly as possible.
6. If the problem is high raw water turbidity, shock the clarifier with high alum and polymer dosage, the same as step 5. If the raw water turbidity is extreme, >50 NTU, be aggressive and turn up the chemical by 100%.
7. Monitor the turbidity on the top of the clarifier at the overflow to waste weir every half hour.
8. If the reservoir level is in critical, attempt to put the filter back online when the clarifier turbidity is <3 NTU. If the level is not critical, allow the clarifier more time to cleanup.
9. Turn the cleanest filter back online and immediately initiate a backwash. When the backwash is over, immediately turn the other filter online and initiate a backwash.
10. Monitor the effluent of the first filter. If the turbidity exceeds 1.0 NTU for 10

minutes and shows no sign of improving then shut that filter off and backwash again after the second filter has finished backwashing. Continue in this manner until effluent turbidity is satisfactory.

11. Turn the treatment process back to the automatic mode.
12. Turn the chlorinator and soda ash feeders back on. Increase chlorine feed rate, depending on the length of time effluent turbidity was higher than normal. Check the trend of the chlorine residual.
13. If the problem was caused by other than high raw water turbidity, then turn the alum and polymer feed rate back to normal, slowly over several hours. Do not reduce the chemicals too drastically until the clarifier effluent turbidity is <1.0 NTU and the floc bed rises to the first sample port.
14. If the problem was caused by raw water turbidity then continue to monitor the raw water because the turbidity may still be increasing. Review the alum feed rate charts. Identify instances of similar circumstances (flow rate and turbidity) and adjust the alum and polymer to that rate slowly over several hours.
15. If for whatever reason, the filter effluent exceeded 1.0 NTU for over 15 minutes, MOE and MOH must be contacted.

- **Insufficient operators at the WTP—O&M Procedures**

In the Event of All Staff Operators Absence:

1. The Supervisor of Public Works shall be notified immediately by the designated ORO of pending absences. If neither the ORO or OIC are able to notify the supervisor due to an emergency, the Township of Emo's Administrator/Clerk Treasurer shall notify that person.
2. The Supervisor shall contact the Rainy River Water Treatment Plant and arrange for qualified operators to tend to the Emo Water Treatment Plant.
3. The Supervisor shall provide any assistance and information required by the emergency operator.
4. The Supervisor shall ensure the alarm system is reprogrammed to communicate with the emergency operator.
5. The MOE shall be informed of the situation.

**Contacts:**

Rainy River Water Treatment Plant—852-4485

Bob Jensen—Rainy River WTP ORO – 275-6450

Emergency on Call Number—275-8761 or 852-3244

## - **Water Main Break O&M Procedures**

1. Once the operator in charge has become aware of a break, the ORO will be notified and the situation will be assessed.
2. If the need for immediate repair is required, the affected customers will be notified by door to door canvas as to the length of disruption.
3. At the same time or immediately following the door to door notification depending on the severity of the break, the mainline valves upstream and downstream of the break will be closed or throttled.
4. Other utilities that may have lines in the excavation area will be contacted. Ontario One Call # is 1-800-400-2255, Emo's I.D.#28944. The excavation will proceed only after all other utilities are located, Union gas, Bell Canada, Hydro One, Tbay Tell.
5. All repair work procedures to the mainline piping will strictly follow the AWWA Standard for Disinfecting Water Mains AWWA ( Sec. 4.7 in its entirety).
6. If the break can be repaired with a coupling device (robar coupler) while the line remains full of pressurized water there is little danger of contamination, internal disinfection may not be required and service can be restored as soon as flushing and bench testes are completed.
7. If the risk of contamination is obvious or in question at all because of depressurizing or cutting into the main. Service can be restored only after the Township of Emo has issued a Boil Water Advisory for all downstream customers. The Boil Water Advisory must be delivered door to door.
8. After either Condition 6 or 7 are met, the main will be flushed from the nearest downstream hydrant. If the direction of the flow is not known (looped) the main will also be flushed from the nearest hydrant on the other side of the break. Flushing will continue until chlorine residual returns to normal distribution levels, turbidity falls below 5 N.T.U. and all air is removed.
9. If service is restored under a Boil Water Advisory, daily bacteriological samples must be taken at least 24 hours apart until 2 consecutive negative samples are recorded. Samples shall be taken downstream of the break, or if looped, on either side of the break.
10. All pertinent information will be logged in the daily journal and the water distribution log book.

11. **Northwest Health Unit—Kenora (24/7):**

Phone # (807) 468-3147 Cell# (807) 467-1708 Fax# (807) 468-4970

**MOE SAC Office (24/7):**

Phone # 1-800-268-6060 Fax# 1-800-268-6061

**MOE Kenora (Monday-Friday):**

Phone # (807) 268-2727 Fax # (807) 468-2735

**Northwest Health Unit Fort Frances:**

Phone # 1-807-274-9827 Fax # 1-807-274-0779

***Emergency Response Testing***

Emergency Response testing will take place in the form of orientation and education session for all operators and functional drills for operators.

***Preparedness***

All operators in the Township of Emo have training and are aware of the locations of written procedures to deal with emergencies in the water treatment and distribution system. Twenty-four hour on call operators and Water Treatment Plant alarms ensure that a qualified staff member will attend and assess any emergency situation within a very short period of time. The emergency plan shall contain an up-to-date list of emergency contacts. If present methods should change or if new employees are brought into the system, semi- annual training would occur on dealing with emergency situations. Senior employees or direct supervisors would provide this training as they do yearly simulations themselves to keep refreshed. All testing situations are recorded and kept on file.

***Water Emergencies***

During working hours 7:00 am to 3:30 pm call the **Water Treatment Plant – 482-2208** or the **Emo Municipal Office – 482-2378** from 8:00 am to 4:00 pm. After hours and weekends contact cell phone # 275-8682 or 275-8683 or 275-8686 During emergency situations the Chief Plant Operator, or in his absence the system ORO, shall assume the role of communications lead. The ORO shall contact the Clerk

Treasurer and keep her/him informed about the situation. The ORO and the Clerk Treasurer shall maintain open communication throughout the emergency situation. The ORO is responsible for communicating with the authorities such as MOE and MOH. The Clerk Treasurer will be the lead in communications with other municipal staff. Communications to the public (radio, posting of notices, door to door notices) will be handled through the Clerk Treasurer's office.

***Water Service Problems***

If a customer calls with “no water, low water pressure” the operator shall be dispatched to confirm the water mains are functioning properly and there are no water main breaks. If the problem is not in the mains then the customer will be told to call a plumber. If a customer calls with a water quality problem such as odors or bad taste a Water Treatment Plant operator will be dispatched to assess the problem. All alarms at Water Plant are connected to a cell phone pager system . To cancel out alarms at the water plant you must click on the ACK. All on the SCADA.

***Water Treatment Plant Emergency Contact List***

Ed Bullied	Chief Plant Operator	Ph: 482-2194 Cell 275-8682
Peter McQuaker	Public Works Supervisor	Ph: 482-2210 Cell 275-8683
Jason Smith	Class 2 Operator/OIC	Ph: 482-2332 Cell 275-8686
Travis McCormick	Class OIT	Ph: Cell 276-5591

## **19. Internal Audits**

### **19.1 Purpose:**

This procedure describes the Internal Audit process, which is used to verify that;

- The QMS conforms to the requirements of the DWQMS, and
- The QMS has been effectively implemented and properly maintained.

### **19.2 Scope:**

This procedure is applicable to all process and activities addressed in the Operational Plan for the drinking water treatment and distribution systems in the Township of Emo.

### **19.3 Definitions and Acronyms:**

CAR- Corrective Action Report  
DWQMS- Drinking Water Quality Management Standard  
ORO-Overall Responsible Operator  
OIC-Operator in Charge  
OIT-Operator in Training  
WTP-Water Treatment Plant  
SOP-Standard Operating Procedure  
PSI-Pounds per Square Inch  
SAC-Spills Action Center  
MOE-Ministry Of Environment  
MOH-Ministry Of Health  
NTU-Nephelometric Turbidity Unit  
CCP's-Critical Control Points  
PWS-Public Works Supervisor  
CAO-Chief Administrative Officer  
SCBA- Self Contained Breathing Apparatus  
WHMIS-Workplace Hazardous Material Information  
NSF-National Safety Foundation  
ANSI-American National Standards Institute  
MSDS-Material Safety Data Sheets  
Cl<sub>2</sub>-Chlorine  
HPC-Heterotrophic Plate Count  
TC-Total Coliforms  
EC-E.Coli  
VFD-Variable Frequency Drive

ECA-Environment Compliance Approval  
CEU-Continuing Education Units  
WT-Water Treatment  
WD-Water Distribution  
TDH-Total Dinamic Head  
L/S-Liters Per Second  
MCC-Motor Control Center  
AWWA-American Water Works Association

#### **19.4 Procedure:**

##### Preparation

- a) Internal audits shall only be conducted by persons having the following qualifications:
  - Internal employees who have completed internal audit training, or
  - Employees of the other operating authorities who have completed internal audit training. Outside Auditors shall provide proof of competency prior to conducting an audit.
- b) Internal Audits of the QMS as documented in the Operational Plan are conducted annually. The QMS Representative shall schedule the audits to ensure that all elements of the DWQMS are sampled at least once in a twelve (12) month period.
- c) The audit QMS checklist(s) shall be created and maintained by the Representative jointly with the Overall Responsible Operator or Auditor. The checklist(s) shall be used by the Internal Auditor as a guideline, for record keeping purposes, and for conducting the interviews and document review during the audit.

##### Conducting the Audit

- a) The Auditor shall observe activities, review records, review previous internal and external audit results, and interview personnel as necessary to ensure that the status of the audited QMS has been effectively covered.
- b) No audits may be planned and /or conducted without the QMS Representative's permission.

##### Reporting the Results

- a) The Auditor shall submit a completed report, including the DWQMS checklist, to the Overall Responsible Operator (ORO) and QMS Representative within a reasonable time of the internal audit.
- b) The report shall include any corrective actions requests (CARs) required to address discrepancies between the QMS and the DWQMS, or between the QMS and how it is actually implemented, including a reference to the applicable section of the Standard.
- c) The QMS Representative shall designate responses to CARs to the responsible individual.
- d) It shall be the responsibility of the QMS Representative to ensure that all CARs are followed up and responses to the CARs are provided to the Internal Auditor within 45 days of the internal audit.
- e) CARs shall be completed, addressed and filed at the Water Treatment Plant office.
- f) The QMS Representative shall communicate the results of the audit to the Manager of Operations & Facilities.

#### Corrective Action/Corrective Action Procedure

The purpose of this procedure is:

- To describe how Corrective Actions are initiated, assigned, documented and verified as being effective.
- To detect all non-conformities of the QMS with respect to the requirements of the DWQMS and to all drinking water activities within the Township of Emo.

#### Procedure

- a) Corrective Actions shall be initiated through the identification of non-conformities within the drinking water treatment and distribution system of the DWQMS. Non-conformities may be detected by any number of methods including:
  - Internal or External Audits
  - End user complaints
  - Manager Reviews
  - Operator feedback
- b) Non-conformities shall be reported to the QMS Representative who shall determine if a Corrective Action is required.

### Investigating and Completing a Corrective Action

- a. The QMS Representative shall assign a Corrective Action to the appropriate staff when it is determined that the Corrective Action is required. Each non-conforming shall require separate Corrective Action form
- b. The Corrective Action form shall be completed with the following information:
  - The date the Corrective Action was initiated
  - A description of the roots cause of the non-conformance
  - A description of the corrective action being taken
  - Responsibilities and timelines for corrective actions
  - Signoff by the responsible employee once the corrective action(s) is complete
- c. The root cause shall be determined. The “5-why” technique may be used, where the question ‘why’ is simply asked five (5) times and the root cause is usually the answer.
- d. The Corrective Actions Assignee shall report progress to the QMS Representative based on established timelines.
- e. Corrective Actions shall be closed out once verified as being effective by the QMS Representative or their designate. The purpose of verifying is to ensure that the corrective root cause was identified and that the solution was effective.

### Tracking of Corrective Actions

- a. The QMS Representative shall maintain a listing of all completed Corrective Actions.

## 20. Management Review

Before setting a budget, a management review will take place. All aspects of the Emo Water Treatment System shall be reviewed. The ORO will consult the operators for their input on any changes or recommendations for improvements to the system. Incidents of non-compliance or adverse drinking water tests will be looked at so any problems or potential problems can be rectified. Raw and process water trends will be looked at and attention will be paid to watershed management. Results from internal and external audits will be reviewed with recommendations to any changes to the DWQMS. Results from emergency desk-top exercises will be reviewed. Consumer complaints and suggestions will be reviewed. A report will be produced and presented to Top Management (CAO/Clerk-Treasurer) and the owner (Mayor and Council). This will be done on an annual basis.

If necessary changes need to be made between management reviews, the ORO will bring any issues that have to be dealt with to the CAO/Clerk-Treasurer and the Superintendent of Public Works. If deemed necessary, issues may be brought up at the semi-monthly Council meetings or a special meeting may be called by the CAO/Clerk-Treasurer to inform the Mayor and Council (owner).

The owner (Mayor and Council), will provide the needed resources to maintain the DQMS.

Top Management (CAO/Clerk-Treasurer) shall ensure a management review occurs annually and that all results are reviewed. Deficiency items and decisions on the actions needed shall be recorded and presented to the owner (Mayor and Council).

# Management Review Procedure

## 1.0 Procedure Description

This procedure defines the process for the review of the effectiveness of the Drinking Water Quality Management System (DWQMS) by the Management Review Committee.

## 2.0 Reason for Procedure

Management reviews are conducted to assess and ensure the continuing suitability, adequacy, and effectiveness of the DWQMS.

## 3.0 Responsibility

Management reviews shall be conducted during a meeting of the following participants:

- Mayor and Council
- Town Clerk/Treasurer
- Public Works Superintendent
- Overall Responsible Operator (QMS Representative)

Other participants may be added at the discretion of the Management Review Committee.

## 4.0 Procedure

- 4.1 This procedure is applicable to The Township of Emo management, plant operators, and distribution and collection activities that fall under the scope of the QMS.
- 4.2 A management review shall be conducted at least once per year following completion and documentation of an internal audit and prior to the next scheduled third party audit.
- 4.3 Prior to the Management Review Meeting ,the QMS Representative or Alternate shall provide a meeting agenda and summaries of the following information to the Management Review Committee.
  1. Listing of incidents of regulatory non-conformance
  2. Results of any relevant internal and third-party audits
  3. Results of regulatory compliance inspections
  4. Summary of customer complaints
  5. Summary/trending of operational performance noting any deficiencies
  6. Status of action-items from last Management Review
  7. Summary of Commission meeting minutes pertaining to the QMS scope

8. Deviations from critical control point limits and response actions
9. Changes in process or management that may affect drinking water quality
10. Staff recommendations & suggestions for improvement of the QMS
11. The efficacy of the risk assessment process
12. The status of management action items identified between reviews
13. The results of the infrastructure review
14. Incidents of adverse drinking-water tests
15. Results of emergency response testing
16. Raw water supply and drinking water quality trends
17. The resources needed to maintain the Quality Management System

- 4.4 The Management Review Committee shall review and discuss all information presented. The Committee shall make recommendations and initiate action, as appropriate, to improve the content and implementation of the Operational Plan and related procedures, and to ensure the provision of adequate resources.
- 4.5 Minutes of management review meetings shall be maintained by the QMS Representative or Alternate. The minutes shall document all new outstanding action items as well as any decisions made by the Committee.
- 4.6 The QMS Representative and Alternate shall be responsible for communication and Implementation of the management review action items as per item DWQMS Communication procedure.

## **21. Continual Improvement**

The Township of Emo Water System Management shall strive to continually improve the effectiveness of the DWQMS through the use of corrective actions. Drinking water safety and quality are of the utmost importance. Compliance of regulatory requirements is mandatory. Sufficient water supply for fire-fighting capabilities is essential. Our goal is to provide clean, safe drinking water in the most cost-effective way.