

Wabigoon Lake Ojibway Nation (Band No.157)

Date of Visit: April 2, 2001

by Peter Fox (OCWA) and Jodie Knibbs (Bimose)

Site Address: Site 112, Box 24

Dinoric, ON P0V 1P0

Phone No.: 807-938-6684

Fax No.: 807-938-1166

Tribal Council Affiliation: Bimose Tribal Council

Operators: Dwayne Brown, Marcel Shabaquay

Location: The Wabigoon First Nation community is located on both sides of Dinorwic Lake, approximately 30 km southeast of Dryden

Population: 165 people in the community (November 2000 - INAC)

No. of Units: 57 housing units (CAIS)

1.0 Description of the Community Water Supply

Based on the CAIS report, water to the houses in the Wabigoon Lake Ojibway community is treated as follows:

- 162 people use piped water
- 3 people use other services

- 56 houses are serviced by a communal water system; and
- 1 house has other service.

2.0 Description of the Community Sewage Facilities

Based on the CAIS report, sewage from the houses in the Wabigoon Lake Ojibway community is treated as follows:

- 162 people use septic tanks
- 3 people have no services

- 56 houses are serviced by septic tanks; and
- 1 house has no service.

3.0 Overall Assessment for Communal Water Treatment Supply

The questionnaire developed by PWGSC required OCWA to undertake a risk assessment of the Water Source, Design, Operation, Reporting, and Operators. To properly assess these areas, a revisit to the water treatment facilities would be required.

OCWA was requested to undertake the evaluation without a visit to the site. With the available information, OCWA has undertaken the requested assessment of the facilities.

The ranking system used is as follows:

- 0 = Not enough information to assess
- 1-4 = Low Risk
- 5-7 = Medium Risk
- 8-10 = High Risk

For more detailed information on the Risk Assessment used see the Terms of Reference, Appendix B.

SECTION Water	SECTION RANKING Water	RISK Water
A. Water Source		
Biological	0	No lab
Chemical	7	High turbidity, aluminum, iron
Physical	6	High color, dissolved organic carbon, low hardness
Overall Ranking for Water Source	7	
B. Design		
Biological	5	2 exceedances out of 9 samples
Chemical	9	High THMs, turbidity, aluminum
Physical	6	Color, low hardness, total organic carbon
Risk to Public Health	10	THMs, turbidity, boil water advisory
Condition of Laboratory Equipment	0	Not inspected
Overall Ranking for Design	10	
C. Operations		
Reservoir Cleanliness	0	Not inspected
Emergency Plan	0	Unknown
Overall Ranking for Operations	8	Malfunction equipment
D. Reporting		
Ranking for Laboratories and Testing	8	Not properly recorded

SECTION Water	SECTION RANKING Water	RISK Water
Ranking for Boil Water Advisories	8	Excessive dosage of stem PAC, no record of bacteriological samples, and inexperienced operators
Overall Ranking for Reporting	8	
E. Operators		
Overall Ranking for Operators	4	Not certified but trained
F. Statistical Data		
Overall Ranking for Individual Wells	0	No data
Overall Ranking for the System	8	High Risk

4.0 Communal Water Treatment Supply (56 houses)

4.1 Water Source

The communal surface water supply system brings water by gravity through the intake pipe in Dinorwic Lake to a wet well.

The following table summarizes the treated water data available from Health Canada, which does not meet GCDWQ:

Sample	Exceedances	Result	GCDWQ limit	Notes
Dec. 6, 2000	Turbidity	4.1 NTU	1.0 NTU	Sample appeared yellow but color was not tested
	Aluminum	0.37 mg/L	0.10 mg/L (OG)	
May 16, 2001	Colour	96 TCU	15 TCU (AO)	Sample appeared yellow with brown particulate
	Dissolved Organic	9.8 mg/L	5.0 mg/L (AO)	
	Turbidity	5.2 NTU	1.0 NTU	
	Iron	0.33 mg/L	0.30 mg/L (AO)	
	Aluminum	0.179 mg/L	0.10 mg/L (OG)	
July 30, 2001	Colour	76 TCU	15 TCU (AO)	Sample appeared yellow
	Dissolved Organic Carbon	8.9 mg/L	5.0 mg/L (AO)	
	Turbidity	6.9 NTU	1.0 NTU	
	Iron	0.32 mg/L	0.30 mg/L (AO)	
	Aluminum	0.106 mg/L	0.10 mg/L (OG)	
	Hardness	40 mg/L	80 to 100 mg/L (OG)	
Oct. 3, 2001	Colour	58 TCU	15 TCU (AO)	
	Dissolved Organic Carbon	9.3 mg/L	5.0 mg/L (AO)	
	Iron	0.30 mg/L	0.30 mg/L (AO)	
	Aluminum	0.105 mg/L	0.30 mg/L (OG)	
	Hardness	45 mg/L	80 to 100 mg/L (OG)	

AO = aesthetic objective, OG = operational guideline

4.2 Design

The water treatment plant was constructed in 1995. A low lift pump (3.3 L/s) pumps water to the single water treatment unit. The water treatment process is a small pre-engineered full treatment facility with sedimentation, flocculation, coagulation, and filtration components. This process is followed by disinfection with chlorine discharging to a clear well beneath the facility. Potable water is pumped by high lift pumps that maintain pressure in the distribution system with pressure tanks.

Demand may be exceeding the capacity of the plant (average recent daily demand was 110 m³/d or 3.3 L/sec). There is concern that demands by a tree nursery may force the plant to be pushed beyond its capability to produce water that meets GCDWQ.

The following table summarizes the treated water data available from Health Canada, which does not meet GCDWQ:

Sample Date	Sample Received	Location	Exceedances	Result	GCDWQ limit	Notes
Dec. 6, 2000	Dec. 8, 2000	Water Plant	pH	4.75	6.5 to 8.5 (OG)	Appeared cloudy and yellow
			Turbidity	6.7 NTU	1.0 NTU	
			Aluminum	30.3 mg/L	0.10 mg/L (OG)	
Dec. 18, 2000	Dec. 20, 2000	Water Plant	Turbidity	1.7 NTU	1.0 NTU	
			Aluminum	0.15 mg/L	0.10 mg/L (OG)	
			Hardness	41 mg/L	80 to 100 mg/L (OG)	
Dec. 18, 2000	Dec. 20, 2000	School	Turbidity	1.5 NTU	1.0 NTU	
			Aluminum	1.71 mg/L	0.10 mg/L (OG)	
			Hardness	42 mg/L	80 to 100 mg/L (OG)	
		Private Home	Aluminum	0.90 mg/L	0.10 mg/L (OG)	
			Hardness	45 mg/L	80 to 100 mg/L (OG)	
Jan. 9, 2001	Jan. 10, 2001	Water Plant	Aluminum	0.99 mg/L	0.10 mg/L (OG)	
			Hardness	43 mg/L	80 to 100 mg/L (OG)	
Jan. 9, 2001	Jan. 10, 2001	School Staff Room	Turbidity	1.1 NTU	1.0 NTU	
			Aluminum	0.308 mg/L	0.10 mg/L (OG)	
		Private Home	Turbidity	1.2 NTU	1.0 NTU	
			Aluminum	1.26 mg/L	0.1 mg/L (OG)	
			Hardness	45 mg/L	80 to 100 mg/L (OG)	
Jan. 30, 2001	Feb. 1, 2001	Water Plant	THM	0.172 mg/L	0.1 mg/L	Turbidity result is unreliable as sample was expired
			Turbidity	1.1 NTU	1.0 NTU	
			Aluminum	1.09 mg/L	0.1 mg/L (OG)	
May 16, 2001	May 18, 2001	Water Plant	Aluminum	0.257 mg/L	0.1 mg/L (OG)	
			Turbidity	5.1 NTU	1.0 NTU	
			Iron	0.34 mg/L	0.30 mg/L (OG)	
			Dissolved Organic Carbon	10.0 mg/L	5.0 mg/L	
			Hardness	32 mg/L	80 to 100 mg/L (OG)	
Jul. 30, 2001	Aug. 1, 2001	Water Plant	Aluminum	0.563 mg/L	0.10 mg/L (OG)	

AO = aesthetic objective, OG = operational guideline

There is a diesel-driven pump for fire protection, but we do not know if it is regularly tested. It appears to be in good condition. There is no backup power for the plant.

Safety equipment is available on site, such as an eyewash unit. There is no confined space entry equipment, but there are neither confined spaces nor other safety hazards. Laboratory, office and workshop are adequate, and there are tools available. Ventilation is adequate.

4.3 Operations

The water treatment plant has on-line continuous monitoring chlorine residual and turbidity meters, but they were not operating on the day of OCWA visit. Operators use hand held units to monitor turbidity and chlorine residuals sampled daily at the plant and every other day on the water distribution system. The system uses 12% sodium hypochlorite for disinfection, and Stern PAC as a coagulant. Both sodium hypochlorite and Stern PAC are stored properly and have acceptable shelf life.

The flocculator paddle motor had recently been replaced but not coordinated with the gear reducer. The rotational speed of the flocculator paddles is deemed excessive and will likely contribute to floc shear rather than floc formation.

Local technicians and tradesmen are available in Dryden. The plant has spare chemical pumps but no other spare parts. As-built drawings and operations and maintenance manuals are available on site.

The present operators are not aware of any distribution system-flushing program nor any main valve or hydrant maintenance program. They do plan to put one in place.

4.4 Reporting

The operator takes chlorine residual samples daily at the water treatment plant and every other day in the water distribution system. They take bacteriological samples twice per month. Turbidity in the water is recorded daily.

No sample results could be found at the plant except for one set of chemical analysis by Health Canada.

Exceedances of turbidity have been recorded in the distribution system but not in the plant. Color is high.

A colilert unit is available, but we were not told whether it is used. The reagents are past their shelf life.

A boil water advisory is in place and has been for some time. An excessive dosage of Stern Pac was added in December, there is no record of bacteriological samples, and inexperience of the operators, have led to this consumer protection situation.

The following chlorine residual and colilert data were available from Health Canada:

- January 30, 2001, 2 samples taken from water plant showed 0.45 mg/L free chlorine residual and 2 samples from school showed 0 free chlorine residual. All samples were satisfactory by colilert tests.
- July 30, 2001, 3 samples taken from raw water at the water plant showed 0 mg/L free chlorine residual and were all unsatisfactory by colilert tests.
- July 30, 2001, 3 samples from treated water at the water plant showed 0.25 mg/L free chlorine residual and were all satisfactory by colilert tests.
- July 30, 2001, 2 samples from a store showed a trace of free chlorine residual and were all satisfactory by colilert tests.

- July 30, 2001, 2 samples from an OFTS office showed a trace of free chlorine residual and were all satisfactory by colilert tests.
- July 30, 2001, 2 samples from a private office showed 0 free chlorine residual and were all unsatisfactory by colilert tests.

4.5 Operators

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The current operators are new and are not aware of everything that has been done in the past. This has led to unknowns such as the frequency of bacteriological analyses and whether there has been a watermain flushing program.

The current operators are Dwayne Brown and Marcel Shabaquay. s.19(1)

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The plant is very clean, recently painted, and looks good. The operators keep records (but not accurate). There are two operators so they can back each other up when the other is on vacation or is sick.

5.0 Deficiencies in the Communal Water Supply

1. The communal water supply system gets its water from a surface water source and processes it through a single-unit complete treatment plant. **Demand may be exceeding capacity of the equipment.**
2. The water treatment plant has replacement operators as the regular operator is away on a one-year leave of absence. The current operators are new to plant operations. They are not sure of historical practices at the facility.
3. Exceedances of turbidity have been recorded at the water plant and in the distribution system.
4. Chemical results show significantly high aluminum levels, which may be indicative of excessive dosage or lack of pH adjustment. Turbidity is exceeded in treated water samples and colour (aesthetic parameter) is high.
5. Available chlorine residual and colilert tests in distribution system are unsatisfactory.
6. The water treatment plant has a diesel operated pump for fire protection but no diesel backup for the remainder of the operations. There were no records found of the diesel being tested; it may very well have been, but with no records kept.
7. There were spare chemical pumps on site, but no other equipment parts.
8. There is a colilert kit available but the reagents were past their shelf life. No record could be found of any lab results for bacteriological testing.
9. The operators intended to start bacteriological testing. The operators had just attended a Health Canada workshop and are now aware of the importance and methods of this testing.
10. The operators were unaware of any annual flushing and fire hydrant maintenance program for the water distribution system.

11. Facilities require a plant optimization study to ensure proper dosage of chemicals is used.
12. The flocculator paddle motor had recently been replaced but not coordinated with the gear reducer. The rotational speed of the flocculator paddles is deemed excessive and will likely contribute to floc shear rather than floc formation.

6.0 Recommendations

- Address the cause of boil water advisory.
- Address high turbidity and aluminum in treated water.
- Ensure chlorine residual is maintained in distribution system.
- Implement a training program that can lead to certification of the operator.
- Implement a regular bacteriological and chemical water sampling analyses program.
- Implement a contingency plan for emergencies.
- Repair all equipment in the water plant, including on-line meters and flocculator gear reducer.
- Consider a backup generator for the water plant to keep the facilities in service during power failure.
- Review the treatment capacity of the water plant and restrict its maximum output to the amount to ensure continuous provision of potable water.
- Consider appropriate treatment for colour removal.
- Implement an annual valve testing program, distribution system flushing program, and hydrant maintenance program.
- Undertake a plant optimization study to ensure proper dosage of chemicals.
- Implement a sewage septic tank inspection program to inspect all septic tanks for proper operation and they meet the required standards.

7.0 Plant Classification

Based upon the Terms of Reference – Appendix I – Plant Classification Guideline developed by Public Works and Government Services Canada and with discussions with the Ontario Ministry of the Environment Classification Group, OCWA classified this plant as follows:

Water Treatment Facility - Class II

8.0 Overall Community Risk Assessment

Water Category – High Risk

- **High Risk because of the following:**
 - Boil water advisory;
 - High aluminum and turbidity; and
 - Equipment malfunctioning.

Note: Information within this report is based on discussions with the plant operators and a quick visual walkthrough the facilities. No detailed review was undertaken by OCWA.