
Kasabonika Lake First Nation (Band No. 210)

Date of Visit: March 21, 2001

By R. Beauvais (OCWA)

Site Address: Kasabonika, ON P0V 1Y0

Phone No.: 807-535-2547

Fax No.: 807-535-1152

Tribal Council Affiliation: Shibogama First Nations Council

Operators: Cornelius Anderson, Simon McKay, Robert Jacob

Location: The Kasabonika Lake First Nation community is located approximately 410 km
Northeast of Sioux Lookout

Population: 746 people in the community

No. of Units: 175 houses in the community

1.0 Description of the Community Water Supply

Based on the CAIS report, and information supplied to OCWA, water to the houses in the Kasabonika Lake community is treated as follows:

- 588 people use piped water
- 51 people have trucked water
- 107 people have no service

- 138 houses are serviced by a communal water system;
- 12 houses are serviced by individual water holding tanks with trucked water; and
- 25 houses have no services.

2.0 Description of the Community Sewage Facilities

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

- 567 people use piped sewage
- 68 people use septic tanks
- 111 people have no service

- 133 houses are serviced by a communal sewage system;
- 16 houses serviced by holding tanks and trucked haulage; and
- 26 houses have no services.

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	1	No exceedances
Physical	6	Color, total organic carbon, hardness
Overall Ranking for Water Source	5	
B. Design		
Biological	4	1 exceedance out of 9 samples
Chemical	6	Aluminum
Physical	6	Total organic carbon, hardness
Risk to Public Health	8	2 boil water advisories
Condition of Laboratory Equipment	0	Not inspected
Overall Ranking for Design	6	
C. Operations		
Reservoir Cleanliness	0	Not inspected
Emergency Plan	10	No plan
Overall Ranking for Operations	8	Chlorine residual analyzer not working, no turbidity monitoring, service disruption due to water main break
D. Reporting		
Ranking for Laboratories and Testing	2	Weekly by operator
Ranking for Boil Water Advisories	8	Two boil water advisories. One due to malfunction of equipment and other one due to water main break.

SECTION Water	SECTION RANKING Water	RISK Water
Overall Ranking for Reporting	5	
E. Operators		
Overall Ranking for Operators	3	Two with training and confidence, one with training and no confidence
F. Statistical Data		
Overall Ranking for Individual Wells	0	No data
Overall Ranking for the System	8	High Risk

4.0 Overall Assessment for Communal Sewage Treatment Facilities

The questionnaire developed by PWGSC required OCWA to undertake a risk assessment of the Effluent Receiver, Design, Operation, Reporting, and Operators. To properly assess these areas, a revisit to the sewage treatment facility 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 Sewage	SECTION RANKING Sewage	RISK Sewage
A. Effluent Receiver		
Overall Ranking for Effluent Receiver	0	
B. Design		
Quality of Treated Effluent	0	No data
Ranking of Design of Sewage Plant	0	Insufficient information
Ranking of Concerns and Hazards within the Plant	7	No safety equipment or back-up power
Condition of Laboratory Equipment	0	
Overall Ranking for Design	7	
C. Operations		
Ranking for Emergency Plan	0	
Overall Ranking for Operations	7	No operation and maintenance manuals or as-built drawings and service disruptions; overflow of sewage in plant.
D. Reporting		
Overall Ranking for Reporting	8	No sampling
E. Operators		
Overall Ranking for Operators	4	Some training
F. Statistical Data		
Overall Ranking for Individual Septic Tanks	0	
Overall Ranking for the Systems	8	High Risk

5.0 Communal Water Treatment Supply (138 houses)

5.1 Water Source

The raw water is drawn from Kasabonika Lake.

The following table summarizes all available raw water data from Health Canada in Sioux Lookout:

Date	Exceedances	Result	GCDWQ Limit	Notes
Feb. 10, 2001	Colour	46 TCU	15 TCU (AO)	Sample appeared light yellow
	Hardness	108 mg/L	80 to 100 mg/L (OG)	

AO = aesthetic objective, OG = operational guideline

5.2 Design

The Kasabonika Lake communal water supply consists of a lake intake, a treatment plant with conventional filters, chlorination, an on-site water reservoir, and a water distribution system.

The community is serviced with a water treatment plant constructed in 1994. The rated design capacity of the plant is 196 m³/d or 2.27 L/s.

The following table summarizes all available sample data from Health Canada in Sioux Lookout:

Sample Date	Sample Received	Location	Exceedances	Result	GCDWQ Limit	Notes
Sept. 29, 2000	Oct. 2, 2000	Water Plant	Colour	13 TCU	15 TCU (AO)	The sample appeared light yellow
			TOC	9.1 mg/L	5.0 mg/L	
			Aluminum	0.12 mg/L	0.10 mg/L	
			Hardness	66 mg/L	80 to 100 mg/L (OG)	
Feb. 10, 2001	Feb. 12, 2001	Distribution System	Aluminum	0.121 to 0.139 mg/L	0.10 mg/L	Three distribution system samples
Feb. 10, 2001	Feb. 12, 2001	Treated	TOC	7.4 mg/L	5.0 mg/L	
			Aluminum	0.108 mg/L	0.108 mg/L	
			THM	0.099 mg/L	0.1 mg/L	
			Hardness	107 mg/L	80 to 100 mg/L (OG)	
Aug. 1, 2001	Aug. 3, 2001	Treated	TOC	13.5 mg/L	5.0 mg/L	
			Aluminum	0.192 mg/L	0.10 mg/L	
			Hardness	55 mg/L	80 to 100 mg/L (OG)	

AO = aesthetic objective, OG = operational guideline

There is an on-site water reservoir with capacity of 300 m³.

There is a diesel operated backup power generator for the water treatment plant, and a diesel driven fire pump is also available, but neither is tested on a regular basis. There is sufficient safety equipment at the plant and no safety hazards were observed.

There is adequate office area and ventilation for the plant and chemical storage. However, laboratory and workshop areas are not available.

5.3 Operations

Sodium hypochlorite is used for disinfection. Polymer and sternpac are also used in the process. The disinfection equipment is functional with sufficient sodium hypochlorite on site. There is an on-line chlorine residual analyzer, and also a turbidity meter, but both are currently not functioning. We were not told whether a manual analysis is used to determine chlorine residual. The chemicals are stored in accordance with the MOE guidelines. The operator uses a colilert unit, and has sufficient test reagents available.

There are operation and maintenance manuals for plant equipment, but no as-built drawings on-site. Emergency spare parts are not available, however there is a contact listing of technicians/trades people available. The response for such personnel is about three to five days.

There is no annual hydrant flushing or main valve operating and maintenance program. There is also no hydrant maintenance program and repairs are performed only as required. In the last two years one service disruption has been experienced due to a water main break.

There is a re-occurring operational problem where the diesel generator starts when low reservoir level is reached. It should normally start only when there is a power failure.

5.4 Reporting

The plant operators conduct bacteriological testing every week using a colilert unit. The results and analysis are kept at the plant. Bacteriological samples are not sent to a laboratory for analysis.

Health Canada has issued the following boil water advisories:

- February 12, 2001 because of total malfunction of water treatment plant and was removed on February 13, 2001.
- July 5, 2001 because of water main break and was removed on July 19, 2001.

The following colilert results were available from Health Canada:

Date	Result
Feb. 10, 2001	12 Satisfactory samples
Jul. 17, 2001	4 Satisfactory samples
Sept. 5, 2001	5 Satisfactory samples and 1 unsatisfactory sample

The following chlorine residual data was available from Health Canada:

Date	Result
Feb. 10, 2001	Satisfactory chlorine residual
Jul. 17, 2001	Satisfactory chlorine residual
Sept. 5, 2001	No chlorine residual

5.5 Operators

s.19(1)

Cornelius Anderson (senior operator), Simon McKay (operator), and Robert Jacob (trainee) are the operators at the water and sewage treatment plants. [REDACTED] The operators are familiar with calibrating and maintaining the disinfection equipment at [REDACTED]

The operators have received and are currently receiving hands on training from Northern Waterworks. Additional training on lift station pumps, basic electrical instrumentation, and surface water is recommended.

The facility is generally well kept and clean.

6.0 Deficiencies in the Community Water Supply

1. There are operation and maintenance manuals but no as-built drawings for the plant.
2. The operator does not perform a hydrant maintenance, flushing or valve operation and maintenance program. Fire hydrants are only maintained as required.
3. There has been one service disruption in the last two years, caused by a water main break.
4. There is no written contingency plan available.
5. Record keeping needs improvement.
6. Online chlorine residual analyzer and turbidity meter were not working.
7. There has been two boil water advisories issued on the communal water system in the last year, confirmed by Health Canada.
8. Treated water results show exceedances in total organic carbon and aluminum.
s.19(1)
9. [REDACTED] have received training to operate and maintain the facility.
10. The diesel operated backup system has a re-occurring problem.
11. The bacteriological tests done through the colilert equipment should not be the only testing undertaken by the operator.
12. Chlorine residual should be monitored.

7.0 Communal Sewage Treatment Facilities (133 houses)

7.1 Effluent Receiver

The effluent is discharged into Kasabonika Lake.

7.2 Design

The community is serviced with an RBC sewage treatment plant constructed in 1992. The rated design capacity is unknown. Disinfection of the treated effluent using sodium hypochlorite is used.

7.3 Operating

There are maintenance manuals for plant equipment and operation manuals, but no as-built drawings on site. Emergency spare parts are not available; but there is a contact listing of technicians/trades people available with a 3-5 days response time.

The sewage treatment plant consists of a rotating biological contactor (RBC) followed by the addition of sodium hypochlorite for disinfection. The disinfection equipment is functional. There are four sewage pumping stations as part of the collection system, which are cleaned in the spring and fall. The pumps are said to be “somewhat” maintained.

There is no diesel operated backup power generator for the treatment plant and there is no safety equipment at the plant. There has not been any raw sewage bypassing from the pumping stations.

There is space in the rotating biological contact (RBC) building that was once used for laboratory and office, but is presently not available because of excessive mould in the building. There is a garage building immediately adjacent to the plant that can be used as a workshop.

In the last two years, there have been service disruptions due to the broken chain drive on the RBC. No re-occurring operational problems were identified.

7.4 Reporting

A letter from Health Canada dated October 14, 2000 discusses the state of the RBC plant to be “a serious Public Health Crisis Situation.”

The following items were listed as hazards:

- Sewage was running out of all three doors and into the lake at the time of the Health Canada visit.
- Entire floor surface of sewage plant was flooded including electrical room.
- Furnace was not working which poses a serious risk for the whole plant to freeze.
- There was extensive mould contamination in the plant, which would require replacement of some wall/ceiling/piping surfaces.
- Ventilation system is not operational.
- Excessive sludge in RBC and needs pumping out.
- Personal protective equipment and confined space entry equipment is required in the plant.
- Fire extinguishers were missing off hooks, emergency light up or luminescent door exit signs are missing, and there is no first aid kit in the plant.
- Band members suggest that RBC is undersized for current wastewater flows.

The following sample results are available from Health Canada:

Date	Location	Exceedances	Guideline
Sept. 29, 2000	Final Effluent	E. Coli = 2,060/100 mL	400/mL
Sept. 29, 2000	Final Effluent	No chlorine residual	0.5-1.0 mg/L after 30 min contact time
Aug. 1, 2001	Final Effluent	E. Coli = 12,500/100mL	

The above sample results show that disinfection of the effluent is not effective and may need to be re-evaluated.

7.5 Operators

s.19(1)

Cornelius Anderson (senior operator), Simon McKay (operator), and Robert Jacob (trainee) are the operators at the water and sewage treatment plants. The operators are familiar with calibrating and maintaining the disinfection equipment

The operators have received and are currently receiving hands on training from Northern Waterworks. Additional training on lift station pumps, basic electrical instrumentation, and surface water is recommended.

8.0 Deficiencies in the Communal Sewage Treatment Facilities

1. The effluent receiver is Kasabonika Lake.
2. No safety equipment or personal protective equipment is available on-site.
3. Health Canada's visit on September 29, 2000 describes a serious Public Health Crisis Situation due to the RBC overflowing and raw sewage flowing out of the plant.
4. There are maintenance manuals and operation manuals but no as-built drawings on-site.
5. There is no backup diesel operated power generator in case of power loss.
6. Operator indicated there are technicians/trades people available for three to five days' response to mechanical breakdowns in the plant.
7. **s.19(1)** have received training to operate and maintain the facility.
8. Mould in the RBC building presents serious potential health problem.
9. Disinfection of the treated effluent may not be effective.

9.0 Recommendations

- Investigate cause of boil water advisory.
- Repair turbidity meter and chlorine analyzer.
- Implement more frequent analyses of chlorine residual.
- Provide additional training for operators that can lead to certification.
- Address diesel backup system problem with water treatment plant.

- Establish and implement a protocol for taking water samples at the water treatment plants, including raw water samples. Bacteriological samples should be collected regularly and sent to an accredited laboratory. Chemical analysis of treated water should be conducted annually.
- Develop a comprehensive operation and maintenance program on the water distribution system to address valve and hydrant maintenance.
- Develop a comprehensive contingency plan to address operational problems, breakdowns, vacations and sickness, main breaks and boil water advisories.
- Monitor previous boil water advisories and chemical analyses exceeding Health Canada guidelines to ensure the source of the contamination has been addressed adequately.
- Obtain as-built drawings for water and sewage facilities.
- Relocate the laboratory to a better location.
- Obtain professional assistance to address capacity issues of RBC plant and other major deficiencies.
- Re-evaluate method to achieve disinfection of effluent.
- Address molding problem in office/lab area.
- Obtain necessary safety and personal protective equipment.
- Initiate a sampling program indicating number of samples, location and parameters to be analyzed for sewage facilities.

10.0 Plant Classification

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

Water Treatment Facility - Class II
Sewage Treatment Facility - Class II

11.0 Overall Community Risk Assessment

Water Category – High Risk

- **High Risk because of the following:**
 - chlorine analyzer and turbidity is malfunctioning;
 - bacteriological samples are not sent to accredited lab for analysis; and
 - boil water advisories issued by Health Canada.

Sewage Category – High Risk

- **High Risk because of the following:**
 - RBC plant does not meet capacity;
 - Overflowing of sewage; and
 - Mould in RBC building is a safety hazard.

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