
Cat Lake First Nation (Band No. 216)

Date of Visit: March 14, 2001

By Marcel Lavigne (OCWA)

Site Address: Cat Lake, ON P0V 1J0

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Tribal Council Affiliation: Windigo First Nations Council

Operators: Greg Wesley and Joshua Gray

Location: The Cat Lake First Nation community is approximately 180 km north of Sioux Lookout and is accessible by air.

Population: 454 people in the community (November 2000 – INAC)

No. of Units: 94 houses in the community (CAIS)

1.0 Description of the Community Water Supply

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

- 444 people use piped water
- 10 people are without service

- 92 houses are serviced by a communal water system; and
- 2 houses have no service.

2.0 Description of the Community Sewage Facilities

Based on information supplied to OCWA, sewage from the houses in the Cat Lake community is treated as follows:

- 444 people use piped sewage
- 10 people are without service

- 92 houses are serviced by sewage collection and lagoon systems; and
- 2 houses have 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 data
Chemical	0	No data
Physical	0	No data
Overall Ranking for Water Source	0	No data
B. Design		
Biological	1	No exceedances
Chemical	8	THMs, turbidity, iron, manganese exceedances
Physical	6	Color, hardness, total organic carbon exceedances
Risk to Public Health	10	THMs, turbidity, 10 Boil water advisories
Condition of Laboratory Equipment	0	Not inspected
Overall Ranking for Design	8	Catwalk safety hazard
C. Operations		
Reservoir Cleanliness	0	Not inspected
Emergency Plan	0	Unknown
Overall Ranking for Operations	8	Filter problems, chlorine residual analyzer not calibrated, chlorine out of stock at time of visit
D. Reporting		
Ranking for Laboratories and Testing	9	Test records are irregular
Ranking for Boil Water Advisories	10	10 boil water advisories

SECTION Water	SECTION RANKING Water	RISK Water
Overall Ranking for Reporting	10	
E. Operators		
Overall Ranking for Operators	2	Trained and confident
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	No data
B. Design		
Quality of Treated Effluent	0	No data
Ranking of Design of Sewage Plant	0	No data
Ranking of Concerns and Hazards within the Plant	8	Backups
Condition of Laboratory Equipment	0	
Overall Ranking for Design	8	No lab or required equipment
C. Operations		
Ranking for Emergency Plan	0	
Overall Ranking for Operations	8	No spare parts, excessive weed growth
D. Reporting		
Overall Ranking for Reporting	10	Re-occurring lift station malfunction and raw sewage overflows
E. Operators		
Overall Ranking for Operators	2	Trained and confident
F. Statistical Data		
Overall Ranking for Individual Septic Tanks	0	
Overall Ranking for the Systems	8	High Risk

5.0 Communal Water Treatment Plant (92 houses)

5.1 Water Source

The surface water source is from Cat Lake.

5.2 Design

The community is serviced by a water treatment plant built in 1995. The filtration system consists of a sand filter with granular activated carbon. The design capacity of the plant is 150 m³/day with a water reservoir located on site at the water treatment plant. The capacity of the water reservoir is 300 m³.

The following table summarizes all chemical exceedances available from Health Canada:

Sample Date	Date Received	Location	Exceedances	Result	GCDWQ Limit	Notes
April 7, 2000	April 12, 2000	Nursing Station	DOC	13 mg/L	5.0 mg/L (AO)	
			Hardness	45 mg/L	80 to 100 mg/L (OG)	
Jan. 16, 2001	Jan. 19, 2001	Nursing Station	Colour	64 TCU	15 TCU (AO)	THMs were not tested because the THM vial was not submitted
			DOC	14.1 mg/L	5.0 mg/L (AO)	
			Hardness	43 mg/L	80 to 100 mg/L (OG)	
Feb. 14, 2001	Feb. 16, 2001	Private Home	Colour	47 TCU	15 TCU (AO)	
			DOC	13.1 mg/L	5.0 mg/L (AO)	
			Hardness	47 mg/L	80 to 100 mg/L (OG)	
July 11, 2001	July 13, 2001	Water Plant	Colour	37 TCU	15 TCU (AO)	Sulphide was not tested because sample was not properly preserved.
			DOC	10.5 mg/L	5.0 mg/L (AO)	
			Manganese	0.101 mg/L	0.05 mg/L (AO)	
			THM	0.333 mg/L	0.1 mg/L (MAC)	
			Hardness	47 mg/L	80 to 100 mg/L (OG)	
Sept. 24, 2001	Sept. 26, 2001	Healing Centre	Turbidity	14.6 NTU	1 NTU (MAC)	
			Iron	1.87 mg/L	0.3 mg/L (AO)	

AO = aesthetic objective, OG = operational guideline, MAC = maximum acceptable concentration

Within the plant, there is adequate ventilation but no diesel operated pump for fire protection. There is a diesel-operated generator on site that supplies backup power to the plant with an automatic starter that tests the generator weekly.

The unsafe catwalk above the filter is a potential safety hazard. Some staining on the floor of the fuel area indicates fuel has spilled on the floor and a crack in the floor indicates that fuel can potentially enter the water reservoir beneath the plant. There are adequate workshop, lab and office facilities located on the premises. More tools are required in the maintenance department.

5.3 Operation

Sodium hypochlorite is used for disinfection, but on the day of inspection, no sodium hypochloride was in stock at the plant. Javex from the Northern Store was being used in place of the regular sodium hypochlorite. The on-line chlorine residual analyzer monitors the chlorine residual on a daily basis and is in good working order but operators were unfamiliar with calibrating the instrument. There is a colilert kit on-site but the operator is not using it. The community health representative typically carries out the tests done on a random basis (every couple of months). Design and operation manuals are all maintained on-site.

There is a regular hydrant flushing program but no valve maintenance program.

There is a reoccurring problem with dirt plugging the sand filters. Maintenance on the system is difficult as technicians require a week to get on site and no spare parts are kept on-site.

5.4 Reporting

Bacteriological samples are taken at random intervals by the Community Health Representative. The results are recorded and stored on site as well as at the Band Office and First Nations Environmental Service in Sioux Lookout.

There have been no disease breakouts in the past two years but up to ten-boil water advisories have been issued. Chlorine residual and turbidity are recorded on a daily basis. Chemical analysis of the treated water is performed on an annual basis and has exceeded GCDWQ (color in treated water was 30 TCU units in April 2000).

The following table summarizes the bacteriological data available from Health Canada:

Date	Result
Jun. 13, 2000	3 Satisfactory samples Total coliform and E.Coli of zero, respectively.

The following table summarizes the chlorine residual data available from Health Canada:

Date	Result
Jul. 30, 2001	1 low sample and 1 at zero
Aug. 8, 2001	4 at zero
Aug. 13, 2001	6 low samples and 1 at zero
Aug. 14, 2001	5 satisfactory samples, 1 low sample and 2 at zero
Aug. 15, 2001	5 satisfactory samples and 1 at zero
Aug. 20, 2001	11 satisfactory samples
Aug. 21, 2001	4 satisfactory samples and 5 at zero
Aug. 22, 2001	6 satisfactory samples and 1 low sample
Sept. 5, 2001	6 satisfactory samples and 5 low samples
Sept. 20, 2001	10 satisfactory samples
Sept. 25, 2001	6 satisfactory samples and 1 low sample
Sept. 28, 2001	6 satisfactory samples
Oct. 1, 2001	8 satisfactory samples and 1 low sample

5.5 Operators

There are two operators available to operate the Cat Lake Water Treatment Plant. [REDACTED] Except for the chlorine analyzer, both operators are familiar with calibrating and maintaining the equipment, [REDACTED] s.19(1)

Training in correct operation, calibration, and instrumentation as well as lab analysis, electrical troubleshooting, and sewage pump repair would be beneficial.

6.0 Deficiencies in the Communal Water Supply

1. Cleaning of the filters creates a safety hazard, as the operator has to stand above the filter on a thin plank with little support to clean the filters. The walkway above the filter allows dirt and other materials to enter the filter that can lead to blockage.
2. There is a potential for fuel, if spilt on the floor, to enter the water reservoir below the water treatment facilities.
3. To perform regular maintenance more hand tools are needed.
4. Sodium hypochlorite is used to disinfect but frequently runs out. The operators then use Javex obtained from the Northern Store.
5. Insufficient spare parts.
6. A colilert kit is located on site but is not used.
7. Bacteriological testing is infrequent and irregular.
8. Up to ten boil water advisories have been issued on this system.
9. Dirt clogging the sand filter is a reoccurring problem.
10. GCDWQ exceedances of color, total/dissolved organic carbon, turbidity, iron, manganese, and THMs have occurred.
11. Operators need to be updated on the regular duties of a water operator such as calibration, lab analysis and electrical trouble shooting.
12. There is a potential for cross contamination when sewage equipment is stored at the water treatment plant.
13. Sand filters were observed to be overflowing meaning loss of treatment efficiencies.
14. Electrical work and calibration of equipment is required.
15. All the fire fighting equipment is stored at the water treatment plant because the band has nowhere else to store the equipment.
16. One recirculating pump has been disconnected.

7.0 Communal Sewage Treatment Facilities (92 houses)

7.1 Effluent Receiver

The lagoon system stores the effluent and is discharged once a year into Cat Lake.

7.2 Design

The community is serviced by a sewage treatment facility built in 1995. The system contains two main lift stations with eight individual grinder pump stations.

The following table summarizes exceedances effluent samples available from Health Canada:

Date	Location	Exceedances	Result	Guidelines for Effluent Quality and Wastewater Treatment at Federal Establishments
Jun. 4, 2001	Effluent	No Exceedances		
Jun. 4, 2001	Cell #1	Total Phosphorus	1.91 mg/L	1.0 mg/L
		Suspended Solids	50 mg/L	25 mg/L
Jul. 11, 2001	Cell #2	Total Phosphorus	1.12 mg/L	1.0 mg/L

There are no separate laboratory, office, or maintenance areas at the sewage treatment facility. All mechanical repairs for the sewage treatment facilities are performed at the water plant. There are an insufficient number of tools and spare parts on-site.

7.3 Operation

There are no chemicals used at the sewage facilities. Excessive weed growth was noted where the lagoon is discharged to Cat Lake. Other discharges have occurred throughout the year when the grinder pump in the small sublift station gets clogged and backs up. Several basements have been flooded during this time and some overflowing has lasted up to two weeks before the situation is rectified.

There is no backup power at the pumping stations.

Operation and Maintenance manuals are available as well as as-built drawings.

Response time for technical/trades is one week.

7.4 Reporting

The effluent is tested regularly for biological oxygen demand, suspended solids and total phosphorous. Sodium hypochlorite (12%) is used for disinfection during the annual lagoon discharge. Samples are taken by the Community Health Representative and the results are stored at the plant. There have been no disease or health outbreaks in the past two years.

- A Health Canada letter dated June 15, 2001 discusses the reoccurring problem of lift stations breaking down. Health Canada recommends that the sewage collection system and lift stations be assessed and necessary upgrades implemented. It was also noted that the band does not possess a sewage pumper/hauling vehicle, which is essential for routine maintenance and for short-term action when a malfunction occurs.

- A Health Canada letter dated July 30, 2001 notes that liquid waste had breached the eastern dyke of cell #2 and may be a result of settling. Floating debris, primarily reeds, were also observed in both cells of the sewage lagoon.
- A Health Canada letter dated August 8, 2001 discusses the latest malfunction of the lift station. The overflowing manhole by the station resulted in the toilets and other plumbed fixtures being made inoperable and the Nursing Station was evacuated and closed. The letter notes that this is a re-occurring problem since 1998. There have been several documented cases of thousands of litres of raw sewage overflowing manholes at the nursing station and ball field. Malfunctioning grinder pumps located in crawl spaces of 7 houses in the community also have caused litres of sewage to be spilled in crawl spaces.
- A Health Canada letter dated September 28, 2001 discusses that at the time of inspection, aquatic vegetation was still present in both cells of the lagoon. Although some wastewater had been discharged to help maintain the structural integrity of the lagoon, wastewater was approximately one-half metre from the top of the lagoon. This level is near the maximum capacity of cell #2 and it was recommended that this cell be discharged to ensure adequate storage capacity during the winter.

7.5 Operators

There are two operators available to operate the Cat Lake Water Treatment Plant. [REDACTED] Except for the chlorine analyzer, both operators are familiar with calibrating and maintaining the equipment, and [REDACTED]

s.19(1)

Training in correct operation, calibration, and instrumentation as well as lab analysis, electrical troubleshooting, and sewage pump repair would be beneficial.

8.0 Deficiencies in the Communal Sewage Treatment Facilities

1. There is no back up power for the system in case of a power failure.
2. There is a re-occurring problem of the lift stations malfunctioning and raw sewage bypassing.
3. There have been four or five improper discharges in the past two years.
4. Malfunctioning grinder pumps located at individual houses have caused flooded basements.
5. Cell #2 is breached.
6. No contingency plan.

9.0 Recommendations

- Monitor and control flows to the sand filter to reduce overflowing and plugging.
- Backwash filters more regularly to remove debris that is clogging the filters.
- Investigate high colour and turbidity readings.
- Investigate high THM result.
- Monitor chlorine residual regularly and take action when levels are low.
- Train operators on how to clean and maintain the filter.
- Checks the depth of the sand filter to make sure filters are operating at the correct level.

- Repair re-circulating pump to maintain flow throughout the system.
- Implement a regular inspection program of all the electrical and calibration equipment.
- Address the potential for fuel contamination of water reservoir.
- Add catwalk platforms at the filtration tanks.
- Increase sampling tests.
- Purchase spare parts.
- Implement a training program that can lead to certification of the operator.
- Establish and implement a protocol for taking water samples at the water treatment plant, including raw water samples.
- Review safety equipment that is available on-site.
- Operator needs to implement a house cleaning and general maintenance program at the facilities.
- Consider additional storage/office space for operator and equipment.
- 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 to ensure the source of the contamination has been addressed adequately.
- Arrange for method to clean out the lift station on a regular basis.
- Implement a regular inspection of pumps.
- Provide screening at the sewage pumping station.
- Investigate replacing pumps with the proper sump pumps.
- Obtain spare lift pump.
- Sewage collection system including lift stations need assessment and upgrading.
- Consider backup power.
- Address breached cell problem.
- All floating debris should be removed from the lagoon to ensure optimum treatment of the wastewater.
- Investigate cause of failure of grinder pumps at individual houses.
- A contingency plan should be developed to minimize the number of raw sewage bypasses and reduce the risks to the community.

10.0 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 these plants as follows:

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

11.0 Overall Community Risk Assessment

Water Category – High Risk

- **High Risk because of the following:**
 - Frequent boil water advisories;
 - Operator inadequately trained;
 - Infrequent bacteriological testing; and
 - Filter operation questionable.

Sewage Category – High Risk

- **High Risk because of the following:**
 - Operator inadequately trained;
 - Re-occurring problem of bypassing of pumps and backups into basements; and
 - Lagoon cell is breached.

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.