

Serpent River First Nation (Band No. 201)

Date of Visit: March 7, 2001

by John McGhee (OCWA)

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Tribal Council Affiliation: North Shore Tribal Council

Operators: Percy Owl and Frank Lewis

Location: The Serpent River First Nation community is located on Lake Huron, approximately 40 km east of Blind River on Hwy. 17

Population: 289 people in the community (December 2000 - INAC)

No. of Units: 142 housing units (CAIS)

1.0 Description of the Community Water Supply

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

- 289 people are serviced by four communal well systems
- 142 houses are serviced by four communal well systems

2.0 Description of the Community Sewage Facilities

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

- 289 people are serviced by individual septic tank.
- 142 houses are serviced by individual septic tanks.

4.0 Communal Water Treatment Supply (142 houses)

4.1 Water Source

The four pump houses are supplied by groundwater from four wells.

4.2 Design

There are four different well and pump house systems summarized as follows:

- Well pump house #5 services 21 connections. The well treatment system includes green sand filters using chlorine and potassium permanganate for chemical treatment. There is a 45 m³ in ground reservoir. This system was constructed in 1997-1998. Well pump house #5 is the only one out of the four pump house systems that uses disinfection continuously.

The following table summarizes the treated water chemical data exceedance available from Health Canada for Pump House #5:

Date	Exceedance	Result	GCDWQ Limit
Feb. 10, 1999	Hardness	150 mg/L	80 – 100 mg/L (OG)
	Lead	0.0134 mg/L	0.0100 mg/L
Aug. 16, 2000	Hardness	132 mg/L	80 – 100 mg/L (OG)
	Sodium	22.5 mg/L*	200 mg/L*(AO)
Sept. 26, 2001	Sodium	22.5 mg/L*	200 mg/L*(AO)
	Hardness	124 mg/L	80 – 100 mg/L (OG)

AO – aesthetic objective; OG – operational guideline

*Health officer should be noted when the sodium content is above 20 mg/L for people on sodium restricted diets.

- Well pump house #2 services 24 connections with no disinfection, uses a water softening system and was constructed in 1996.

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

Date	Exceedance	Result	GCDWQ Limit
Feb. 10, 1999	Alkalinity	17 mg/L	30 – 500 mg/L
	Conductivity	1169 µs/cm	800 µs/cm
	Hardness	7 mg/L	80 – 100 mg/L (OG)
	Total dissolved solids	616 mg/L	500 mg/L
	Iron	0.677 mg/L	0.30 mg/L (AO)
	Lead	0.0229 mg/L	0.010 mg/L
	Sodium	208 mg/L*	200 mg/L*(AO)
	Aug. 16, 2000	Alkalinity	16 mg/L
Chloride		407 mg/L	250 mg/L
Conductivity		1300 µs/cm	800 µs/cm
Hardness		186 mg/L	80 – 100 mg/L (OG)
pH		6.23	6.5 – 8.5
Total Dissolved Solids		896 mg/L	500 mg/L (AO)
Sodium		182 mg/L*	200 mg/L*(AO)

Date	Exceedance	Result	GCDWQ Limit
Sept. 26, 2001	Sodium	171 mg/L*	200 mg/L*(AO)
	Chloride	379 mg/L	250 mg/L
	pH	6.3	6.5 – 8.5
	Total Dissolved Solids	798 mg/L	500 mg/L (AO)
	Conductivity	1229 µs/cm	800 µs/cm

AO – aesthetic objective; OG – operational guideline

*Health officer should be noted when the sodium content is above 20 mg/L for people on sodium restricted diets.

- Well pump house #3 services 32 connections, is identical to Pump House #2, but was constructed in 1979-1980.

The following table summarizes the chemical data available from Health Canada for Pump House #3:

Date	Exceedance	Result	GCDWQ Limit
Feb. 10, 1999	Hardness	198 mg/L	80 – 100 mg/L (OG)
Aug. 16, 2000	Hardness	169 mg/L	80 – 100 mg/L (OG)
	Sodium	31 mg/L*	200 mg/L*(AO)
Sept. 26, 2001	Sodium	36 mg/L*	200 mg/L*(AO)
	Hardness	166 mg/L	80 – 100 mg/L (OG)

AO – aesthetic objective; OG – operational guideline

*Health officer should be noted when the sodium content is above 20 mg/L for people on sodium restricted diets.

- Well pump house #1 (Rio Subdivision) services 65 connections, has a chlorination system, but is not used continuously. The system also consists of a 1,000 gallon above steel reservoir. This system was constructed in 1979-1980.

The following table summarizes the treated water chemical exceedances available from Health Canada for Pump House #1:

Date	Exceedance	Result	GCDWQ Limit
Aug. 16, 2000	Phenol	<0.002 mg/L	0.001 mg/L
	Aluminum	0.11 mg/L	0.01 mg/L (OG)
Sept. 21, 2001 (Rio)	Hardness	78 mg/L	80 – 100 mg/L (OG)
	Manganese	0.137 mg/L	0.05 mg/L(AO)

AO – aesthetic objective; OG – operational guideline

There is no backup power for any of the pump houses. The community has one portable diesel generator, but according to the OCWA inspector, it is not deemed to be sufficient for backup power to any of the pumping stations. Pumping station #2 is the only system that has its own diesel generator. Neither generator is tested on a regular basis.

There is insufficient safety equipment in pumping station #5 (only safety equipment is protective clothing), and there is a safety concern over chemical handling and confined space entry for this pumping station.

There is no backup power generator for fire protection or water treatment plant.

The pumping stations do not have designated laboratory, office/filing and workshop areas.

Pumping station #5 uses 12% sodium hypochlorite for disinfection. The disinfectant is ordered every three months. There is no on-line chlorine residual analyzer, and information on the frequency of chlorine residual testing is not available.

There are no operating and maintenance manuals for plant equipment, except for the pump manuals, available on site. As-built drawings are not available. Emergency spare parts are not available. There is a contact listing of technicians/trades people available. The response for such personnel is 'immediate'.

The fire department conducts a semi-annual fire hydrant maintenance program. There is no annual hydrant flushing program or main valve operating and maintenance program.

In the last two years service disruptions have been experienced due to power failures. There are no re-occurring operational problems because most of the pumps have been replaced with new ones.

4.4 Reporting

The operators report that Health Canada in Sault Ste. Marie carried out bacteriological testing every month. The results are kept in the Band Office and with the Tribal Council.

The following table summarizes the bacteriological data available from Health Canada (Pump houses #1, #2, and #3):

Period	Frequency	Regularity	Total Coliform Exceedances
99/10/06 to 01/10/29	1 – 6 times per month	▪ Months missing 2000: Feb.	▪ 00/08/16 – Residence

There have been several boil water advisories in the community in the past.

The turbidity of the treated water is not recorded. A chemical analysis of the treated water is conducted every two to three years.

4.5 Operators

Percy Owl and Frank Lewis operate the treatment plant. [REDACTED]
 [REDACTED]
 [REDACTED]
 [REDACTED] A comprehensive training program is suggested for the operators.

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5.0 Deficiencies in the Communal Water Supply

1. Only one of the four pump house systems has continuous disinfection.
2. There is no safety equipment available at any of the pump houses.
3. The community has a portable backup generator, but the generator is not powerful enough to run the pumps in the pumping stations.
4. There are no operating and maintenance manuals for plant equipment except for the pump manuals, and there are no as-built drawings on site.
5. Several safety hazards/concerns were noted on site for Pump House #5 (chlorination used), including lack of chemical handling and confined space equipment.
6. The chlorine equipment was working and information on the frequency of chlorine residual testing is not available. There is no on-line chlorine analyzer.
7. There are no hydrant flushing or valve operating and maintenance programs on the water distribution system.
8. There is no written contingency plan available.
9. There have been several boil water advisories issued in the community. None are currently in place.
10. Chemical exceedance for the Pump Houses have been recorded.
11. Service disruptions include power failures.
12. No emergency spare parts are readily available on site.
13. The operators are not certified and report that they have had no training and, therefore, need more training.

6.0 Recommendations

- Install continuous chlorination equipment for three of the four pump house systems.
- Address chemical exceedances at Pump Houses.
- Purchase safety equipment, which includes eyewash and confined space entry equipment.
- Implement a training program that can lead to certification of the operator.
- Implement a training program for water truck haulers.
- Establish and implement a procedure for cleaning and disinfecting private water holding tanks. At a minimum, tanks with boil water advisories to be cleaned and disinfected.
- Establish and implement a protocol for taking water samples at the water pumping stations, including raw water.
- Consider individual backup power for each system.
- Consider installing an on-line chlorine analyzer. This could save operators time in sampling every day.
- Develop a comprehensive operating and maintenance program on the water distribution system to address hydrant flushing and main valve 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.
- Obtain as-built drawings and operating and maintenance manuals.
- Develop a contingency plan for the individual water supply systems.
- Establish sampling responsibilities for the individual water holding tanks.
- Implement a sewage septic tank inspection program to inspect all septic tanks in the community for proper operations and meeting the required standards.

7.0 Overall Community Risk Assessment

Water Category – High Risk

- **High Risk because of the following:**
 - No chlorination in three of the four systems in the community; and
 - Several boil water advisories have been issued in the community.

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.