

2006 Hamlet of Tuktoyaktuk Annual Water Licence Report

Prepared by AECOM for the Hamlet of Tuktoyaktuk

October 28, 2009

1.0 Introduction

In 2006, the community infrastructure systems providing water, sewage and solid waste management to the residents of the Hamlet of Tuktoyaktuk were operated and maintained by the community. Figure 1 shows the general layout of the water and sewer systems.

2.0 Water Use

Tuktoyaktuk obtains its drinking water from Kudlak Lake. Water for winter use is pumped from Kudlak Lake to a raw water storage reservoir; in September 2006, the Hamlet pumped 43,010 cubic metres of water into this reservoir.

In 2006 the community used a total of 46,806 cubic metres (m³) of potable water. Monthly water use is shown in the table below. The estimated potable water use is 134 liters per capita per day based upon the 2007 estimated population of 956 (NWT Bureau of Statistics).

Table 1: Water Consumption

Month	Quantity Used (m ³)
January	3,969
February	3,389
March	3,913
April	3,132
May	4,036
June	4,333
July	4,362
August	4,216
September	4,343
October	4,013
November	3,363
December	3,737
Total	46,806

3.0 Surveillance Network Program Monitoring

Water sample data is collected periodically to check the performance of the water and waste systems. As of June 28, 2005 when the community received its latest water licence, the SNP station numbers are:

- 0714-1 Supply line to reservoir

- 0714-2 Effluent discharge structure at the Sewage Disposal Facilities
- 0714-3 Water contained within the Solid Waste Lagoon

The Hamlet collected three samples during the 2006 Sewage Lagoon decant. The pH of these samples was mainly within the allowable range, except for a recorded pH of 9.76 on July 27. SNP sampling results for 2006 (from Taiga Labs electronic records) are presented in Table 2.

In 2006, to the best of the community's knowledge, the community infrastructure systems providing water, sewage and solid waste management were operating mainly within the water quality criteria of the water licence.

4.0 System Modifications, Maintenance and Licence Amendments

The raw water intake line at Kudlak Lake was replaced in October 2006 with a new 200 mm (8") diameter pipe after the old pipeline broke in the summer of 2006.

5.0 System Studies and Inspections

There was no Municipal Water Licence Inspection of Tuktoyaktuk by INAC in 2006.

6.0 System Discharges

The community infrastructure system providing water, sewage and solid waste management to Tuktoyaktuk residents has two licensed discharges. The sewage lagoon discharge is seasonal from the sewage lagoon into a saltwater inlet leading to Kugmallit Bay. The solid waste lagoon discharges into the mouth of a small, adjacent bay.

48,000 m³ of treated wastewater was decanted from the sewage lagoon in 2006.

7.0 System Excavations

In 2006, there were no trench or sump excavations associated with the community's water, sewer and solid waste management systems.

8.0 Lagoon Sludge

In 2006, there was no removal of sludge from the sewage lagoon.

9.0 Operation and Maintenance Plans

Earth Tech (Canada) Inc. submitted a response to NWT Water Board comments (dated January 27, 2006) on the draft O&M Manuals for Tuktoyaktuk's sewage lagoon and landfill. The response and revised manuals were submitted in February 2006.

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Table 2: SNP Sampling Results – Water Licence N7L3-0714

Location (labeled)	Assumed SNP #	Sample Date	Fecal Coliforms		BOD ₅		Suspended Solids		pH	Hexane Extractable Material	NO ₂ /NO ₃	NH ₃
			CFU/100 mL		mg/L		mg/L		(6-9)	mg/L	mg/L	mg/L
			grab	MAC	grab	MAC	grab	MAC	grab	grab	grab	grab
Sewage - Facility	0714-2	July 27 2006				120	103	180	9.76			0.799
Sewage – Solid Waste Lagoon (SWL)	0714-3	July 27 2006				120	10	180	8.36			
Unknown Water – SWL	0714-3	Aug 29 2006	1200		12	120	18	180	7.50			
Unknown Water – SWL	0714-3	Aug 29 2006	20		< 2	120	8	180	8.58	5.0		0.212
Sewage – SWL	0714-2	Oct 3 2006				120	10	180	7.59			

Location	SNP #	Sample Date	Polychlorinated biphenyls µg/L		Cadmium	Cobalt	Chromium	Copper	Iron	Mercury	Manganese	Nickel	Lead	Zinc
			grab	MAC	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sewage – SWL	0714-3	July 27 2006			< 0.1	0.3	1.6	22.8	2110	0.02	19.4	2.8	0.9	41
Unknow n Water – SWL	0714-3	Aug 29 2006			< 0.1	0.4	0.6	7.6	1080	0.02	122	2.4	0.2	10
Sewage – SWL	0714-2	Oct 3 2006	< 0.1	25	< 0.05	0.4	0.5	10.0	774	< 0.02	142	2.7	0.3	7.0

Appendix A

Taiga Labs Sample Testing Results

2006 Taiga Labs electronic records for Tuktoyaktuk

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Client Name	Taiga Sample ID	Client Sample ID	Sample Type	Sampling Location	Sample Collect Date	Imple Received D	Lab Section	Parameter Name	Result Flag	Reported Result	Units	Calc MDL	Imple Result Qual	lysis Result Qual	Analysis Date	Prep Method	Test Method
Hamlet of Tuktoyaktuk	262444	Facility	Sewage	Facility		27-Jul-06	Micro. (w)	Coliforms, Fecal			CFU/100mL					none	SM9222:D
Hamlet of Tuktoyaktuk	262444	Facility	Sewage	Facility		27-Jul-06	Nuts. (w)	Ammonia as N	0.799	mg/L	0.005			7/28/2006	none	SM4500-NH3:G	
Hamlet of Tuktoyaktuk	262444	Facility	Sewage	Facility		27-Jul-06	Nuts. (w)	Oxygen		mg/L					none	SM5210:B	
Hamlet of Tuktoyaktuk	262444	Facility	Sewage	Facility		27-Jul-06	Organic (w)	Extractable		mg/L					HEM Ext.	EPA1664a	
Hamlet of Tuktoyaktuk	262444	Facility	Sewage	Facility		27-Jul-06	Phys. (w)	pH	9.76	pH units				7/31/2006	none	SM4500-H:B	
Hamlet of Tuktoyaktuk	262444	Facility	Sewage	Facility		27-Jul-06	Phys. (w)	Suspended	103	mg/L	3			7/28/2006	GF/C Filtr.	SM2540:D	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	Micro. (w)	Coliforms, Fecal		CFU/100mL					none	SM9222:D	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	Nuts. (w)	Oxygen		mg/L					none	SM5210:B	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	Phys. (w)	pH	8.36	pH units				7/31/2006	none	SM4500-H:B	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	Phys. (w)	Suspended	10	mg/L	3			7/28/2006	GF/C Filtr.	SM2540:D	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	Sub - Org	Biphenyls		µg/L					Solvent Ext.	EPA8082	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	Sub - Org	Dissociable	0.004	mg/L	0.002			8/1/2006			
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	T Metals (w)	Cadmium	<	0.1	µg/L	0.1		7/28/2006	Acid Digest	EPA200.8	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	T Metals (w)	Chromium		1.6	µg/L	0.3		7/28/2006	Acid Digest	EPA200.8	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	T Metals (w)	Cobalt		0.3	µg/L	0.1		7/28/2006	Acid Digest	EPA200.8	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	T Metals (w)	Copper		22.8	µg/L	0.3		7/28/2006	Acid Digest	EPA200.8	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	T Metals (w)	Iron		2110	µg/L	50		7/28/2006	Acid Digest	EPA200.8	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	T Metals (w)	Lead		0.9	µg/L	0.1		7/28/2006	Acid Digest	EPA200.8	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	T Metals (w)	Manganese		19.4	µg/L	0.1		7/28/2006	Acid Digest	EPA200.8	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	T Metals (w)	Mercury	<	0.02	µg/L	0.02		7/28/2006	Acid Digest	EPA200.8	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	T Metals (w)	Nickel		2.8	µg/L	0.1		7/28/2006	Acid Digest	EPA200.8	
Hamlet of Tuktoyaktuk	262445	Lagoon	Sewage	Solid Waste Lagoon		27-Jul-06	T Metals (w)	Zinc		41	µg/L	10		7/28/2006	Acid Digest	EPA200.8	

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Client Name	Taiga Sample ID	Client Sample ID	Sample Type	Sampling Location	Sample Collect Date	Imple Received D	Lab Section	Parameter Name	Result Flag	Reported Result	Units	Calc MDL	Imple Result Qual	lysis Result Qual	Analysis Date	Prep Method	Test Method
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	Micro. (w)	Coliforms, Fecal		1200	CFU/100mL	100			8/29/2006	none	SM9222:D
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	Nuts. (w)	Oxygen		12	mg/L	2			8/30/2006	none	SM5210:B
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	Phys. (w)	pH		7.50	pH units				9/5/2006	none	SM4500-H:B
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	Phys. (w)	Suspended		18	mg/L	3			9/5/2006	GF/C Filtr.	SM2540:D
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	Sub - Org	Biphenyls			µg/L					Solvent Ext.	EPA8082
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	T Metals (w)	Cadmium	<	0.1	µg/L	0.1			9/1/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	T Metals (w)	Chromium		0.6	µg/L	0.3			9/1/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	T Metals (w)	Cobalt		0.4	µg/L	0.1			9/1/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	T Metals (w)	Copper		7.6	µg/L	0.3			9/1/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	T Metals (w)	Iron		1080	µg/L	50			9/1/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	T Metals (w)	Lead		0.2	µg/L	0.1			9/1/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	T Metals (w)	Manganese		122	µg/L	0.1			9/1/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	T Metals (w)	Mercury	<	0.02	µg/L	0.02			9/1/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	T Metals (w)	Nickel		2.4	µg/L	0.1			9/1/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	263416	N7L3-0714-3	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	T Metals (w)	Zinc	<	10	µg/L	10			9/1/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	263417	N7L3-0714-2	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	Micro. (w)	Coliforms, Fecal		20	CFU/100mL	10			8/29/2006	none	SM9222:D
Hamlet of Tuktoyaktuk	263417	N7L3-0714-2	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	Nuts. (w)	Ammonia as N		0.212	mg/L	0.005			8/31/2006	none	SM4500-NH3:G
Hamlet of Tuktoyaktuk	263417	N7L3-0714-2	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	Nuts. (w)	Oxygen	<	2	mg/L	2			8/30/2006	none	SM5210:B
Hamlet of Tuktoyaktuk	263417	N7L3-0714-2	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	Organic (w)	Extractable	<	5.0	mg/L	5.0			9/5/2006	HEM Ext.	EPA1664a
Hamlet of Tuktoyaktuk	263417	N7L3-0714-2	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	Phys. (w)	pH		8.58	pH units				9/5/2006	none	SM4500-H:B
Hamlet of Tuktoyaktuk	263417	N7L3-0714-2	Unknown Water	Solid Waste Lagoon	8/29/2006	29-Aug-06	Phys. (w)	Suspended		8	mg/L	3			9/5/2006	GF/C Filtr.	SM2540:D

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Client Name	Taiga Sample ID	Client Sample ID	Sample Type	Sampling Location	Sample Collect Date	Imple Received D	Lab Section	Parameter Name	Result Flag	Reported Result	Units	Calc MDL	Imple Result Qual	lysis Result Qual	Analysis Date	Prep Method	Test Method
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	Micro. (w)	Coliforms, Fecal			CFU/100mL					none	SM9222:D
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	Nuts. (w)	Oxygen			mg/L					none	SM5210:B
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	Phys. (w)	pH		7.59	pH units				10/10/2006	none	SM4500-H:B
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	Phys. (w)	Suspended		10	mg/L	3			10/12/2006	GF/C Filtr.	SM2540:D
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	T Metals (w)	Cadmium	<	0.05	µg/L	0.05			10/18/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	T Metals (w)	Chromium		0.5	µg/L	0.3			10/18/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	T Metals (w)	Cobalt		0.4	µg/L	0.1			10/18/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	T Metals (w)	Copper		10.0	µg/L	0.3			10/18/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	T Metals (w)	Iron		774	µg/L	50			10/18/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	T Metals (w)	Lead		0.3	µg/L	0.1			10/18/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	T Metals (w)	Manganese		142	µg/L	0.1			10/18/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	T Metals (w)	Mercury	<	0.02	µg/L	0.02			10/18/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	T Metals (w)	Nickel		2.7	µg/L	0.1			10/18/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	264387	N7L3-0714-3	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	T Metals (w)	Zinc		7.0	µg/L	0.4			10/18/2006	Acid Digest	EPA200.8
Hamlet of Tuktoyaktuk	264388	Solid Waste	Sewage	Solid Waste Lagoon	10/3/2006	05-Oct-06	Sub - Org	Biphenyls	<	0.1	µg/L	0.1			10/17/2006	Solvent Ext.	EPA8082