



ᑭᓄᓐᓂᓐ ᓂᓐᓂᓐ ᓂᓐᓂᓐ  
Building Nunavut Together  
Nunavut liuqatigiingniq  
Bâtir le Nunavut ensemble

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Department of Community and Government Services  
Nunalingni Kavamatkunnilu Pivikhaqautikkut  
Ministère des Services Communautaires et gouvernementaux

## Kugaaruk Water Licence: 3BM-PEL0712

## Annual Report 2013

February 18, 2014

Nunavut Water Board

P.O. Box 119

Gjoa Haven, NU X0B 1L0

Attention: Phyllis Beaulieu, Manager of Licensing

RE: Annual Report 2013 - Hamlet of Kugaaruk Water Licence 3BM-PEL0712

Dear Ms. Phyllis,

The Hamlet of Kugaaruk is pleased to submit to Nunavut Water Board the attached file of "Annual Report 2013" of water uses and sewage solid waste disposal as required and directed under the compliance of Water Licence No. 3BM-PEL-0712 as stated above. Copies of required tests reports are attached herewith (Appendices) as requested for your review and reference.

With the help of Government of Nunavut through Community and Government Services, the Hamlet has undertaken a comprehensive waste management program which has led to improve sewage and solid waste facilities, wetland and effluent discharge. The annual monitoring program for sewage and solid waste has been in effect during June-Sep each year since 2012. Samples test result has shown excellent control on contamination parameters within allowable limit comprising BOD, TSS, E-coli and Toxicity components. We summarized those conditions and requirements outlined in Part B through part H as below:

### Part B: General conditions:

#### Item 1.(i through ix):

- Tabular Form of Annual water consumption and sewage disposal are duly filled-up
- Quantities were measured on daily basis of water distribution and sewage disposal
- No modification to water supply and sewage waste disposal during this period
- No unauthorized discharge of sewage and solid waste or other types
- Approved O&M manuals for sewage and solid waste facilities remains active since 2009
- Review of Dam Safety inspection is planned for next year 2014

#### Items 2-6:

- Monitoring stations marked at site using GPS locator and location signage placed, any missing signage will be installed by the Hamlet in summer 2014.



Department of Community and Government Services  
Nunalingni Kavamatkunnilu Pivikhaqautikkut  
Ministère des Services Communautaires et gouvernementaux

- ### Part C: Water Use:

- ## Part D: Waste Disposal

- All sewage and solid waste disposal carried into the prescribed locations of sewage Lagoon and waste site facilities using hamlet operated trucks and operators. Sewage and effluent samples were taken during summer and fall, tested in accredited laboratories and noted all parameters of contaminants within allowable limits (Appendix C Test Reports).
- Freeboard at sewage lagoon maintained minimum 1.0 m and discharge into secondary cell through regulated valve control dyke.
- The existing wetland area and facilities used for effluent treatment and remediation. Assessment of wetland remediation submitted to the Board in Dec 2009. Test results shown the effluent from Final Discharge Point (PEL- 4) within limiting values for BOD, TSS, Coliform, pH and not acutely toxic to Rainbow Trout or crustacean fish food.

## Part E-G: Modification, construction, operation, abandonment and restoration

- No modifications to sewage or solid waste facilities, but only upgrading to water intake screens completed. Site work and preparation for new intake pumphouse and treatment plant under construction which started during fall 2013, stopped for winter and will resume in summer 2014.
- No changes in operation of existing intake system and water distribution. New O&M manual for water system will be available once the new plant completed, expecting in Aug 2014.
- No geo-inspection or study happened during this period; however a review inspection and assessment for sludge blanket and remediation is planned for next year 2014.

## Part H: Monitoring Program

- Annual monitoring of sewage and solid waste effluent has been carried during the summer and fall. Samples were taken from monitoring stations where available and convenient, and tested for parameters at Taiga Laboratory at Yellowknife, NWT (CALA approved). Test reports of such samples as well as Bacterial Test (Taiga Lab and Cambridge Bay Regional Lab) are included with this report for your review and reference (Appendix B and C).



Department of Community and Government Services  
Nunalingni Kavamatkunnilu Pivikhaqautikkut  
Ministère des Services Communautaires et gouvernementaux

- Shah Alam, P. Eng.  
Municipal Planning Engineer,  
Government of Nunavut  
Community and Government Services  
Kitikmeot Region, Cambridge Bay, Nu  
Phone: 867-983-4156, fax: 867-983-4124  
[salam@gov.nu.ca](mailto:salam@gov.nu.ca)<<mailto:salam@gov.nu.ca>>*

**Kugaaruk Water Licence 3BM-PEL 0712**

**Annual Report 2013**

**Hamlet of Kugaaruk, Nunavut**

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## **Table of Contents**

<b><u>Description</u></b>	<b><u>Page/ number</u></b>
Letter to Nunavut Water Board	3 pages
Annual Report 2013 (NWB Form)	1-4
Appendix A: Environmental Sample Results Summary	3 pages
Appendix B: Water Sample Results Taiga lab and Cambridge Bay Lab	19 pages
Appendix C: sewage and waste Sample Results- Taiga Lab	21 pages

## ANNUAL REPORT

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**YEAR BEING REPORTED:** 2013

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence 3BM-PEL-0712 issued to the Hamlet of Kugaaruk.

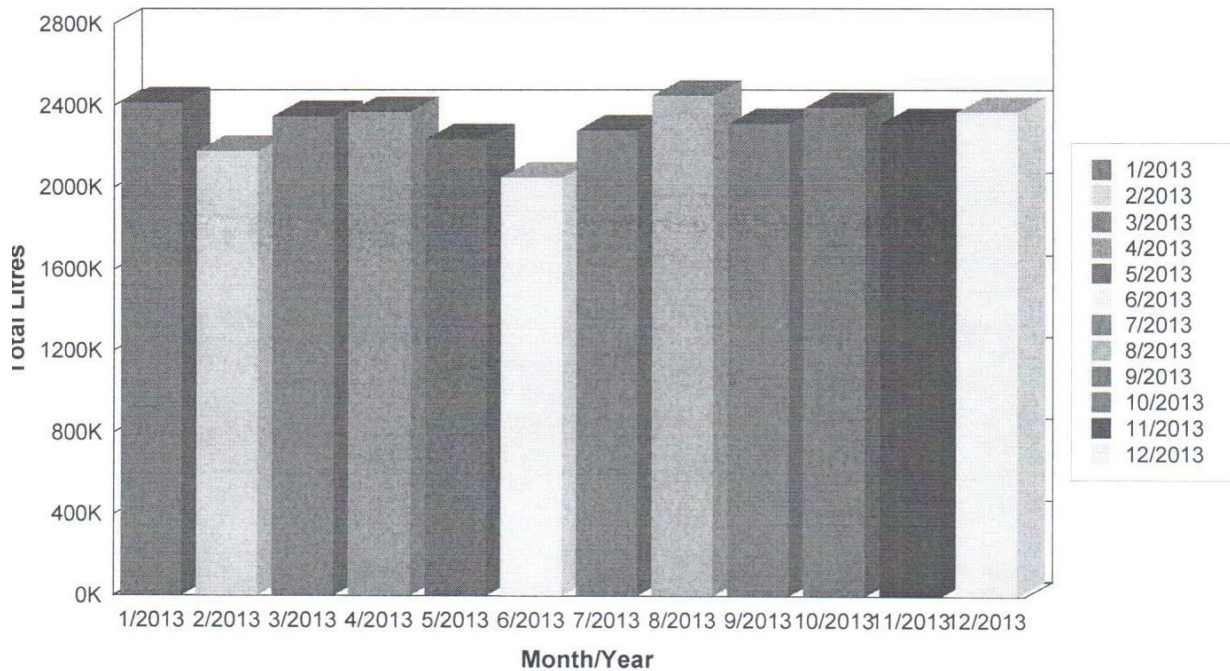
- i) - iii) tabular summaries of all data generated under the “Monitoring Program”; monthly and annual quantities in cubic metres of freshwater obtained from all sources; monthly and annual quantities in cubic metres of each and all wastes discharged;

Attached are quantities of water used as reported in our On Tap Water Delivery System and the estimated discharge of sewage waste based on quantities used.

Month Reported	Quantity of Water Obtained from all sources (Litres)	Quantity of Sewage Waste Discharged
January	2,414,887.00	Same
February	2,176,719.80	Same
March	2,347,169.70	Same
April	2,368,039.30	Same
May	2,235,275.10	Same
June	2,048,207.70	Same
July	2,278,394.50	Same
August	2,448,061.00	Same
September	2,310,103.70	Same
October	2,389,421.50	Same
November	2,310,924.50	Same
December	2,369,162.20	Same
<b>ANNUAL TOTAL</b>	<b>27,696,366.00</b>	Same

## ANNUAL REPORT

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iv. a summary of modifications and/or major maintenance work carried out on the [Water Supply and Waste Disposal Facilities](#), including all [associated structures](#) and facilities;

- No major changes in water supply and waste disposal. Water collect by truck-fill from intake pumphouse station with chlorine mixing (dosing) and distribute to household tank for potable water to the resident and office/institution.
- New intake pumphouse and treatment plant under construction, expecting completion by Aug 2014. Current intake pumphouse will be refurbished for storage purpose for the treatment plant.
- New electrical line installed to connect intake pumphouse and treatment plant direct to power grid, backup power with current generator sets (two).
- No changes of sewage and waste disposal system. Sewage collect from house tank through vacuum truck and dispose to sewage lagoon main cell where raw sewage stays about a year before discharge to second cell through valve control dyke. Discharge from main cell to secondary cell by opening the valve manually, mostly in Aug-Sep when raw sewage melts to flow and main cell attains allowable height

## ANNUAL REPORT

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- v. a list of unauthorized discharges and summary of follow-up action taken;
- 
- No unauthorized discharge carried anytime during this period (Jan- Dec 2013).
  - All sewage waste discharged in the new lagoon using vacuum truck. Beside house sewage, no other black water (industrial or manufacture wastewater) discharged into the lagoon.
- vi. a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;
- 
- No abandonment or restoration work carried during this period.
  - However, a plan for current intake pumphouse refurbishment to a storage facility for new water treatment plant sometime in Aug 2014.
- vii. a summary of any studies requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned;
- 
- Lagoon Dam Safety inspection follow up requested by the Board which is related to sewage containment and facility full operation as per design and development.
  - Plan for Geotechnical inspection follow up for lagoon dam safety and sludge management in Aug 2014.
- viii. any other details on water use or waste disposal requested by the Board by November 1st of the year being reported; and
- 
- O&M Manual for current water system intake plant including QA/QC plan requested, plan for such submission for new water system by Dec 2014.
  - Addendum to Spill Contingency Plan and O&M manuals for sewage and solid waste requested and responded to the Board.
  - Plan for compliance for monitoring sewage and waste submitted to the Board with information for QA/QC with respect to standard and manual.
- ix updates or revisions to the approved Operation and Maintenance Plans.
- 
- Operation and maintenance plan for solid waste and sewage facility approved by the Board (Feb 22-23, 2010) with an addendum request. Those approved O&M plans remains functional and addendum clarification updated with the Board. Additional information including monitoring and Quality Assurance plan updated with the Licence Amendment Application (Dec 03, 2013) and follow up later.
  - Revision of Operation and Maintenance plan for water supply updating once the new treatment plant starts operation-expecting Aug 2014.
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## **ANNUAL REPORT**

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### **ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:**

- Semi engineered wetland for sewage effluent remediation working effectively. Environmental monitoring sample results shown contamination parameters within allowable limits.
- No evidence or sign of leak or crack across lagoon berm, dam or approach road. Request for geotechnical inspection follow up as per recommendation by the consultant (AMEC- report 2009) and sludge blanket thickness measurement in 5-years from starts operation. Hamlet is in plan to hire a geotechnical consultant for both activities sometime in July-Aug 2014.
- Current Water intake and truck-fill plant is over 20 years old, and no standard O&M manual available. The new treatment plant includes scope for O&M manual, operational training and monitoring which is under way and expecting completion by Aug 2014. Since a new O&M manual will be in place shortly, preparation or upgrading of old manual will no longer be effective, and therefore request to the Board for the exemption of the requirement of old O&M manual.
- No evidence of Bacteria or E. Coli in the source water or supply water as tested by the Regional Health & Environmental Laboratory in Cambridge Bay.
- There is no mechanical or digital system for water supply measurement, but truck-fill supply from Fluid Manger Data ensures the quantity of distribution.

### **FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:**

- Earlier submitted compliance plan has been updated with the Board for short term and long term implementation for sewage and solid waste site management.
- Results of monitoring samples are attached with this Annual Report and summarized in the Tabular Form for review and information.



# Appendix A:

Environmental Sample Results-sewage and solid waste Effluent  
Kugaaruk Water Licence 3BM-PEL0712

# Wastewater/Sewage parameters

Sample date: July 08, 2013

Parameter	MAC	units	Results of sample taken on July 08, 2013						
	Limits		PEL-3	PEL-4	PEL-5	PEL-6	PEL-7	PEL 8-1	PEL 8-2
Alkalinity		mg/L	23.4	66.3	43.0	112	22.1	23.7	26.3
Conductivity		µS/cm	121.0	470	4200	549	125	132	135
p <sup>H</sup>	6-9		9.52	6.93	7.74	7.80	7.16	7.44	7.34
TSS	45	mg/L	12.0	<3	22	12	<3	6	8
Ammonia N2		mg/L	0.661	5.12	<0.005	0.08	<0.005	<0.005	<0.005
BOD	45	mg/L	12.0	5	<2	4	<2	<2	<2
CBOD		mg/L	14.0	17.3	4.4				
Nitrate N2		mg/L	0.64	10.7	<0.01	0.08	0.02	0.05	0.07
Calcium		mg/L	7.7	17.6	36.3	38.6	8.8	10.1	11.2
Chloride		mg/L	14.7	46.3	1180				
Hardness		mg/L	31.4	67.8	424	133	31.3	35.2	38.3
Magnesium		mg/L	3.0	5.8	81	9.0	2.3	2.4	2.5
Potassium		mg/L	2.5	9.9	24.6	5.7	0.9	0.9	1.0
Sodium		mg/L	11.1	49.5	646	55.6	12.6	12.1	12.1
Sulphate		mg/L	5	32	172	66	7	7	7
Fecal Coliform	1x10 <sup>4</sup>	CFU/100mL	<100	<100	<1	400	<100	<100	<100
Oil and Gas	Non-vis	µg/L	non-vis	non-vis	Non-vis				
Aluminium		µg/L	139	33	54				
Arsenic	100	µg/L	0.4	1.7	0.4	0.5	0.3	0.3	0.2
Cadmium	10	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	100	µg/L	0.5	0.4	0.3	0.5	0.4	0.8	1.0
Cobalt	50	µg/L	0.2	2.1	<0.1				
Copper	200	µg/L	6.3	4.9	<0.2	2.5	1.0	1.3	1.5
Iron		µg/L	172	305	69	402	166	452	605
Lead	50	µg/L	0.2	0.3	<0.1	0.2	<0.1	12.8	1.8
Manganese		µg/L	28.9	446	2.7				
Nickel	200	µg/L	0.8	3.3	0.4	1.6	0.5	0.7	1.0
Zinc	500	µg/L	<5	<5	<5				
Mercury	0.6	µg/L	<0.01	<0.01	0.05	<0.01	<0.01	<0.01	<0.01
PCB	1000	µg/L							
Phenols	20	µg/L	<0.002	<0.002	<0.002	0.004			
Hexane						<2.0	2.0	<2.0	<2.0

Monitoring Stations:

Monitoring Station	Description	Status
PEL-1	Raw water supply intake at the Kugajuk river	Active
PEL-2	Raw sewage from pump-out truck	Active (volume)
PEL-3	Discharge from sewage disposal facility at the controlled point of release following treatment	Active
PEL-4	Final discharge point of the wetland treatment area	Active
PEL-5	Ocean water five (5) meters from point where effluent enters ocean	Active (new)
PEL-6	Run-off from solid waste disposal facility	Active
PEL-7	Monitoring well located up gradient of solid waste facility	Active
PEL-8-1	Monitoring well located down gradient of solid waste facility	Active
PEL-8-2	Monitoring well located down gradient of solid waste facility	Active

# Appendix B:

Water Sample Results-Bacterial Test

Kugaaruk Water Licence 3BM-PEL0712



**LABORATORY REPORT**  
**Stanton Territorial Hospital Laboratory**  
550 Byrne Road, P.O. Box 10  
Yellowknife, NT X1A 2N1  
Phone: 867-669-4163 Fax: 867-669-4141

Lab No: 25110284

Patient: KUGAARUK, HAMLET OF  
DOB: 01/01/1900 Age: 113 Sex: N  
HCN: Client ID: HX00000042  
Stanton Chart No:  
Pl. Phone: 8676694162  
Location: EHO - KITIKMEOT  
Room: Adm. Date: 05/12/11

Encounter: WX0000000042  
Attending Pract: PHYSICIAN, NOT  
Requested by: PHYSICIAN, NOT  
Send to: KITIKMEOT REGIONAL ENGINEER  
Copy to: EHO - KITIKMEOT, EHK  
KITIKMEOT REGIONAL  
KITIKMEOT MUNICIPAL

Test, Water

**MICROBIOLOGY**

Requested on: 11/01/13 13:43

Status:

KITIKMEOT REGIONAL ENGINEER, KRF - Cambridge Bay NU,

Source: Water Truck#2

Collected: 09/01/13 14:30

Order#: 25110284

Received: 11/01/13 13:43

public, chlorinated, 800, River

**TOTAL COLIFORM & E.COLI TESTING (P/A \* FINAL.**  
**COLILERT METHOD)**

12/01/13 13:30

12/01/13 **TOTAL COLIFORM: absent**  
**E.COLI: absent**

Micro Key for Results: \* - New Results \*\* - Result was modified after Final status set

SCC

STATUS  
Page 1 of 1

Form: HHSI 01/01/13

Printed: 01/12/13 13:39



**LABORATORY REPORT**  
**Stanton Territorial Hospital Laboratory**  
550 Byrne Road, P.O. Box 10  
Yellowknife, NT X1A 2N1  
Phone: 867-669-4163 Fax: 867-669-4141

Lab No: 25110285

Patient: KUGAARUK, HAMLET OF  
DOB: 01/01/1900 Age: 113 Sex: N  
HCN: Client ID: HX00000042  
Stanton Chart No:  
Pt. Phone: 8676694162  
Location: EHO - KITIKMEOT  
Room: Adm. Date: 05/12/11

Encounter: WX0000000042  
Attending Pract.: PHYSICIAN, NOT  
Requested by: PHYSICIAN, NOT  
Send to: KITIKMEOT REGIONAL ENGINEER  
Copy to: EHO - KITIKMEOT, EHK  
KITIKMEOT REGIONAL  
KITIKMEOT MUNICIPAL

Test, Water

**MICROBIOLOGY**

Requester: 11/01/13 13:45

KITIKMEOT REGIONAL ENGINEER, KRB - Cambridge Bay NU,

Source: Water Truck#1  
Order#: 25110285

Collected: 09/01/13 15:00  
Received: 11/01/13 13:45

public, chlorinated, 800, River

**TOTAL COLIFORM & E.COLI TESTING (P/A \* FINAL  
COLILERT METHOD)**

12/01/13 13:30

12/01/13 **TOTAL COLIFORM: absent**  
**E.COLI: absent**

Micro Key for Results: \* - New Results \*\* - Result was modified after Final status set

SCC

STATUS  
Page 1 of 1

Printed: 01/12/13 13:30



**LABORATORY REPORT**  
**Stanton Territorial Hospital Laboratory**  
550 Byrne Road, P.O. Box 10  
Yellowknife, NT X1A 2N1  
Phone: 867-669-4163 Fax: 867-669-4141

Lab No: 25110286

Patient: KUGAARUK, HAMLET OF  
DOB: 01/01/1900 Age: 113 Sex: N  
HCN: Client ID: HX00000042  
Stanton Chart No:  
Pl. Phone: 8676694162  
Location: EHO - KITIKMEOT  
Room: Adm. Date: 05/12/11

Encounter: WX0000000042  
Attending Pract.: PHYSICIAN, NOT  
Requested by: PHYSICIAN, NOT  
Send to: KITIKMEOT REGIONAL ENGINEER  
Copy to: EHO - KITIKMEOT, EHK,  
KITIKMEOT REGIONAL  
KITIKMEOT MUNICIPAL

Test, Water

**MICROBIOLOGY**

Received on 11/01/13 13:46

Status

KITIKMEOT REGIONAL ENGINEER, KRL - Cambridge Bay NU,

Source: Water Pump house  
Order#: 25110286

Collected: 09/01/13 15:00  
Received: 11/01/13 13:46

800, nver

**TOTAL COLIFORM & E.COLI TESTING (P/A \* FINAL 12/01/13 13:30**  
**COLILERT METHOD)**

12/01/13 **TOTAL COLIFORM: absent**  
**E.COLI: absent**

Micro Key for Results: \* - New Results \*\* - Result was modified after Final status set

SCC

STATUS  
Page 1 of 1

Printed: 01/12/13 13:39



**LABORATORY REPORT**  
**Stanton Territorial Hospital Laboratory**  
550 Byrne Road, P.O. Box 10  
Yellowknife, NT X1A 2N1  
Phone: 867-669-4163 Fax: 867-669-4141

Lab No. 27210253

Patient: KUGAARIK, HAMLET OF  
DOB: 01/01/1900 Age: 113 Sex: N  
ICN: Client ID: HX00000042  
Stanton Chart No:  
Pl. Phone: 8676694162  
Location: EHO - KITIKMEOT  
Room: Adm. Date: 05/12/11

Encounter: WX0000000042  
Attending Pract.: PHYSICIAN, NOT  
Requested by: PHYSICIAN, NOT  
Send to: KITIKMEOT REGIONAL ENGINEER  
Copy to: EHO - KITIKMEOT, EHK  
KITIKMEOT REGIONAL  
KITIKMEOT MUNICIPAL

Test: Water

**MICROBIOLOGY**

Received on: 20/03/13

Status:

KITIKMEOT REGIONAL ENGINEER, KRP - Cambridge Bay NU,

Switches

Source: River Water pump house  
Order#: 27210253

Collected: 20/03/13 00:01  
Received: 21/03/13 12:51

TOTAL COLIFORM & E.COLI TESTING (P/A \* FINAL  
COLIFERT METHOD)

22/03/13 13:52

22/03/13 TOTAL COLIFORM: absent  
E.COLI: absent

*Seen: shah*

Micro Key for Results: \* - New Results \*\* - Result was modified after Final status set

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Page 1 of 1

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**LABORATORY REPORT**  
**Stanton Territorial Hospital Laboratory**  
550 Byrne Road, P.O. Box 10  
Yellowknife, NT X1A 2N1  
Phone: 867-669-4163 Fax: 867-669-4141

Lab No. 27210254

Patient: KUCAARUK, HAMLET OF  
DOB: 01/01/1900 Age: 113 Sex: N  
LICN: Client ID: HX000000042  
Stanton Chart No:  
Pt. Phone: 8676694162  
Location: EHO - KITIKMEOT  
Room: Adm. Date: 05/12/11

Encounter: WX0000000042  
Attending Pract: PHYSICIAN, NOT  
Requested by: PHYSICIAN, NOT  
Send to: KITIKMEOT REGIONAL ENGINEER  
Copy to: EHO - KITIKMEOT, EHK  
KITIKMEOT REGIONAL  
KITIKMEOT MUNICIPAL

Ted. Water

**MICROBIOLOGY**

Received on: 21/03/13 12:51

KITIKMEOT REGIONAL ENGINEER, KRF - Cambridge Bay N.U.

Switcher

Source: River Water truck #2  
Order#: 27210254

Collected: 20/03/13 13:40  
Received: 21/03/13 12:51

TOTAL COLIFORM & E.COLI TESTING (P/A \* FINAL  
COLILERT METHOD)

22/03/13 13:52

22/03/13 TOTAL COLIFORM: absent  
E.COLI: absent

Seen:  
Shah

Micro Key for Results: \* - New Results \*\* - Result was modified after Final status set

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STATUS  
Page 1 of 1

Printed: 03/22/13 14:09



**LABORATORY REPORT**  
**Stanton Territorial Hospital Laboratory**  
550 Byrne Road, P.O. Box 10  
Yellowknife, NT X1A 2N1  
Phone: 867-669-4163 Fax: 867-669-4141

Lab No: 27210255

Patient: KUGAARUK, HAMLET OF  
DOB: 01/01/1900 Age: 113 Sex: M  
HCN: Client ID: HX00000042  
Stanton Chart No:  
Pl. Phone: 8676694162  
Location: EHO - KITIKMEOT  
Room: Adm. Date: 05/12/11

Encounter: WX0000000042  
Attending Pract.: PHYSICIAN, NOT  
Requested by: PHYSICIAN, NOT  
Send to: KITIKMEOT REGIONAL ENGINEER  
Copy to: EHO - KITIKMEOT, EHK,  
KITIKMEOT REGIONAL,  
KITIKMEOT MUNICIPAL

Test: Water

**MICROBIOLOGY**

Received: 20/03/13 12:52

Status:

KITIKMEOT REGIONAL ENGINEER, KRJ - Cambridge Bay NU,

Switcher

Source: River Water truck #1  
Order#: 27210255

Collected: 20/03/13 00:01  
Received: 21/03/13 12:52

TOTAL COLIFORM & E.COLI TESTING (P/A \* FINAL  
COLILERT METHOD)

22/03/13 13:52

22/03/13 TOTAL COLIFORM: absent  
E.COLI: absent

Micro Key for Results: \* - New Results \*\* - Result was modified after Final status set

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Page 1 of 1

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Building *Nunavut* Together  
*Nunavut* iuqatigiingniq  
Bâtir le *Nunavut* ensemble

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Department of Health  
Munaqhiliqiyitkut  
Ministère de la Santé

## LABORATORY REPORT

*Cambridge Bay Water Laboratory*

*Reporting Date: May 17, 2013*

*Reference Number 425-05-01*

Source of water: Truck # 2, Hamlet of Kugaaruk  
Date & Time collected: May 15, 2013; 15:00 AM  
Date & Time Received: May 16, 2013; 09:30 AM.

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca).



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Building *Nunavut* Together  
*Nunavut* liuqatigiingniq  
Bâtir le *Nunavut* ensemble

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Department of Health  
Munaqhiliqiyitkut  
Ministère de la Santé

## LABORATORY REPORT

*Cambridge Bay Water Laboratory*

*Reporting Date: May 17, 2013*

*Reference Number 425-05-01*

Source of water: Truck # 1, Hamlet of Kugaaruk

Date & Time collected: May 15, 2013; 15:10 AM

Date & Time Received: May 16, 2013; 09:30 AM.

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca).



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Building *Nunavut* Together  
*Nunavut* iugatiingniq  
Bâtir le *Nunavut* ensemble

Department of Health  
Munaqiliqiyitkut  
Ministère de la Santé

## LABORATORY REPORT

Cambridge Bay Water Laboratory  
Reporting Date: May 17, 2013

Reference Number 425-05-01

Source of water: Pump House, Hamlet of Kugaaruk  
Date & Time collected: May 15, 2013; 10:53 AM  
Date & Time Received: May 16, 2013; 09:30 AM.

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca).



**LABORATORY REPORT**  
*Cambridge Bay Water Laboratory*  
*Reporting Date: June 29, 2013*

Reference Number 425-06-01

Date & Time Received: June 28, 2013; 10:30 AM.

1. TOTAL COLIFORM: **present**
2. E. Coli: **absent**

Total coliform present in this sample; Sample was taken from the Kugaaruk river (raw water), unchlorinated water, therefore no action is required.

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca)



**LABORATORY REPORT**  
*Cambridge Bay Water Laboratory*  
*Reporting Date: June 29, 2013*

Source of water: Truck # 1, Hamlet of Kugaaruk  
Date & Time collected: June 27, 2013; 1:15 PM  
Date & Time Received: June 28, 2013; 10:30 AM.

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

Satisfactory

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca)

**LABORATORY REPORT**  
*Cambridge Bay Water Laboratory*  
*Reporting Date: July 05, 2013*

Reference Number 425-07-01

Source of water: Truck # 1, Hamlet of Kugaaruk  
Date & Time collected: July 03, 2013; 13:47 PM  
Date & Time Received: July 04, 2013; 11:00 AM.

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coliert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

## Satisfactory

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca)



**LABORATORY REPORT**  
*Cambridge Bay Water Laboratory*  
*Reporting Date: July 05, 2013*

Reference Number 425-07-01

Source of water: Truck # 2, Hamlet of Kugaaruk  
Date & Time collected: July 03, 2013; 13:44 PM  
Date & Time Received: July 04, 2013; 11:00 AM.

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coliert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

## Satisfactory

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca)



Wilfred Ntiamuah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0 Phone: (867) 983-4236  
Email : [wntiamuah@gov.nu.ca](mailto:wntiamuah@gov.nu.ca)

# LABORATORY REPORT

**Cambridge Bay Water Laboratory**

**Reporting Date: July 05, 2013**

Reference Number 425-07-01

Source of water: Kugaaruk River (Raw water), Hamlet of Kugaaruk

Date & Time collected: July 03, 2013; 15:00 PM

Date & Time Received: July 04, 2013; 11:00 AM.

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **Present**
2. E. Coli: **absent**

REMARK:

**Total coliform present in this sample; sample was taken from the Kugaaruk River. Control sample, therefore no action is required.**

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca).

# LABORATORY REPORT

**Cambridge Bay Water Laboratory**

**Reporting Date: August 09, 2013**

Reference Number 425-08-01

Source of water: Truck #1, Hamlet of Kugaaruk

Date & Time collected: August 07, 2013; 14:46 PM

Date & Time Received: August 08, 2013; 11:50 AM.

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**  
2. E. Coli: **absent**

REMARK:

## Satisfactory

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca)



**LABORATORY REPORT**  
*Cambridge Bay Water Laboratory*  
*Reporting Date: August 09, 2013*

Reference Number 425-08-01

Source of water: Truck # 2, Hamlet of Kugaaruk  
Date & Time collected: August 07, 2013; 14:57 PM  
Date & Time Received: August 08, 2013; 11:50 AM.

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coliert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

## Satisfactory

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca)

# LABORATORY REPORT

**Cambridge Bay Water Laboratory**

**Reporting Date: August 09, 2013**

Reference Number 425-08-01

Source of water: Pump House, Hamlet of Kugaaruk

Date & Time collected: August 07, 2013; 14:38 PM

Date & Time Received: August 08, 2013; 11:50 AM.

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**  
2. E. Coli: **absent**

REMARK:

## Satisfactory

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca)

# Appendix C:

sewage and solid waste effluent results- Taiga Lab  
Kugaaruk Water Licence 3BM-PEL0712



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**130493**

## **- FINAL REPORT -**

**Prepared For:** Hamlet of Kugaaruk

**Address:** Box 205  
Kugaaruk, NU  
X0B 1K0

**Attn:** Gord Dinney

**Facsimile:** (867) 769-6069

**Final report has been reviewed and approved by:**

**Angelique Ruzindana**  
**Quality Assurance Officer**

### **NOTES:**

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

**ReportDate:** Friday, July 26, 2013

**Print Date:** Friday, July 26, 2013





**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**130493**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID:** PEL-3

**Taiga Sample ID:** 001

**Client Project:**

**Sample Type:** Sewage

**Received Date:** 09-Jul-13

**Sampling Date:** 08-Jul-13

**Sampling Time:** 9:00

**Location:** Kugaaruk

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	23.4	0.4	mg/L	09-Jul-13	SM2320:B	
Conductivity, Specific (@ 25°C)	121	0.4	µS/cm	09-Jul-13	SM2510:B	
pH	9.52		pH units	09-Jul-13	SM4500-H:B	
Solids, Total Suspended	12	3	mg/L	10-Jul-13	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	0.661	0.005	mg/L	11-Jul-13	SM4500-NH <sub>3</sub> :	
Biochemical Oxygen Demand	12	2	mg/L	09-Jul-13	SM5210:B	
Organic Carbon, Total	14.0	0.5	mg/L	09-Jul-13	SM5310:B	
<b><u>Major Ions</u></b>						
Calcium	7.7	0.1	mg/L	09-Jul-13	SM4110:B	
Chloride	14.7	0.7	mg/L	09-Jul-13	SM4110:B	
Hardness	31.4	0.7	mg/L	09-Jul-13	SM2340:B	
Magnesium	3.0	0.1	mg/L	09-Jul-13	SM4110:B	
Nitrate as Nitrogen	0.64	0.01	mg/L	09-Jul-13	SM4110:B	

**ReportDate:** Friday, July 26, 2013

**Print Date:** Friday, July 26, 2013



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**130493**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: PEL-3**

**Taiga Sample ID: 001**

Nitrite as Nitrogen	0.04	0.01	mg/L	09-Jul-13	SM4110:B
Potassium	2.5	0.1	mg/L	09-Jul-13	SM4110:B
Sodium	11.1	0.1	mg/L	09-Jul-13	SM4110:B
Sulphate	5	1	mg/L	09-Jul-13	SM4110:B

**Microbiology**

Coliforms, Fecal (other)	< 100	100	CFU/100mL	09-Jul-13	SM9222:D	68
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**Organics**

Oil and Grease, visible	Non-visible			10-Jul-13	Visual Exam
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**Trace Metals, Total**

Aluminum	139	5	µg/L	18-Jul-13	EPA200.8
Arsenic	0.4	0.2	µg/L	18-Jul-13	EPA200.8
Cadmium	< 0.1	0.1	µg/L	18-Jul-13	EPA200.8
Chromium	0.5	0.1	µg/L	18-Jul-13	EPA200.8
Cobalt	0.2	0.1	µg/L	18-Jul-13	EPA200.8
Copper	6.3	0.2	µg/L	18-Jul-13	EPA200.8
Iron	172	5	µg/L	18-Jul-13	EPA200.8
Lead	0.2	0.1	µg/L	18-Jul-13	EPA200.8
Manganese	28.9	0.1	µg/L	18-Jul-13	EPA200.8
Mercury	< 0.01	0.01	µg/L	18-Jul-13	EPA200.8
Nickel	0.8	0.1	µg/L	18-Jul-13	EPA200.8
Zinc	< 5	5	µg/L	18-Jul-13	EPA200.8

**Subcontracted Organics**

Phenols, Total	< 0.002	0.002	mg/L	11-Jul-13	APHA 5530D
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**ReportDate:** Friday, July 26, 2013  
**Print Date:** Friday, July 26, 2013



Taiga Environmental Laboratory  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:  
**130493**

## - CERTIFICATE OF ANALYSIS -

Client Sample ID: **PEL-4**

Taiga Sample ID: **002**

**Client Project:**

**Sample Type:** Sewage

**Received Date:** 09-Jul-13

**Sampling Date:** 08-Jul-13

**Sampling Time:** 9:15

**Location:** Kugaaruk

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	66.3	0.4	mg/L	09-Jul-13	SM2320:B	
Conductivity, Specific (@ 25°C)	470	0.4	µS/cm	09-Jul-13	SM2510:B	
pH	6.93		pH units	09-Jul-13	SM4500-H:B	
Solids, Total Suspended	< 3	3	mg/L	10-Jul-13	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	5.12	0.005	mg/L	11-Jul-13	SM4500-NH <sub>3</sub> :	
Biochemical Oxygen Demand	5	2	mg/L	09-Jul-13	SM5210:B	
Organic Carbon, Total	17.3	0.5	mg/L	09-Jul-13	SM5310:B	
<b><u>Major Ions</u></b>						
Calcium	17.6	0.1	mg/L	09-Jul-13	SM4110:B	
Chloride	46.3	0.7	mg/L	09-Jul-13	SM4110:B	
Hardness	67.8	0.7	mg/L	08-Jul-13	SM2340:B	
Magnesium	5.8	0.1	mg/L	09-Jul-13	SM4110:B	
Nitrate as Nitrogen	10.7	0.01	mg/L	09-Jul-13	SM4110:B	
Nitrite as Nitrogen	0.09	0.01	mg/L	09-Jul-13	SM4110:B	

**ReportDate:** Friday, July 26, 2013

**Print Date:** Friday, July 26, 2013



Taiga Environmental Laboratory  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:  
**130493**

**- CERTIFICATE OF ANALYSIS -**

Client Sample ID: **PEL-4**

Taiga Sample ID: **002**

Potassium	9.9	0.1	mg/L	09-Jul-13	SM4110:B
Sodium	49.5	0.1	mg/L	09-Jul-13	SM4110:B
Sulphate	32	1	mg/L	09-Jul-13	SM4110:B

**Microbiology**

Coliforms, Fecal (other)	< 100	100	CFU/100mL	09-Jul-13	SM9222:D	68
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**Organics**

Oil and Grease, visible	Non-visible			10-Jul-13	Visual Exam
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**Trace Metals, Total**

Aluminum	33	5	µg/L	18-Jul-13	EPA200.8
Arsenic	1.7	0.2	µg/L	18-Jul-13	EPA200.8
Cadmium	< 0.1	0.1	µg/L	18-Jul-13	EPA200.8
Chromium	0.4	0.1	µg/L	18-Jul-13	EPA200.8
Cobalt	2.1	0.1	µg/L	18-Jul-13	EPA200.8
Copper	4.9	0.2	µg/L	18-Jul-13	EPA200.8
Iron	305	5	µg/L	18-Jul-13	EPA200.8
Lead	0.3	0.1	µg/L	18-Jul-13	EPA200.8
Manganese	446	0.1	µg/L	18-Jul-13	EPA200.8
Mercury	< 0.01	0.01	µg/L	18-Jul-13	EPA200.8
Nickel	3.3	0.1	µg/L	18-Jul-13	EPA200.8
Zinc	< 5	5	µg/L	18-Jul-13	EPA200.8

**Subcontracted Organics**

Phenols, Total	< 0.002	0.002	mg/L	11-Jul-13	APHA 5530D
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**ReportDate:** Friday, July 26, 2013  
**Print Date:** Friday, July 26, 2013



Taiga Environmental Laboratory  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:  
**130493**

## - CERTIFICATE OF ANALYSIS -

Client Sample ID: **PEL-5**

Taiga Sample ID: **003**

**Client Project:**

**Sample Type:** Salt Water

**Received Date:** 09-Jul-13

**Sampling Date:** 08-Jul-13

**Sampling Time:** 9:30

**Location:** Kugaaruk

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	43.0	0.4	mg/L	09-Jul-13	SM2320:B	
Conductivity, Specific (@ 25°C)	4200	0.4	µS/cm	09-Jul-13	SM2510:B	
pH	7.74		pH units	09-Jul-13	SM4500-H:B	
Solids, Total Suspended	22	3	mg/L	10-Jul-13	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	< 0.005	0.005	mg/L	11-Jul-13	SM4500-NH <sub>3</sub> :	
Biochemical Oxygen Demand	< 2	2	mg/L	09-Jul-13	SM5210:B	
Organic Carbon, Total	4.4	0.5	mg/L	09-Jul-13	SM5310:B	
<b><u>Major Ions</u></b>						
Calcium	36.3	0.1	mg/L	09-Jul-13	SM4110:B	
Chloride	1180	0.7	mg/L	09-Jul-13	SM4110:B	
Hardness	424	0.7	mg/L	09-Jul-13	SM2340:B	
Magnesium	81.0	0.1	mg/L	09-Jul-13	SM4110:B	
Nitrate as Nitrogen	< 0.01	0.01	mg/L	09-Jul-13	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	09-Jul-13	SM4110:B	

**ReportDate:** Friday, July 26, 2013

**Print Date:** Friday, July 26, 2013



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**130493**

## **- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: PEL-5**

**Taiga Sample ID: 003**

Potassium	24.6	0.1	mg/L	09-Jul-13	SM4110:B
Sodium	646	0.1	mg/L	09-Jul-13	SM4110:B
Sulphate	172	1	mg/L	09-Jul-13	SM4110:B

### **Microbiology**

Coliforms, Fecal (other)	< 1	1	CFU/100mL	09-Jul-13	SM9222:D
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### **Organics**

Oil and Grease, visible	Non-visible			10-Jul-13	Visual Exam
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### **Trace Metals, Total**

Aluminum	54	5	µg/L	18-Jul-13	EPA200.8
Arsenic	0.4	0.2	µg/L	18-Jul-13	EPA200.8
Cadmium	< 0.1	0.1	µg/L	18-Jul-13	EPA200.8
Chromium	0.3	0.1	µg/L	18-Jul-13	EPA200.8
Cobalt	< 0.1	0.1	µg/L	18-Jul-13	EPA200.8
Copper	< 0.2	0.2	µg/L	18-Jul-13	EPA200.8
Iron	69	5	µg/L	18-Jul-13	EPA200.8
Lead	< 0.1	0.1	µg/L	18-Jul-13	EPA200.8
Manganese	2.7	0.1	µg/L	18-Jul-13	EPA200.8
Mercury	0.05	0.01	µg/L	18-Jul-13	EPA200.8
Nickel	0.4	0.1	µg/L	18-Jul-13	EPA200.8
Zinc	< 5	5	µg/L	18-Jul-13	EPA200.8

### **Subcontracted Organics**

Phenols, Total	< 0.002	0.002	mg/L	11-Jul-13	APHA 5530D
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**ReportDate:** Friday, July 26, 2013  
**Print Date:** Friday, July 26, 2013



Taiga Environmental Laboratory  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:  
**130493**

## - CERTIFICATE OF ANALYSIS -

Client Sample ID: **PEL-6**

Taiga Sample ID: **004**

**Client Project:**

**Sample Type:** Wastewater

**Received Date:** 09-Jul-13

**Sampling Date:** 08-Jul-13

**Sampling Time:** 10:00

**Location:** Kugaaruk

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	112	0.4	mg/L	09-Jul-13	SM2320:B	
Conductivity, Specific (@ 25°C)	549	0.4	µS/cm	09-Jul-13	SM2510:B	
pH	7.80		pH units	09-Jul-13	SM4500-H:B	
Solids, Total Suspended	12	3	mg/L	10-Jul-13	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	0.080	0.005	mg/L	11-Jul-13	SM4500-NH <sub>3</sub> :	
Biochemical Oxygen Demand	4	2	mg/L	09-Jul-13	SM5210:B	
<b><u>Major Ions</u></b>						
Calcium	38.6	0.1	mg/L	09-Jul-13	SM4110:B	
Hardness	133	0.7	mg/L	09-Jul-13	SM2340:B	
Magnesium	9.0	0.1	mg/L	09-Jul-13	SM4110:B	
Nitrate as Nitrogen	0.08	0.01	mg/L	09-Jul-13	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	09-Jul-13	SM4110:B	
Potassium	5.7	0.1	mg/L	09-Jul-13	SM4110:B	
Sodium	55.6	0.1	mg/L	09-Jul-13	SM4110:B	

**ReportDate:** Friday, July 26, 2013

**Print Date:** Friday, July 26, 2013



Taiga Environmental Laboratory  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:  
**130493**

**- CERTIFICATE OF ANALYSIS -**

Client Sample ID: **PEL-6**

Taiga Sample ID: **004**

Sulphate	66	1	mg/L	09-Jul-13	SM4110:B
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**Microbiology**

Coliforms, Fecal (other)	400	100	CFU/100mL	09-Jul-13	SM9222:D
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**Organics**

Benzene			mg/L	EPA8260B	111
Ethylbenzene			mg/L	EPA8260B	111
Hexane Extractable Material	< 2.0	2.0	mg/L	16-Jul-13 EPA1664A	
Hydrocarbons, Total Purgeable			mg/L	EPA8015	111
m/p-xylene			mg/L	EPA8260B	111
o-xylene			mg/L	EPA8260B	111
Toluene			mg/L	EPA8260B	111

**Trace Metals, Total**

Arsenic	0.5	0.2	µg/L	18-Jul-13	EPA200.8
Cadmium	< 0.1	0.1	µg/L	18-Jul-13	EPA200.8
Chromium	0.5	0.1	µg/L	18-Jul-13	EPA200.8
Copper	2.5	0.2	µg/L	18-Jul-13	EPA200.8
Iron	402	5	µg/L	18-Jul-13	EPA200.8
Lead	0.2	0.1	µg/L	18-Jul-13	EPA200.8
Mercury	< 0.01	0.01	µg/L	18-Jul-13	EPA200.8
Nickel	1.6	0.1	µg/L	18-Jul-13	EPA200.8

**Subcontracted Organics**

Acenaphthylene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Acenaphthene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Acridine	< 0.1	0.1	µg/L	11-Jul-13	EPA8270

**ReportDate:** Friday, July 26, 2013

**Print Date:** Friday, July 26, 2013





**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**130493**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: PEL-6**

**Taiga Sample ID: 004**

Anthracene	< 0.005	0.005	µg/L	11-Jul-13	EPA8270
Benzo(a)anthracene	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Benzo(a)pyrene	< 0.008	0.008	µg/L	11-Jul-13	EPA8270
Benzo(bj)fluoranthene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Benzo(g,h,i)perylene	< 0.05	0.05	µg/L	11-Jul-13	EPA8270
Benzo(k)fluoranthene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Carcinogenic Potency	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Chrysene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Dibenzo(a,h)anthracene	< 0.05	0.05	µg/L	11-Jul-13	EPA8270
Fluoranthene	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Fluorene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Hydrocarbons, Total Extractable	< 0.1	0.1	mg/L	15-Jul-13	EPA8015B
Indeno(1,2,3-cd)pyrene	< 0.05	0.05	µg/L	11-Jul-13	EPA8270
Naphthalene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Phenanthrene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Phenols, Total	< 0.002	0.002	mg/L	11-Jul-13	APHA 5530D
Pyrene	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Quinoline	< 0.3	0.3	µg/L	11-Jul-13	EPA8270



Taiga Environmental Laboratory  
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Taiga Batch No.:  
**130493**

**- CERTIFICATE OF ANALYSIS -**

Client Sample ID: **PEL-7**

Taiga Sample ID: **005**

**Client Project:**

**Sample Type:** Wastewater

**Received Date:** 09-Jul-13

**Sampling Date:** 08-Jul-13

**Sampling Time:** 10:30

**Location:** Kugaaruk

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	22.1	0.4	mg/L	09-Jul-13	SM2320:B	
Conductivity, Specific (@ 25°C)	125	0.4	µS/cm	09-Jul-13	SM2510:B	
pH	7.16		pH units	09-Jul-13	SM4500-H:B	
Solids, Total Suspended	< 3	3	mg/L	10-Jul-13	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	< 0.005	0.005	mg/L	11-Jul-13	SM4500-NH <sub>3</sub> :	
Biochemical Oxygen Demand	< 2	2	mg/L	09-Jul-13	SM5210:B	
<b><u>Major Ions</u></b>						
Calcium	8.8	0.1	mg/L	09-Jul-13	SM4110:B	
Hardness	31.3	0.7	mg/L	09-Jul-13	SM2340:B	
Magnesium	2.3	0.1	mg/L	09-Jul-13	SM4110:B	
Nitrate as Nitrogen	0.02	0.01	mg/L	09-Jul-13	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	09-Jul-13	SM4110:B	
Potassium	0.9	0.1	mg/L	09-Jul-13	SM4110:B	
Sodium	12.6	0.1	mg/L	09-Jul-13	SM4110:B	

**ReportDate:** Friday, July 26, 2013

**Print Date:** Friday, July 26, 2013



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Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**130493**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: PEL-7**

**Taiga Sample ID: 005**

Sulphate	7	1	mg/L	09-Jul-13	SM4110:B
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**Microbiology**

Coliforms, Fecal (other)	< 100	100	CFU/100mL	09-Jul-13	SM9222:D	68
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**Organics**

Hexane Extractable Material	< 2.0	2.0	mg/L	16-Jul-13	EPA1664A
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**Trace Metals, Total**

Arsenic	0.3	0.2	µg/L	18-Jul-13	EPA200.8
Cadmium	< 0.1	0.1	µg/L	18-Jul-13	EPA200.8
Chromium	0.4	0.1	µg/L	18-Jul-13	EPA200.8
Copper	1.0	0.2	µg/L	18-Jul-13	EPA200.8
Iron	166	5	µg/L	18-Jul-13	EPA200.8
Lead	< 0.1	0.1	µg/L	18-Jul-13	EPA200.8
Mercury	< 0.01	0.01	µg/L	18-Jul-13	EPA200.8
Nickel	0.5	0.1	µg/L	18-Jul-13	EPA200.8

**Subcontracted Organics**

Acenaphthylene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Acenaphthene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Acridine	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Anthracene	< 0.005	0.005	µg/L	11-Jul-13	EPA8270
Benzene	< 0.001	0.001	mg/L	15-Jul-13	EPA8021B
Benzo(a)anthracene	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Benzo(a)pyrene	< 0.008	0.008	µg/L	11-Jul-13	EPA8270
Benzo(b)fluoranthene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Benzo(g,h,i)perylene	< 0.05	0.05	µg/L	11-Jul-13	EPA8270

**ReportDate:** Friday, July 26, 2013

**Print Date:** Friday, July 26, 2013



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**Taiga Batch No.:**  
**130493**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: PEL-7**

**Taiga Sample ID: 005**

Benzo(k)fluoranthene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Carcinogenic Potency	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Chrysene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Dibenzo(a,h)anthracene	< 0.05	0.05	µg/L	11-Jul-13	EPA8270
Ethylbenzene	< 0.001	0.001	mg/L	15-Jul-13	EPA8021B
Fluoranthene	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Fluorene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Hydrocarbons, Total Extractable	< 0.1	0.1	mg/L	15-Jul-13	Alta.Env.Met
Hydrocarbons, Total Purgeable	< 0.01	0.01	mg/L	15-Jul-13	EPA8021B
Indeno(1,2,3-cd)pyrene	< 0.05	0.05	µg/L	11-Jul-13	EPA8270
Naphthalene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Phenanthrene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Phenols, Total	< 0.002	0.002	mg/L	11-Jul-13	APHA 5530D
Pyrene	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Quinoline	< 0.3	0.3	µg/L	11-Jul-13	EPA8270
Toluene	< 0.001	0.001	mg/L	15-Jul-13	EPA8021B
Xylenes	< 0.001	0.001	mg/L	15-Jul-13	EPA8021B



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Taiga Batch No.:  
**130493**

## - CERTIFICATE OF ANALYSIS -

Client Sample ID: **PEL-8-1**

Taiga Sample ID: **006**

**Client Project:**

**Sample Type:** Wastewater

**Received Date:** 09-Jul-13

**Sampling Date:** 08-Jul-13

**Sampling Time:** 11:00

**Location:** Kugaaruk

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	23.7	0.4	mg/L	09-Jul-13	SM2320:B	
Conductivity, Specific (@ 25°C)	132	0.4	µS/cm	09-Jul-13	SM2510:B	
pH	7.44		pH units	09-Jul-13	SM4500-H:B	
Solids, Total Suspended	6	3	mg/L	10-Jul-13	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	< 0.005	0.005	mg/L	11-Jul-13	SM4500-NH <sub>3</sub> :	
Biochemical Oxygen Demand	< 2	2	mg/L	09-Jul-13	SM5210:B	
<b><u>Major Ions</u></b>						
Calcium	10.1	0.1	mg/L	09-Jul-13	SM4110:B	
Hardness	35.2	0.7	mg/L	09-Jul-13	SM2340:B	
Magnesium	2.4	0.1	mg/L	09-Jul-13	SM4110:B	
Nitrate as Nitrogen	0.05	0.01	mg/L	09-Jul-13	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	09-Jul-13	SM4110:B	
Potassium	0.9	0.1	mg/L	09-Jul-13	SM4110:B	
Sodium	12.1	0.1	mg/L	09-Jul-13	SM4110:B	

**ReportDate:** Friday, July 26, 2013

**Print Date:** Friday, July 26, 2013



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4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**130493**

## - CERTIFICATE OF ANALYSIS -

**Client Sample ID:** PEL-8-1

**Taiga Sample ID:** 006

Sulphate	7	1	mg/L	09-Jul-13	SM4110:B
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### Microbiology

Coliforms, Fecal (other)	< 100	100	CFU/100mL	09-Jul-13	SM9222:D
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68

### Organics

Hexane Extractable Material	< 2.0	2.0	mg/L	16-Jul-13	EPA1664A
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### Trace Metals, Total

Arsenic	0.3	0.2	µg/L	18-Jul-13	EPA200.8
Cadmium	< 0.1	0.1	µg/L	18-Jul-13	EPA200.8
Chromium	0.8	0.1	µg/L	18-Jul-13	EPA200.8
Copper	1.3	0.2	µg/L	18-Jul-13	EPA200.8
Iron	452	5	µg/L	18-Jul-13	EPA200.8
Lead	12.8	0.1	µg/L	18-Jul-13	EPA200.8
Mercury	< 0.01	0.01	µg/L	18-Jul-13	EPA200.8
Nickel	0.7	0.1	µg/L	18-Jul-13	EPA200.8

### Subcontracted Organics

Acenaphthylene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Acenaphthene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Acridine	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Anthracene	< 0.005	0.005	µg/L	11-Jul-13	EPA8270
Benzene	< 0.001	0.001	mg/L	15-Jul-13	EPA8021B
Benzo(a)anthracene	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Benzo(a)pyrene	< 0.008	0.008	µg/L	11-Jul-13	EPA8270
Benzo(b)fluoranthene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Benzo(g,h,i)perylene	< 0.05	0.05	µg/L	11-Jul-13	EPA8270

**ReportDate:** Friday, July 26, 2013

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Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**130493**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: PEL-8-1**

**Taiga Sample ID: 006**

Benzo(k)fluoranthene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Carcinogenic Potency	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Chrysene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Dibenzo(a,h)anthracene	< 0.05	0.05	µg/L	11-Jul-13	EPA8270
Ethylbenzene	< 0.001	0.001	mg/L	15-Jul-13	EPA8021B
Fluoranthene	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Fluorene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Hydrocarbons, Total Extractable	< 0.1	0.1	mg/L	15-Jul-13	Alta.Env.Met
Hydrocarbons, Total Purgeable	< 0.01	0.01	mg/L	15-Jul-13	EPA8021B
Indeno(1,2,3-cd)pyrene	< 0.05	0.05	µg/L	11-Jul-13	EPA8270
Naphthalene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Phenanthrene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Phenols, Total	< 0.002	0.002	mg/L	11-Jul-13	APHA 5530D
Pyrene	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Quinoline	< 0.3	0.3	µg/L	11-Jul-13	EPA8270
Toluene	< 0.001	0.001	mg/L	15-Jul-13	EPA8021B
Xylenes	< 0.001	0.001	mg/L	15-Jul-13	EPA8021B



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**Taiga Batch No.:**  
**130493**

## - CERTIFICATE OF ANALYSIS -

**Client Sample ID:** PEL-8-2

**Taiga Sample ID:** 007

**Client Project:**

**Sample Type:** Wastewater

**Received Date:** 09-Jul-13

**Sampling Date:** 08-Jul-13

**Sampling Time:** 11:30

**Location:** Kugaaruk

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	26.3	0.4	mg/L	09-Jul-13	SM2320:B	
Conductivity, Specific (@ 25°C)	135	0.4	µS/cm	09-Jul-13	SM2510:B	
pH	7.34		pH units	09-Jul-13	SM4500-H:B	
Solids, Total Suspended	8	3	mg/L	10-Jul-13	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	< 0.005	0.005	mg/L	11-Jul-13	SM4500-NH <sub>3</sub> :	
Biochemical Oxygen Demand	< 2	2	mg/L	09-Jul-13	SM5210:B	
<b><u>Major Ions</u></b>						
Calcium	11.2	0.1	mg/L	09-Jul-13	SM4110:B	
Hardness	38.3	0.7	mg/L	09-Jul-13	SM2340:B	
Magnesium	2.5	0.1	mg/L	09-Jul-13	SM4110:B	
Nitrate as Nitrogen	0.07	0.01	mg/L	09-Jul-13	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	09-Jul-13	SM4110:B	
Potassium	1.0	0.1	mg/L	09-Jul-13	SM4110:B	
Sodium	12.1	0.1	mg/L	09-Jul-13	SM4110:B	

**ReportDate:** Friday, July 26, 2013

**Print Date:** Friday, July 26, 2013





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**Taiga Batch No.:**  
**130493**

## - CERTIFICATE OF ANALYSIS -

**Client Sample ID:** PEL-8-2

**Taiga Sample ID:** 007

Sulphate	7	1	mg/L	09-Jul-13	SM4110:B
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### Microbiology

Coliforms, Fecal (other)	< 100	100	CFU/100mL	09-Jul-13	SM9222:D
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68

### Organics

Hexane Extractable Material	< 2.0	2.0	mg/L	16-Jul-13	EPA1664A
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### Trace Metals, Total

Arsenic	0.2	0.2	µg/L	18-Jul-13	EPA200.8
Cadmium	< 0.1	0.1	µg/L	18-Jul-13	EPA200.8
Chromium	1.0	0.1	µg/L	18-Jul-13	EPA200.8
Copper	1.5	0.2	µg/L	18-Jul-13	EPA200.8
Iron	605	5	µg/L	18-Jul-13	EPA200.8
Lead	1.8	0.1	µg/L	18-Jul-13	EPA200.8
Mercury	< 0.01	0.01	µg/L	18-Jul-13	EPA200.8
Nickel	1.0	0.1	µg/L	18-Jul-13	EPA200.8

### Subcontracted Organics

Acenaphthylene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Acenaphthene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Acridine	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Anthracene	< 0.005	0.005	µg/L	11-Jul-13	EPA8270
Benzene	< 0.001	0.001	mg/L	15-Jul-13	EPA8021B
Benzo(a)anthracene	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Benzo(a)pyrene	< 0.008	0.008	µg/L	11-Jul-13	EPA8270
Benzo(bj)fluoranthene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Benzo(g,h,i)perylene	< 0.05	0.05	µg/L	11-Jul-13	EPA8270

**ReportDate:** Friday, July 26, 2013

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Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**130493**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: PEL-8-2**

**Taiga Sample ID: 007**

Benzo(k)fluoranthene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Carcinogenic Potency	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Chrysene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Dibenzo(a,h)anthracene	< 0.05	0.05	µg/L	11-Jul-13	EPA8270
Ethylbenzene	< 0.001	0.001	mg/L	15-Jul-13	EPA8021B
Fluoranthene	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Fluorene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Hydrocarbons, Total Extractable	< 0.1	0.1	mg/L	15-Jul-13	Alta.Env.Met
Hydrocarbons, Total Purgeable	< 0.01	0.01	mg/L	15-Jul-13	EPA8021B
Indeno(1,2,3-cd)pyrene	< 0.05	0.05	µg/L	11-Jul-13	EPA8270
Naphthalene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Phenanthrene	< 0.1	0.1	µg/L	11-Jul-13	EPA8270
Phenols, Total	< 0.002	0.002	mg/L	11-Jul-13	APHA 5530D
Pyrene	< 0.01	0.01	µg/L	11-Jul-13	EPA8270
Quinoline	< 0.3	0.3	µg/L	11-Jul-13	EPA8270
Toluene	< 0.001	0.001	mg/L	15-Jul-13	EPA8021B
Xylenes	< 0.001	0.001	mg/L	15-Jul-13	EPA8021B



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Taiga Batch No.:  
**130493**

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- CERTIFICATE OF ANALYSIS -

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Client Sample ID: **PEL-8-2**

Taiga Sample ID: **007**

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- DATA QUALIFIERS -

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*Data Qualifier Descriptions:*

- 68**      *Unable to repeat analysis at a lower dilution. Holding time exceeded.*
- 111**     *Sample bottle contained air bubble, analysis not possible.*

**\* Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

**ReportDate:** Friday, July 26, 2013

**Print Date:** Friday, July 26, 2013

Page 20 of 20