

# **Land farm Licence Renewal Application**

**Licence number: 1BR-KRK1318**

Submission: December 18, 2018

Prepared by:

Shah Alam, P. Eng. E.P.  
*Municipal Planning Engineer,  
Government of Nunavut  
Community and Government Services  
Cambridge Bay, Nu*



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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 Landfarm Licence: 1BR-KRK 1318**

**Renewal**

December 18, 2018

Nunavut Water Board  
PO Box 119  
Gjoa Haven, Nunavut  
X0B 1J0

Attention: Richard Dwyer, Manager of Licensing

RE: Kugaaruk Land farm License 1BR KRK 1318 Renewal application

Dear Richard,

The Community and Government Services (CGS) is pleased to submit to Nunavut Water Board the enclosed application package for renewal of the licence 1BR-KRK1318 as stated above. Copies of required reports are attached herewith for your review and information.

We realize that it has been late in submitting the Renewal Application; however, a renewal request has already been submitted to Nunavut Planning Commission website. Government of Nunavut, Community and Government Services (CGS) has taken over the facility operation and monitoring program of the HC contaminated soil remediation Landfarm as the Licensee from the original owner Petroleum Product Division (PPD). Sample test result has shown decreasing trend of F2 hydrocarbon, an indication of naturally remediation but slowly and no mechanical activities to expedite the treatment process.

We hope that Nunavut Water Board will find our supporting documents valuable to consider renewal of the current licence 1BR-KRK 1318 for another 10 years to complete the deposited soils remediation.

Best Regards,

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 Landfarm Licence Renewal

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## **Executive Summary**

The Community and Government Services (CGS) is responsible for the hydrocarbon impacted soil disposition and remediation using the Kugaaruk Landfarm facility under the Licence 1BR-KRK1318 which is expired as of August 15, 2018.

The facility has been in operation since 1<sup>st</sup> built in 2006 to treat about 2,172m<sup>3</sup> of contaminated soils initially from the previous fuel storage tank farm site. Later in 2017, about 120 m<sup>3</sup> of new soils in bags were moved in the facility during the construction of new Hamlet Office building. This new candidate soils are in addition to the previously laid soils in the facility. Pre-treated layers of existing soils will be re-purposed first once remediation reach to accepted level and then this new soil will be screened and put layers to continue the treatment naturally.

Soil and soil washed water samples are collected from monitoring stations or from identified locations to assess concentration of F1-F4 fractions of petroleum hydrocarbon (PHC) as per the CCME Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in soils. Samples are tested at the Taiga Laboratory, Yellowknife (CALA accredited).

The review of sample results of previous years and recent years 2016 -2017 have indicated that decreasing trend of F2 hydrocarbon is the indication of naturally remediation in time but slowly although no mechanical activities involved. The facility was built to scope of natural remediation of HC contaminated soils and any spill materials with minimum cost. It can be equipped with mechanical process and water spray to expedite remediation process. As planned and designed, no other alternatives adopted but to continue on natural remediation process and monitoring of samples of soil and soil washed water. Remediated soils will be repurposed for solid waste site cover and access road construction.

The Licensee will continue the facility operation, soil and water sampling twice during summer and fall annually until a full remediation adapted. Updated O&M manual will be submitted to the Board by July 2019.

We confidently believe that operational procedure and plan of compliance will be helpful to complete the hydrocarbon contaminated soil remediation naturally as determined in the Licence using the liner cell, and thus benefit to the community.



## Application for Water Licence Renewal

Document Date: May 2011

Application Submission Date: 12/17/2018  
Month/Day/Year

P.O. BOX 119  
GJOA HAVEN, NUNAVUT  
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NUNAVUT IMALIRIYIN KATIMAYIT  
NUNAVUT WATER BOARD  
OFFICE DES EAUX DU NUNAVUT

## DOCUMENT MANAGEMENT

Original Document Date: April 2010

### DOCUMENT AMENDMENTS

	Description	Date
(1)	Updated for public distribution as separate document from NWB Guide 7	June 2010
(2)	Updated NWB logos and reformatted table to allow rows to break across page	May 2011
(3)		
(4)		
(5)		
(6)		
(7)		
(8)		
(9)		
(10)		



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NUNAVUT WATER BOARD  
NUNAVUT IMALIRIYIN KATIMAYIT  
OFFICE DES EAUX DU NUNAVUT

## APPLICATION FOR WATER LICENCE RENEWAL

Your application may be classified as a **renewal** only if all operations remain the same as previously licensed and only the term of the licence requires change. If your application contemplates:

- a change to the volume of water authorized for use;
- a new activity related to water use or waste disposal;
- a new component related to water use or waste disposal;
- a change in predicted environmental impacts(s); and/or
- a change to any term or condition of the original licence

your application is **NOT** classified as a renewal but rather an amendment and will require submission of an Application for Water Licence Amendment. Licensees applying for combined renewal / amendment are also referred to the Application for Water Licence Amendment.

The applicant is referred to the NWB's Guide 7: *Licensee Requirements Following the Issuance of a Water Licence* for more information about this application form.

**EXISTING LICENCE NO: 1BR-KRK-1318**

### 1. LICENSEE CONTACT INFORMATION

Is the licensee the same as that referred to on the existing licence?

☒ Yes ☐ No

If No, a licence assignment must be completed and approved by the NWB. **A renewal will only be issued in the name of the current licensee in the absence of assignment of the licence.**

If the licensee is the same, but the name of the licensee has changed, attach a certificate of name change.

Name: **Government of Nunavut- Department of Community & Government Services (CGS)**

Address: **Helen Maksagak Centre**

Phone: **867-983-4156**

Fax: **867-983-4123**

e-mail: **salam@gov.nu.ca**

### 2. LICENSEE REPRESENTATIVE CONTACT INFORMATION – If different from Block 1.

Name: **Shah Alam, P. Eng. E.P**

Address: [Municipal Planning Engineer, Cambridge Bay, NU, XOB 0C0](#)

Phone: [867-983-4156](#)  
Fax: [867-983- 4123](#)  
e-mail: [salam@gov.nu.ca](mailto:salam@gov.nu.ca)

### 3. NAME OF PROJECT

Is the name of the project the same as that considered in the existing water licence?

☒ Yes ☐ No

Indicate the name of the project including the name of the location: \_\_\_\_\_

### 4. LOCATION OF UNDERTAKING

Is the location of the undertaking the same as that considered in the existing water licence?

☒ Yes ☐ No

#### Project Extents

NW:	<a href="#">Latitude: ( 68° 31' 10" N )</a>	<a href="#">Longitude: ( 89 ° 48' 22 " W)</a>
NE:	<a href="#">Latitude: ( 68° 31' 12 " N )</a>	<a href="#">Longitude: ( 89 ° 48 ' 09 " W)</a>
SE:	<a href="#">Latitude: ( 68 ° 31' 10 " N )</a>	<a href="#">Longitude: ( 89 ° 48 ' 07 " W)</a>
SW:	<a href="#">Latitude: ( 68 ° 31' 07 " N )</a>	<a href="#">Longitude: ( 89 ° 48 ' 23 " W)</a>

#### Camp Location(s) [N/A](#)

Latitude: ( ° ' " N) Longitude: ( ° ' " W)

### 5. MAP

Are the locations of the main components of the undertaking the same as those considered in the existing licence?

☒ Yes ☐ No

Attach a topographical map, indicating the main components of the undertaking.

NTS Map Sheet No.: \_\_\_\_\_ Map Name: \_\_\_\_\_ Map Scale: \_\_\_\_\_

### 6. NATURE OF INTEREST IN THE LAND

Is the nature of the interest in the land the same as that considered in the existing water licence?

☒ Yes ☐ No

Check any of the following that are applicable to the proposed undertaking (at least one box under the 'Surface' header must be checked).



**Sub-surface**

☐ Mineral Lease from Nunavut Tunngavik Incorporated (NTI)  
Date (expected date) of issuance: \_\_\_\_\_ Date of expiry: \_\_\_\_\_

☐ Mineral Lease from Indian and Northern Affairs Canada (INAC)  
Date (expected date) of issuance: \_\_\_\_\_ Date of expiry: \_\_\_\_\_

**Surface**

☐ Crown Land Use Authorization from Indian and Northern Affairs Canada (INAC)  
Date (expected date) of issuance: \_\_\_\_\_ Date of expiry: \_\_\_\_\_

☒ Inuit Owned Land (IOL) Authorization from Kitikmeot Inuit Association (KIA)  
Date (expected date) of issuance: \_\_\_\_\_ Date of expiry: \_\_\_\_\_

☐ IOL Authorization from Kivalliq Inuit Association (KivIA)  
Date (expected date) of issuance: \_\_\_\_\_ Date of expiry: \_\_\_\_\_

☐ IOL Authorization from Qikiqtani Inuit Association (QIA)  
Date (expected date) of issuance: \_\_\_\_\_ Date of expiry: \_\_\_\_\_

☐ Commissioner's Land Use Authorization  
Date (expected date) of issuance: \_\_\_\_\_ Date of expiry: \_\_\_\_\_

☐ Other \_\_\_\_\_

Date (expected date) of issuance: \_\_\_\_\_ Date of expiry: \_\_\_\_\_

Is the name of the entity(s) holding authorizations the same as that considered in the existing water licence?

☒ Yes ☐ No

If No, a licence assignment must be completed and approved by the NWB.

Name of entity(s) holding authorizations: \_\_\_\_\_

**7. NUNAVUT PLANNING COMMISSION (NPC) DETERMINATION**

Is the undertaking located in the same land use planning area as that considered in the existing licence?

☒ Yes ☐ No

Indicate the land use planning area in which the project is located.

<input type="checkbox"/> North Baffin	<input type="checkbox"/> Keewatin
<input type="checkbox"/> South Baffin	<input type="checkbox"/> Sanikiluaq
<input type="checkbox"/> Akunnig	<input checked="" type="checkbox"/> West Kitikmeot

Was a land use plan conformity determination required from NPC prior to the issuance of the existing water licence?

☐ Yes ☒ No

If Yes, indicate date issued and attach copy. \_\_\_\_\_

Does the proposed renewal change the original NPC conformity determination or the need to obtain one?

☐ Yes ☒ No

If Yes, indicate date issued (or expected) and attach a copy. \_\_\_\_\_  
If No, provide written confirmation from NPC confirming that a land use plan conformity review is not required.

**8. NUNAVUT IMPACT REVIEW BOARD (NIRB) DETERMINATION**

Was a screening determination required from NIRB prior to the issuance of the existing water licence?

☐ Yes ☒ No

If Yes, indicate date issued and attach copy. \_\_\_\_\_

Does the proposed renewal change the original NIRB screening determination or the need to obtain one?

☐ Yes ☒ No

If Yes, indicate date issued (or expected) and attach a copy. \_\_\_\_\_  
If No, provide written confirmation from NIRB confirming that a screening determination is not required.

**9. DESCRIPTION OF UNDERTAKING**

Is the description of the undertaking the same as that considered in the existing water licence?

☒ Yes ☐ No

List and attach plans and drawings or project proposal.

**10. OPTIONS**

Are the alternative methods and locations that were considered to carry out the project the same as those considered in the existing water licence?

☒ Yes ☐ No

Provide a brief explanation of the alternative methods or locations that were considered to carry out the project.  
**N/A**

**11. CLASSIFICATION OF PRIMARY UNDERTAKING**

Is the primary undertaking the same as that considered in the existing water licence?

☒ Yes ☐ No

Indicate the primary classification of undertaking by checking one of the following boxes.

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> Industrial  | <input type="checkbox"/> Agricultural                          |
| <input type="checkbox"/> Mining and Milling (includes exploration/drilling/exploration camps) |  |
| <input type="checkbox"/> Conservation   |  |
| <input type="checkbox"/> Municipal (includes camps/lodges)                                    | <input type="checkbox"/> Recreational                          |
| <input type="checkbox"/> Power  | <input type="checkbox"/> Miscellaneous (describe below): _____ |

See Schedule II of the *Northwest Territories Waters Regulations* for Description of Undertakings.

## 12. WATER USE

Is the type(s) of water use(s) the same as that considered in the existing water licence?

☒ Yes ☐ No

Check the appropriate box(s) to indicate the type(s) of water use(s) being applied for.

- |  |   |
|--|---|
| <input type="checkbox"/> To obtain water for camp/ municipal purposes                              | <input type="checkbox"/> To divert a watercourse                    |
| <input type="checkbox"/> To obtain water for industrial purposes                                   | <input type="checkbox"/> To modify the bed or bank of a watercourse |
| <input type="checkbox"/> To cross a watercourse  | <input type="checkbox"/> Flood control                              |
| <input type="checkbox"/> To alter the flow of, or store water                                      |   |
| <input checked="" type="checkbox"/> Other: <u>no water uses required, but only soil deposition</u> |   |

## 13. QUANTITY OF WATER INVOLVED

Is the source of water the same as that considered in the existing licence?

☒ Yes ☐ No

Name of water source(s): N/A  
(show location(s) on map)

Is the quality of the water source and its available capacity the same as that considered in the existing licence?

☒ Yes ☐ No

Describe the quality of the water source(s) and the available capacity(s):

Is the overall estimated quantity of water to be used the same as that considered in the existing licence?

☒ Yes ☐ No

Provide the overall estimated quantity of water to be used:

Are the quantity(s) of water to be used from each source the same as those considered in the existing licence?

☒ Yes ☐ No

Provide the estimated quantity(s) of water to be used from each source:

Are the quantity(s) of water to be used for each purpose the same as those considered in the existing licence?

☒ Yes ☐ No

Provide the estimated quantities to be used for each purpose (camp, drilling, etc.): N/A

Are the method(s) of extraction the same as those considered in the existing licence?

☒ Yes ☐ No

Describe the method(s) of extraction:

Are the quantity(s) of water returned to source(s) the same as those considered in the existing licence?

☒ Yes ☐ No

Estimated quantity(s) of water returned to source(s): 180 m<sup>3</sup>/day

Are the quality(s) of water(s) returned to source(s) the same as those considered in the existing licence?

☒ Yes ☐ No

Describe the quality(s) of water(s) returned to source(s):

#### 14. WASTE

Are the type(s) of waste(s) to be generated and/ or deposited the same as those considered in the existing licence?

☒ Yes ☐ No

Check the appropriate box(s) to indicate the types of waste(s) generated and deposited.

- ☐ Sewage  
☐ Solid Waste  
☒ Hazardous  
☐ Bulky Items/Scrap Metal  
☐ Animal Waste  
☐ Other (describe): \_\_\_\_\_

- ☐ Waste oil  
☒ Greywater  
☐ Sludges  
☒ Contaminated soil and/or water

#### 15. QUANTITY AND QUALITY OF WASTE INVOLVED

Are the quantity(s) of the types of wastes involved the same as those considered in the existing licence?

☒ Yes ☐ No

Are the composition(s) of the types of wastes involved the same as those considered in the existing licence?

☒ Yes ☐ No

Are the method(s) of treatment for the types of waste involved the same as those considered in the existing licence?

☒ Yes ☐ No

Are the method(s) of disposal for the types of waste involved the same as those considered in the existing licence?

☒ Yes ☐ No

For each type of waste indicated in Block 14, describe its composition, quantity in cubic meters/day, method of treatment and method of disposal.

Type of Waste	Composition	Quantity Generated	Treatment Method	Disposal Method
Soils & gravel	HC impacted coarse & fine	3,300 m3	natural	Soil place in layers on HDPE liner and remove by bobcat once remedies.
Run off water	HC impacted soil washed water retain in a liner cell	1,200 m3	natural	Use decanting pump when needed.

**16. OTHER AUTHORIZATIONS**

In addition to the sub-surface and surface land use authorizations provided in Block 6, are the same authorizations required as considered in the existing licence?

☐ Yes ☒ No

For each provide the following:

Authorization: \_\_\_\_\_

Administering Agency: \_\_\_\_\_

Project Activity: \_\_\_\_\_

Date (expected date) of issuance: \_\_\_\_\_ Date of expiry: \_\_\_\_\_

**17. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED MITIGATION MEASURES**

Are predicted environmental impacts of the undertaking and proposed mitigation measures the same as those considered in the existing water licence?

☒ Yes ☐ No

Describe direct, indirect, and cumulative impacts related to water and waste.

No harmful impact to environment or inhabitants. The HC contaminated soil remediation process at the lined cell is happening naturally into the air and rain/snow water washed into the retention cell.

**18. WATER RIGHTS OF EXISTING AND OTHER WATER USERS**

Are the effects of the undertaking on any known persons or property including those that hold licences for water use in precedence to the application, domestic users, in-stream users, authorized waste depositors, owners of property, occupiers of property, and/or holders of outfitting concessions, registered trapline holders, and holders of other rights of a similar nature, the same as those considered in the existing water licence?

☒ Yes ☐ No

Provide the names, addresses and nature of use for any known persons or properties that may be adversely affected by the proposed undertaking, including those that hold licences for water use in precedent to the application, domestic users, in-stream users, authorized waste depositors, owners of property, occupiers of property, and/or holders of outfitting concessions, registered trapline holders, and holders of other rights of a similar nature.

Advise the Board if compensation has been paid and/or agreement(s) for compensation have been reached with any existing or other users.

N/A

**19. INUIT WATER RIGHTS**

Are the effects of the undertaking on the quality, quantity or flow of waters flowing through Inuit Owned Land (IOL) the same as those considered in the existing water licence?

☒ Yes ☐ No

Advise the Board of any substantial affect of the quality, quantity or flow of waters flowing through Inuit Owned Land (IOL), and advise the Board if negotiations have commenced or an agreement to pay compensation for any loss or damage has been reached with one or more Designated Inuit Organization (DIO).

There is no known effect of the quality and quantity of flow of water through Inuit owned land. No effect to fish or fish habitat.

**20. CONSULTATION** - Provide a summary of any consultation meetings including when the meetings were held, where and with whom. Include a list of concerns expressed and measures to address concerns.

The Department of Community and Government Services had active consultation, meeting with the Hamlet.

**21. SECURITY INFORMATION**

Is the financial security assessment the same as that considered in the existing water licence? **N/A**

☐ Yes ☒ No

Is the estimate of the total financial security for final reclamation the same as that considered in the existing water licence? **N/A**

☐ Yes ☒ No

Provide an estimate of the total financial security for final reclamation equal to the total outstanding reclamation liability for land and water combined sufficient to cover the highest liability over the life of the undertaking. Estimates of reclamation costs must be based on the cost of having the necessary reclamation work done by a third party contractor if the operator defaults. The estimate must also include contingency factors appropriate to the particular work to be undertaken.

Where applicable, the financial security assessment should be prepared in a manner consistent with the principals respecting mine site reclamation and implementation found in the *Mine Site Reclamation Policy for Nunavut*, Indian and Northern Affairs Canada, 2002.

No, financial security involved in development and operation of these facilities, therefore not applicable.

**22. FINANCIAL INFORMATION**

Is the statement of financial security the same as that considered in the existing water licence? **N/A**

☐ Yes ☒ No

Provide an updated statement of financial security. **N/A**

If the applicant is a business entity please answer the questions below:

Is the list of the officers of the company the same as those considered in the existing water licence?

☒ Yes ☐ No

Provide a list of the officers of the company.

Is the Certificate of Incorporation or evidence of registration of the company name the same? **N/A**

☐ Yes ☐ No

Attach a copy of the Certificate of Incorporation or evidence of registration of the company name.

Not applicable for these facilities.

### 23. STUDIES UNDERTAKEN TO DATE

List and attach updated studies, reports, research etc.

Provide a compliance assessment and status report including a response to any inspector's reports. The licensee must contact the NWB for licence specific direction in completing the assessment and report.

If in non-compliance, a licence may not be issued until compliance is achieved. If in non-compliance, attach plans/reports for consideration. Application will not be processed if significant issues of non-compliance exist.

Hamlet operators are working closely with GN technical team and plant operator to continue the compliance plan.

### 24. PROPOSED TIME SCHEDULE

Is the time schedule for all phases of development (construction, operations, closure and post closure) the same as that considered in the existing licence?

☒ Yes ☐ No

Indicate the proposed start and completion dates for each applicable phase of development (construction, operation, closure, and post closure).

Construction of

Proposed Start Date: August 2005 Proposed Completion Date: August 2006  
(month/year) (month/year)

Operation

Proposed Start Date: August 2018 Proposed Completion Date: August 2028  
(month/year) (month/year)

Closure

Proposed Start Date: \_\_\_\_\_ Proposed Completion Date: \_\_\_\_\_  
(month/year) (month/year)

Post - Closure

Proposed Start Date: \_\_\_\_\_ Proposed Completion Date: \_\_\_\_\_  
(month/year) (month/year)

For each applicable phase of development indicate which season(s) activities occur. **N/A**

Construction

☐ Winter ☐ Spring ☐ Summer ☐ Fall ☐ All season

Operation

☐ Winter ☐ Spring ☒ Summer ☒ Fall ☐ All season

Closure

☐ Winter ☐ Spring ☐ Summer ☐ Fall ☐ All season

Post - Closure

☐ Winter ☐ Spring ☐ Summer ☐ Fall ☐ All season

## 25. PROPOSED TERM OF LICENCE

On what date does the existing licence expire? August 15, 2018

Indicate the proposed term of the renewal (maximum of 25 years): 10 (ten) years

Requested date of renewal issuance: December 16, 2018 Requested Expiry Date: December 15, 2028  
(month/year) (month/year)

(The requested date of renewal issuance must be at least three (3) months from the date of application for a type B water licence and at least one (1) year from the date of application for a type A water licence, to allow for processing of the water licence application. These timeframes are approximate and do not account for the time to complete any pre-licensing land use planning or development impact requirements, time for the applicant to prepare and submit a water licence application in accordance with any project specific guidelines issued by the NWB, or the time for the applicant to respond to requests for additional information. See the NWB's *Guide 5: Processing Water Licence Applications* for more information)

## 26. ANNUAL REPORTING

Is the annual report template expected to be the same as that considered in the existing licence?

☒ Yes ☐ No

If not using the NWB's *Standardized Form for Annual Reporting*, provide details regarding the content of annual reports and a proposed outline or template of the annual report. [Use NWB standard Form for Annual Reporting](#)

## 27. CHECKLIST

The following must be included with the application for renewal for the water licensing process to begin.

Completed Application for Water Licence Renewal form.

☒ Yes ☐ No If no, date expected \_\_\_\_\_

Updated plans, including designs and reports (see Block 23).

☐ Yes ☒ No If no, date expected N/A

Updated security assessment (see Block 21).

☐ Yes ☒ No If no, date expected N/A

Updated financial statement (see Block 22).

☐ Yes ☒ No If no, date expected N/A

Compliance Assessment / Status Report (see Block 23).

☐ Yes ☒ No If no, date expected N/A

English Summary of Renewal Application.

☒ Yes ☐ No If no, date expected \_\_\_\_\_



Inuktitut and/or Inuinnaqtun Summary of Renewal Application.

☐ Yes

☒ No

If no, date expected Dec 28, 2018

Application fee of \$30.00 CDN (Payee Receiver General for Canada).

☒ Yes

☐ No

If no, date expected \_\_\_\_\_

Water Use Fee Deposit of \$30.00 CDN (Payee Receiver General for Canada). The actual water use fee will be calculated by the NWB based upon the amount of water authorized for use in accordance with the Regulations at the time of issuance of the licence.

☒ Yes

☐ No

If no, date expected \_\_\_\_\_

**28. SIGNATURE**

I, Shah Alam (print name)

certify that the application requires no changes to water use or waste disposal as previously authorized and that the information given on this form is, to the best of my knowledge, correct and complete.



Signature

December 17, 2018

Date

# Appendix: A

AANDC Inspection Report - 2018

Kugaaruk Landfarm Licence 1BR-KRK 1318



WATER LICENCE INSPECTION FORM

☒ Original  
☐ Follow-Up Report

Licensee		Licensee Representative	
Gov't of Nunavut CG&S		Shah Alam	
Licence No. / Expiry		Representative's Title	
1BR-KRK1318		Municipal Planning Engineer	
Land / Other Authorizations		Land / Other Authorizations	
Date of Inspection		Inspector	
11 July 2018		Baba Pedersen	
Activities Inspected			
<input type="checkbox"/> Camp	<input type="checkbox"/> Drilling	<input type="checkbox"/> Mining	<input type="checkbox"/> Construction
<input type="checkbox"/> Roads/Hauling	<input type="checkbox"/> Other:	<input checked="" type="checkbox"/> Other: Land Farm	<input type="checkbox"/> Reclamation
<input type="checkbox"/> Fuel Storage			

Conditions:		A - Acceptable	C - Concern	U - Unacceptable	NA – Not Applicable	NI – Not Inspected	
Water Use		Condition	Comment	Site Conditions		Condition	Comment
Intake/Screen				Water Management Structures		C	5
Flow Measure. Device				Culverts / Bridges			
Source:				Drainage			
Water Use:				Erosion / Sediment		C	5
Recirculation ( y /n)				Mitigation Measures			
				Reclamation Activities		C	2
				Materials Storage		C	2
Waste Disposal				Signage		U	1&6
Waste Water		C	4				
Solid Waste				Monitoring			
Hazardous Waste				Sample Collection / Analysis		C	4
*The number in the comments field will correspond with specific comments provided below.							
Samples taken by Inspector:		Location(s): No Samples taken during this visit					
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							

SECTION 1	<input checked="" type="checkbox"/> Comments (s. __)	<input type="checkbox"/> Non-Compliance with Act or Licence (s. __)	<input type="checkbox"/> Action Required (s. __)
On July 11, 2018 I Inspected the Gov't of Nunavut, CG&S Kugaaruk Land Farm Water License 1BR-KRK1318. I was accompanied by Shah Alam from the GN CGS.			
SECTION 2	<input checked="" type="checkbox"/> Comments	<input type="checkbox"/> Non-Compliance with Act or Licence	<input type="checkbox"/> Action Required
At the Land Farm location I saw the following; 1. There was No Signage at the Entrance (Photo 1) to Identify the Site and Warn the Public of its contents, 2. The top half of the Upper Cell (Photo 2) contained Mega Bags of Contaminated Soils, 3. The bottom half of the Upper Cell (Photo 3) was Clean and Dry, 4. The lower Cell (Photo 4) was full of clear Water, 5. A portion of the Lower Cell Berm (Photo 5) has visible Damage from Overflow Run-Off, 6. There was No Signage at the bottom of the Lower Cell (Photo 6) to identify where the Sample Location and Decant Areas are. 7. Annual Reports have been submitted to the Nunavut Water Board. 8. The Water License is Expiring in 2018.			
SECTION 3	<input type="checkbox"/> Comments	<input type="checkbox"/> Non-Compliance with Act or Licence	<input checked="" type="checkbox"/> Action Required
1. Appropriate Signage, in both languages, must be installed at the Entrance to Identify the Site and warn the Public of its Contents. 2. The Contaminated Soils need to be removed from the Mega Bags and spread out in order for the natural process of biodegrading to start. 4. The Lower Cell must be Sampled and then Decanted prior to Freeze-up. 5. The Damaged area of the Lower Cell Berm must be repaired prior to Freeze-up. 6. Appropriate Signage must be installed to identify the Sample Locations as well as the Decant Area. 8. The Renewal Process must be started in order to get a new License prior to Expiry.			

Licensee or Representative	Inspector's Name
	Baba Pedersen
Signature	Signature
	Signed Original on File
Date	Date
	19 October 2018

Office Use Only:	Follow-up report to be issued by Inspector	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
------------------	--	---

cc. CIRNAC, Manager Field Operations, Iqaluit, [justin.hack@canada.ca](mailto:justin.hack@canada.ca)

Nunavut Water Board, Manager of Licensing, Gjoa Haven, [licensing@nwb-oen.ca](mailto:licensing@nwb-oen.ca)







PHOTO LOG

Date	Camera	Inspector	Authorization
11 July 2018	Sony DSC-HX50V	Baba Pedersen	1BR-KRK1318
Photo Log # DSC02723		Kugaaruk Land Farm	

Photo 1



Description: Entrance to Land Farm – No Signage

Photo Log # DSC02724	Kugaaruk Land Farm
Photo 2	



Description: Top half of Upper Cell containing Mega Bags of Contaminated Soil





Photo Log # DSC02725

Kugaaruk Land Farm

Photo 3



Description: Bottom Half of Upper Cell – Clean and Dry

Photo Log # DSC02726

Kugaaruk Land Farm

Photo 4



Description: Lower Cell Full of Water





Photo Log # DSC02730

Kugaaruk Land Farm

Photo 5



Description: Lower Cell Berm Damaged from Overflow Run Off

Photo Log # DSC02733

Kugaaruk Land Farm

Photo 6



Description: Bottom edge of Lower Berm – No Signage for Sample Location and Decant Area



# Appendix: B

Soil and Water samples results - 2018

Kugaaruk Landfarm Licence 1BR-KRK 1318





**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-767-9235 Fax: (867)-920-8740

**Taiga Batch No.:**  
**180670**

## **- FINAL REPORT -**

**Prepared For:** Government of Nunavut

**Address:** Community and Government Services  
P.O. Box 200  
Cambridge Bay, NU  
X0B 0C0

**Attn:** Shah Alam

**Facsimile:**

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

**Glen Hudy**  
**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) to ISO/IEC 17025 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, August 17, 2018

**Print Date:** *Monday, August 20, 2018*

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Taiga Environmental Laboratory  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:  
**180670**

**- CERTIFICATE OF ANALYSIS -**

Client Sample ID: **SW-1**

Taiga Sample ID: **001**

Client Project: Kugaaruk Landfarm  
Sample Type: Water  
Received Date: 03-Aug-18  
Sampling Date: 02-Aug-18  
Sampling Time: 11:45  
Location: SW-1  
Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Nutrients</u></b>						
Organic Carbon, Total	11.4	0.5	mg/L	14-Aug-18	SM5310:B	
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	86.9	0.4	mg/L	03-Aug-18	SM2320:B	
Conductivity, Specific (@25C)	193	0.4	µS/cm	03-Aug-18	SM2510:B	
pH	8.03		pH units	03-Aug-18	SM4500-H:B	
Solids, Total Suspended	< 3	3	mg/L	07-Aug-18	SM2540:D	
<b><u>Major Ions</u></b>						
Calcium	17.4	0.1	mg/L	04-Aug-18	SM4110:B	
Chloride	4.5	0.7	mg/L	04-Aug-18	SM4110:B	
Hardness	79.6	0.7	mg/L	04-Aug-18	SM4110:B	
Magnesium	8.8	0.1	mg/L	04-Aug-18	SM4110:B	
Nitrate as Nitrogen	0.22	0.01	mg/L	04-Aug-18	SM4110:B	
Potassium	2.4	0.1	mg/L	04-Aug-18	SM4110:B	
Sodium	7.0	0.1	mg/L	04-Aug-18	SM4110:B	
Sulphate	3	1	mg/L	04-Aug-18	SM4110:B	

ReportDate: Friday, August 17, 2018  
Print Date: **Monday, August 20, 2018**

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## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:

**180670**

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: **SW-1**

Taiga Sample ID: **001**

#### Organics

Benzene	< 0.002	0.002	mg/L	08-Aug-18	EPA8260B
Ethylbenzene	< 0.002	0.002	mg/L	08-Aug-18	EPA8260B
F2: C10-C16	< 0.2	0.2	mg/L	14-Aug-18	EPA8015B
F3: C16-C34	< 0.2	0.2	mg/L	14-Aug-18	EPA8015B
F4: C34-C50	< 0.2	0.2	mg/L	14-Aug-18	EPA8015B
Hydrocarbons, Total Extractable	< 0.2	0.2	mg/L	14-Aug-18	EPA8015B
Toluene	< 0.002	0.002	mg/L	08-Aug-18	EPA8260B
Xylenes	< 0.002	0.002	mg/L	08-Aug-18	EPA8260B

#### Subcontracted Organics

Phenols, Total	< 0.0010	0.001	mg/L	08-Aug-18	AB ENV.06537
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#### Trace Metals, Total

Aluminum	74.4	5	µg/L	16-Aug-18	EPA200.8
Antimony	0.2	0.1	µg/L	16-Aug-18	EPA200.8
Arsenic	0.7	0.2	µg/L	16-Aug-18	EPA200.8
Barium	6.1	0.1	µg/L	16-Aug-18	EPA200.8
Beryllium	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8
Bismuth	< 0.2	0.2	µg/L	16-Aug-18	EPA200.8
Boron	43.1	0.9	µg/L	16-Aug-18	EPA200.8
Cadmium	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8
Cesium	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8
Chromium	0.2	0.1	µg/L	16-Aug-18	EPA200.8
Cobalt	0.1	0.1	µg/L	16-Aug-18	EPA200.8
Copper	1.6	0.2	µg/L	16-Aug-18	EPA200.8
Iron	201	5	µg/L	16-Aug-18	EPA200.8

ReportDate: Friday, August 17, 2018

Print Date: **Monday, August 20, 2018**

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**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-767-9235 Fax: (867)-920-8740

**Taiga Batch No.:**  
**180670**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: SW-1**

**Taiga Sample ID: 001**

Lead	0.1	0.1	µg/L	16-Aug-18	EPA200.8
Lithium	0.8	0.2	µg/L	16-Aug-18	EPA200.8
Manganese	46.6	0.1	µg/L	16-Aug-18	EPA200.8
Mercury	< 0.01	0.01	µg/L	16-Aug-18	EPA200.8
Molybdenum	2.5	0.1	µg/L	16-Aug-18	EPA200.8
Nickel	0.5	0.1	µg/L	16-Aug-18	EPA200.8
Rubidium	0.9	0.1	µg/L	16-Aug-18	EPA200.8
Selenium	< 0.5	0.5	µg/L	16-Aug-18	EPA200.8
Silver	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8
Strontium	152	0.1	µg/L	16-Aug-18	EPA200.8
Thallium	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8
Tin	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8
Titanium	4.4	0.1	µg/L	16-Aug-18	EPA200.8
Uranium	6.2	0.1	µg/L	16-Aug-18	EPA200.8
Vanadium	0.3	0.1	µg/L	16-Aug-18	EPA200.8
Zinc	< 5.0	5	µg/L	16-Aug-18	EPA200.8

**ReportDate:** Friday, August 17, 2018  
**Print Date:** *Monday, August 20, 2018*

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Taiga Environmental Laboratory  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:  
**180670**

## - CERTIFICATE OF ANALYSIS -

Client Sample ID: **SW-2**

Taiga Sample ID: **002**

Client Project: Kugaaruk Landfarm

Sample Type: Water

Received Date: 03-Aug-18

Sampling Date: 02-Aug-18

Sampling Time: 11:45

Location: SW-2

Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Nutrients</u></b>						
Organic Carbon, Total	10.9	0.5	mg/L	14-Aug-18	SM5310:B	
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	77.6	0.4	mg/L	03-Aug-18	SM2320:B	
Conductivity, Specific (@25C)	174	0.4	µS/cm	03-Aug-18	SM2510:B	
pH	8.19		pH units	03-Aug-18	SM4500-H:B	
Solids, Total Suspended	< 3	3	mg/L	07-Aug-18	SM2540:D	
<b><u>Major Ions</u></b>						
Calcium	15.6	0.1	mg/L	04-Aug-18	SM4110:B	
Chloride	4.5	0.7	mg/L	04-Aug-18	SM4110:B	
Hardness	73.1	0.7	mg/L	04-Aug-18	SM4110:B	
Magnesium	8.3	0.1	mg/L	04-Aug-18	SM4110:B	
Nitrate as Nitrogen	0.21	0.01	mg/L	04-Aug-18	SM4110:B	
Potassium	2.3	0.1	mg/L	04-Aug-18	SM4110:B	
Sodium	8.1	0.1	mg/L	04-Aug-18	SM4110:B	
Sulphate	3	1	mg/L	04-Aug-18	SM4110:B	
<b><u>Organics</u></b>						

ReportDate: Friday, August 17, 2018

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## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:

180670

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: **SW-2**

Taiga Sample ID: **002**

Benzene		0.002	mg/L		EPA8260B	111
Ethylbenzene		0.002	mg/L		EPA8260B	111
F2: C10-C16	< 0.2	0.2	mg/L	14-Aug-18	EPA8015B	
F3: C16-C34	< 0.2	0.2	mg/L	14-Aug-18	EPA8015B	
F4: C34-C50	< 0.2	0.2	mg/L	14-Aug-18	EPA8015B	
Hydrocarbons, Total Extractable	< 0.2	0.2	mg/L	14-Aug-18	EPA8015B	
Toluene		0.002	mg/L		EPA8260B	111
Xylenes		0.002	mg/L		EPA8260B	111

#### Subcontracted Organics

Phenols, Total	< 0.0010	0.001	mg/L	08-Aug-18	AB ENV.06537	
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#### Trace Metals, Total

Aluminum	52.5	5	µg/L	16-Aug-18	EPA200.8	
Antimony	0.2	0.1	µg/L	16-Aug-18	EPA200.8	
Arsenic	0.6	0.2	µg/L	16-Aug-18	EPA200.8	
Barium	4.3	0.1	µg/L	16-Aug-18	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8	
Bismuth	< 0.2	0.2	µg/L	16-Aug-18	EPA200.8	
Boron	39.0	0.9	µg/L	16-Aug-18	EPA200.8	
Cadmium	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8	
Cesium	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8	
Chromium	0.2	0.1	µg/L	16-Aug-18	EPA200.8	
Cobalt	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8	
Copper	1.6	0.2	µg/L	16-Aug-18	EPA200.8	
Iron	75	5	µg/L	16-Aug-18	EPA200.8	
Lead	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8	

ReportDate: Friday, August 17, 2018

Print Date: *Monday, August 20, 2018*

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**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-767-9235 Fax: (867)-920-8740

**Taiga Batch No.:**  
**180670**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: SW-2**

**Taiga Sample ID: 002**

Lithium	0.7	0.2	µg/L	16-Aug-18	EPA200.8
Manganese	12.3	0.1	µg/L	16-Aug-18	EPA200.8
Mercury	< 0.01	0.01	µg/L	16-Aug-18	EPA200.8
Molybdenum	2.3	0.1	µg/L	16-Aug-18	EPA200.8
Nickel	0.4	0.1	µg/L	16-Aug-18	EPA200.8
Rubidium	0.7	0.1	µg/L	16-Aug-18	EPA200.8
Selenium	< 0.5	0.5	µg/L	16-Aug-18	EPA200.8
Silver	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8
Strontium	119	0.1	µg/L	16-Aug-18	EPA200.8
Thallium	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8
Tin	< 0.1	0.1	µg/L	16-Aug-18	EPA200.8
Titanium	2.8	0.1	µg/L	16-Aug-18	EPA200.8
Uranium	5.3	0.1	µg/L	16-Aug-18	EPA200.8
Vanadium	0.2	0.1	µg/L	16-Aug-18	EPA200.8
Zinc	< 5.0	5	µg/L	16-Aug-18	EPA200.8

**ReportDate:** Friday, August 17, 2018  
**Print Date:** *Monday, August 20, 2018*

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Taiga Environmental Laboratory  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:  
**180670**

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**- CERTIFICATE OF ANALYSIS -**

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Client Sample ID: **SW-2**

Taiga Sample ID: **002**

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**- DATA QUALIFIERS -**

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*Data Qualifier Descriptions:*

**111**      *Vial 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, August 17, 2018

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Soil and Water samples results – 2018-09-14

Kugaaruk Landfarm Licence 1BR-KRK 1318



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-767-9235 Fax: (867)-920-8740

**Taiga Batch No.:**  
**180949**

## **- FINAL REPORT -**

---

**Prepared For:** Hamlet of Kugaaruk

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

**Attn:** John Ivey

**Facsimile:** 867-769-6069

---

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

---

**Glen Hudy**  
**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) to ISO/IEC 17025 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:** Thursday, October 04, 2018

**Print Date:** *Saturday, October 06, 2018*

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## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:  
**180949**

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: **SW1**

Taiga Sample ID: **001**

Client Project: Kugaaruk Landfarm

Sample Type: Water

Received Date: 14-Sep-18

Sampling Date: 13-Sep-18

Sampling Time: 11:00

Location:

Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Nutrients</u></b>						
Phosphorous, Total	0.008	0.002	mg/L	25-Sep-18	SM4500-P:D	
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	105	0.4	mg/L	14-Sep-18	SM2320:B	
Conductivity, Specific (@25C)	221	0.4	µS/cm	14-Sep-18	SM2510:B	
pH	8.19		pH units	14-Sep-18	SM4500-H:B	
Solids, Total Suspended	< 3	3	mg/L	18-Sep-18	SM2540:D	
<b><u>Major Ions</u></b>						
Calcium	22.0	0.1	mg/L	16-Sep-18	SM4110:B	
Chloride	4.8	0.7	mg/L	16-Sep-18	SM4110:B	
Hardness	113	0.7	mg/L	16-Sep-18	SM4110:B	
Magnesium	14.2	0.1	mg/L	16-Sep-18	SM4110:B	
Nitrate as Nitrogen	0.23	0.01	mg/L	16-Sep-18	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	16-Sep-18	SM4110:B	
Potassium	2.2	0.1	mg/L	16-Sep-18	SM4110:B	

ReportDate: Thursday, October 04, 2018

Print Date: **Saturday, October 06, 2018**

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## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:

**180949**

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: **SW1**

Taiga Sample ID: **001**

Sodium	7.3	0.1	mg/L	16-Sep-18	SM4110:B
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Sulphate	4	1	mg/L	16-Sep-18	SM4110:B
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#### Organics

Benzene	< 0.002	0.002	mg/L	15-Sep-18	EPA8260B
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Ethylbenzene	< 0.002	0.002	mg/L	15-Sep-18	EPA8260B
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F2: C10-C16	< 0.2	0.2	mg/L	21-Sep-18	EPA8015B
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F3: C16-C34	< 0.2	0.2	mg/L	21-Sep-18	EPA8015B
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F4: C34-C50	< 0.2	0.2	mg/L	21-Sep-18	EPA8015B
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Hydrocarbons, Total Extractable	< 0.2	0.2	mg/L	21-Sep-18	EPA8015B
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Hydrocarbons, Total Purgeable	< 0.3	0.3	mg/L	15-Sep-18	EPA8015
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Oil and Grease, visible	Non-visible			14-Sep-18	Visual Exam
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Toluene	< 0.002	0.002	mg/L	15-Sep-18	EPA8260B
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Xylenes	< 0.002	0.002	mg/L	15-Sep-18	EPA8260B
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#### Trace Metals, Total

Aluminum	23.5	0.6	µg/L	03-Oct-18	EPA200.8
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Antimony	0.1	0.1	µg/L	03-Oct-18	EPA200.8
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Arsenic	0.6	0.2	µg/L	03-Oct-18	EPA200.8
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Barium	5.7	0.1	µg/L	03-Oct-18	EPA200.8
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Beryllium	< 0.1	0.1	µg/L	03-Oct-18	EPA200.8
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Cadmium	< 0.04	0.04	µg/L	03-Oct-18	EPA200.8
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Cesium	< 0.1	0.1	µg/L	03-Oct-18	EPA200.8
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Chromium	0.1	0.1	µg/L	03-Oct-18	EPA200.8
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Cobalt	< 0.1	0.1	µg/L	03-Oct-18	EPA200.8
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Copper	1.6	0.2	µg/L	03-Oct-18	EPA200.8
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Iron	160	5	ug/L	03-Oct-18	EPA200.8
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ReportDate: Thursday, October 04, 2018

Print Date: *Saturday, October 06, 2018*



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-767-9235 Fax: (867)-920-8740

**Taiga Batch No.:**  
**180949**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: SW1**

**Taiga Sample ID: 001**

Lead	< 0.1	0.1	µg/L	03-Oct-18	EPA200.8
Lithium	0.6	0.2	µg/L	03-Oct-18	EPA200.8
Manganese	8.5	0.1	µg/L	03-Oct-18	EPA200.8
Molybdenum	2.4	0.1	µg/L	03-Oct-18	EPA200.8
Nickel	0.4	0.1	µg/L	03-Oct-18	EPA200.8
Rubidium	0.7	0.1	µg/L	03-Oct-18	EPA200.8
Selenium	< 0.3	0.3	µg/L	03-Oct-18	EPA200.8
Silver	< 0.1	0.1	µg/L	03-Oct-18	EPA200.8
Strontium	165	0.1	µg/L	03-Oct-18	EPA200.8
Thallium	< 0.1	0.1	µg/L	03-Oct-18	EPA200.8
Titanium	1.1	0.1	µg/L	03-Oct-18	EPA200.8
Uranium	5.8	0.1	µg/L	03-Oct-18	EPA200.8
Vanadium	0.2	0.1	µg/L	03-Oct-18	EPA200.8
Zinc	< 0.4	0.4	µg/L	03-Oct-18	EPA200.8

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**Print Date:** *Saturday, October 06, 2018*

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## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:

**180949**

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: **SW2**

Taiga Sample ID: **002**

Client Project: Kugaaruk Landfarm

Sample Type: Water

Received Date: 14-Sep-18

Sampling Date: 13-Sep-18

Sampling Time: 11:00

Location:

Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Nutrients</u></b>						
Phosphorous, Total	0.008	0.002	mg/L	25-Sep-18	SM4500-P:D	
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	105	0.4	mg/L	14-Sep-18	SM2320:B	
Conductivity, Specific (@25C)	222	0.4	µS/cm	14-Sep-18	SM2510:B	
pH	8.19		pH units	14-Sep-18	SM4500-H:B	
Solids, Total Suspended	< 3	3	mg/L	18-Sep-18	SM2540:D	
<b><u>Major Ions</u></b>						
Calcium	24.5	0.1	mg/L	16-Sep-18	SM4110:B	
Chloride	4.8	0.7	mg/L	16-Sep-18	SM4110:B	
Hardness	111	0.7	mg/L	16-Sep-18	SM4110:B	
Magnesium	12.1	0.1	mg/L	16-Sep-18	SM4110:B	
Nitrate as Nitrogen	0.24	0.01	mg/L	16-Sep-18	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	16-Sep-18	SM4110:B	
Potassium	3.0	0.1	mg/L	16-Sep-18	SM4110:B	
Sodium	6.3	0.1	mg/L	16-Sep-18	SM4110:B	
Sulphate	3	1	mg/L	16-Sep-18	SM4110:B	

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## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:

**180949**

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: **SW2**

Taiga Sample ID: **002**

#### Organics

Benzene	< 0.002	0.002	mg/L	15-Sep-18	EPA8260B
Ethylbenzene	< 0.002	0.002	mg/L	15-Sep-18	EPA8260B
F2: C10-C16	< 0.2	0.2	mg/L	21-Sep-18	EPA8015B
F3: C16-C34	< 0.2	0.2	mg/L	21-Sep-18	EPA8015B
F4: C34-C50	< 0.2	0.2	mg/L	21-Sep-18	EPA8015B
Hydrocarbons, Total Extractable	< 0.2	0.2	mg/L	21-Sep-18	EPA8015B
Hydrocarbons, Total Purgeable	< 0.3	0.3	mg/L	15-Sep-18	EPA8015
Oil and Grease, visible	Non-visible			14-Sep-18	Visual Exam
Toluene	< 0.002	0.002	mg/L	15-Sep-18	EPA8260B
Xylenes	< 0.002	0.002	mg/L	15-Sep-18	EPA8260B

#### Trace Metals, Total

Aluminum	9.7	0.6	µg/L	03-Oct-18	EPA200.8
Antimony	0.2	0.1	µg/L	03-Oct-18	EPA200.8
Arsenic	0.7	0.2	µg/L	03-Oct-18	EPA200.8
Barium	5.7	0.1	µg/L	03-Oct-18	EPA200.8
Beryllium	< 0.1	0.1	µg/L	03-Oct-18	EPA200.8
Cadmium	< 0.04	0.04	µg/L	03-Oct-18	EPA200.8
Cesium	< 0.1	0.1	µg/L	03-Oct-18	EPA200.8
Chromium	0.1	0.1	µg/L	03-Oct-18	EPA200.8
Cobalt	< 0.1	0.1	µg/L	03-Oct-18	EPA200.8
Copper	1.4	0.2	µg/L	03-Oct-18	EPA200.8
Iron	63	5	ug/L	03-Oct-18	EPA200.8
Lead	< 0.1	0.1	µg/L	03-Oct-18	EPA200.8
Lithium	0.6	0.2	µg/L	03-Oct-18	EPA200.8

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Taiga Environmental Laboratory  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:  
**180949**

**- CERTIFICATE OF ANALYSIS -**

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Client Sample ID: **SW2**

Taiga Sample ID: **002**

Manganese	1.8	0.1	µg/L	03-Oct-18	EPA200.8
Molybdenum	2.5	0.1	µg/L	03-Oct-18	EPA200.8
Nickel	0.4	0.1	µg/L	03-Oct-18	EPA200.8
Rubidium	0.7	0.1	µg/L	03-Oct-18	EPA200.8
Selenium	< 0.3	0.3	µg/L	03-Oct-18	EPA200.8
Silver	< 0.1	0.1	µg/L	03-Oct-18	EPA200.8
Strontium	170	0.1	µg/L	03-Oct-18	EPA200.8
Thallium	< 0.1	0.1	µg/L	03-Oct-18	EPA200.8
Titanium	0.2	0.1	µg/L	03-Oct-18	EPA200.8
Uranium	5.7	0.1	µg/L	03-Oct-18	EPA200.8
Vanadium	0.1	0.1	µg/L	03-Oct-18	EPA200.8
Zinc	< 0.4	0.4	µg/L	03-Oct-18	EPA200.8

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## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:

**180949**

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: **LT-1**

Taiga Sample ID: **003**

Client Project: Kugaaruk Landfarm

Sample Type: Soil

Received Date: 14-Sep-18

Sampling Date: 13-Sep-18

Sampling Time: 11:00

Location:

Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Subcontracted Organics</u></b>						
% Moisture	7.370	0.25	%	21-Sep-18	CCME CWS PHC	
Benzene	< 0.0050	0.005	mg/kg	21-Sep-18	CCME CWS PHC	
Ethylbenzene	< 0.010	0.010	mg/kg	21-Sep-18	CCME CWS PHC	
F1: C6-C10	< 10	10	mg/kg	21-Sep-18	CCME CWS PHC	
F1-BTEX	< 10	10	mg/kg	21-Sep-18	CCME CWS PHC	
F2: C10-C16	< 20	20	mg/kg	21-Sep-18	CCME CWS PHC	
F3: C16-C34	53	20	mg/kg	21-Sep-18	CCME CWS PHC	
F4: C34-C50	< 20	20	mg/kg	21-Sep-18	CCME CWS PHC	
Toluene	< 0.050	0.05	mg/kg	21-Sep-18	CCME CWS PHC	
Total Hydrocarbons (C6-C50)	53	20	mg/kg	21-Sep-18	CCME CWS PHC	
Xylenes	< 0.10	0.1	mg/kg	21-Sep-18	CCME CWS PHC	

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## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:

**180949**

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: **LT-2**

Taiga Sample ID: **004**

Client Project: Kugaaruk Landfarm

Sample Type: Soil

Received Date: 14-Sep-18

Sampling Date: 13-Sep-18

Sampling Time: 11:00

Location:

Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Subcontracted Organics</u></b>						
% Moisture	6.090	0.25	%	21-Sep-18	CCME CWS PHC	
Benzene	< 0.0050	0.005	mg/kg	21-Sep-18	CCME CWS PHC	
Ethylbenzene	< 0.010	0.010	mg/kg	21-Sep-18	CCME CWS PHC	
F1: C6-C10	< 10	10	mg/kg	21-Sep-18	CCME CWS PHC	
F1-BTEX	< 10	10	mg/kg	21-Sep-18	CCME CWS PHC	
F2: C10-C16	< 20	20	mg/kg	21-Sep-18	CCME CWS PHC	
F3: C16-C34	24	20	mg/kg	21-Sep-18	CCME CWS PHC	
F4: C34-C50	< 20	20	mg/kg	21-Sep-18	CCME CWS PHC	
Toluene	< 0.050	0.05	mg/kg	21-Sep-18	CCME CWS PHC	
Total Hydrocarbons (C6-C50)	24	20	mg/kg	21-Sep-18	CCME CWS PHC	
Xylenes	< 0.10	0.1	mg/kg	21-Sep-18	CCME CWS PHC	

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**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-767-9235 Fax: (867)-920-8740

**Taiga Batch No.:**  
**180949**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID:** **LT-3**

**Taiga Sample ID:** **005**

**Client Project:** Kugaaruk Landfarm

**Sample Type:** Soil

**Received Date:** 14-Sep-18

**Sampling Date:** 13-Sep-18

**Sampling Time:** 11:00

**Location:**

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
<b><u>Subcontracted Organics</u></b>						
% Moisture	3.740	0.25	%	21-Sep-18	CCME CWS PHC	
Benzene	< 0.0050	0.005	mg/kg	21-Sep-18	CCME CWS PHC	
Ethylbenzene	< 0.010	0.010	mg/kg	21-Sep-18	CCME CWS PHC	
F1: C6-C10	< 10	10	mg/kg	21-Sep-18	CCME CWS PHC	
F1-BTEX	< 10	10	mg/kg	21-Sep-18	CCME CWS PHC	
F2: C10-C16	175	20	mg/kg	21-Sep-18	CCME CWS PHC	
F3: C16-C34	1800	20	mg/kg	21-Sep-18	CCME CWS PHC	
F4: C34-C50	120	20	mg/kg	21-Sep-18	CCME CWS PHC	
Toluene	< 0.050	0.05	mg/kg	21-Sep-18	CCME CWS PHC	
Total Hydrocarbons (C6-C50)	2100	20	mg/kg	21-Sep-18	CCME CWS PHC	
Xylenes	< 0.10	0.1	mg/kg	21-Sep-18	CCME CWS PHC	

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## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:

**180949**

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: **LT-4**

Taiga Sample ID: **006**

Client Project: Kugaaruk Landfarm

Sample Type: Soil

Received Date: 14-Sep-18

Sampling Date: 13-Sep-18

Sampling Time: 11:00

Location:

Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Subcontracted Organics</u></b>						
% Moisture	5.860	0.25	%	21-Sep-18	CCME CWS PHC	
Benzene	< 0.0050	0.005	mg/kg	21-Sep-18	CCME CWS PHC	
Ethylbenzene	< 0.010	0.010	mg/kg	21-Sep-18	CCME CWS PHC	
F1: C6-C10	< 10	10	mg/kg	21-Sep-18	CCME CWS PHC	
F1-BTEX	< 10	10	mg/kg	21-Sep-18	CCME CWS PHC	
F2: C10-C16	< 20	20	mg/kg	21-Sep-18	CCME CWS PHC	
F3: C16-C34	74	20	mg/kg	21-Sep-18	CCME CWS PHC	
F4: C34-C50	< 20	20	mg/kg	21-Sep-18	CCME CWS PHC	
Toluene	< 0.050	0.05	mg/kg	21-Sep-18	CCME CWS PHC	
Total Hydrocarbons (C6-C50)	74	20	mg/kg	21-Sep-18	CCME CWS PHC	
Xylenes	< 0.10	0.1	mg/kg	21-Sep-18	CCME CWS PHC	

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## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-767-9235 Fax: (867)-920-8740

**Taiga Batch No.:**

**180949**

### - CERTIFICATE OF ANALYSIS -

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**Client Sample ID:** **LT-4**

**Taiga Sample ID:** **006**

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**\* 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

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