Cambridge Bay Soil and Water Treatment Facility
2017 Annual Report
Nunavut Water Board Licence 1BR-CST1723

2017 Annual Report

FINAL

Cambridge Bay SWTF 2017 Annual Report
V. 1
16-025

March 31, 2018

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ᓴᓇᐅᑎᐅᓂᐊᒥᔪᖅ ᑕᖅᓂᒥᑦ 2018-ᒥ ᐊᔪᖏᔪᑦᑕᑦ ᒪᓕᓂᐊᖃᑕᖓᓕᒫᑦ ᑕᐃᒪᓗ ᓄᓇᓕᒃ ᐃᒪᓕᖅᑎᑦᑕᓕᓚᓂᑦ ᐊᖏᓂᑕᐅᒥᒍᑦ ᐅᖃᓕᒫᒥᑦ.

EXECUTIVE SUMMARY

The Kitnuna Environmental (KEL) soil and water treatment facility was licensed in 2017 by the Nunavut Water Board under water licence number 1BR-CST1723 and construction of the facility was completed in October 2017.

The facility consists of one soil treatment cell for the receipt of soil contaminated with petroleum hydrocarbons, one cell for the receipt of contaminated snow and water along with one cell for the storage of containerized hazardous waste material. The soil treatment cell dimension are approximately 35 meters by 49 meters. The water cell and hazardous waste storage cell dimensions are both approximately 14 meters by 16 meters. The water cell is designed with a capacity of 170 cubic meters. In 2017 a total of 79 cubic meters of soil was deposited at the facility and will undergo treatment in 2018.

One water discharge occurred at the site, prior to completing construction and before any contaminated soil was present. This discharge occurred with approval from the Indigenous and Northern Affairs (INAC) inspector.

1.0 INTRODUCTION

Licensee:

Kitnuna Environmental Ltd. (KEL)
PO Box 92, 10 Omilik Road
Cambridge Bay, Nunavut
X0B 0C0

The Cambridge Bay Soil and Water Treatment Facility (SWTF) is operated under Nunavut Water Board (NWB) water licence 1BR-CST1723. This 2017 Annual Report serves to satisfy the requirements outlined in Part B, Item 1 of the licence.

2.0 BACKGROUND

Beginning in 2016, KEL submitted applications with the Nunavut Planning Commission, Nunavut Impact Review Board and the Nunavut Water Board in anticipation of obtaining a water licence for the construction and operation of the Cambridge Bay SWTF. On March 23, 2017 water licence 1BR-CST1723 was issued to KEL for a period of 6 years for the ongoing operation of the soil and water treatment facility. Construction of the SWTF was completed in September 2017. The location of the facility is shown on Figure 1.

The facility consists of one large soil treatment cell for the receipt of soil contaminated with petroleum hydrocarbons, one cell for the receipt of contaminated snow and water along with one cell for the storage of containerized hazardous waste material. The soil treatment cell dimension are approximately 35 meters by 49 meters. The water cell and hazardous waste storage cell dimensions are both approximately 14 meters by 16 meters. The water cell is designed to contain approximately 170 cubic meters. A site diagram is shown on Figure 2.

Soil will be treated by mechanical means to enhance bioremediation of the soil. Once soil is treated in will be sampled to confirm that it meets the beneficial re-use guidelines for Industrial use that are outlined in the Operations and Maintenance Plans (KEL, 2017). Treated soil may be used for covering garbage at the local landfill of for other uses approved by the inspector.

3.0 LICENCE PART B GENERAL CONDITIONS REPORTING REQUIREMENTS

3.1. Part B Item 1a: Quantity of Waste Deposited

79 cubic meters (m3) of soil was deposited at the facility in 2017. Generator name, site and volumes received are tabulated below:

Generator Name	Generator Site	Date Received	Volume
Qulliq Energy Corporation	6 Tuktu Cambridge Bay, NU	October 9	50m^3
Government of Nunavut Community and Government Services	3 Amagok, Cambridge Bay, NU	October 9	29m^3

3.2. Part B Item 1b: Characterization of Treated Soil

No soil was treated at the facility in 2017.

3.3. Part B Item 1c: Discharge Quantities

Prior to completing the installation of the synthetic liner, approximately 23 cubic meters of water was removed from the footprint of the facility to allow work to proceed. No contaminated soil was present at the facility prior to this discharge which was done with approval from the Indigenous and Northern Affairs (INAC) inspector. A copy of the inspector approval can be found in Appendix A.

3.4. Part B Item 1d: Waste Backhauled

No waste was backhauled to any community in 2017.

3.5. Part B Item 1e: Waste Coordinates

The coordinates of the facility are 69º 7.718' North and 105º 2.760 West.

3.6. Part B Item 1f: Construction Work Completed at Facility

The facility was constructed in 2017. A copy of the HDPE liner installation report can be found in Appendix B. As built drawings were submitted to the NWB on December 29, 2017.

3.7. Part B Item 1g: Tabular Summaries

Tabular summaries of baseline sampling are located in Tables 1-3 of this report and described in sections 4.0 through 7.0.

3.8. Part B Item 1h: Monitoring Program Data Analysis

No data was collected from monitoring program stations in 2017.

3.9. Part B Item 1i: Summary of Studies

No studies were requested by the board in 2017. The Nunavut Water Board Annual Reporting form can be found in Appendix C.

3.10. Part B Item 1j: Unauthorized Discharges

No unauthorized discharges occurred in 2017.

3.11. Part B Item 1k: Trenches or Sumps

No trenches or sumps were excavated in 2017.

3.12. Part B Item 1l: Public Consultation

No public consultations occurred in 2017.

3.13. Part B Item 1m: Summary of Inspector Reports

No inspections or reports were prepared by an inspector in 2017.

4.0 BASELINE SOIL ASSESSMENT

Baseline soil samples were collected from the footprint of the facility prior to construction along with a background location. Samples were collected from surface to approximately 0.2 meters below surface. Locations of baseline samples are shown on Figure 3.

5.0 BASELINE GROUNDWATER ASSESSMENT

Groundwater monitoring wells will be installed in 2018 at locations surrounding the facility. The locations of these wells will be established in accordance with Part K Item 1 of the licence. The requirements for the monitoring program are for one well to be installed upgradient of the facility (CST-2) and two wells installed down gradient (CST-3, CST-4). Results from groundwater monitoring and sampling at these locations will be included in the 2018 Annual Report.

As per Part K Item 7 of the licence, a Water Monitoring Plan (WMP) was created and submitted to the NWB on May 12, 2017. The WMP will be revised once the groundwater monitoring wells have been installed.

6.0 BASELINE SURFACE WATER ASSESSMENT

Baseline surface water sampling was completed prior to construction at two nearby water bodies to confirm representative conditions. Sample locations are shown on Figure 3.

7.0 ASSESSMENT ANALYTICAL RESULTS

7.1. Soil

All results of from baseline soil sampling in the footprint of the soil treatment cell had results below the referenced guidelines. The background sample had high moisture due to organic content, but still had results below the referenced guidelines. All results from baseline soil sampling can be found in Tables 1 and 2.

7.2. Groundwater

Groundwater monitoring wells will be installed in 2018 and sampled. Results from the sampling event will be contained in the 2018 Annual Report.

7.3. Surface Water

Surface water samples were collected from two nearby water bodies and analyzed for the parameters listed on the effluent discharge concentrations for CST-1. The baseline samples were all within acceptable limits. Results from the baseline surface water sampling can be found in Table 3.

8.0 SAMPLE QUALITY ASSURANCE & QUALITY CONTROL (QA/QC)

This section details quality assurance & quality control (QA/QC) procedures and protocols applied during the

execution of the work completed at the Site in 2017. Environmental samples collected during the field programs were submitted to Maxxam Analytics Inc (Maxxam). Maxxam is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA).

8.1. Sample Handling

Sample collection QA/QC procedures were adhered to at all times; these included changing disposable nitrile gloves between samples and using laboratory supplied containers for sample collection. Samples were stored in dedicated coolers, and kept cool. Samples were collected and held as per standard chain of custody protocols. Samples were transferred to Maxxam Analytics in Yellowknife, NT via Canadian North Cargo.

8.2. Field Decontamination

Sample collection equipment including hand augers were cleaned and decontaminated using an Alconox© (a biodegradable detergent) and water mix prior to, and between the collection of each sample.

8.3. Blind Field Duplicates

A field duplicate (or blind duplicate) sample is a second sample collected from the same sample location as the original sample and stored in a separate sample container. The sample is assigned a different sample identifier to prevent the laboratory from being aware of its origin. The relative percent difference (RPD) is calculated for the results of each field duplicate compared to the original. The RPD for two data points is equal to the Difference divided by the Mean multiplied by 100%. The RPD is used to evaluate the representativeness of the sample.

The RPD values for duplicate samples were calculated using the following formula:

$$RPD\% = \left| \frac{(C1 - C2)}{[\frac{C1 + C2}{2}]} \right| \times 100\%$$

8.3.1. Soil

Relative percent differences of 40% or less are generally accepted for a soil assessment (Zeiner 1994). For duplicate or replicate samples, where one or both of the sample results are within five times the laboratory method detection limit (MDL), the difference between the sample results should be less than or equal to the MDL. For results that are more than five times the MDL the relative percent between two sample values should be less than 40% of the guideline. Values where the RPD exceeds the 40% guidelines should be considered to be estimates. Differences between the duplicate samples may be a result of the natural heterogeneity of the soil, non-uniform contaminant distribution, and inherent errors in the laboratory method.

A total of one (1) duplicate soil sample was submitted for analyses during the 2017 baseline environmental monitoring program. Relative percent differences of all analytical results were found to be within acceptable RPD values, with the exception of Boron which had an RPD of 47.06%.

8.3.2. Groundwater

Duplicate samples will be collected during the 2018 sampling event, assuming there is enough water present.

9.0 CONCLUSION & RECOMMENDATIONS

Groundwater monitoring wells are to be installed at the site in 2018 in accordance with the requirements outlined in Part K of the Water Licence. The wells will be monitored and sampled (assuming enough water is present).

Prior to any discharge of water to the receiving environment, a representative sample shall be collected and analyzed for the parameters listed for monitoring network station CST-1 and the results presented to the inspector. No discharge of water will occur without prior approval from the inspector.

Signage will be installed at the site indicating the site name and advising the public to not enter the facility.

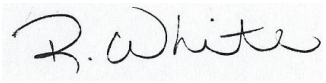
Data from any monitoring network program location will be collected and tabulated and reported the 2018 Annual Report.

Sincerely,

Prepared by:

Josh Foster
Project Manager

Reviewed by:



Renee White, EP
Licensing and Compliance Manager

10.0 NOTICE TO READERS/CLOSURE

This report has been prepared and the work referred to in this report has been undertaken by Kitnuna Environmental (KEL) for the exclusive use of the Nunavut Water Board who has been party to the development of the scope of work and understands its limitations. The methodology, findings, conclusions and recommendations in this report are based solely upon the scope of work and subject to the time and budgetary considerations derived in the documents which constitute the proposal and/or contract pursuant to which this report was issued.

The findings, conclusions and recommendations in this report have been developed in a manner consistent with the level of skill normally exercised by professionals currently practicing under similar conditions in the area, and reflect KEL's best judgement based on information available at the time of preparation of this report. No other warranties, either expressed or implied are made as to the professional services included in this report.

The findings and conclusions contained in this report are valid only as of the date of this report and may be based, in part, upon information provided by others. If any of the information is inaccurate, new information is discovered, the conditions of the Site or intended use of the Site change, or applicable standards are amended, modifications to this report may be necessary. KEL cannot be responsible for the use of this report or portions thereof unless KEL is requested to review and, if necessary, update the report. The results of the work herein should in no way be construed as a warranty that the subject Site is free from any and all contamination.

If referenced, groundwater, vapour or other subsurface conditions refer only to those observed at the location and time of observation noted in this report. This report must be read in whole, as sections taken out of context may be misleading. KEL cannot be responsible for the use of portions of the report without reference to the entire report. If discrepancies occur between the preliminary (draft) and final versions of this report, it is the final version that takes precedence. Nothing in this report is intended to constitute or provide a legal opinion.

Any use, reliance on, or decision made by a third party based on this report is the sole responsibility of such third party. KEL accepts no liability or responsibility for any damages that may be suffered or incurred by any third party as a result of the use of, reliance on, or any decision made based on this report.

11.0 SITE PHOTOS

Photo 1: Pad and berm construction August 2017

Photo 2: Synthetic liner installation September 21, 2017

12.0 REFERENCES

Canadian Council of Ministers of the Environment (CCME). 2008. *Canada Wide Standards for Petroleum Hydrocarbons (PHC) in Soil*

Canadian Council of Ministers of the Environment (CCME). 1998-2014. *Canadian Environmental Quality Guidelines*

Kitnuna Environmental (KEL). 2017 *Operations and Maintenance Plan*

Kitnuna Environmental (KEL). 2017 *Water Monitoring Plan*

Nunavut Water Board (NWB). 2017. Water Licence No. 1BR-CST1723 Cambridge Bay Soil and Water Treatment Facility

Zeiner, S.T., Realistic Criteria for the Evaluation of Field Duplicate Sample Results, SUPERFUND XV: Washington, November 29 – December 1, 1994.

FIGURES

File: 16-025_16STF.dwg Date: March-15-18 2:21:01 PM

MAP SOURCE: TOPORAMA 77D/01, 02

NOTES:

LOCATIONS ARE APPROXIMATE.

LEGEND

LINEAR FLOW LINES

0 500 1000 2000m

Scale 1 : 50 000

TOPOGRAPHIC MAP SHOWING SITE LOCATION

KEL

Date: 15-MAR-18	Drawn: LH	CAMBRIDGE BAY SOIL AND WATER TREATMENT FACILITY	Figure: 1
File name: 16-025_16STF-A.dwg	Approved: DRAFT		

File: 16-025_18STF.dwg Date: March-15-18 4:09:15 PM

JUNE 2017 SATELLITE PHOTO SOURCE: GOOGLE EARTH

NOTES:

LOCATIONS ARE APPROXIMATE.

0 10 20 40m

Scale 1 : 1000

SITE OVERVIEW SHOWING FACILITY DESIGN

KEL

Date: 20-MAR-18	Drawn: DT	CAMBRIDGE BAY SOIL AND WATER TREATMENT FACILITY	Figure: 2
File name: 16-025_18STF-B.dwg	Approved: DRAFT		

File: 16-025_18STF.dwg Date: ----

SATELLITE PHOTO SOURCE: DIGITALGLOBE, CNES, DISTRIBUTION AIRBUS DS (BING)

LEGEND

- SURFACE WATER SAMPLE
- SOIL SAMPLE

NOTES:

LOCATIONS ARE APPROXIMATE.

0 25 50 100m

Scale 1 : 2000

SAMPLE LOCATION DIAGRAM

KEL

Date: 15-MAR-18	Drawn: DT	CAMBRIDGE BAY SOIL AND WATER TREATMENT FACILITY	Figure: 3
File name: 16-025_18STF-A.dwg	Approved: DRAFT		

TABLES

Table 1: Soil Characterization Data – Petroleum Hydrocarbon Parameters
Client: KEL
Project: Remediation
KEL File #: 16-025

Sampling Information			Physical	Volatile Organic Compounds				Petroleum Hydrocarbons			
Sample ID	Lab ID	Date	Moisture	Benzene	Toluene	Ethylbenzene	Xylenes (Total)	F1-BTEX (C6-C10)	F2 (>C10-C16)	F3 (C16-C34)	F4 (C34-C50)
-	-	dd-mmm-yy	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
CCME Soil Quality Guidelines				0.03	0.37	0.082	11	-	-	-	-
CCME CWS for PHC				-	-	-	-	30	150	300	2800
Soil Sampling Locations											
SS1	RR3328	01-Aug-17	4.4	<0.005	<0.02	<0.01	<0.04	<10	<10	<50	<50
SS2	RR3329	01-Aug-17	2.6	<0.005	<0.02	<0.01	<0.04	<10	<10	<50	<50
SS3	RR3330	01-Aug-17	2.2	<0.005	<0.02	<0.01	<0.04	<10	<10	<50	<50
SS4	RR3331	01-Aug-17	9.2	<0.005	<0.02	<0.01	<0.04	<10	<10	<50	<50
SS5	RR3332	01-Aug-17	3.9	<0.005	<0.02	<0.01	<0.04	<10	<10	<50	<50
SS6	RR3333	01-Aug-17	4.1	<0.005	<0.02	<0.01	<0.04	<10	<10	<50	<50
Dup (SS7)	RR3334	01-Aug-17	2.8	<0.005	<0.02	<0.01	<0.04	<10	<10	<50	<50
Quality Assurance RPD			37.68%	--	--	--	--	--	--	--	--
BG	RR3337	01-Aug-17	62	<0.013	<0.05	<0.25	<0.1	<25	<26	140	<130

Legend

mbgs	metres below ground surface
mg/kg	milligrams per kilogram
Duplicate	Blind field duplicate sample
RPD	relative percent difference (-- indicates incalculable as below detection limits)

Applicable Guidelines

- *Canadian Environmental Quality Guidelines* (CCME Soil Quality Guidelines; CCME, 1998-2014); residential/parkland land use, coarse-grained surface soil
- *Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil* (CCME CWS for PHC; CCME, 2008); residential/parkland land use, coarse-grained surface soil

Notes

- Parameters not measured and absence of applicable guideline indicated by "-"
- Analytical data reported by Maxxam Analytics (Work Order #: B766031)
- Exceedance of applicable guidelines or background conditions indicated by shading; where multiple guidelines apply, the most stringent guideline was used
- Detection limits raised for Sample BG due to high moisture content, sample contains = > 50% moisture

Table 2: Soil Characterization Data – Total Metals
Client: KEL
Project: Remediation
KEL File #: 16-025

Sampling Information			Total Metals																				
Sample ID	Lab ID	Date	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Boron (B), soluble (hot water)	Cadmium (Cd)	Chromium (Cr), Total	Chromium (Cr6), Hexavalent	Cobalt (Co)	Copper (Cu)	Lead (Pb)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Thallium (Tl)	Tin (Sn)	Uranium (U)	Vanadium (V)	Zinc (Zn)
-	-	dd-mmm-yy	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
CCME Soil Quality Guidelines			20	12	500	4	-	10	64	0.4	50	63	140	6.6	10	45	1	40	1	50	23	130	200
Soil Sampling Locations																							
SS1	RR3328	01-Aug-17	<0.5	2.2	47	<0.4	0.23	<0.05	7.5	<0.08	2.8	6.1	4.3	<0.05	<0.4	5.8	<0.5	<0.2	<0.1	<1	0.49	13	<10
SS2	RR3329	01-Aug-17	<0.5	2.4	73	<0.4	0.25	<0.05	18	<0.08	2.9	5.8	4.8	<0.05	<0.56	11	<0.5	<0.2	<0.1	<1	0.56	13	<10
SS3	RR3330	01-Aug-17	<0.5	2.0	54	<0.4	<0.10	<0.05	14	<0.08	2.8	5.8	4.2	<0.05	0.44	9.2	<0.5	<0.2	<0.1	<1	0.48	13	<10
SS4	RR3331	01-Aug-17	<0.5	4.3	83	<0.4	1.7	<0.05	5.2	<0.08	2.2	1.8	5.1	<0.05	0.91	9.1	<0.5	<0.2	<0.1	<1	0.77	12	<10
SS5	RR3332	01-Aug-17	<0.5	2.4	40	<0.4	0.3	<0.05	25	<0.08	2.9	6.3	4.6	<0.05	0.83	13	<0.5	<0.2	<0.1	<1	0.63	14	<10
SS6	RR3333	01-Aug-17	<0.5	2.1	62	<0.4	0.21	<0.05	10	<0.08	2.7	5.6	4.1	<0.05	0.42	7.2	<0.5	<0.2	<0.1	<1	0.65	12	<10
Dup (SS7)	RR3334	01-Aug-17	<0.5	1.9	42	<0.4	0.13	<0.05	8.5	<0.08	2.7	5.6	4.1	<0.05	<0.4	7.2	<0.5	<0.2	<0.1	<1	0.50	12	<10
Quality Assurance RPD			--	10.00%	38.46%	--	47.06%	--	16.22%	--	0.00%	0.00%	0.00%	--	--	0.00%	--	--	--	--	26.09%	0.00%	--
BG	RR3335	01-Aug-17	<1	2.8	230	<0.8	7.2	0.25	13	<0.21	3.6	11	6.8	<0.1	0.96	11	<1	<0.4	<0.2	<2	4.4	17	38

Legend
mbgs metres below ground surface
mg/kg milligrams per kilogram
Duplicate Blind field duplicate sample
RPD relative percent difference (-- indicates incalculable as below detection limits)

Applicable Guidelines
- *Canadian Environmental Quality Guidelines* (CCME Soil Quality Guidelines; CCME, 1998-2014); residential/parkland, coarse-grained surface soil

Notes
- Parameters not measured and absence of applicable guideline indicated by "-"
- Analytical data reported by Maxxam Analytics (Work Order #: B766031)
- Exceedance of applicable guidelines or background conditions indicated by shading; where multiple guidelines apply, the most stringent guideline was used

Table 3: Surface Water Characterization Data
Client: KEL
Project: Remediation
KEL File #: 16-025

Sampling Information			Volatile Organic Compounds				Petroleum Hydrocarbons		Misc. Organic	Misc. Inorganics		Elements	
Sample ID	Lab ID	Date	Benzene	Toluene	Ethylbenzene	Xylenes (Total)	F1-BTEX (C6-C10)	F2 (C10-C16)	Extractable Oil and Grease	pH	Total Suspended Solids	Dissolved Lead (Pb)	Total Lead (Pb)
-	-	dd-mmm-yy	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	-	mg/L	mg/L	mg/L
CCME Water Quality Guidelines			0.37	0.002	0.09	-	-	-	-	6.5-9.0	-	0.007	0.007
Surface Water Monitoring Locations													
SW1	RR3335	01-Aug-17	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	2	8.52	4.7	<0.0002	<0.0002
SW2	RR3336	01-Aug-17	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1	<2	8.46	6.0	<0.0002	<0.0002

Legend
mg/L milligrams per litre

Applicable Guidelines
- *Canadian Environmental Quality Guidelines* (CCME Water Quality Guidelines; CCME, 1998-2014) for the protection of freshwater aquatic life

Notes
- Parameters not measured and absence of applicable guideline indicated by "-"
- Analytical data reported by Maxxam Analytics (Work Order #: B766031)
- Exceedance of applicable guidelines or background conditions indicated by shading; where multiple guidelines apply, the most stringent guideline was used

APPENDIX A

Inspector Approval to Discharge

From:	Baba Pedersen
To:	Joshua Foster
Cc:	Ferguson, Barrie
Subject:	RE: Cambridge Bay Water Pump Off
Date:	September 21, 2017 1:50:02 PM
Attachments:	ATT00001.jpg

Hi Josh,

Discharge Approval is granted.

Koana,
Baba

>>> Joshua Foster <jfoster@kblenv.com> 9/21/2017 12:55 PM >>>
Hi Baba,

Thank you for the quick reply. I can confirm that no contaminated soil has entered the berm yet and I have attached a photo from today showing the current state of the landfarm. Can you kindly respond to this email and confirm approval to discharge the water. Care will be taken to ensure that no erosion occurs during discharge.

Many thanks,

Josh

From: Baba Pedersen [mailto:Baba.Pedersen@aadnc-aandc.gc.ca]
Sent: September 21, 2017 11:23 AM
To: Joshua Foster <jfoster@kblenv.com>
Subject: Re: Cambridge Bay Water Pump Off

Hi Josh,

As long as the Berm has **NEVER** contained any sort of Contaminated Soils yet, **AND** the accumulated water is just from rain/snow, **then yes I will approve your Discharge Request**.

If the Berm has **EVER** contained any sort of Contaminated Soils, then you **MUST** sample and analyze as per your Water Licence. I do **NOT** have the authority to change NWB requirements.

Koana,
Baba

Baba Pedersen
Resource Management Officer III
Indigenous and Northern Affairs Canada
P.O. Box 278
Kugluktuk, Nunavut
X0B - 0E0
Phone 867-982-4306
Fax 867-982-4307
Cell 867-222-2839
Email : baba.pedersen@aandc.gc.ca

>>> Joshua Foster <jfoster@kblenv.com> 9/21/2017 9:50 AM >>>
Hi Baba,

There is accumulated water in the lined area of our landfarm that is under construction. There is currently no bulk contaminated soil stockpiled in the landfarm yet. I was wondering if we could receive approval to pump that water off as per our licence to the discharge point, without collecting analytical as the water has not contacted any contaminated soil. If we need to collect a sample, we are not sure we'll have results before freeze up.

Please let me know as soon as you can.

Josh Foster
Project Manager

Cell 780.289.9090
Office 867.873.5263
Fax 877.316.7991

Yellowknife Office
17 Cameron Road
PO Box 1895
Yellowknife, NT
X1A 2P4
kblenv.com

APPENDIX B

HDPE Liner Installation Report

A&A Technical Services
Yellowknife NT

Project:
KEL Land farm - Cambridge Bay NU

Client supplied 60mil Double textured HDPE installation

August 19-24, 2017

Client: KEL Environmental

TECHNICAL SERVICES

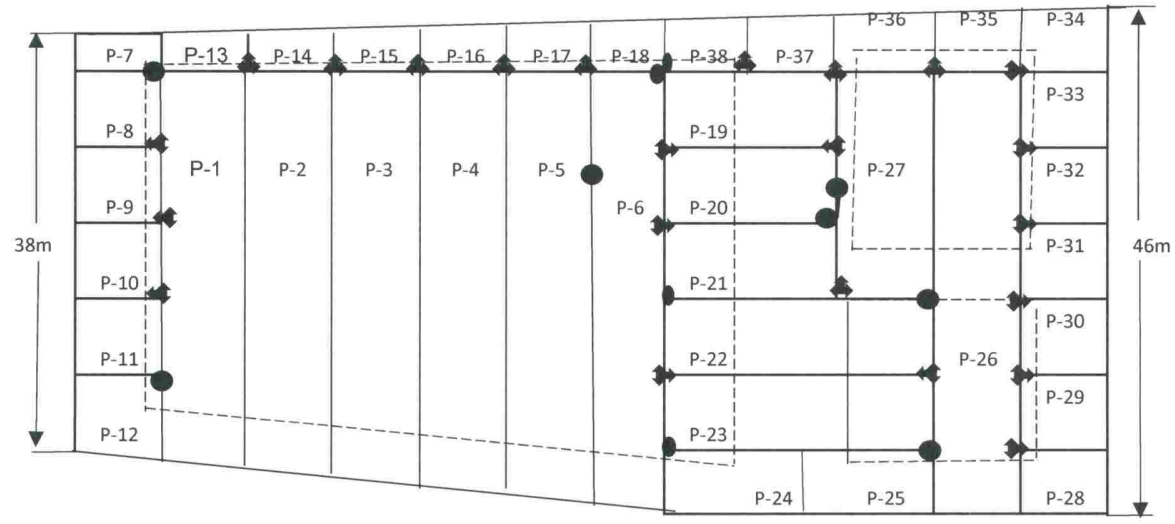
A&A Technical Services
Yellowknife NT

KEL Environmental – Cambridge Bay NU Land farm

Client supplied 60mil Double textured HDPE installation

August 19-24, 2017

KEL Land Farm _ Cambridge Bay NU
Panel layout drawing
August 19-24, 2017



Total m2 surface area = 3030.64 m2 lined
Measured to the back of anchor trench

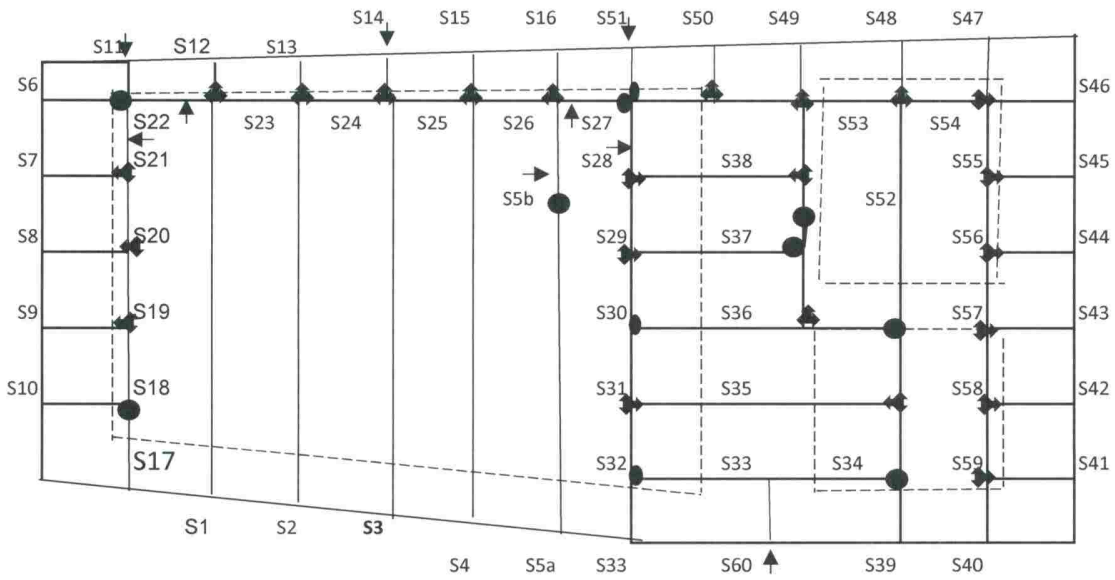
LEGEND:

P-1 PANEL NUMBER
EXTRUSION T weld
PATCH
Inside toe of cells

NOTE: NOT TO SCALE
see panel placement log for dimensions

PROJECT:		KEL- Land Farm - Liner panel dimensions		
LOCATION:		Cambridge Bay NU		
MATERIAL:		Client supplied 60 mil double textured HDPE		
CLIENT:		KEL Environmental		
Panel #	width m	length m	m2	Roll number
P-1	6.7	30.6	205.02	Unknown
P-2	6.6	31.0	204.6	Unknown
P-3	6.6	31.9	210.54	Unknown
P-4	6.6	33.6	221.76	Unknown
P-5	6.6	34.9	230.34	Unknown
P-6	6.6	35.1	231.66	Unknown
P-7	6.6	6.	39.6	Unknown
P-8	6.6	6.8	44.88	Unknown
P-9	6.6	6.8	44.88	Unknown
P-10	6.6	6.8	44.88	Unknown
P-11	6.6	6.8	44.88	Unknown
P-12	5.0	5.2	26.00	Unknown
P-13	6.6	6.8	44.88	Unknown
P-14	6.6	6.8	44.88	Unknown
P-15	6.6	6.8	44.88	Unknown
P-16	6.6	6.8	44.88	Unknown
P-17	6.6	6.8	44.88	Unknown
P-18	6.6	6.8	44.88	Unknown
P-19	6.6	10.5	69.3	Unknown
P-20	6.6	10.5	69.3	Unknown
P-21	6.6	10.5	69.3	Unknown
P-22	6.6	13.1	86.46	Unknown
P-23	6.6	13.1	86.46	Unknown
P-24	6.6	7.6	50.16	Unknown
P-25	6.6	5.4	35.64	Unknown
P-26	6.6	37.5	247.5	Unknown
P-27	6.6	16.5	108.9	Unknown
P-28	6.6	5.3	34.98	Unknown
P-29	6.6	5.3	34.98	Unknown
P-30	6.6	5.3	34.98	Unknown
P-31	6.6	5.3	34.98	Unknown
P-32	6.6	5.3	34.98	Unknown
P-33	6.6	5.3	34.98	Unknown
P-34	6.6	5.3	34.98	Unknown
P-35	6.6	8.5	56.1	Unknown
P-36	6.6	**8.5**	**56.1**	Unknown
P-37	6.0	8.0	**48.0**	Unknown
P-38	5.2	6.2	**32.24**	Unknown
	Total surface area		**3030.64 m2**	

KEL Land Farm - Cambridge Bay NU
Seam location drawing
August 19-24, 2017



Total m2 surface area = 3030.64 m2 lined
Measured to the back of anchor trench

LEGEND:

- S1 Seam number
- EXTRUSION T weld
- PATCH
- Inside toe of cells

NOTE: NOT TO SCALE
see panel placement log for dimensions

NON-DESTRUCTIVE AIR PRESSURE TESTING FORM

PROJECT:	**KEL Land Farm**
LOCATION:	**Cambridge Bay NU**
MATERIAL:	**Client supplied 60mil Double textured HDPE**
CLIENT:	**KEL Environmental**

Date	Seam Number	Tech.	TEST DATA				
			PRESSURE (psi) 5minutes			Pass/Fail	Comments
			Start	Finsh	Change		
Aug. 22, 2017	S1	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S2	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S3	AH	32.0	32.0	0.0	P	
Aug. 22, 2017	S4	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S5a	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S5b	AH	35.0	35.0	0.0	P	
Aug. 22, 2017	S6	AH	30.5	30.5	0.0	P	
Aug. 22, 2017	S7	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S8	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S9	AH	34.0	34.0	0.0	P	
Aug. 22, 2017	S10	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S11	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S12	AH	32.0	32.0	0.0	P	
Aug. 22, 2017	S13	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S14	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S15	AH	31.0	31.0	0.0	P	
Aug. 22, 2017	S16	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S17	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S18	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S19	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S20	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S21	AH	30.0	30.0	0.0	P	
Aug. 22, 2017	S22	GH	32.0	32.0	0.0	P	
Aug. 22, 2017	S23	GH	40.0	40.0	0.0	P	
Aug. 22, 2017	S24	GH	38.0	38.0	0.0	P	
Aug. 22, 2017	S25	GH	32.0	31.5	0.5	P	
Aug. 22, 2017	S26	GH	42.0	42.0	0.0	P	
Aug. 22, 2017	S27	GH	32.0	31.0	1.0	P	
Aug. 23, 2017	S28	GH	34.0	34.0	0.0	P	
Aug. 23, 2017	S29	GH	35.0	35.0	0.0	P	
Aug. 23, 2017	S30	GH	30.0	29.5	0.5	P	
Aug. 23, 2017	S31	GH	40.0	40.0	0.0	P	
Aug. 23, 2017	S32	GH	35.0	35.0	0.0	P	
Aug. 23, 2017	S33	GH	40.0	40.0	0.0	P	
Aug. 23, 2017	S34	GH	48.0	48.0	0.0	P	

NON-DESTRUCTIVE AIR PRESSURE TESTING FORM

PROJECT:	KEL Land Farm
LOCATION:	Cambridge Bay NU
MATERIAL:	Client supplied 60mil Double textured HDPE
CLIENT:	KEL Environmental

Date	Seam Number	Tech.	TEST DATA				
			PRESSURE (psi) 5minutes			Pass/Fail	Comments
			Start	Finsh	Change		
Aug. 23, 2017	S35	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S36	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S37	GH	32.0	32.0	0.0	P	
Aug. 23, 2017	S38	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S39	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S40	GH	35.0	35.0	0.0	P	
Aug. 23, 2017	S41	GH	30.5	30.5	0.0	P	
Aug. 23, 2017	S42	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S43	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S44	GH	34.0	34.0	0.0	P	
Aug. 23, 2017	S45	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S46	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S47	GH	32.0	32.0	0.0	P	
Aug. 23, 2017	S48	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S49	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S50	GH	31.0	31.0	0.0	P	
Aug. 23, 2017	S51	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S52	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S53	GH	30.0	30.0	0.0	P	
Aug. 23, 2017	S54	AH	30.0	30.0	0.0	P	
Aug. 23, 2017	S56	AH	30.0	30.0	0.0	P	
Aug. 23, 2017	S57	AH	30.0	30.0	0.0	P	
Aug. 23, 2017	S58	AH	40.0	40.0	0.0	P	
Aug. 23, 2017	S59	AH	38.0	37.5	0.5	P	
Aug. 23, 2017	S60	AH	36.0	35.5	0.5	P	
Aug. 23, 2017	Patches	GH				P	All patches were
							vaccum box tested
							1 pinhole detected
							and repaired on S5

PROJECT:	**KEL Land farm**
LOCATION:	**Cambridge Bay NU**
MATERIAL:	**Client supplied 60mil Double textured HDPE**
CLIENT:	**KEL Environmental**

Wedge and Extrusion welder daily pre-qualification data

Wedge welder#	Tech.	Wedge temp	speed	Date : Aug. 21, 2017		
1		420 C	2.6m/min	Ambient temp: overcast '+12C		
		Peel	**Minimum ppi***	**Shear**	**Min. ppi**	Comments
Sample #		Inside/outside				
1	AH	150/148	80	168	120	All samples broke
2	AH	144/149	80	171	120	outside weld

Wedge welder#		Wedge temp	speed	Date : Aug. 22, 2017		
1		420 C	2.6m/min	Ambient temp: broken cloud '+12C		
		Peel	**Minimum ppi***	**Shear**	**Min. ppi**	Comments
Sample #		Inside/outside				
1	AH	158/144	80	170	120	All samples broke
2	AH	142/144	80	163	120	outside weld

Wedge welder#		Wedge temp	speed	Date : Aug. 23, 2017		
1		420 C	2.6m/min	Ambient temp: sunny/broken cloud'+13C		
		Peel	**Minimum ppi***	**Shear**	**Min. ppi**	Comments
Sample #		Inside/outside				
1	GH	155/152	80	168	120	All samples broke
2	GH	149/144	80	168	120	outside weld

Extrusion welder		extrudite temp.	hot air temp.	Date : , 2017		
#1		250 C	250 C	Ambient temp: clear +14C		
		Peel	**Minimum ppi**	**Shear**	**Min. ppi**	Comments
Sample #		Inside/outside				
1	GH	145	80	170	120	All samples broke
2	GH	152	80	172	120	outside weld

*ppi= pounds per inch

A&A Technical Services Warranty

KEL Environmental – Cambridge Bay NU Land farm

Client supplied 60mil Double textured HDPE installation

August 19-24, 2017

Warranties issued by A&A Technical Services shall cover only the cost of replacement and/or repair of defective installations, determined or agreed to be the responsibility of A&A Technical Services, provide that the warranty work will be performed to the same standards and scope of work set out in the contract documents. A&A's installation warranty shall commence upon acceptance of the individual geosynthetic components by the owner or its representative as such components are completed. The installation warranty period shall not exceed beyond 1 years. Our installation warranty is rendered null and void if the installed geosynthetics are subject to abuse by machinery, equipment or personnel not under the control of A&A, harmful chemicals or unusual weather conditions or catastrophic earthworks failures.

A&A Technical Services shall not be held liable for defects, damage and/or deficient materials and installations, either in whole or in part should the defects, damage or deficient materials and installations arise as the result from the use of poor quality and inappropriate or unsuitable earthworks material or site preparation. This limitation of liability extends to improper and/or construction techniques, and methods and equipment used to create the earthworks covering all or any portion of the completed geosynthetic installation.

Signed: Alan Harman Dated: August 25, 2017

Al Harman
President
A&A Technical Services
Yellowknife NT

International Association of
Geosynthetic Installers

June 7, 2016

Alan Harman
A & A Technical Services

Dear Alan,

On behalf of the International Association of Geosynthetics Installers, we would like to congratulate you on passing your Renewal for the Polyethylene Welding Certification test. You have received certification in Wedge and Extrusion Welding. Your registration number is **CWT162010.** Your continued commitment to the Certified Welding Technician program is to be commended. The IAGI Polyethylene Welding Certification Program recognizes individuals who have hands-on skills, knowledge and experience in the welding and installation of polyethylene (PE) geomembranes. The certification program's goal is to promote the professionalism of the industry.

Certification encourages generally acceptable installation methods and provides a reward to individuals who have developed a certain level of expertise and professionalism. This program will be helpful to those regulators and engineers on jobsites who want to verify that the installation personnel working on their jobs are qualified to do the work.

Enclosed is your Certified Welding Technician certificate and wallet card. If you have any questions we may be contacted via phone at (720) 353-4977 or e-mail iagi@iagi.org.

Sincerely,

Laurie Honnigford

Laurie Honnigford
Managing Director

CERTIFIED WELDING TECHNICIAN

The International Association of Geosynthetic Installers
Certifies:

ALAN HARMAN

As a **Certified Welding Technician**, in polyethylene wedge and extrusion welding, having demonstrated superior hands-on skills, knowledge and experience in the welding and installation of polyethylene (PE) geomembranes, and having basic mechanical aptitude for working with welders and equipment on the job site.
Registration number: **CWT162010**

Valid 07 June 2016 — 07 June 2021

International Association of Geosynthetic Installers

President, IAGI

Managing Director, IAGI

International Association of
Geosynthetic Installers

June 7, 2016

Guy Horesay
A & A Technical Services

Dear Guy,

On behalf of the International Association of Geosynthetics Installers, we would like to congratulate you on passing your Renewal for the Polyethylene Welding Certification test. You have received certification in Wedge and Extrusion Welding. Your registration number is **CWT170010.** Your continued commitment to the Certified Welding Technician program is to be commended. The IAGI Polyethylene Welding Certification Program recognizes individuals who have hands-on skills, knowledge and experience in the welding and installation of polyethylene (PE) geomembranes. The certification program's goal is to promote the professionalism of the industry.

Certification encourages generally acceptable installation methods and provides a reward to individuals who have developed a certain level of expertise and professionalism. This program will be helpful to those regulators and engineers on jobsites who want to verify that the installation personnel working on their jobs are qualified to do the work.

Enclosed is your Certified Welding Technician certificate and wallet card. If you have any questions we may be contacted via phone at (720) 353-4977 or e-mail iagi@iagi.org.

Sincerely,

Laurie Honnigford

Laurie Honnigford
Managing Director

CERTIFIED WELDING TECHNICIAN

The International Association of Geosynthetic Installers
Certifies:

GUY HORESAY

As a **Certified Welding Technician**, in polyethylene wedge and extrusion welding, having demonstrated superior hands-on skills, knowledge and experience in the welding and installation of polyethylene (PE) geomembranes, and having basic mechanical aptitude for working with welders and equipment on the job site.
Registration number: **CWT170010**

Valid 07 June 2016 — 07 June 2021

President, IAGI

Managing Director, IAGI

APPENDIX C

Nunavut Water Board Annual Reporting Form

NWB Annual Report **Year being reported:** 2017

License No: 1BR-CST1723 **Issued Date:** March 23, 2017
Expiry Date: March 22, 2022

Project Name: Cambridge Bay Soil and Water Treatment Facility

Licensee: Kitnuna Environmental

Mailing Address:
PO Box 92, 10 Omilik Road
Cambridge Bay, NU
X0B 0C0

Name of Company filing Annual Report (if different from Name of Licensee please clarify relationship between the two entities, if applicable):

General Background Information on the Project (*optional):

Licence Requirements: the licensee must provide the following information in accodance with

Part C | Item 3

A summary report of water use and waste disposal activities, including, but not limited to: methods of obtaining water; sewage and greywater management; drill waste management; solid and hazardous waste management.

Water Source(s):

Water Quantity:

	Quantity Allowable Domestic (cu.m)
	Actual Quantity Used Domestic (cu.m)
	Quantity Allowable Drilling (cu.m)
	Total Quantity Used Drilling (cu.m)

Waste Management and/or Disposal

- ☐ Solid Waste Disposal
- ☐ Sewage
- ☐ Drill Waste
- ☐ Greywater
- ☐ Hazardous
- ☐ Other:

Additional Details:

A list of unauthorized discharges and a summary of follow-up actions taken.

Spill No.: (as reported to the Spill Hot-line)
Date of Spill:
Date of Notification to an Inspector:
Additional Details: (impacts to water, mitigation measures, short/long term monitoring, etc)

Revisions to the Spill Contingency Plan

SCP submitted and approved - no revision required or proposed

Additional Details:

Revisions to the Abandonment and Restoration Plan

AR plan submitted and approved - no revision required or proposed

Additional Details:

Progressive Reclamation Work Undertaken

Additional Details (i.e., work completed and future works proposed)

Results of the Monitoring Program including:

The GPS Co-ordinates (in degrees, minutes and seconds of latitude and longitude) of each location where sources of water are utilized;

Not Applicable (N/A)

Additional Details:

The GPS Co-ordinates (in degrees, minutes and seconds of latitude and longitude) of each location where wastes associated with the licence are deposited;

Not Applicable (N/A)

Additional Details:

Results of any additional sampling and/or analysis that was requested by an Inspector

No additional sampling requested by an Inspector or the Board

Additional Details: (date of request, analysis of results, data attached, etc)

Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported.

No additional sampling requested by an Inspector or the Board

Additional Details: (Attached or provided below)

Any responses or follow-up actions on inspection/compliance reports

No inspection and/or compliance report issued by INAC

Additional Details: (Dates of Report, Follow-up by the Licensee)

Any additional comments or information for the Board to consider

Date Submitted:	April 2, 2018	
Submitted/Prepared by:	Josh Foster	
Contact Information:	**Tel:**	867.873.5263
	Fax:	
	email:	jfoster@kblenv.com