SATHU LAND AND WATER BOARD
DRAFT - Type B Water Licence S17L8-003
Transport Canada, Prairie and Northern Region –
Environmental Services, Contaminated Sites

Commented [SS1]: These draft WL conditions have been developed in consideration of recent issuances by the Board (i.e., S13L8-003 for a land treatment facility operated by Mackenzie Valley Environmental Contractors Ltd. & S17L8-002 for remediation of the Great Bear Lake Mine Sites by INAC-CARD) as well as others issued in the Mackenzie Valley (i.e. G17L1-002 for the Inuvik Soil Treatment Facility operated by KBL Environmental & MV2017L8-0004 for the Landfarm operated by GNWT-ENR) as well as the Draft Guideline for Design, Operation, Monitoring, Maintenance and Closure of Hydrocarbon Contaminated Soil Treatment Facilities in the Northwest Territories and information submitted in the Application Package deemed complete November 15, 2017.

Part A: Scope and Definitions

Scope

1. This Licence entitles the Licensee to use Water and dispose of Waste for the purpose of the operation and maintenance, monitoring, and closure of the hydrocarbon contaminated soil Land Treatment Facility (Landfarm) located at the Norman Wells Airport property as described in the Application dated November 14, 2017.

2. This Licence is issued subject to the conditions contained herein with respect to the taking of Water and the depositing of Waste of any type in any Waters or in any place under any conditions where such Waste or any other Waste that results from the deposit of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the *Waters Act*, or other statutes imposing more stringent conditions relating to the quantity or type of Waste that may be so deposited or under which any such Waste may be so deposited this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conform with such Regulations.

3. Compliance with the term and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of any applicable Federal, Territorial or Municipal legislation.

Definitions

In this Licence, S17L8-003

Act - the *Waters Act*, S.N.W.T. 2014, c.18.

Action Level – a predetermined qualitative or quantitative trigger which, if exceeded, requires the Licensee to take appropriate actions including but not limited to: further investigations, changes to operations, or enhanced mitigation measures and reporting of same.

Analyst - an Analyst designated by the Minister under subsection 65(1) of the Act.

Board - the Sahtu Land and Water Board established by Part 3 of the *Mackenzie Valley Resource Management Act*.

Complete Application - the Type B Water Licence application with supporting documents as submitted to the Board on November 14, 2017 for operation and maintenance, monitoring, and closure activities at the hydrocarbon contaminated soil Land Treatment Facility located at the Norman Wells Airport property, NT

Composite Soil Sample – three or more discrete soil samples which have been collected and combined into a single sample, representing the average conditions in the soil.

Contingency Planning – a plan to establish a state of readiness that will enable prompt and effective response to possible spill or system failure.

Construction - any activities undertaken to construct or build any components of, or associated with, the development of the Project.

Discharge – the direct or indirect release of any Water or Waste to the Receiving Environment.

Engagement Plan - a document, developed in accordance with the Board's June 2013 *Engagement and Consultation Policy and the Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits,* that describes proposed engagement activities during the life of the undertaking.

Engineered Structure - means any structure or facility related to Water Use or the deposit of Waste that is normally designed and approved by a Professional Engineer, that are associated with the Construction, Operation, closure and Reclamation of the Project.

Freeboard - the vertical distance between the Water line and the lowest elevation of the effective Water containment crest on a dam or dyke's upstream slope.

Inspector - an Inspector designated by the Minister under subsection 65(1) of the Act.

Landfarm - the lined and bermed, engineered infrastructure designed to contain and treat hydrocarbon contaminated soil as described in the Complete Application as the Land Treatment Facility/Unit.

Leachate – water that has percolated through the soil on the Hydrocarbon Contaminated Soil Treatment Facility and may contain some of the constituents.

Licensee - the holder of this Licence.

Maximum Grab Concentration - a concentration of a parameter listed in the Licence that cannot be exceeded in any one grab sample.

Minister - a duly appointed member of the Executive Council who is responsible for the *Waters Act* or the department responsible for administering that Act.

Modification - a change, other than an expansion, that does not alter the purpose or function of a structure.

Overflow Pond - the engineered pond designed to hold Water pumped from the Retention Pond.

Professional Engineer - a person who is registered with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists in accordance with the Engineering and Geoscience Professions Act. S.N.W.T. 2006, V.16, or subsequent editions, as a Professional Engineer, and whose principal field of specialization is appropriate to address the components of the Project at hand.

Reclamation - the activities which facilitate the return of areas affected by the Project to a viable and, wherever practical, self-sustaining ecosystems that are compatible with a healthy environment, human activities, and surrounding environment.

Project - the Norman Wells Airport property Land Treatment Facility undertaking in its entirety, as described in Transport Canada's type B Water Licence application dated November 14, 2017.

Receiving Environment – the natural/aquatic environment that receives any deposit or Discharge of Waste or Water, including runoff, from the Project.

Retention Pond - the engineered pond designed to contain run-off Water from the Landfarm.

Regulations - Regulations proclaimed pursuant to section 63 of the Act.

Spill Contingency Plan - a document, developed in accordance with Indian and Northern Affairs Canada's April 2007 *Guidelines for Spill Contingency Planning* that describes the set of procedures to be implemented to minimize the effects of a spill.

Surveillance Network Program - a series or network of devices or sampling points designed to test environmental conditions for comparison against baseline data obtained from a point or area designated as a control. This is a method of tracking and identifying the spread of deleterious substances in the environment.

Unauthorized Discharge - is the release or Discharge or spill of any Water or Waste not authorized under this Licence.

Waste(s) - Waste as defined by section 1 of the Act.

Waste Management Plan - a document, developed in accordance with the Board's March 2011 *Guidelines for the Development of a Waste Management Plan,* which describes the methods of Waste management from Waste generation to final disposal.

Water(s) - means any Waters as defined by section 1 of the Act.

Water Use - a use of Water as defined by section 1 of the Act.

Part B: General Conditions

1. The Licensee shall ensure a copy of this Licence is maintained on site at all times, and that all employees conducting work related to the Landfarm are made aware of the appropriate sections of this Licence.

2. All references to policies, guidelines, codes of practice, statutes, regulations or other authorities shall be read as a reference to the most recent versions, unless otherwise denoted.

3. All information submitted to the Board, as required by this Licence, shall:

   a) Be submitted in a form acceptable to the Board;
   b) Be in accordance with the Board's March 2012 *Document Submission Standards*; and
   c) Include a section within each submission which identifies wherein the pertinent requirements of this Licence are addressed.

4. The Licensee shall operate in accordance with the plans, programs and manuals approved pursuant to the conditions of this Licence, including any revisions as may be made pursuant to the conditions of this Licence and as approved by the Board. If any plan is not approved by the Board, the Licensee shall revise the plan as directed by the Board and resubmit it for approval. Each revised submission shall include a list of material revisions.

5. The Licensee shall review the plans, programs, and manuals annually, or as directed by the Board, and make any necessary revisions to reflect changes in operations. All revised plans, programs, studies and manuals shall be submitted to the Board, for approval, at least sixty (60) days, unless otherwise specified, prior to implementing any proposed updates or changes in the approved plan, program, study or manual, and shall be accompanied by a brief summary of the changes made. All revised plans, programs, studies, and manuals shall be presented in a format consistent with the Board's *Standard Outline for Management Plans*.

6. The Licensee shall comply with the **Surveillance Network Program**, which is annexed to and forms part of this Licence, and any changes to the Surveillance Network Program as may be made from time to time by the Board.

7. The Licensee shall comply with the **Schedules**, which are annexed to and forms part of this Licence, and any changes to the Schedules as may be made by the Board.

8. The Surveillance Network Program and any compliance dates specified in this Licence may be changed at the discretion of the Board. If any date for any submission falls on a weekend or holiday, the item shall be submitted on the following business day.

9. Within sixty (60) days of the issuance of this Licence, the Licensee shall post the necessary signs, where possible, to identify the Landfarm and the station(s) of the Surveillance Network Program. All postings shall be located and maintained to the satisfaction of an Inspector.

10. Meters, devices, or other such methods used for measuring the volumes of Water used and Waste Discharged shall be installed, operated, and maintained by the Licensee to the satisfaction of an Inspector.

11. The Licensee shall submit an **Annual Water Licence Report** to the Board not later than March 31, 2018 and each year thereafter for the life of the Water Licence which shall be in accordance with **Schedule 1**.

12. The Licensee shall act in accordance with the **Engagement Plan** submitted to Board on November 8, 2017, once approved.

Part C: Conditions Applying to Security Requirements

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Part D: Conditions Applying to Water Use

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Part E: Conditions Applying to Waste and Water Management

1. The Licensee shall take every reasonable precaution to ensure that any unauthorized Waste(s) associated with this Project do not enter any Waters.

2. The Licensee shall immediately notify the Board and Inspector of the exceedance of any effluent quality criterion.

Management Plans and Monitoring Programs

3. The Licensee shall act in accordance with the **Waste Management Plan** submitted on November 7, 2017, until a revised version is approved by the Board.

4. Within sixty (60) days of issuance, the Licensee shall submit to the Board for approval, a revised **Waste Management Plan** that is in accordance with the Board's *Guidelines for Developing a Waste Management Plan* and commitments made during the review process for the Water Licence application.

5. Within 6 months of issuance, the Licensee shall submit to the Board for approval, a **Water Quality Monitoring Program**. The Licensee shall act in accordance with the Plan, once approved. The Plan shall be in accordance with **Schedule 2**.

Operations and Maintenance

6. Within sixty (60) days of issuance of this Licence, the Licensee shall submit to the Board for approval, an **Operations and Maintenance Manual**. The Licensee shall act in accordance with the Manual, once approved. The Manual shall be in accordance with the *Federal Contaminated Sites Action Plan, Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils* and include, but not be limited to, the following:

   a) Project description;
   b) Facility design;
   c) Facility Personnel and Training;
   d) Soil management procedures including the dimensions of soil piles (windrows);
   e) Soil removal procedures;
   f) Surface and groundwater monitoring;
   g) Leachate management and monitoring;
   h) Soil sampling and analysis plan;
   i) Effluent discharge procedures; and
   j) Inspection and maintenance schedule including response to major storm or catastrophic events.

7. The Licensee shall maintain and operate the Landfarm in such a manner as to prevent structural failure and to the satisfaction of an Inspector.

Acceptance Criteria

8. Contaminated soil from industrial, commercial, residential and institutional operators shall not be accepted at the Landfarm, unless otherwise authorized in writing by an Inspector.

Effluent Quality Criteria

9. The Licensee shall take measures to minimize or eliminate standing water at the Landfarm to the satisfaction of an Inspector.

10. The Licensee shall provide analytical results for Water sampling from Surveillance Network Program (SNP) station 2017-1, with the proposed discharge location, to an Inspector and the Board a minimum of ten (10) days prior to the discharge of standing Water from the Landfarm. Discharge shall not commence until authorized in writing by an Inspector.

11. Wastewater to be discharged from the Landfarm (SNP 2017-1) shall meet the following effluent quality criteria:

Commented [SS2]: As background studies indicate potential for PFAS as source of some soils from former Fire Training Area (fire-fighting foams), Board staff request reviewer comment on the EQC with consideration of inclusion of PFOS established to align with the ECCC (2017) Federal Environmental Quality Guidelines for PFOS is 6.8 µg/L for surface water (Table 1) and 0.068 mg/L for groundwater (coarse and fine soil, Table 3)

Parameter	Maximum Grab Concentration
pH	6.5-8.5
Aluminum	0.1 mg/L
Antimony	0.006 mg/L
Arsenic	0.005 mg/L
Barium	1 mg/L
Beryllium	0.0053 mg/L
Boron	1.5 mg/L
Cadmium	0.001 mg/L
Chromium (VI)	0.001 mg/L
Chromium (III)	0.0089 mg/L
Cobalt	0.05 mg/L
Copper	0.002 mg/L[1]
Iron	0.3 mg/L 0.
Lead	0.001 mg/L[2]
Manganese	0.05 mg/L
Mercury (inorganic)	0.000026 mg/L
Methylmercury	0.000004 mg/L
Molybdenum	0.073 mg/L
Nickel	0.025 mg/L[3]
Selenium	0.001 mg/L
Silver	0.00025 mg/L
Zinc	0.03 mg/L
Uranium	0.02 mg/L
Vanadium	0.1 mg/L
Benzene	0.37 mg/L
Toluene	0.002 mg/L
Ethylbenzene	0.09 mg/L
Xylenes	3.9 mg/L
Styrene	0.072 mg/L
F1	0.81 mg/L
F2	1.3 mg/L
Acenapthene	0.0058 mg/L
Acenaphthylene	0.046 mg/L
Anthracene	0.000012 mg/L
Fluoranthene	0.00004 mg/L
Fluorene	0.003 mg/L

[1] If water hardness is >180 mg/L the Maximum Grab Concentration is 0.004 mg/L

[2] If water hardness is >180 mg/L the Maximum Grab Concentration is 0.007 mg/L

[3] If water hardness is >180 mg/L the Maximum Grab Concentration is 0.007 mg/L

Naphthalene	0.0011 mg/L
Phenanthrene	0.0004 mg/L
Pyrene	0.000025 mg/L
Carcinogenic PAHs (as B(a)P TPE)	0.00001 mg/L
Benz[a]anthracene	0.000018 mg/L
Benzo[b+j]fluoranthene	0.00048 mg/L
Benzo[k]fluoranthene	0.00048 mg/L
Benzo[a]pyrene	0.000017 mg/L
Chrysene	0.0014 mg/L
Dibenz[a,h]anthracene	0.00028 mg/L
Indeno[1,2,3-c,d]pyrene	0.00023 mg/L
Phenol	0.004 mg/L
Polychlorinated biphenyls (PCBs)	0.0094 mg/L
Perfluorooctane sulfonate (PFOS)	6.8 µg/L
Ammonia	0.0094-73.3 mg/L[a]
Total Nitrate	13 mg/L
Nitrite (as nitrogen)	0.06 mg/L
Nitrate + Nitrite (as nitrogen)	100 mg/L

[a] The Maximum Grab Sample Concentration of Ammonia is dependent on the temperature and pH of the sample, at the time of sampling, as per the following table:

	pH				
	6.5	**7**	**7.5**	**8**	**8.5**
Temperature (°C)	**Maximum Grab Sample Concentration of Ammonia (mg/L)**				
0	73.3	23.1	7.32	2.33	0.749
5	48.3	15.3	4.84	1.54	0.502
10	32.4	10.3	3.26	1.04	0.343
15	22.0	6.98	2.22	0.715	0.239
20	15.2	4.82	1.54	0.499	0.171
25	10.6	3.37	1.08	0.354	0.125
30	7.50	2.39	0.767	0.256	0.094

Treated Soil Criteria

12. The Licensee shall ensure all treated soil from the Landfarm meets the remediation criteria for the proposed end use as per the Government of the Northwest Territories' *Environmental Guideline for Contaminated Site Remediation,* unless otherwise authorized by the Board and an Inspector, and includes at a minimum the following:

Substance	**Maximum Concentration for Composite Sample (mg/kg)**
pH	6-9
Antimony	40
Arsenic (inorganic)	120
Barium	2000
Beryllium	8
Cadmium	22

Commented [SS3]: Board staff request reviewer comment on consideration of inclusion of PFOS and PFOA at 3.2 mg/kg and 1.28 mg/kg as suggested by Arcadis 2017 as soil screening criteria for commercial use established by Health Canada (2017).

Board staff note that the ECCC Final Proposed Federal Soil Quality Guidelines (FSQG) for PFOS for Commercial Use is 0.14 mg/kg (coarse soil) and 0.21 mg/kg (fine soil).

Criteria presented are for the purpose of Commercial Use

Total chromium	87
Cobalt	300
Copper	91
Lead	260
Mercury	24
Molybdenum	40
Nickel	89
Selenium	3.9
Silver	40
Thallium	1
Tin	100
Uranium	300
Vanadium	130
Zinc	360

Substance	**Soil Maximum Concentration for Fine-grained soil (mg/kg)**	**Soil Maximum Concentration for Coarse-grained soil (mg/kg)**
Petroleum Hydrocarbons		
Fraction 1 (C6 - C10)	660	310
Fraction 2 (>C10 - C16)	1500	760
Fraction 3 (>C16 – C34)	2500	1700
Fraction 4 (>C34 – C50+)	6600	3300
Benzene	5.0	5.0
Toluene	0.8	0.8
Ethylbenzene	20	20
Xylene	20	20
Phenolic Compounds		
Cholorphenols		5
Nonchlorinated		10
Pentachlorophenol		7.6
Phenol		3.8
Polycyclic Aromatic Hydrocarbons (PAHs)		
Benzo(a)anthracene		10
Benzo(b)fluoranthene		10
Benzo(k)fluoranthene		10
Benzo(a)pyrene		0.7
Dibenz(a,h)anthracene		10
Indeno(1,2,3-c,d)pyrene		10
Naphthalene		22
Phenanthrene		50
Pyrene		100
Chlorinated Hydrocarbons		
Polychlorinated biphenyls (PCBs)		33
Perfluoroalkyl substances (PFAS)		
Perfluorooctane sulfonate (PFOS)		3.2
Perfluorooctanoic acid (PFOA)		1.28

*If testing for particle size is not completed by the Licensee to determine if soil texture, soil must be treated to achieve Coarse-grained soil criteria.

13. The Licensee shall obtain representative samples of treated soil as follows, or as authorized by an Inspector:

Volume of Soil (m^3)	Number of Composite Samples Required
1 - 50	1
51 - 500	2
501 - 1000	3
1001 - 2000	4
2001 - 4000	5
Each additional 1000	1 additional

14. Prior to removing treated soil from the Landfarm, the Licensee shall submit soil analytical results to the Inspector.

Part F: Conditions Applying to Construction

1. The Licensee shall ensure that all structures intended to contain, withhold, divert, or retain Water or Wastes are designed, constructed, and maintained to minimize the escape of Waste to the Receiving Environment.

2. The Licensee shall ensure that all Engineered Structures intended to contain, withhold, divert, or retain Water or Wastes and which meet the definition of a dam under the *Dam Safety Guidelines* are designed, constructed, and maintained to meet or exceed the *Dam Safety Guidelines*.

3. The Licensee shall ensure that all Engineered Structures are constructed and maintained following the recommendations of the Professional Engineer responsible for the design, including but not limited to, recommendations regarding field supervision and inspection requirements.

4. The Licensee shall maintain Construction records of Construction materials for all Engineered Structures and make them available at the request of the Board or an Inspector.

5. Within sixty (60) days prior to the commencement of Construction of any Engineered Structures intended to contain, withhold, divert, or retain Water or Waste, the Licensee shall submit to the Board, the **Final Detailed Construction Plan** and a **Design Report,** stamped by a Professional Engineer, which note "issued for Construction" or similar phrase. The Licensee shall ensure that these Engineered Structures are constructed in accordance with this submission.

6. A minimum of ten (10) days prior to the commencement of Construction of the structures referred to in Part F, condition 5, the Licensee shall provide written notification to the Board and an Inspector. Notification shall include the name and contact information for the site manager.

7. Within ninety (90) days of the completion of the Construction of each Engineered Structure, the Licensee shall submit to the Board an **As-built Report** which shall include as-built drawings of the Engineered Structures, documentation of field decisions that deviate from the Final Detailed Construction Plan and Design Report referred to in Part D, condition 5, and any data used to support these decisions.

8. Within thirty (30) days of Licence issuance, the Licensee shall provide the Board with a detailed sketch and photos of the layout of the Landfarm that shows where the holding tanks, sump (surface run-off Retention Pond), containment berms, surface and groundwater monitoring stations, and spill kits are/will be located, noting the size and capacity of each and any other relevant information.

Part G: Conditions Applying to Modifications

1. The Licensee may, without written approval from the Board, carry out Modifications to the Landfarm provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:
   a) The Licensee has notified the Board and an Inspector in writing of such proposed Modifications at least sixty (60) days prior to beginning the Modifications;
   b) The Modifications do not place the Licensee in contravention of either the Licence or the Act;
   c) The Board has not, during the sixty (60) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than 60 days;
   d) An Inspector has authorized the proposed Modifications and provided a letter of notification to the Board; and
   e) The Board has not rejected the proposed Modifications.

2. Modifications for which all of the conditions referred to in Part G, condition 1 have not been met, may be carried out only with written approval from the Board.

3. Within 90 days of the completion of Modifications referred to in Part G, condition 1, the Licensee shall provide as-built drawings stamped by a Professional Engineer to the Board.

Part H: Conditions Applying to Contingency Planning

1. The Licensee shall act in accordance with the **Spill Contingency Plan** submitted to the Board on November 6, 2017, until a revised version is approved by the Board.

2. Within sixty (60) days of issuance, the Licensee shall submit to the Board for approval, a revised **Spill Contingency Plan** that is in accordance with commitments made during the review process for the Water Licence application.

3. The Licensee shall ensure that petroleum products, hazardous material and other waste(s) associated with the Project do not enter any Waters.

4. If, during the period of this Licence, a spill or Unauthorized Discharge of Waste occurs, or is foreseeable, the Licensee shall:
   a) Implement the approved Spill Contingency Plan referred to in Part H, condition 1;
   b) Report the incident immediately via the 24-Hour Spill Report Line at (867) 920-8130 in accordance with the instructions contained in the Spill Report Form NWT 1752/0593;
   c) Report each spill and Unauthorized Discharge to the Board and an Inspector within 24 hours; and
   d) Submit a detailed report on each spill and Unauthorized Discharge, including descriptions of root causes, response actions and any changes to procedures to prevent similar occurrences in the future, to the Board and an Inspector within thirty (30) days.

5. All spills and Unauthorized Discharges of Water or Waste shall be reclaimed to the satisfaction of an Inspector.

Part I: Conditions Applying to Closure and Reclamation

1. Within six months of issuance of this Licence, the Licensee shall submit to the Board for approval a **Closure and Reclamation Plan** which shall include, but is not limited to, the following information:
   a) A description of existing conditions, including photographs;
   b) A summary compilation of pre-existing conditions, including assessments of soil, Water, groundwater, and permafrost;
   c) Target petroleum hydrocarbon concentrations for final land use;
   d) Closure and reclamation of the Landfarm, including:
      i. Final removal and disposal of treated and untreated soil;
      ii. Removal of synthetic liner system, surface water management retention structures and berms;
      iii. Underlying soil testing;
      iv. Site Reclamation; and
      v. Groundwater Monitoring well decommissioning;
   e) Closure and reclamation of any site affected by Waste spills;
   f) Management of natural runoff Waters from the Project area;
   g) Restoration of natural drainage at the Project area;
   h) Any potential for groundwater contamination;
   i) Any facilities or areas which may have been affected by development such that potential pollution problems exist;
   j) A description of the phased approach to closure and reclamation with an associated implementation schedule;
   k) Maps delineating all disturbed areas and site facilities including hydrological features and elevation contours;
   l) Future land use of the site;
   m) A post-closure monitoring plan that considers a schedule of periodic monitoring of contaminants of concern (including benzene, toluene, ethylbenzene and xylenes (BTEX); phenols, volatile organic compounds (VOCs); F1 to F4 hydrocarbon fractions; polycyclic aromatic hydrocarbons (PAHs); and total metals).

2. The Licensee shall act in accordance the Plan specified in Part I, condition 1, once approved by the Board.

3. Upon implementation of the Closure and Reclamation Plan, the Licensee shall provide to the Board and Inspector updates of all related activities within the Annual Water Licence Report as per Part B, condition 6 and Schedule 1.

4. Prior to Licence expiry, the Licensee shall submit to the Board a **Final Remediation Report**, including a record of site condition and final risk assessment results.

Signed on behalf of the Sahtu Land and Water Board

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Witness **Larry Wallace (Chairman)**

Schedule 1 – Annual Water Licence Report
Attached to Water Licence S17L8-003

The **Annual Water Licence Report** referred to in Part B, condition 11 of this Licence shall include, but not be limited to the following information:

a) Updates or revisions to the **Engagement Plan** referred to in Part B;
b) Updates or revisions to the **Waste Management Plan** referred to in Part E;
c) Updates or revisions to the **Operations and Maintenance Manual** referred to in Part E;
d) Details and results of the **Surface and Groundwater Quality Management Plan**, referred to in Part E, including, but not limited to: monitoring location (GPS coordinates); inspection results, depths, frequency of monitoring events, flow direction, chemical parameters tested, and data analysis;
e) Reporting of Action Levels exceedances and actions taken during the year as identified in the **Water Quality Management Plan**;
f) Monthly and annual quantities in cubic metres of all effluent discharged from the Landfarm;
g) Volume and analytical results of soil, including soil chemistry and soil particle size, removed from the Landfarm, the locations of the receiving sites, and the land use activity occurring at each receiving site location.
h) A description of how the contaminated soil was managed during the previous calendar year, including relevant operational details and methods and dates of soil tilling;
i) A summary of Construction, Modifications and/or maintenance activities at the Landfarm referred to in Parts F and G;
j) Contravention reports, if applicable;
k) Tabular summaries of all data generated under the Surveillance Network Program in accordance with reporting requirements in Part A, condition 2 of Annex A of this Licence;
l) A sampling and analysis plan for the forthcoming year;
m) Record of inspections of the Landfarm;
n) Updates or revisions to the Spill Contingency Plan referred to in Part H;
o) A list of spills or Unauthorized Discharges;
p) Updates or revisions to the Closure and Reclamation Plan referred to in Part I;
q) Details of any Reclamation including progressive Reclamation undertaken; and
r) Any other details on Waste disposal requested by the as Board by November 1 of the year being reported.

Schedule 2 – Water Quality Monitoring Program
Attached to Water Licence S17L8-003

The **Water Quality Monitoring Report** referred to in Part E, condition 5 of this Licence shall include, but not be limited to the following information:

a) A summary of the potential impacts from Project-related activities on the Receiving Environment;
b) A summary of how all site Water and Wastewater will be managed and finally discharged;
c) Identification, with rationale, of parameters of concern that should be used as indicators of potential impacts from Project-related activities on the Receiving Environment;
d) A description of the hydrogeology underlying and surrounding the Landfarm as assessed by a Professional Engineer, hydrologist; hydrogeologist or equivalent professional;
e) A description of the location, operation, and discharge procedures for standing Waters within the Landfarm;
f) A description of how leachate is monitored and managed at the Landfarm with appropriate maps or diagrams;
g) Baseline data that establishes existing concentration ranges of potential contaminants of concern, including but not limited to: benzene, toluene, ethylbenzene, and xylenes (BTEX), phenols, volatile organic compounds (VOCs), F1 to F4 hydrocarbon fractions, polycyclic aromatic hydrocarbons (PAHs), and total metals;
h) Details of monitoring for all existing and proposed components of the Water management system, with a purpose and rationale, as provided by a Professional Engineer, hydrologist; hydrogeologist or equivalent professional including a map and attached table or detailed legend illustrating monitoring and sampling locations;
i) The timing and frequency of monitoring events, including at least two monitoring events per year;
j) A description and rationale for the parameters to be tested and measured to identify potential impacts from Project-related activities;
k) A description of monitoring protocols, methodologies, parameters, and frequency specific to each type of monitoring;
l) Definitions, with rationale, for Action Levels for parameters of concern that will be monitored under the Water Quality Monitoring Program;
m) For each Action Level, a description of actions taken in response to any Action Level exceedances under the Water Quality Monitoring Program;
n) Reporting of Action Level exceedances and actions taken during the year in the Annual Water Licence Report as per Part B of this Licence;
o) A quality assurance/quality control plan for sample management; and
p) An explanation of any actions to be taken in response to any exceedances of the effluent quality criteria specified in Part E of this Licence.

Annex A – Surveillance Network Program (SNP)
Annexed to Water Licence S17L8-003

Table of Contents

Part A: Reporting Requirements

1. The effective date of this Surveillance Network Program (SNP) is TBD.

2. Beginning March 31, 2018, and for every year thereafter, the Licensee shall submit to the Board and Inspector, a **Surveillance Network Program Report** as part of the Annual Water Licence Report, as per Part B, condition 11 and specified in Schedule 1 of this Licence, which shall include, but not be limited to the following:

   a) Electronic and tabular summaries of all data and information generated under Part B of this Annex, including rationale for SNP stations where samples were not collected and results and interpretation of quality assurance/quality control procedures;
   b) Graphical summaries and interpretation of the analytical results from the SNP samples collected at the points of compliance compared to the effluent quality criteria identified in Part E of this Licence;
   c) Graphical summaries and interpretation of the analytical results from the SNP groundwater samples compared to the *Federal Contaminated Sites Action Plan – Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites*.
   d) An explanation of any actions taken in response to any exceedances of the effluent quality criteria;
   e) Information regarding the calibration and status of the meters and devices referred to in Part B of this Licence;
   f) The exact coordinates of all SNP stations which were established within the year being reported, including an updated map identifying the locations of all the SNP stations; and,
   g) A tabular summary of all Water discharged from the Landfarm.

3. The Licensee shall also provide SNP data at other times, if requested by the Board or Inspector.

Part B: Sampling and Analysis Requirements

1. The quantities of Water discharged from the Landfarm shall be measured and recorded in cubic metres.

2. All sampling, sample preservation, and analyses shall be conducted in accordance with methods prescribed in the current edition of American Public Health Association's (APHA) *Standard Methods for the Examination of Water and Wastewater* at the time of analysis, or by other such methods approved by an Analyst.

3. All groundwater samples are to be collected in accordance with ASTM D4448-01, Standard Guide for Sampling Ground-water Monitoring Wells or as recommended by a qualified professional.

4. All analyses shall be performed in a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA) for the specific analyses to be performed or as approved by an Analyst.

5. Prior to the collection of SNP samples, the Licensee shall submit to the Board and an Analyst, a Quality Assurance and Quality Control Plan, which shall include both field and laboratory requirements. The Analyst shall provide a recommendation to the Board. The Licensee shall not initiate the SNP until the Analyst has approved the Plan.

6. More frequent sample collection may be required at the request of an Inspector.

Part C: SNP Station Descriptions and Monitoring Requirements

1. The location of sampling sites is subject to approval of an Inspector.

2. Coordinates of the SNP stations shall be submitted to the Board within 60 days of issuance of this Licence.

3. The sampling station locations are as follows:

SNP Station Quick Reference Table

SNP Station #	Description	Status
2017-1	Monitors retention Waters in the Landfarm prior to discharge.	Active prior to proposed retention Water discharge
2017-2a	MW1 – Northwestern corner outside perimeter of the Landfarm	To be installed under S17X-004
2017-2b	MW2 – Southwest corner outside perimeter of the Landfarm	To be installed under S17X-004
2017-2c	MW3 – Southern edge outside perimeter of the Landfarm	To be installed under S17X-004

SNP Station 2017-1

Description	Monitors retention waters in the Landfarm prior to a proposed discharge.
Location	Within the Landfarm
Sampling Frequency	As required prior to discharge
Sampling Parameters	As identified in Part E, condition 11, phosphorus, hardness and temperature at the time of sampling.
Rationale	Point of compliance, to ensure discharge Water meets Part E, condition 11.
Status	Active prior to proposed retention Water discharge.

SNP Station 2017-2a

Description	Monitoring well at northwestern edge outside perimeter of the Landfarm
Location	TBD
Sampling Frequency	Following spring freshet and prior to freeze-up
Sampling Parameters	ICP-MS Metal Scan (Total) Field parameters Total Petroleum Hydrocarbons (F1, F2, F3, F4 CCME Fractions) Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) Chemical Oxygen Demand (COD) Extractable Petroleum Hydrocarbons (EPH) Total Suspended Solids (TSS) pH
Rationale	To ensure leachate Waters are not impacting surrounding environment via groundwater.
Status	Active following spring freshet and before freeze-up

SNP Station 2017-2b

Description	Monitoring well at southwestern edge outside perimeter of the Landfarm
Location	TBD
Sampling Frequency	Following spring freshet and prior to freeze-up
Sampling Parameters	ICP-MS Metal Scan (Total) Field parameters Total Petroleum Hydrocarbons (F1, F2, F3, F4 CCME Fractions) Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) Chemical Oxygen Demand (COD) Extractable Petroleum Hydrocarbons (EPH) Total Suspended Solids (TSS) pH
Rationale	To ensure leachate Waters are not impacting surrounding environment via groundwater.
Status	Active following spring freshet and before freeze-up

SNP Station 2017-2c

Description	Monitoring well at southern edge outside perimeter of the Landfarm
Location	TBD
Sampling Frequency	Following spring freshet and prior to freeze-up
Sampling Parameters	ICP-MS Metal Scan (Total) Field parameters Total Petroleum Hydrocarbons (F1, F2, F3, F4 CCME Fractions) Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) Chemical Oxygen Demand (COD) Extractable Petroleum Hydrocarbons (EPH) Total Suspended Solids (TSS) pH
Rationale	To ensure leachate Waters are not impacting surrounding environment via groundwater.
Status	Active following spring freshet and before freeze-up

Signed on behalf of the Sahtu Land and Water Board

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Witness **Larry Wallace (Chairman)**

Annex B – Concordance Table of Items Requiring Submission
Annexed to Water Licence S17L8-003

Table 1: Summary of the information the Licensee is required to submit as per the Water Licence conditions

Licence Condition	Item	Timeline for Submission	Requirement
B.9	Post signs to inform the public of the Landfarm and SNP Stations	Within 60 days of Licence issuance	Satisfaction of Inspector
B.11	Submit Annual Water Licence Report	Beginning March 31, 2018 and every year thereafter n	Acceptance by Board
B.5	Submit updated Engagement Plan	Upon any revision	Board approval
E.4	Submit revised Waste Management Plan	Within 60 days of Licence issuance	Board approval
E.5	Submit Water Quality Monitoring Program	Within 6 months of Licence issuance	Board approval
E.6	Submit Operation and Maintenance Manual	Within 60 days of Licence issuance	Board approval
E.10	Submit analytical results from SNP station 2017-1 with proposed discharge location	A minimum of 10 days prior to discharge	Written authorization by an Inspector
E.14	Submit analytical results from treated soil	Prior to removal from Landfarm	
F.5	Submit Fine Detailed Construction Plan and Design Report for any structures intended to contain, withhold, divert or retain Waters or Wastes.	Within 60 days prior to commencement	
F.6	Notify Board and Inspector before commencing Construction	At least 10 days prior to commencement	
F.7	Submit As-build Report for Construction of any structures intended to contain, withhold, divert or retain Waters or Waste	Within 90 days of completion of Construction	
F.8	Submit detailed sketch of Landfarm	Within 30 days of Licence issuance	
G.1	Notify Board and Inspector before commencing Modifications	At least 60 days prior to commencement	
G.3	Submit as-built drawings of Modifications	Within 90 days of completion	
H.2	Submit revised Spill Contingency Plan	Within 60 days of License issuance	Board approval
I.1	Submit Closure and Reclamation Plan	Within 6 months of Licence issuance	Board approval
Annex A	Submit Surveillance Network Program Report	Beginning March 31, 2018 and every year thereafter with the Annual Water Licence Report	

Annex C – Table of Revision History
Annexed to Water Licence S17L8-003

Table 1: Updates and changes that have been made to the Water Licence since issuance

Date	Location of Change	Description of Change