# ENVIRONMENTAL WASTE PROCESSING FACILITY

# REVISED 2019 ANNUAL REPORT

Nunavut Water Board
c/o Manager of Licensing
PO Box 119
Gjoa Haven, Nunanut  X0B 1J0

April 2020

O/Ref.: QE19-300-2

*Confidential document*

Qikiqtaaluk environmental
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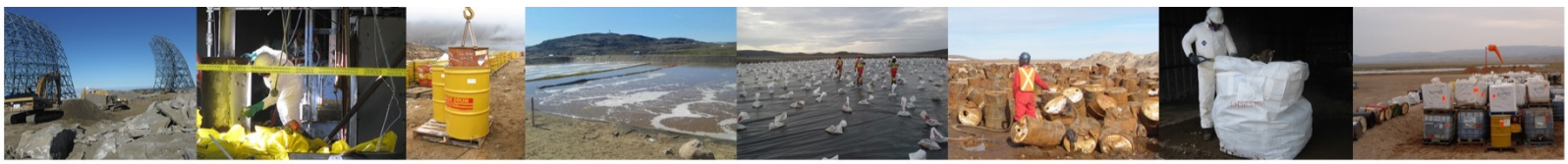

# Environmental Waste Processing Facility

# REVISED 2019 ANNUAL REPORT

*Confidential document presented to*

## NUNAVUT WATER BOARD

Prepared and verified by:

Raquel Labranche, P.Eng.
Project Manager

Approved by:

Jennifer Godin
Director

Qikiqtaaluk environmental
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April 2020

O/Ref.: QE19-300-2

**NWB Annual Report** **Year being reported:** 2019

**License No:** 1BR-THI1722 **Issued Date:** May 4, 2017
**Expiry Date:** May 3, 2022

**Project Name:** Hydrocarbon-Impacted Water Treatment Facility Project

**Licensee:** Qikiqtaaluk Environmental Inc.

**Mailing Address:**
PO Box 2110
2027 Iqaluit Lane
Iqaluit, Nunavut X0A 0H0

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

Same

**General Background Information on the Project (*optional):**

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

**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): No water used

| Water Quantity: | | |
|---|---|---|
| | 0 | Quantity Allowable Domestic (cu.m) |
| | 0 | Actual Quantity Used Domestic (cu.m) |
| | 0 | Quantity Allowable Drilling (cu.m) |
| | 0 | Total Quantity Used Drilling (cu.m) |

Waste Management and/or Disposal

Approximately 605 m³ of solid waste in Quatrex bags and drums, in addition to 23x 20-foot containers, and 1x 40-foot container of solid waste were disposed of down South at an accredited location.

In 2019, 1,850 m³ of soils were treated and sent to the local landfill to be used as cover material. 800 m³ of soils were treated and sent to a private client for commercial use. 800 m³ of soils were treated and used as backfill material on an industrial property.

Hydrocarbon-Impacted Water

Additional Details:

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

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

N/A

**Revisions to the Spill Contingency Plan**

Additional Details:

An updated version was approved after the licence renewal
**NWB Amendment – Renewal Water Licence No. 1BR-THI2027**

**Revisions to the Abandonment and Restoration Plan**

Additional Details:

An updated version was approved after the lisence renewal
**NWB Amendment – Renewal Water Licence No. 1BR-THI2027**

**Progressive Reclamation Work Undertaken**

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

N/A

**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;**

Additional Details:

No water used.

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

Additional Details:

Treated water was discharged at N63°44.640', W068° 35.986'. Associated hazardous waste, if any, is packaged and shipped South to an authorized disposal facility.

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

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

N/A

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

Additional Details: (Attached or provided below)

N/A

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

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

Licence No. 1BR-THI2027 issued to Qikiqtaaluk Environmental Inc. by the Nunavut Water Board (NWB or Board) on January 6, 2020 (see attached).

**Any additional comments or information for the Board to consider**

Attached are the analytical results for water samples collected at monitoring station THI-1 prior to the discharge of treated water on September 27, 2019 (≈ 12,000 L), and October 8, 2019 (≈ 64,000 L).

| | | |
|---|---|---|
| **Date Submitted:** | 01//04/2020 | |
| **Submitted/Prepared by:** | Raquel Labranche | |
| **Contact Information:** | **Tel:** | 514 208-5981 |
| | **Fax:** | N/A |
| | **email:** | rlabranche@qenv.ca |

File No.: **1BR-THI2027**

January 6, 2020

Olivier Simard
Project Manager, Northern Projects
Qikiqtaaluk Environmental Inc.
PO Box 2110 / 2027 Iqaluit Lane
Iqaluit, NU X0A 0H0

Email: osimard@qenv.ca

Raquel Labranche
Project Manager
Qikiqtaaluk Environmental Inc.
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Iqaluit, NU X0A 0H0

Email: rlabranche@qenv.ca

**RE: NWB Amendment – Renewal Water Licence No. 1BR-THI2027**

Dear Mr. Simard and Ms. Labranche:

Please find attached Licence No. 1BR-THI2027 issued to Qikiqtaaluk Environmental Inc. by the Nunavut Water Board (NWB or Board) pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada* (*Nunavut Agreement*). The terms and conditions of the attached Licence related to Water use and Waste disposal are an integral part of this approval.

If the Licensee contemplates the renewal of this Licence, it is the responsibility of the Licensee to apply to the NWB for its renewal. The past performance of the Licensee, new documentation and information, and issues raised during a public hearing, if the NWB is required to hold one, will be used to determine the terms and conditions of the Licence renewal. Note that if the Licence expires before the NWB issues a new one, then the use of Water and deposit of Waste must cease, or the Licensee may be in contravention of the *Nunavut Land Claims Agreement* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act (NWNSRTA)*. However, the expiry or cancellation of a licence does not relieve the holder from any obligations imposed by the licence. The NWB recommends that an application for the renewal of this Licence be filed at least **three (3) months** prior to the Licence expiry date. It should be noted that in accordance with Section 75(1)(a) of the *Nunavut Planning and Project Assessment Act (NuPPAA)*, the Board is not allowed to issue a permit or authorization for any project proposal that has not been submitted to the Nunavut Planning Commission (NPC) in accordance with Section 76 of *NuPPAA*.

If the Licensee contemplates or requires an amendment to this Licence, the NWB may decide, in the public's interest, to hold a public hearing. The Licensee should submit applications for amendment as soon as possible to give the NWB sufficient time to go through the amendment process. The process and timing may vary depending on the scope of the amendment; however, a minimum of **sixty (60) days** is required from time of acceptance by the NWB**.** It is the responsibility of the Licensee to ensure that all application materials have been received and are acknowledged by the Manager of Licensing.

The NWB strongly recommends that the Licensee consult the comments received from Crown-Indigenous Relations and Northern Affairs (CIRNA) on issues identified. This information is attached for your consideration[1].

Sincerely,

Lootie Toomasie
Nunavut Water Board
Chair

LT/sk/kc

Enclosure: Amendment – Renewal Licence No. **1BR-THI2027**

Comments: CIRNA

Cc: Distribution List – Qikiqtani

[1] CIRNA Letter, Re: Crown-Indigenous Relations and Northern Affairs comments on 1BR-THI1722 Amendment and Renew Application, dated October 28, 2019

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**DECISION**

**LICENCE No. 1BR-THI12027**

This is the decision of the Nunavut Water Board (NWB) with respect to an application dated July 15, 2019 for the amendment – renewal of a Water Licence made by:

**QIKIQTAALUK ENVIRONMENTAL INC.**

to allow for the deposit of Waste during the operation of a commercial Environmental Waste Processing Facility (EWPF) located within the City of Iqaluit (Lot 666, Plan 1673, Parcels O and Q), in the Qikiqtani Region, Nunavut, generally located at the following geographical coordinates:

| | | |
|---|---|---|
| EWPF location | Latitude: 63° 44' 40" N | Longitude: 68° 33' 03" W |
| | Latitude: 63° 44' 34" N | Longitude: 68° 32' 51" W |

## DECISION

After having received confirmation from the Nunavut Planning Commission (NPC)[2] that the Application is for a project proposal that falls outside of an area with an approved land use plan, and, as such, a conformity determination is not required, and is exempt from the requirements for screening by the Nunavut Impact Review Board (NIRB)[2] as described within Section 12.4.3/ Schedule 12-1 of the *Nunavut Agreement*, the NWB decided that the application could proceed through the regulatory process. In accordance with Section 55.1 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (*NWNSRTA* or *Act*) and Article 13 of the *Nunavut Agreement*, public notice of the Application was given and interested persons were invited to make representations to the NWB.

After reviewing the submission of the Applicant and considering the representations made by interested persons, the NWB, having given due regard to the facts and circumstances, the merits of the submissions made to it and to the purpose, scope and intent of the *Nunavut Agreement* and of the *Act*, waived the requirement to hold a public hearing, and determined that:

**Licence No. 1BR-THI1722 be renewed as Licence No. 1BR-THI2027 subject to the terms and conditions contained therein (Motion #: 2019-B1-029).**

Signed this 27th day of DECEMBER 2019 at Gjoa Haven, NU.

Lootie Toomasie
Nunavut Water Board Chair
LT/sk/kc

[2] Nunavut Planning Commission (NPC) Conformity Determination, August 9, 2019.

## I. INTRODUCTION

The Environmental Waste Processing Facility (EWPF) operated by Qikiqtaaluk Environmental Inc. (Qikiqtaaluk Environmental, QE, the Licensee or the Applicant) is located in Iqaluit, Nunavut. QE was established in 2003 and currently operates out of a 19,160 $m^3$ property located in a Heavy Industrial Zoned lot (Lot 1673, Plan 666, Parcels O & Q) within the limits of the City of Iqaluit. Currently, QE is engaged in the following Waste management activities regulated under the existing NWB Type "B" Water Licence No. 1BR-THI1722 (the Existing Licence):

- treatment of Water impacted by hydrocarbons, organic compounds and / or metals at the Water Treatment Facility (WTF);
- treatment of hydrocarbon contaminated soils through a biopile (landfarming); and
- operation of a Hazardous Waste Transfer Centre (HWTC).

In current Application, the Licensee has requested to increase its treatment capacity and storage volume by constructing the following infrastructure:

- 400,000 L lined watertight basin, along with a 120,000 L holding tank to increase the Petroleum Hydrocarbon (PHC)-impacted Water processing capacity,
- 9,000 $m^3$ lined watertight cell to increase storage volume of the PHC-impacted soils.

In its Cover Letter, the Licensee indicated that the soil containment cell was constructed in June 2018 as an emergency measure to contain the thaw from the accumulated PHC-impacted products.

## II. FILE HISTORY

Qikiqtaaluk Environmental has held Water Licences with the NWB since 2014, as outlined in Table 1.

**Table 1. Project Licensing History**

| Licence No. | Date Issued | Comments |
|---|---|---|
| 1BR-THI1419 | August 20, 2014 | Authorization to commercially treat hydrocarbon impacted Water |
| 1BR-THI1722 | May 04, 2017 | Authorization to commercially treat contaminated soil, contaminated Water and manage hazardous Waste |
| 1BR-THI1722 Amendment No. 1 | September 15, 2017 | Modification of discharge limits for the WTF's treated effluent |

## III. APPLICATION PROCEDURAL HISTORY

On July 15, 2019, Qikiqtaaluk Environmental Inc. submitted to the NWB an Application requesting to amend the Water Licence No. 1BR-THI1722. Following receipt, the NWB conducted a preliminary internal technical review of the full Application package, which identified specific deficiencies that had to be addressed in order for the Application to proceed through the licensing process. The Board provided details of its findings to the Applicant in correspondence[3] dated July 17, 2019.

On July 22, 2019, the NWB received a response[4] from the Applicant advising that the comments will be addressed within a few weeks. Following a reminder email, dated September 11, 2019, the Applicant submitted the compliance table on September 17, 2019. The information provided did not fully address the deficiencies indicated previously, and the Proponent was asked to provide more information in correspondence[5] from the Board dated September 17, 2019.

On September 27, 2019, in response to the NWB's correspondence, the Applicant provided copies of new or revised documents to address the indicated deficiencies. Having determined the submission to address the relevant deficiencies satisfactorily, the Board distributed the Application for a thirty (30) day public review period with a deadline set at October 28, 2019. The Application to amend Licence No. 1BR-THI1722 included the following documents:

- NWB Application for Water Licence Amendment, dated July 15, 2019;
- Summary of Application for Amendment in English;
- Summary of Application for Amendment in Inuktitut
- Previous NPC Determination, dated November 24, 2015;
- Previous NIRB Screening, dated April 15, 2016;
- 2019 Compliance Table, dated September 17, 2019;
- 2017 and 2018 Annual reports;
- Environmental Protection Plan, dated May 14, 2019;
- Abandonment and Restoration Plan, dated July 16, 2019
- Spill Contingency Plan, dated September 27, 2019;
- Operations and Management Plan, dated September 27, 2019;
- NPC Determination, dated August 9, 2019.

Additionally, the Applicant indicated in their Compliance Table that the Quality Assurance / Quality Control (QA/QC) Plan will be submitted to the Board *"before the winter".*

On or before the deadline for comments, the NWB received a submission from Crown-Indigenous and Northern Affairs (CIRNA)[1]. Comments provided by CIRNA were related to missing Construction Report for the new cell, missing Waste volumes in the Annual Reports and clarification on the Water used for soil physical treatment through washing.

[3] Email from S. Kuflevskiy, NWB, to O. Simard, QE, Re: 1BR-THI1722 Amendment Application Inquiry, July 17, 2019.
[4] Email from O. Simard, QE, to S. Kuflevskiy, NWB, Re: 1BR-THI1722 Amendment Application Inquiry, July 22, 2019.
[5] Email from S. Kuflevskiy, NWB, to R. Labranche, QE, Re: 1BR-THI1722 Amendment Application Inquiry, September 17, 2019.

## IV. ISSUES

### A. Term of the Licence

The Licensee has requested a twenty five (25) year term for the Renewal Licence. In accordance with s. 45 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (*NWNSRTA* or the *Act*), the NWB may issue a Licence for a term not exceeding twenty-five (25) years. In determining an appropriate term for the Renewal Licence, the Board took into consideration several factors including intervener's comments, the Licensee's compliance history, and rationale included in the Application.

Given the Licensee's ongoing compliance disposition, the Board has decided to issue the Licence for only seven (7) years term which will bring the current expiry in 2022 to 2027. The Board believes that this term will provide the Applicant with adequate time to address all non-compliance issues associated with its Undertaking. Additionally, this term will provide stakeholders and the Board with an opportunity to observe the Licensee compliance pattern over an extended period of time, and assess their performance prior to considering any future renewal licence that might include a longer term.

### B. Annual Reporting

Under Part B, Item 1 of the Licence, the Licensee is required to submit Annual Reports for the purpose of ensuring that the NWB has an accurate annual update of municipal activities related to Water use and Waste disposal during each calendar year. This information is maintained on the Public Registry and is available to interested parties upon request. A "*Standardized Form for Annual Reporting*" is to be used by the Licensee and could be supplemented by additional monitoring documentation and Licensee's annual reporting forms. The NWB *Standardized Form* is available from the NWB file transfer protocol (FTP) site under the following Public Registry link at the NWB Website:

ftp://ftp.nwb-oen.ca/other documents/Standardized Forms/

The NWB has also taken this opportunity to review the Annual Reports submitted in recent years, and the following deficiencies in reporting have been identified:

- failure to submit the required documentation on time;
- failure to submit the Construction Summary Report for the newly built cell;
- failure to provide a description of all progressive reclamation work undertaken; and
- failure to provide a discussion on the WTF best achievable treatment levels.

The Board would like to remind the Licensee that the Annual Reporting requirements of the Licence should be adhered to so as to help maintain full compliance with respective terms and conditions in the Licence. The Board strongly recommends that for all subsequent annual submissions the Licensee provides the quantities of all hazardous and non-hazardous Wastes collected at the facility, as well as the quantities of contaminated soils treated and disposed.

## C. Security

The NWB notes that during the 2017 Application process the Licensee provided a financial estimate of CAD $324,460 for potential reclamation activities associated with the proposed project. However, the Board has decided to exempt the Licensee from posting a reclamation security amount for the Project. The Board understands that reclamation security for this type of undertaking has to be examined in a holistic manner and in accordance with the type of undertaking so as to avoid a tiered approach to reclamation security requirements for similar undertakings.

The Board maintains, however, under Part C, Item 1 of current Licence, the requirement to annually review the reclamation cost estimate, update it as needed and submit the changes to the Board for review. In addition, should the Project scope change or further reviews of subsequent applications and information provided through Annual Reports and Inspection Reports warrant the need, and the Board approach to reclamation security broadens, the requirements for providing a total reclamation security for site liability may be required during the term of this Licence.

## D. Water Use

Water use is not authorized under the existing Water Licence. This condition will be maintained in current Licence, as the Applicant has indicated that the planned modifications would not affect the Project requirement of Water and did not apply for a Board's authorization to use Water.

## E. Waste Management

The Licensee currently operates three facilities or units at the Environmental Waste Processing Facility (EWPF). Two units are intended to treat contaminated Waters and soils and the third one is to store / transfer hazardous Waste. The management of the Water, Waste and Wastewater related to these units requires the Licensee to follow applicable legislation and guidelines, and be consistent with the terms and conditions included in this Licence.

**Water Treatment Facility (WTF)**

The WTF treats Petroleum Hydrocarbon (PHC)-impacted Water (including Water originating from impacted snow and ice) as well as Water impacted by inorganic contaminants (i.e. metals) and organic contaminants (i.e. solvents, glycols, etc.). The WTF includes the following components:

- oil/Water separator;
- particulate filters;
- patented ultra-sorption filters;
- activated carbon filters;
- Water pumps; and
- storage tanks for the treated effluent and the impacted Water.

PHC-contaminated Water is passed first through an oil/Water separator and preliminary filtered to remove suspended solids. Following this, Water is circulated through ultra-sorption filters and then activated carbon filters to remove the organic contaminants (solvents, glycol, etc.). Inorganic contaminated Water may be chemically processed by precipitation or undergo ion-exchange treatment using an ion-exchange resin.

The Facility can currently treat up to a maximum of 43.2 $m^3$ of contaminated Water per day. The total Water storage capacity at the Facility, which includes both the impacted and treated Water, is 674 $m^3$. Water is stored in tanks that are provided with a system consisting of secondary containment and berms to prevent spills. This Amendment aims to increase the treatment capacity by constructing a 400,000 L lined watertight basin to hold PHC-impacted Water, as well as a 120,000 L holding tank for treated Water.

Details provided in the Application indicate that, in addition to the treated effluent that originates through processing contaminated Water, the following residual or secondary types of Waste may be generated during the treatment: waste fuel, oil and lubricants; waste filter media from treatment units and used absorbent materials; sludge; contaminated Water; contaminated soil; and other hydrocarbon, metal and organic contaminated Waste. All Waste generated is required to be managed in accordance with the terms and conditions in this Licence and/or applicable legislation, regulations and guidelines. In addition, Hazardous Waste shall be removed from site to an approved hazardous waste management facility.

The Applicant has indicated that treated compliant Water generated at the WTF can be reused for equipment cleaning or discharged directly to the environment. Furthermore, contaminated Water may be added to soils with similar contaminants in order to aid in the soil biotreament.

In addition:

- sludge originating from the treatment of the PHC-impacted Water will be shipped off to an authorized facility;
- sludge generated from the treatment of inorganic contaminated Water will either be disposed of at the Municipal Landfill or shipped off to an authorized facility;
- hydrocarbons recovered during the Water treatment operations will either be used in a Waste oil furnace or shipped off site to an authorized facility;
- used filter media will be shipped off site to an authorized facility;
- treatable hydrocarbon impacted soil will be treated at site;
- untreatable contaminated soil will be shipped off site; and
- untreatable hydrocarbon contaminated material will be shipped off site.

***Effluent from the WTF***

The treated effluent generated at the WTF is to be either reused for cleaning (equipment washing) or discharged to the environment, where it must not exceed the *Water Quality Guidelines* set in the *Canadian Water Quality Guidelines for the Protection of Aquatic Life, Canadian Council of Ministers of Environment (CCME)* for surface Water reception. In addition, Water reused for cleaning is then treated, tested and if compliant, discharged. According to Part E of the Licence, the NWB has set discharge limits for the most usual

parameters expected to be found in the contaminated Water and has also included limits for oil and grease and total suspended solids (TSS), that are consistent with limits set for those parameters under licences for similar types of undertaking.

The Licensee should note that parameters which are not included under Part E, but relevant to the Undertaking must not exceed values set in the *Canadian Council of Ministers of Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life*.

***Other Waste produced in the WTF***

Sludge is a semi-solid residual that usually needs to be dewatered prior to disposal. Sludge is generated as by product of Water treatment (Water contaminated by hydrocarbons, metals and/ or other inorganic compounds).

Sludge is generated as residual from the treatment of PHC-impacted Water and would likely be contaminated by hydrocarbons. This sludge is considered hazardous Waste and shall be shipped off to an authorized Waste disposal site. On the other hand, the disposal of sludge generated by chemical treatment of inorganic impacted Water depends on the sludge physio-chemical characteristics. Provided it is not hazardous Waste, this type of sludge might be disposed of in a landfill. It is the Licensee's responsibility to ensure that the sludge is suitable for disposal of at the municipal landfill.

The *Government of Nunavut's Environmental Guideline for Industrial Waste Discharges into Municipal Solid Waste and Sewage Treatment Facilities*[6] recommends a leachate testing method to determine the acceptability of a process residual (or sludge) in a landfill. If the process residual meets the relevant criteria indicated in the Guideline, it can be disposed of in a landfill; process residual which does not meet the Guideline relevant criteria is considered to be hazardous Waste and shall be disposed of according to the *Guideline for the General Management of Hazardous Waste in Nunavut*[7].

With respect to the Waste oil, the Applicant has indicated its intention of burning the Waste oil in a Waste oil furnace. Regarding this use, it should be taken into account that the quality of the burner feedstock is one of the greatest determinants of emissions quality[8]. For this reason, DOE – GN does not recommend burning of used oil or Waste fuel when the undiluted levels of metals, halogens and polychlorinated biphenyls (PCBs) exceed those recommended in the *Guideline for Used Oil and Waste Fuel*. With respect to the residue collected from the burning appliance (ash and other solid residue) it is suitable for burial in municipal solid waste facility, when it meets the criteria set out in *Table 1* of the *Environmental Guideline for Industrial Waste Discharges into Municipal Solid Waste and Sewage Treatment Facilities* (Table 2). When the residue meets the criteria and is to be disposed of into a municipal landfill, consent from the local community government must first be obtained. Ash not meeting the criteria is considered to be Hazardous Waste and must be managed in accordance with the *Environmental Guideline for the General Management of Hazardous Waste.*

6 Environmental Guideline for Industrial Waste Discharge into Municipal Solid Waste and Sewage Treatment Facilities, DOE-GN, Rev. 2011

7 Environmental Guideline for the General Management of Hazardous Waste, DOE-GN, Rev. October 2010

8 Environmental Guideline for Used Oil and Waste Fuel, DOE-GN, 2012

All Waste generated at the EWPF will require management in accordance with the terms and conditions established under Part E of this Licence and/or applicable legislation for this type of Waste. In addition to the above, the Licensee is required to manage the Waste generated from the Undertaking in accordance with applicable guidelines including but no limited to:

- GN - DOE, *Environmental Guideline for Used Oil and Waste Fuel* (June 2012),
- GN – DOE *Environmental Guideline for Industrial Waste Discharge* (rev. April 2011) and the GN-DOE *Environmental Guideline for the General Management of Hazardous Waste* (rev. October 2010).

**Soil Treatment Facility (Landfarm)**

At the Soil Treatment Facility (STF) or Landfarm, up to a maximum of 500 $m^3$ of contaminated soil is currently stored and treated using a combination of physical (screening and washing) chemical (oxidation) and biological (biopiles and/or landfarm techniques) methods. This Amendment aims at increasing the current storage volume through construction of a new lined watertight cell able to contain 9,290 $m^3$ of material.

The STF or Landfarm is expected to treat hydrocarbon contaminated soils resulting from oil spills (e.g. from oil storage tanks and furnaces). The targeted contaminants are mostly petroleum hydrocarbons (PHCs), including Benzene, Toluene, Ethylbenzene, and Xylene (BTEX), Monocyclic Aromatic Hydrocarbons (MAHs) and Polycyclic Aromatic Hydrocarbons (PAHs). The estimated treatment capacity of the facility is 1,000 t of soil per year. The system is to be operational during the summer and early fall season.

The soil treatment unit consists of a soil storage and processing area with a biopile pad, and a Water collection pond constructed using a 40 mil thick HDPE liner, covered and underlain by a protective geotextile liner and further protected by a 0.3 m thick layer of clean gravel.

The biopile pad has a berm around the perimeter to prevent soil or Water loss. Soils undergoing treatment are covered by semi permeable liners in order to prevent dust. The pad will be built with a slope towards a Water collection drain. The drain directs the collected leachate/Water toward the Water collection pond.

The Water collection pond is installed at the low point between the treatment pad and the processing storage area. The function of the pond is to collect Water from precipitation, the leachate from the soil pile and the Water from the air/water separators. The pond is equipped with a submersible pump to direct Water back onto the soil piles or to direct excess Water to the WTF.

The soil storage area is used for the temporary storage and screening of soils as well as rock washing.

The soils are received, weighed and inspected to check for the nature of the soil, extent of contamination, etc. Representative soil samples are taken and analyzed. After treatment the batches are sampled and analyzed again. Depending on results the soils may undergo further treatment.

Further details on the management of soils are discussed in the Application and include:

- the disposal of compliant treated soil at the Iqaluit landfill, alternatively treated compliant soil - after sampling, analysis and verification of compliance - can be used as backfill;
- the off-site disposal of untreatable soil such as soil contaminated with oil, grease creosote, PCBs, metals, etc.;

With respect to effluent discharge, the Applicant has indicated that the system is configured in a way that no effluent is discharged into the environment. The collection pond will collect the Water, which will then be recycled or treated.

With regards to groundwater impact due to soil treatment, QE has installed monitoring wells and is implementing the Environmental Monitoring Program in order to ensure that no contamination migrates off-site.

With respect to the soil quality criteria to be required after treatment or soil remediation objective, the Board agrees with the Licensee's proposed soil remediation objective, in that soils will be treated to satisfy the Tier 1 Criteria for PHC as provided by the *Nunavut Guideline for Contaminated Site Remediation*, 2009 (GN-DOE).

The Applicant has also indicated its intention to dispose of the treated soil at the Iqaluit Municipal Landfill. In such case, in addition of the generic Tier 1 Criteria, the soil quality shall also satisfy the criteria established under Column 2 of Table 1 (or Table 3 in this Licence) of the *Environmental Guideline for Industrial Discharge into a Municipal Solid Waste and Sewage Treatment Facility*, April 2011 (GN-DOE).

In addition to the above named Guidelines, the following Guidelines also apply for the Undertaking and shall be consulted by the Applicant:

- *Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils* (updated 2013, Federal Contaminated Sites Action Plan, Government of Canada), and

- *Canada Wide Standards for Petroleum Hydrocarbons (PHC) in Soil* (2001, CCME).

**Hazardous Waste Transfer Facility**

The Licensee operates a Hazardous Waste Transfer Facility (HWTF) to process glycols, batteries, paint or paint related materials, regulated building demolition debris, and biohazard medical Waste. The Applicant has indicated that all Hazardous Waste is segregated, consolidated, packaged, labelled and shipped off site for disposal in accordance with appropriate Regulations.

In addition, QE is registered as a Hazardous Waste management facility in Nunavut as per email from GN-DOE[9] providing QE's registration number as generator and carrier.

9 Email from Robert Eno to QE, Re: application for waste carrier and waste generator, dated August 31, 2011

The DOE - GN *Guideline General Management of Hazardous Waste*[10] provides helpful information to generators, carriers and receivers of Hazardous Waste to develop an environmentally sound system of waste management. According to the Guide, some general points to consider when establishing a Hazardous Waste storage facility are:

- Inspections at the facility and of stored Wastes should be performed and recorded at least once every week;
- Containers should be placed, so that each can readily and easily be inspected for signs of leakage, corrosion or deterioration. Leaking, corroded or deteriorated containers should immediately be removed and their contents transferred to a sound container;
- Records should be maintained indicating the type and quantity of Waste being stored along with the date, type and quantity of Hazardous Waste brought into or removed from the facility;
- Drainage into and from the storage facility site should be controlled to prevent spills or leaks from leaving the site and to prevent run-off from entering the site;
- All Waste should be stored on a firm working surface that is impervious to leaks;
- Incompatible Waste must be stored in a manner that prevents contact in the event of a spill or accidental release;
- An Emergency Response Plan should be developed.

Additionally, the following guidelines from the DOE-GN may apply and shall be consulted by the Applicant in order to use the best available environmental practices at the Facility:

- *Environmental Guideline for the General Management of Hazardous Waste*, DOE-GN, October 2010;
- *Environmental Guideline for Waste Lead and Lead Paint*, GN-DOE, revised March 2011;
- *Environmental Guideline for Used Oil and Waste Fuel*, GN-DOE, June 2012;
- *Environmental Guideline for Waste Batteries*, GN-DOE, January 2011;
- *Environmental Guidelines for Waste Solvent*, GN-DOE, January 2011*;*
- *Environmental Guidelines for Waste Lead and Lead Paint*, GN-DOE, March 2011*;*
- *Environmental Guidelines for Waste Asbestos*, GN-DOE, January 2011;
- *Mercury – Containing Products and Waste Mercury*, GN-DOE, November 2010.

It should be noted that all Hazardous Wastes must be handled in accordance with applicable regulations including the *Transportation of Dangerous Goods Act*. In addition, the Licensee is required, under Part E of current Licence to dispose of all hazardous substances and/or materials at approved facilities.

Finally, under Part E, Item 22 of the Renewal – Amended Licence, the Board has established criteria to govern the discharge to the environment of the surface contact Water and seepage from the Environmental Waste Processing Facility. Surface Water shall be collected, sampled and analyzed. Water in compliance with Licence quality limits can be discharged to the freshwater environment. Non-compliant Water shall be treated and the cause of the non-compliance investigated and determined.

10 Environmental Guideline for the General Management of Hazardous Waste, DOE-GN, Rev. October 2010

## F. Modifications and Construction

The Board understands that the additional lined watertight cell was constructed in June 2018 as an emergency measure to contain the thaw from the accumulated PHC-impacted products. The Boards notes that the updated drawings signed by an engineer were provided to the NWB as part of the Amendment Application package.

However, the Construction Summary Report required under Part F, Item 5 has not been provided to the Board to date. Therefore, the Licensee is required to provide the missing report to the Board within the 2019 Annual Report submission.

## G. Operations

The following Management Plans were approved with the issuance of current Licence:

- *"Environmental Protection Plan, Environmental Waste Processing Facility",* dated May 14, 2019;
- "*Operation and Management Plan, Environmental Waste Processing Facility*", dated December 9, 2019

However, the Board notes that the Monitoring Station descriptions in these Plans do not match with those in the Water Licence and has therefore requested to revise current Plans and provide the updated versions to the Board for review with the 2019 Annual Report.

## H. Spill Contingency Planning

The Plan entitled "*Spill Contingency Plan, Environmental Waste Processing Facility*", dated September 27, 2019, was approved by the NWB with the issuance of current Licence.

## I. Abandonment and Reclamation

The Plan entitled *"Abandonment and Restoration Plan, Environmental Waste Processing Facility, 2019 Amendment to 1BR-THI1722",* dated July 16, 2019, was approved by the NWB with the issuance of current Licence.

However, the Board notes that the Licensee has not submitted the schedule of reclamation work for the abandoned Facility (previous location) located at 63° 45' 44" N and 68° 32' 41" W, within the City of Iqaluit, required by the Existing Water Licence. Therefore, this condition has been carried forward into current Licence under Part I, Item 1a.

Additionally, under Part B, Item 1(g) the Licensee is required to include into the Annual Report "*a description of all progressive and or final reclamation work undertaken, including photographic records of site conditions before, during and after completion of operations."*

Further to that, the Licensee is required to annually review the A&R Plan and submit to the Board for approval, at least one year prior to the Project's closure, a Final Abandonment and Remediation Plan.

## J. Monitoring

The NWB maintains the conditions pertaining to the Monitoring Program requirements outlined in Part J of the previous Water Licence. The Licensee must ensure that the Monitoring Program requirements are fully implemented. It should also be noted that while minimum sampling requirements have been imposed, additional sampling may be required upon request by an Inspector.

In the event of temporary or long term closure, the Board has included conditions under Part J, Item 16 of the Licence requiring the Licensee to submit a Monitoring Plan to the Board for approval at least sixty (60) days prior to the suspension of temporary or long-term operation of site facilities.

Additionally, the Applicant indicated in their Compliance Table that the Quality Assurance / Quality Control (QA/QC) Plan will be submitted to the Board *"before the winter"*. However, this submission has not been provided to the NWB to date. Therefore, as established in condition under Part J Item 11, the Licensee is required to submit to the Board for approval the missing QA/QC Plan with the 2019 Annual Report. The Plan must be approved in writing by an accredited laboratory, confirming that the Plan is acceptable.

Table 2. Recommended Levels of Impurities for Burning Used Oil & Waste Fuel[11]

| | USED OIL | WASTE FUEL |
|---|---|---|
| IMPURITY | MAXIMUM CONCENTRATION (PPM) | MAXIMUM CONCENTRATION (PPM) |
| Cadmium | 2 | 2 |
| Chromium | 10 | 10 |
| Lead | 100 | 100 |
| Total Organic Halogens (as chlorine) | 1,0000 | 1,5000 |
| Polychlorinated Biphenyls | 2 | 2 |
| Ash content | | 0.6% by weight |

Table 3. Criteria for Process Residuals[12a]

| Substance | Column 2: Process Residual Criteria, µg/L |
|---|---|
| Arsenic | 2.5 |
| Barium | 0.5 |
| Cadmium | 0.5 |
| Carbon Tetrachloride (tetrachloromethane) | 0.5 |
| Chromium | 5 |
| Lead | 5 |
| Mercury | 0.1 |
| Methyl Ethyl Ketone | 200 |
| Polychlorinated Biphenyls (PCBs) | 50[b] |
| Polychlorinated Dibenzo Dioxins and Furans | 0.0000015 I-TEQ[c] |
| Selenium | 1 |
| Silver | 5 |
| Tetrachloroethylene | 3 |
| Trihalomethanes (Total) | 10 |
| Vinyl Chloride | 0.2 |
| Zinc | 500 |

a. Refer to the Canadian Environmental Protection Act (CEPA) Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations - Schedule 6 for criteria regulating other process residuals.
b. Based on concentration by mass.
c. International Toxicity Equivalents.

11 Environmental Guideline for Used Oil and Waste Fuel, DOE-GN, 2012
12 Environmental Guidelines for Industrial Waste Discharges into Municipal Solid Waste and Sewage Treatment Facilities, Department of Environment, Government of Nunavut, revised April 2011

# NUNAVUT WATER BOARD
# AMENDED RENEWAL WATER LICENCE

**Licence No. 1BR-THI2027**

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

**QIKIQTAALUK ENVIRONMENTAL INC.**

(Licensee)

**PO BOX 2110 / 2027 IQALUIT LANE, IQALUIT, NU X0A 0H0,**

(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use Water or dispose of Waste for a period subject to restrictions and conditions contained within this Licence Renewal:

| | |
|---|---|
| Licence Number/Type: | **1BR-THI2027 / TYPE "B"** |
| Water Management Area: | **FROBISHER BAY WATERSHED (53)** |
| Location: | **CITY OF IQALUIT / QIKIQTANI REGION, NUNAVUT** |
| Classification: | **INDUSTRIAL UNDERTAKING** |
| Purpose: | **DEPOSIT OF WASTE** |
| Quantity of Water use not to Exceed: | **USE OF WATER IS NOT AUTHORIZED** |
| Effective Date : | **JANUARY 1, 2020** |
| Expiry of Licence: | **DECEMBER 31, 2027** |

This Licence amendment and renewal, issued and recorded at Gjoa Haven, Nunavut, includes and is subject to the annexed conditions.

**Lootie Toomasie,**
**Nunavut Water Board, Chair**

## PART A: SCOPE, DEFINITIONS AND ENFORCEMENT

### 1. Scope

This Licence allows for the deposit of Waste for an undertaking classified as 'Industrial' as per Schedule I of the *Regulation*s, at the Qikiqtaaluk Environmental Inc.'s Environmental Waste Processing Facility, located in an industrial area within the City of Iqaluit, Qikiqtani Region, Nunavut, generally located at:

| | |
|---|---|
| Latitude: 63° 44' 40" N | Longitude: 68° 33' 03" W |
| Latitude: 63° 44' 34" N | Longitude: 68° 32' 51" W |

a. This Licence is issued subject to the conditions contained herein with respect to 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 deposits of such Waste may enter any Waters. Whenever new Regulations are made or existing *Regulations* are amended by the Governor in Council under the *Nunavut Waters and Nunavut Surface Rights Tribunal 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 subject to such requirements; and

b. Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation.

### 2. Definitions

"**Act**" means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"**Addendum**" means the supplemental text that is added to a full plan or report usually included at the end of the document and is not intended to require a full resubmission of the revised report.

"**Amendment**" means a change to original terms and conditions of this Licence requiring correction, addition or deletion of specific terms and conditions of the Licence; modifications inconsistent with the terms of the set terms and conditions of the Licence;

"**Appurtenant Undertaking**" means an undertaking in relation to which a use of Water or a deposit of Waste is permitted by a licence issued by the Board;

**"Batch Discharge"** means the controlled discharge of a discrete, contained volume of effluent from the WTF at the Final Discharge Point. The maximum volume of a batch discharge shall not exceed 21,000 $m^3$ per batch, or otherwise as permitted by an Inspector;

"**Board**" means the Nunavut Water Board established under the *Nunavut Land Claims Agreement* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

**"Care and Maintenance"** in respect of operation, means when the Licensee ceases production or commercial operation for an undefined period of time;

**"Construction"** means any activities undertaken to establish and install any or all components of the Environmental Waste Processing Facility;

**"Dangerous Good"** means any product, substance or organism included by its nature or by the Transportation of Dangerous Goods Regulations in any of the classes listed in the Schedule provided in the Transportation of Dangerous Goods Act;

**"Effluent"** means treated or untreated liquid Waste material that is discharged into the environment from a structure such as a settling pond, landfarm or a treatment plant;

**"Engineer"** means a professional engineer registered to practice in Nunavut in accordance with the *Consolidation of Engineers and Geoscientists Act S. Nu 2008, c.2 and the Engineering and Geoscience Professions Act S.N.W.T. 2006, c.16 Amended by S.N.W.T. 2009, c.12*;

**"Environmental Waste Processing Facility (EWPF)"** means the commercial Facility used for the collection, and temporarily storage of Water, soil and Hazardous Waste. It is designed to treat contaminated Water, soil and manage (collect, store and transfer) Hazardous Waste, as described in the Application for Water Licence amendment filed with the Board by the Applicant on July 15, 2019;

**"Final Discharge Point"** means the point at which the Licensee no longer exerts care and/or control over the quality and/or quantity of the effluent from a treatment process;

**"Hazardous Waste"** means Waste classified as "hazardous" by Nunavut Territorial or Federal Legislation, or as "dangerous goods" under the Transportation of Dangerous Goods Act at the time of clean-up;

**"Hazardous Waste Transfer Facility (HWTF)"** means the commercial facility used for the collection, storage and transfer, of a Hazardous Waste as described in the Application for Water Licence amendment filed by the Applicant on July 15, 2019;

"**High Water Mark**" means the usual or average level to which a body of Water rises at its highest point and remains for sufficient time so as to change the characteristics of the land (ref. Department of Fisheries and Oceans Canada, Operational Statement: Mineral Exploration Activities);

"**ICP Scan**" means the laboratory method for determining trace metals in Water through Emission Spectroscopy using inductively coupled plasma (including from approximately 22 to 32 elements, depending on the laboratory performing the analysis);

**"Incompatible Hazardous Waste"** means a Hazardous Waste that, when in contact with another substance or Hazardous Waste under normal circumstances, reacts to produce heat, gas, fire, explosion or a corrosive or toxic substance;

"**Inspector**" means an Inspector designated by the Minister under Section 85 (1) of the *Act*;

"**Licensee**" means the holder of this Licence;

**"Long Term Storage of Hazardous Waste**" means the storage of Hazardous Waste for a period of 180 days or more;

**"Minister"** means the Minister of Crown-Indigenous Relations and Northern Affairs;

"**Modification**" means an alteration to a physical work that introduces a new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion;

**"Monitoring Program"** means a program established to collect data on surface Water, groundwater, and soil quality to assess impacts to the environment of an appurtenant undertaking;

**"Nunavut Agreement"** means the *"Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*", including its preamble and schedules, and any amendments to that agreement made pursuant to it;

**"Process Residuals"** means solid, semi-solid or sludge Waste resulting from an industrial operation;

"**Regulations**" means the *Nunavut Waters Regulations* SOR/2013-69 18th April, 2013;

"**Secondary Containment**" means an impermeable structure, external to and separate from primary containment, which prevents unplanned spills of hazardous materials and provides a minimum capacity of 110% of the original vessel. Where multiple vessels are stored within the containment, it must provide a minimum capacity equal to the sum of the largest vessel and 10% of the aggregate volume of all other vessels located in the containment. This structure shall also provide containment and control of hoses and nozzles;

**"Seepage"** means any Water that drains through or escapes from any structure designed to contain, withhold, divert or retain Water or Waste;

**"Soil Treatment Facility (STF)"** means the commercial Facility used for the collection, temporarily storage and treatment of contaminated soil, as described in the Application for Water Licence amendment filed by the Applicant on July 15, 2019;

"**Spill Contingency Plan**" means a Plan developed to deal with unforeseen petroleum and hazardous materials events that may occur during the operations conducted under the Licence;

"**Sump or Sumps**" A structure or depression that collects, controls, and filters liquid Waste before it is released to the environment. This structure should be designed to prevent erosion while allowing percolation of liquid Waste;

**"Tier I Soil"** means soil containing contaminant concentrations within the types and ranges defined for Tier I soil at the *Canada Wide Standards (CWS) for Petroleum Hydrocarbons (PHC) in Soil, CCME*;

**"Transfer"** means the temporary storage of Hazardous Waste for a period of 179 days or less for the purpose of changing from one vehicle or means of transportation to another;

**"Transporter"** means a person who accepts Hazardous Waste for transportation or transports Hazardous Waste, whether or not for hire or reward. A transporter is also referred to as a carrier of Hazardous Waste;

**"Used Oil"** means Engine, turbine and gear lubricating oil, hydraulic and transmission fluid and insulating coolant (i.e. transformer fluid) that is unsuitable for its intended purpose due to the presence of impurities or the loss of original properties, but does not include Waste derived from animal or vegetable fat or a petroleum product spilled on land or Water;

"**Waste**" means, as defined in S.4 of the *Act*, any substance that, by itself or in combination with other substances found in Water, would have the effect of altering the quality of any Water to which the substance is added to an extent that is detrimental to its use by people or by any animal, fish or plant, or any Water that would have that effect because of the quantity or concentration of the substances contained in it or because it has been treated or changed, by heat or other means;

**"Waste Fuel"** means a flammable or combustible petroleum hydrocarbon that is unsuitable for its intended purpose due to the presence of impurities or the loss of original properties, and includes gasoline, diesel and fuel oil, aviation fuel, kerosene and naphtha, but does not include paint, solvent or propane;

"**Water**" **or** "**Waters**" means Waters as defined in section 4 of the *Act*;

**"Water Licence or Licence"** means this Licence, 1BR-THI2027;

**"Water Treatment Facility (WTF)"** means the commercial Facility used for the collection, temporary storage and treatment of contaminated Water, as described in the Application for Water Licence amendment filed by the Applicant on July 15, 2019.

**3. Enforcement**

a. Failure to comply with this Licence will be a violation of the *Act*, subjecting the Licensee to the enforcement measures and the penalties provided for in the *Act*;

b. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the *Act*; and

c. For the purpose of enforcing this Licence and with respect to the use of Water and deposit or discharge of Waste by the Licensee, Inspectors appointed under the *Act*, hold all powers, privileges and protections that are conferred upon them by the *Act* or by other applicable law.

## PART B: GENERAL CONDITIONS

1. The Licensee shall file an Annual Report on the Appurtenant Undertaking with the Board no later than March 31st of the year following the calendar year being reported, containing the following information:

a. summary of the Water Treatment Facility (WTF) activities, including:

i. quantity and chemical characterization of Contaminated Water/snow/ice collected for treatment at the Water Treatment Facility (WTF);
ii. quantity of Waste generated at the Water Treatment Facility (WTF) including petroleum, oil, and lubricants (POL), sludge, Waste filter media, and any other Waste resulting from the treatment of Water at the Water Treatment Facility, and details of the Waste fate;
iii. inventory of contaminated Water stored at the project site;
iv. inventory of treated Water stored at the project site, lab analysis results of the treated Water;
v. effluent discharged to the receiving environment from the Water Treatment Facility (WTF) including location and quantity and quality of Effluent discharged;
vi. treated Water reused for cleaning, quantity and analysis results;
vii. sludge disposal, if sludge is disposed of at the landfill, lab results and Hamlet authorization; and
viii. summary of all Waste backhauled for disposal at approved facilities

b. summary of the Soil Treatment Facility (STF) activities, including:

i. quantity and chemical characterization of soil received/ collected at the Soil Treatment Facility (STF);
ii. summary of the origin of the soil treated at the Soil Treatment Facility (STF) and associated spill report number;
iii. quantity and chemical characterization of soils placed within the Soil Treatment Facility (STF) for treatment;

iv. laboratory results of the soil monitoring for verification of remediation;
v. average time of soil treatment;
vi. tabular data of annual quantities in cubic metres of: soils treated, collected at the Facility and a list of type of contaminants;
vii. summary of all Waste backhauled for disposal at approved facilities;
viii. results of the groundwater monitoring program.

c. summary of the Hazardous Waste Management Facility (HWMF) activities, including:

i. quantity and type of Hazardous Waste received;
ii. summary of all Hazardous Waste backhauled, for disposal at approved facilities.

d. a list of unauthorized discharges and a summary of follow-up actions taken;
e. summary of any construction work, modification and major maintenance work (including as-built diagrams) carried out on all new and existing licensed waste facilities;
f. any revisions to the Spill Contingency Plan, Abandonment and Restoration Plan, and any other Plans as required in *Part B, Item 6*, submitted in the form of an Addendum;
g. description of all progressive and or final reclamation work undertaken, including photographic records of site conditions before, during and after completion of operations;
h. review of the reclamation cost estimate, as required in *Part C, Item 1*;
i. tabular summary of all information requested and results of the Monitoring Program;
j. an analysis of data collected during the "Monitoring Program" and a brief description of any future studies planned by the Licensee;
k. public consultation/participation report describing consultation with local organizations and the residents of the nearby communities;
l. any other details on Waste disposal requested by the Board by November 1 of the year being reported; and
m. for the first Annual Report following issuance of current Licence, include a discussion on the Water Treatment Facility best achievable treatment levels.

2. The Licensee shall notify the NWB of any changes in operating plans or conditions associated with this project at least thirty (30) days prior to any such change.

3. The Licensee shall install flow meters or other such devices, or implement suitable methods to the satisfaction of the Inspector for the measuring of Effluent volumes discharged into the receiving environment at the Final Discharge Point as required under *Part J, Item 2*.

4. The Licensee shall, for all Plans submitted under this Licence, include a proposed timetable for implementation. Plans submitted, cannot be undertaken without subsequent written Board approval and direction. The Board may alter or modify a Plan

if necessary to achieve the legislative objectives and will notify the Licensee in writing of acceptance, rejection or alteration of the Plan.

5. The Licensee shall, for all Plans submitted under this Licence, implement the Plan as approved by the Board in writing.

6. The Licensee shall review the Plans referred to in this Licence, as required by changes in operation and/or technology, and modify the Plan accordingly. Revisions to the Plans shall be submitted in the form of an Addendum to be included with the Annual Report.

7. Every Plan to be carried out pursuant to the terms and conditions of this Licence shall become a part of this Licence, and any additional terms and conditions imposed upon approval of a Plan by the Board become part of this Licence. All terms and conditions of the Licence should be contemplated in the development of a Plan where appropriate.

8. The Licensee shall ensure a copy of this Licence is maintained at the site of operations at all times. Any communication with respect to this Licence shall be made in writing to the attention of:

**a. Manager of Licensing:**
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369
Email: licensing@nwb-oen.ca

**b. Inspector Contact:**
Manager of Field Operations, CIRNA
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4295
Fax: (867) 979-6445

9. The Licensee shall submit an electronic copy of all reports, studies, and plans to the Board. Reports or studies submitted to the Board by the Licensee shall include a detailed executive summary in Inuktitut.

10. The Licensee shall ensure that any document(s) or correspondence submitted by the Licensee to the NWB is received and acknowledged by the Manager of Licensing.

11. This Licence is assignable as provided for in Section 44 of the *Act*.

12. The expiry or cancellation of this Licence does not relieve the Licensee from any obligation imposed by the Licence, or any other regulatory requirement.

## PART C: CONDITIONS APPLYING TO SECURITY

1. The Licensee shall review annually, the reclamation cost estimate submitted as part of the 2017 Application package. Any changes made to the estimate should be submitted to the Board for review with the Annual Report required under *Part B, Item 1*.

## PART D: CONDITIONS APPLYING TO WATER USE

1. Water use is not authorized under this Licence.

2. The Licensee shall not remove any material from below the ordinary High Water Mark of any Water body unless authorized.

3. The Licensee shall not cause erosion to the banks of any body of Water and shall provide necessary controls to prevent such erosion.

4. Sediment and erosion control measures shall be implemented prior to and maintained during the operation to prevent entry of sediment into Water.

## PART E: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall provide at least ten (10) days' notice in writing, to an Inspector prior to any planned discharge of Effluent from the Environmental Waste Processing Facility (EWPF). The notice shall include the volumes proposed for discharge, the Effluent quality of the proposed discharge, location of discharge and an indication of any nearby Water bodies that may be impacted.

2. The Licensee shall confirm, with an Inspector, the suitable location(s) or Final Discharge Point(s) for the Effluent from the Environmental Waste Processing Facility (EWPF) prior to any discharge into the receiving environment.

3. The Licensee shall locate areas designated for Waste disposal at a minimum distance of thirty-one (31) metres from the ordinary High Water Mark of any Water body such that the quality, quantity or flow of Water is not impaired, unless otherwise approved by the Board in writing.

4. The Licensee shall implement appropriate measures to minimize erosion during any discharge of Effluent from the Environmental Waste Processing Facility (EWPF) into the receiving environment.

5. The Licensee shall ensure that temporary storage areas are maintained such that dust control measures are implemented and surface ponding of Water is minimized.

6. The Licensee shall operate and maintain the Environmental Waste Processing Facility (EWPF) to the satisfaction of an Inspector and in accordance with acceptable engineering standards and the corresponding approved Operation and Maintenance Plans.

7. The Licensee shall operate and maintain the Environmental Waste Processing Facility (EWPF) to engineering standards such that:

   a. During periods of flow, the Licensee shall carry out, at a minimum, weekly inspection of the berms and keep records for review upon the request of an Inspector. Areas of deterioration and erosion shall be repaired immediately;

   b. Monitoring Wells shall be monitored in accordance with the Monitoring Plan as per *Part J* of the Licence, and should the analytical results indicate contamination associated with the Facility, the Licensee shall implement immediate corrective action; and

   c. Washing of all rock reject from soil stockpiles shall be done within the berms of the Soil Treatment Facility (STF).

8. The License shall not combine incompatible Waste types for the purpose of storage, shipment, buffering concentration of Waste constituents or for any other purposes unless authorized by the Board in writing.

9. The License shall store, transport and treat all Waste generated by the undertaking in accordance with applicable regulations and best management practices.

10. The Licensee shall backhaul and dispose of all Hazardous Wastes collected or generated throughout the course of the Environmental Waste Processing Facility (EWPF) operation at a licensed waste disposal facility.

11. The Licensee shall maintain records of all Waste backhauled and records of confirmation of proper disposal of backhauled Waste. These records shall be made available to an Inspector upon request.

12. The Licensee shall establish and confirm compliance with Effluent quality limits of *Part E, Items 14 and 22* prior to reuse or discharge the Effluent.

13. If Effluent does not meet the Effluent quality limits of *Part E, Items 14 and 22*, it shall be considered Hazardous Waste and disposed of off-site at an approved facility.

14. All Effluent discharged from Monitoring Program Station THI-1a shall not exceed the following Effluent quality criteria:

| Parameter | Maximum Concentration of any Grab Sample |
|---|---|
| pH | 6.0 – 9.0 |
| Total Suspended Solids(TSS) | 50 mg/L |
| Oil and grease | 15 mg/L and no visible sheen |
| Benzene | 370 µg/L |
| Toluene | 2 µg/L |
| Ethylbenzene | 90 µg/L |
| Total Lead | 50 µg/L |
| Total Arsenic | 50 µg/L |
| Total Cadmium | 10 µg/L |
| Total Copper | 25 µg/L |
| Total Mercury | 0.6 µg/L |
| Total Silver | 5 µg/L |
| Total Zinc | 200 µg/L |

15. The Licensee shall install groundwater monitoring wells for the purpose of monitoring the groundwater beneath the site where the treated Effluent is discharged from the Water Treatment Facility (WTF), as per *Part E, Item 14*. The groundwater monitoring wells shall be installed in such a way that at least one is up-gradient and two are down-gradient from the location where the treated effluent is discharged.

16. The Licensee shall treat contaminated soil at the Soil Treatment Facility to meet the remediation objectives and in accordance with the corresponding approved Operation & Maintenance Plan or as otherwise approved by the Board in writing.

17. The Licensee shall for the purposes of monitoring, install groundwater monitoring wells, at least one up-gradient and two down-gradient of the Soil Treatment Facility, as per the approved Operation and Management Plan referred to in *Part G, Item 5*.

18. The Licensee shall dispose of soils containing contaminants in excess of the Treatment Objectives off site at an approved treatment facility.

19. The Licensee shall not mix or blend soils for the expressed purpose of attaining the specific limits of the relevant quality criteria.

20. The Licensee shall, prior to the removal of any treated soil for future use, confirm with the Government of Nunavut, Environmental Protection Service that the soils have been treated so as to meet all legislatively-required treatment objectives.

21. The Licensee shall, prior to disposal of any sludge at the Iqaluit Landfill, confirm with the Government of Nunavut, Environmental Protection Service that the sludge meets all legislatively required treatment objectives.

22. Surface Water and seepage collected from the perimeter of the Environmental Waste Processing Facility (drainage ditches) shall not exceed the following Effluent discharge criteria at Monitoring Program Station THI-3 (down gradient):

| Parameter | Maximum Concentration of any Grab Sample |
|---|---|
| pH | 6.5 – 9.0 |
| Total Suspended Solids (TSS) | 50 mg/L |
| Oil and grease | 15 mg/L and no visible sheen |
| Benzene | 370 µg/L |
| Toluene | 2.0 µg/L |
| Ethyl benzene | 90 µg/L |
| Total Lead | When hardness is 0 to ≤ 60 mg/L, the CWQG is 1 µg/L;<br><br>When hardness >60 to ≤ 180 mg/L the CWQG is calculated using: CWQG (µg/L) = e{1.273[ln(hardness)]-4.705}<br><br>When hardness >180 mg/L, the CWQG is 7 µg/L |
| Total Cadmium | 1.0 µg/L |
| Total Mercury | 0.026 µg/L |

23. All Effluent discharge shall be located at least thirty-one (31) meters above the ordinary High Water Mark of any Water body, at a site where direct flow into a Water body is not possible and no additional impacts are created, unless otherwise approved by the Board in writing.

24. The Licensee shall provide the Board with documented authorization from any community in Nunavut receiving Waste from the QE Environmental Waste Treatment Facility.

25. The Licensee shall maintain records of all Waste stored, transported and final destinations, including details confirming proper disposal of the Waste through a Waste manifest. Detail related to Waste backhauled should be included with the Annual Report as per *Part B, Item 1* and made available to and Inspector upon request.

## PART F: CONDITIONS APPLYING TO MODIFICATIONS AND CONSTRUCTION

1. The Licensee may, without written consent from the Board, carry out Modifications to the Environmental Waste Processing Facility 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 in writing of such proposed Modifications at least sixty (60) days prior to beginning the Modifications;
b. such Modifications do not place the Licensee in contravention of the Licence or the Act;
c. such Modifications do not change the scope of the project as approved by NIRB Decision;
d. 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 sixty (60) days; and
e. the Board has not rejected the proposed Modifications.

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

3. The Licensee shall provide as-built plans and drawings of the Modifications referred to in this Licence within ninety (90) days of completion of the Modification. These plans and drawings shall be stamped by an Engineer.

4. The Licensee shall submit to the Board for review, at least sixty (60) days prior to the commencement of construction of any dams, dykes or structures intended to contain, withhold, divert or retain Water or Waste, including facilities or systems for the storage and treatment of contaminated Waters, soil, and storage of Hazardous Wastes, for-construction design drawings and plans, stamped by an Engineer.

5. The Licensee shall provide to the Board, within ninety (90) days of completion of the construction of any dams, dykes or structures intended to contain, withhold, divert or retain Water or Waste, including facilities or systems for the storage, treatment and disposal of contaminated Waters, soils, and storage of Hazardous Wastes, design drawings and construction reports, including as-built drawings stamped by an Engineer, documentation of field decisions that deviate from original plans, and any data used to support these decisions.

## PART G: CONDITIONS APPLYING TO OPERATIONS

1. The Licensee is authorized to drill for the purpose of installing groundwater monitoring wells.

2. The Licensee shall not conduct any land-based drilling within thirty-one (31) metres of the ordinary high Water mark of any Water body, unless otherwise approved by the Board in writing.

3. The Licensee shall, where drilling has penetrated below the permafrost layer, record the depth of permafrost and location of the drill hole for inclusion in the annual report required under *Part B, Item 1*.

4. The Licensee shall conduct all activities in such a manner as to minimize impacts on surface drainage and immediately undertake and implement corrective measures in the event of any impacts on surface drainage.

5. The Board has approved with the issuance of this Licence the Plan entitled "*Operations and Management Plan, Environmental Waste Processing Facility*", dated December 9, 2019, that was submitted as part of the Application package.

6. The Board has approved with the issuance of this Licence the Plan entitled "*Environmental Protection Plan, Environmental Waste Processing Facility",* dated May 14, 2019, that was submitted as additional information with the Application.

7. The Licensee shall submit updated versions of the Plans referred to in *Part G, Items 5 and 6* for Board review with the 2019 Annual Report to reflect the sampling strategy described in *Part J, Item 1*.

8. Equipment used should be well cleaned and free of oil and grease and maintained free of fluid leaks.

9. The Licensee shall operate the Water Treatment Facility, the Solid Treatment Facility and the Hazardous Waste Transfer Facility in accordance with the approved Management Plans, or as otherwise approved by the Board in writing.

## PART H: CONDITIONS APPLYING TO SPILL CONTINGENCY PLANNING

1. The Board has approved the Plan entitled "*Spill Contingency Plan, Environmental Waste Processing Facility*", dated September 27, 2019, that was submitted as additional information with the Application.

2. The Licensee shall prevent any chemicals, petroleum products or Wastes associated with the project from entering Water. All Sumps and fuel caches shall be located at a distance of at least thirty-one (31) metres from the ordinary High Water Mark of any adjacent Water body and inspected on a regular basis.

3. If during the term of this Licence, an unauthorized discharge of Waste occurs, or if such a discharge is foreseeable, the Licensee shall:

    a. employ the approved Spill Contingency Plan;
    b. report the spill immediately to the NWT/NU 24-Hour Spill Line at (867) 920-8130 and to the Inspector at (867) 975-4295; and
    c. for each spill occurrence, submit to the Inspector and to the Board, no later than thirty (30) days after initially reporting the event, a detailed report that will include the amount and type of spilled product, the GPS location of the spill, and the measures taken to contain and clean up the spill site.

4. The Licensee shall, in addition to *Part H, Item 3*, regardless of the quantity of releases of harmful substances, report to the NWT/NU 24-Hour Spill Line, if the release is near or into a Water body.

5. Spills, overfills, and storm Water from product transfer areas shall be contained, and treated at the Water Treatment Facility (WTF) to remove any residual hydrocarbons prior to being discharged.

6. The oil-water separator at the Water Treatment Facility (WTF) shall be equipped with a spill containment device at the point of oil removal.

7. The Licensee shall provide secondary containment for fuel, chemical and contaminated Water storage as required by applicable standards and acceptable industry practice.

## PART I: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION OR TEMPORARY CLOSURE

1. The Board has approved the Plan entitled *"Abandonment and Restoration Plan, Environmental Waste Processing Facility, 2019 Amendment to 1BR-THI1722"*, dated July 16, 2019, that was submitted as additional information with the Application. The Licensee shall submit with the 2019 Annual Report an addendum to the Plan that includes:

    a. schedule of reclamation work to be completed on the Hydrocarbon Impacted Water Treatment Facility (previous location) located at 63° 45' 44" N and 68° 32' 41" W, within the City of Iqaluit

2. The Licensee shall annually review the approved Plan in *Part I, Item 1* and modify the Plan as necessary to reflect changes in personnel, operations and/or technology. Any proposed modifications to the Plan shall be submitted to the Board for approval in writing.

3. The Licensee shall submit to the Board for approval in writing, at least one year prior to the Project's closure, an Environmental Processing Facility's Final Abandonment and Remediation Plan.

4. The Licensee shall complete the restoration work within the time schedule specified in the approved Plan, or as subsequently revised and accepted by the Board in writing.

5. The Licensee shall carry out progressive reclamation for any components of the project no longer required for the Licensee's operations.

6. The Licensee shall notify the Board of its intention to proceed with final abandonment of undertaking at least six (6) months prior to the planned dates of closure.

7. The Licensee shall backfill and restore, all temporary containment sumps, to the pre-existing natural contours of the land.

8. All disturbed areas shall be stabilized and re-vegetated as required, upon completion of work, and restored as practically as possible to a pre-disturbed state.

## PART J: CONDITIONS APPLYING TO THE MONITORING PROGRAM

1. The Licensee shall establish and maintain, at a minimum, the following Monitoring Program Stations or as otherwise approved by the Board in writing:

| Monitoring Station ID | Description | Frequency | Parameters |
|---|---|---|---|
| THI-1a | Monitoring Station at new location of the WTF, treated effluent prior to be reused for equipment cleaning discharged to the environment | as per Part J, Item 3 | Volume (as per Part J, Item 2), Quality (as per Part J, Item 5) |
| THI-2 & THI-3 | Monitoring Stations at the EWPF, surface contact water and seepage up gradient and down gradient, collected from the perimeter of the Facility (drainage ditches) | As per approved Environmental Protection Plan | Quality (as per Part J, Item 6) |
| THI-4a | Monitoring well installed up-gradient of the STF | Once during spring freshet, and once during late summer | Quality (as per Part J, Item 6) |
| THI-4b | Monitoring well installed up-gradient of the site where the WTF treated effluent is discharged | Once during spring freshet, and once during late summer | Quality (as per Part J, Item 6) |
| THI-5a | Monitoring well installed down-gradient of the STF | Once during spring freshet, and once during late summer | Quality (as per Part J, Item 6) |
| THI-5b | Monitoring well installed downgradient of the site where the WTF treated effluent is discharged | Once during spring freshet, and once during late summer | Quality (as per Part J, Item 6) |
| THI-6a | Monitoring well installed down-gradient of the STF | Once during spring freshet, and once during late summer | Quality (as per Part J, Item 6) |
| THI-6b | Monitoring well installed downgradient of the site where the WTF treated effluent is discharged | Once during spring freshet, and once during late summer | Quality (as per Part J, Item 6) |
| THI-7 | Reference or Control Area for soil monitoring (determined by the Licensee directed by Inspector) | Once a year at the same time that THI-8 monitoring is carried out | Quality (as per Part J, Item 17) |
| THI-8 | Soil monitoring at the location where the WTF Effluent is discharged | Once a year after treated effluent from the WTF is discharged | Quality (as per Part J, Item 17) |

2. The Licensee shall measure and record in cubic metres, the quantity of treated Effluent to be recycled for equipment cleaning and or discharged from the Water Treatment Facility (WTF) at Monitoring Station THI-1a.

3. The Licensee shall sample prior to discharge at Monitoring Station THI-1a, at minimum once prior to each batch discharge event and again prior to completion of the discharge to verify compliance with Effluent Quality Limits under *Part E, Item 14*.

4. The Licensee shall take a representative sample of contact Water at Monitoring Station THI-3 (down gradient) to verify compliance with Effluent Quality Limits under *Part E, Item 22*.

5. The Licensee shall sample at Monitoring Program Station THI-1a, at minimum, once prior to each batch discharge event and prior to completion of discharge, and analyze for the following parameters:

| | |
|---|---|
| pH | Conductivity |
| Total Suspended Solids | Ammonia Nitrogen |
| Nitrate – Nitrite | Oil and Grease (visual) |
| Total Phenols | Sulphate |
| Total Hardness | Total Alkalinity |
| Sodium | Potassium |
| Magnesium | Calcium |
| Chloride | Total Cadmium |
| Total Copper | Total Chromium |
| Total Iron | Total Lead |
| Total Mercury | Total Nickel |
| Total Zinc | Total Aluminum |
| Total Manganese | Total Cobalt |
| Total Arsenic | |
| Polycyclic Aromatic Hydrocarbons (PAHs) | |
| Total Petroleum Hydrocarbons (TPH) | |
| Benzene, Toluene, Ethylbenzene, Xylene (BTEX) | |

6. The Licensee shall sample at Monitoring Stations THI-1a, THI-2, THI-3, THI-4a, THA-4b, THI-5a, THI-5b, THI-6a, and THI-6b with a frequency as established under *Part J, Item 1*. Samples shall be analyzed for the parameters included under *Part J, Item 5*.

7. Additional sampling and analysis may be requested by the Board or an Inspector.

8. The Licensee shall determine, prior to discharge and upon agreement with an Inspector the final discharge location(s), and record the GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) where treated effluent is discharged.

9. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of Standard Methods for the Examination of Water and Wastewater, or by such other methods as approved by the Board in writing.

10. All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.

11. The Licensee shall submit to the Board for approval, with the 2019 Annual Report, a Quality Assurance/ Quality Control Plan, approved by an Analyst, that includes requirements for independent third party sampling and analysis. This Plan shall be developed in accordance with the *1996 Quality Assurance (QA) and Quality Control (QC) Guidelines for Use by Class "A" (INAC)*.

12. The Quality Assurance/ Quality Control Plan referred to in *Part J, Item 11* shall include Water and soil sampling procedures and chemical analysis methodology, and be consistent where appropriate with the Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume 1: Main Report (CCME, 1993), and Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil – Tier 1 Method (CCME, 2001).

13. If the Analyst does not approve the Plan referred to in *Part J, Item 11*, the Licensee shall revise the Plan and resubmit to the Analyst for approval within thirty (30) days of notification by the Analyst.

14. The Board shall be notified within thirty (30) days of the Analyst decision with respect to the QA/QC Plan referred to in *Part J, Item 11*.

15. The Licensee shall include summaries and an interpretation of all the data and information required by the "Monitoring Program", required under *Part J*, in the Annual Report as per *Part B, Item 1*.

16. The Licensee shall submit to the Board for approval, at least sixty (60) days prior to temporary or permanent suspension of normal site activities, a Post-Closure Monitoring Plan that includes information on monitoring requirements of the Environmental Waste Processing Facility, and that addresses Water quality monitoring requirements as well as monitoring the condition and stability of any soil left on site.

17. The Licensee shall sample at Monitoring Stations THI-7 and THI-8 with a frequency as established under *Part J, Item 1*. Samples shall be analyzed for the following parameters:

| | |
|---|---|
| pH | Benzene |
| Ethylbenzene | Toluene |
| Xylene | Phenol |
| Polychlorinated Biphenyls | Arsenic total and inorganic |
| Cadmium total and inorganic | Chromium total |
| Copper total | Lead total |
| Mercury total and inorganic | Nickel total |
| Total Petroleum Hydrocarbons in soil | Silver total |

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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: G 29524** **REPORT No. B19-29524**

**Report To:**

**Qikiqtaaluk Env Inc**
9935, rue de Chateauneuf, Entrée 1
Brossard Quebec J4Z 3V4 Canada
**Attention:** Jennifer Godin

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 16-Sep-19
DATE REPORTED: 26-Sep-19
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Water Treatment EWPF
P.O. NUMBER: 430002905
WATERWORKS NO. Treated Water Batch 1

| | | | Client I.D. | | TW-B1.5_190912 | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample I.D. | | B19-29524-1 | | | |
| | | | Date Collected | | 12-Sep-19 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Hardness (as CaCO3) | mg/L | 1 | SM 3120 | 25-Sep-19/O | 399 | | | |
| Alkalinity(CaCO3) to pH4.5 | mg/L | 5 | SM 2320B | 17-Sep-19/O | 199 | | | |
| pH @25°C | pH Units | | SM 4500H | 17-Sep-19/O | 7.96 | | | |
| Conductivity @25°C | µmho/cm | 1 | SM 2510B | 17-Sep-19/O | 888 | | | |
| Total Suspended Solids | mg/L | 3 | SM2540D | 18-Sep-19/K | 27 | | | |
| Chloride | mg/L | 0.5 | SM4110C | 18-Sep-19/O | 33.8 | | | |
| Nitrite (N) | mg/L | 0.1 | SM4110C | 18-Sep-19/O | < 0.1 | | | |
| Nitrate (N) | mg/L | 0.1 | SM4110C | 18-Sep-19/O | < 0.1 | | | |
| Sulphate | mg/L | 1 | SM4110C | 18-Sep-19/O | 237 | | | |
| Aluminum | mg/L | 0.01 | SM 3120 | 25-Sep-19/O | 3.15 | | | |
| Antimony | mg/L | 0.0001 | EPA 200.8 | 23-Sep-19/O | 0.0005 | | | |
| Arsenic | mg/L | 0.0001 | EPA 200.8 | 23-Sep-19/O | 0.0090 | | | |
| Barium | mg/L | 0.001 | SM 3120 | 25-Sep-19/O | 0.074 | | | |
| Beryllium | mg/L | 0.002 | SM 3120 | 25-Sep-19/O | < 0.002 | | | |
| Boron | mg/L | 0.005 | SM 3120 | 25-Sep-19/O | 0.066 | | | |
| Cadmium | mg/L | 0.000015 | EPA 200.8 | 23-Sep-19/O | 0.000016 | | | |
| Calcium | mg/L | 0.02 | SM 3120 | 25-Sep-19/O | 133 | | | |
| Chromium | mg/L | 0.001 | EPA 200.8 | 23-Sep-19/O | < 0.001 | | | |
| Chromium (VI) | mg/L | 0.001 | MOE E3056 | 23-Sep-19/O | < 0.001 | 1 | | |
| Cobalt | mg/L | 0.0001 | EPA 200.8 | 23-Sep-19/O | 0.0065 | | | |
| Copper | mg/L | 0.0001 | EPA 200.8 | 23-Sep-19/O | 0.0023 | | | |
| Iron | mg/L | 0.005 | SM 3120 | 25-Sep-19/O | 1.46 | | | |
| Lead | mg/L | 0.00002 | EPA 200.8 | 23-Sep-19/O | 0.00056 | | | |
| Magnesium | mg/L | 0.02 | SM 3120 | 25-Sep-19/O | 16.1 | | | |
| Manganese | mg/L | 0.001 | SM 3120 | 25-Sep-19/O | 2.79 | | | |
| Mercury | mg/L | 0.00002 | SM 3112 B | 20-Sep-19/O | < 0.00002 | | | |
| Molybdenum | mg/L | 0.0001 | EPA 200.8 | 23-Sep-19/O | 0.0020 | | | |

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: G 29524** **REPORT No. B19-29524**

**Report To:**

**Qikiqtaaluk Env Inc**
9935, rue de Chateauneuf, Entrée 1
Brossard Quebec J4Z 3V4 Canada
**Attention:** Jennifer Godin

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 16-Sep-19
DATE REPORTED: 26-Sep-19
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Water Treatment EWPF
P.O. NUMBER: 430002905
WATERWORKS NO. Treated Water Batch 1

| | | | Client I.D. | | TW-B1.5_190912 | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample I.D. | | B19-29524-1 | | | |
| | | | Date Collected | | 12-Sep-19 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Nickel | mg/L | 0.0002 | EPA 200.8 | 23-Sep-19/O | 0.0103 | | | |
| Potassium | mg/L | 0.1 | SM 3120 | 25-Sep-19/O | 12.5 | | | |
| Selenium | mg/L | 0.001 | EPA 200.8 | 23-Sep-19/O | < 0.001 | | | |
| Silver | mg/L | 0.0001 | EPA 200.8 | 23-Sep-19/O | < 0.0001 | | | |
| Sodium | mg/L | 0.2 | SM 3120 | 25-Sep-19/O | 23.8 | | | |
| Strontium | mg/L | 0.001 | SM 3120 | 25-Sep-19/O | 0.349 | | | |
| Tin | mg/L | 0.05 | SM 3120 | 25-Sep-19/O | < 0.05 | | | |
| Titanium | mg/L | 0.005 | SM 3120 | 25-Sep-19/O | < 0.005 | | | |
| Uranium | mg/L | 0.00005 | EPA 200.8 | 23-Sep-19/O | 0.00029 | | | |
| Vanadium | mg/L | 0.0001 | EPA 200.8 | 23-Sep-19/O | 0.0013 | | | |
| Yttrium | mg/L | 0.005 | SM 3120 | 25-Sep-19/O | < 0.005 | | | |
| Zinc | mg/L | 0.005 | SM 3120 | 25-Sep-19/O | 0.166 | | | |
| Ammonia (N)-Total | mg/L | 0.01 | SM4500-NH3-H | 19-Sep-19/K | 2.00 | | | |
| Phenolics | mg/L | 0.002 | MOEE 3179 | 19-Sep-19/K | < 0.002 | | | |
| Benzene | µg/L | 0.5 | EPA 8260 | 19-Sep-19/R | < 0.5 | | | |
| Toluene | µg/L | 0.5 | EPA 8260 | 19-Sep-19/R | < 0.5 | | | |
| Ethylbenzene | µg/L | 0.5 | EPA 8260 | 19-Sep-19/R | < 0.5 | | | |
| Xylene, m,p- | µg/L | 1.0 | EPA 8260 | 19-Sep-19/R | < 1.0 | | | |
| Xylene, o- | µg/L | 0.5 | EPA 8260 | 19-Sep-19/R | < 0.5 | | | |
| Xylene, m,p,o- | µg/L | 1.1 | EPA 8260 | 19-Sep-19/R | < 1.1 | | | |
| Toluene-d8 (SS) | % rec. | | EPA 8260 | 19-Sep-19/R | 104 | | | |
| PHC F1 (C6-C10) | µg/L | 50 | MOE E3421 | 19-Sep-19/R | < 50 | | | |
| PHC F2 (>C10-C16) | µg/L | 50 | MOE E3421 | 23-Sep-19/K | < 50 | | | |
| PHC F3 (>C16-C34) | µg/L | 400 | MOE E3421 | 23-Sep-19/K | < 400 | | | |
| PHC F4 (>C34-C50) | µg/L | 400 | MOE E3421 | 23-Sep-19/K | < 400 | | | |
| Oil & Grease-Total | mg/L | 1.0 | SM 5520 | 23-Sep-19/K | < 1.0 | | | |

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: G 29524** **REPORT No. B19-29524**

**Report To:**

**Qikiqtaaluk Env Inc**
9935, rue de Chateauneuf, Entrée 1
Brossard Quebec J4Z 3V4 Canada
**Attention:** Jennifer Godin

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 16-Sep-19
DATE REPORTED: 26-Sep-19
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Water Treatment EWPF
P.O. NUMBER: 430002905
WATERWORKS NO. Treated Water Batch 1

| | | | Client I.D. | | TW-B1.5_190912 | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample I.D. | | B19-29524-1 | | | |
| | | | Date Collected | | 12-Sep-19 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Acenaphthene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Acenaphthylene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Anthracene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Benzo(a)anthracene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Benzo(a)pyrene | µg/L | 0.01 | EPA 8270 | 23-Sep-19/K | 0.020 | | | |
| Benzo(b)fluoranthene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Benzo(b+k)fluoranthene | µg/L | 0.1 | EPA 8270 | 23-Sep-19/K | < 0.1 | | | |
| Benzo(g,h,i)perylene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Benzo(k)fluoranthene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Chrysene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Dibenzo(a,h)anthracene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Fluoranthene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Fluorene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Indeno(1,2,3,-cd)pyrene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Methylnaphthalene,1- | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Methylnaphthalene,2- | µg/L | 0.08 | EPA 8270 | 23-Sep-19/K | < 0.08 | | | |
| Naphthalene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Phenanthrene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Pyrene | µg/L | 0.05 | EPA 8270 | 23-Sep-19/K | < 0.05 | | | |
| Terphenyl-d14 (SS) | % rec. | 10 | EPA 8270 | 23-Sep-19/K | 85.0 | | | |

**1** . Chromium (VI) result is based on total chromium

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: ---**

**REPORT No. B19-31400**


**Report To:**

**Qikiqtaaluk Env Inc**
9935, rue de Chateauneuf, Entrée 1
Brossard Quebec J4Z 3V4 Canada
**Attention:** Jennifer Godin

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244


DATE RECEIVED: 30-Sep-19
DATE REPORTED: 08-Oct-19
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Water Treatment EWPF.
P.O. NUMBER: 430002892
WATERWORKS NO. Treated Water Batch 2

| | | | Client I.D. | | TW-B2_190928 | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample I.D. | | B19-31400-1 | | | |
| | | | Date Collected | | 28-Sep-19 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Hardness (as CaCO3) | mg/L | 1 | SM 3120 | 07-Oct-19/O | 330 | | | |
| Alkalinity(CaCO3) to pH4.5 | mg/L | 5 | SM 2320B | 02-Oct-19/O | 155 | | | |
| pH @25°C | pH Units | | SM 4500H | 02-Oct-19/O | 7.94 | | | |
| Conductivity @25°C | µmho/cm | 1 | SM 2510B | 02-Oct-19/O | 738 | | | |
| Total Suspended Solids | mg/L | 3 | SM2540D | 03-Oct-19/K | 23 | | | |
| Chloride | mg/L | 0.5 | SM4110C | 03-Oct-19/O | 24.8 | | | |
| Nitrite (N) | mg/L | 0.1 | SM4110C | 03-Oct-19/O | < 0.1 | | | |
| Nitrate (N) | mg/L | 0.1 | SM4110C | 03-Oct-19/O | < 0.1 | | | |
| Sulphate | mg/L | 1 | SM4110C | 03-Oct-19/O | 182 | | | |
| Aluminum | mg/L | 0.01 | SM 3120 | 07-Oct-19/O | 2.76 | | | |
| Antimony | mg/L | 0.0001 | EPA 200.8 | 03-Oct-19/O | 0.0004 | | | |
| Arsenic | mg/L | 0.0001 | EPA 200.8 | 03-Oct-19/O | 0.0063 | | | |
| Barium | mg/L | 0.001 | SM 3120 | 07-Oct-19/O | 0.043 | | | |
| Beryllium | mg/L | 0.002 | SM 3120 | 07-Oct-19/O | < 0.002 | | | |
| Boron | mg/L | 0.005 | SM 3120 | 07-Oct-19/O | 0.076 | | | |
| Cadmium | mg/L | 0.000015 | EPA 200.8 | 03-Oct-19/O | 0.000022 | | | |
| Calcium | mg/L | 0.02 | SM 3120 | 07-Oct-19/O | 108 | | | |
| Chromium | mg/L | 0.001 | EPA 200.8 | 03-Oct-19/O | < 0.001 | | | |
| Chromium (VI) | mg/L | 0.001 | MOE E3056 | 07-Oct-19/O | < 0.001 | 1 | | |
| Cobalt | mg/L | 0.0001 | EPA 200.8 | 03-Oct-19/O | 0.0087 | | | |
| Copper | mg/L | 0.0001 | EPA 200.8 | 03-Oct-19/O | 0.0036 | | | |
| Iron | mg/L | 0.005 | SM 3120 | 07-Oct-19/O | 2.47 | | | |
| Lead | mg/L | 0.00002 | EPA 200.8 | 03-Oct-19/O | 0.00500 | | | |
| Magnesium | mg/L | 0.02 | SM 3120 | 07-Oct-19/O | 14.7 | | | |
| Manganese | mg/L | 0.001 | SM 3120 | 07-Oct-19/O | 2.36 | | | |
| Mercury | mg/L | 0.00002 | SM 3112 B | 04-Oct-19/O | < 0.00002 | | | |
| Molybdenum | mg/L | 0.0001 | EPA 200.8 | 03-Oct-19/O | 0.0005 | | | |

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CADUCEON™ ENVIRONMENTAL LABORATORIES
*Client committed. Quality assured.*

# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: ---**

**REPORT No. B19-31400**


**Report To:**

**Qikiqtaaluk Env Inc**
9935, rue de Chateauneuf, Entrée 1
Brossard Quebec J4Z 3V4 Canada
**Attention:** Jennifer Godin

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244


DATE RECEIVED: 30-Sep-19
DATE REPORTED: 08-Oct-19
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Water Treatment EWPF.
P.O. NUMBER: 430002892
WATERWORKS NO. Treated Water Batch 2

| | | | Client I.D. | | TW-B2_190928 | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample I.D. | | B19-31400-1 | | | |
| | | | Date Collected | | 28-Sep-19 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Nickel | mg/L | 0.0002 | EPA 200.8 | 03-Oct-19/O | 0.0195 | | | |
| Potassium | mg/L | 0.1 | SM 3120 | 07-Oct-19/O | 11.5 | | | |
| Selenium | mg/L | 0.001 | EPA 200.8 | 03-Oct-19/O | < 0.001 | | | |
| Silver | mg/L | 0.0001 | EPA 200.8 | 03-Oct-19/O | < 0.0001 | | | |
| Sodium | mg/L | 0.2 | SM 3120 | 07-Oct-19/O | 23.4 | | | |
| Strontium | mg/L | 0.001 | SM 3120 | 07-Oct-19/O | 0.254 | | | |
| Tin | mg/L | 0.05 | SM 3120 | 07-Oct-19/O | < 0.05 | | | |
| Titanium | mg/L | 0.005 | SM 3120 | 07-Oct-19/O | < 0.005 | | | |
| Uranium | mg/L | 0.00005 | EPA 200.8 | 03-Oct-19/O | 0.00010 | | | |
| Vanadium | mg/L | 0.0001 | EPA 200.8 | 03-Oct-19/O | 0.0005 | | | |
| Yttrium | mg/L | 0.005 | SM 3120 | 07-Oct-19/O | < 0.005 | | | |
| Zinc | mg/L | 0.005 | SM 3120 | 07-Oct-19/O | 0.360 | | | |
| Ammonia (N)-Total | mg/L | 0.01 | SM4500-NH3-H | 02-Oct-19/K | 1.06 | | | |
| Phenolics | mg/L | 0.002 | MOEE 3179 | 03-Oct-19/K | < 0.002 | | | |
| Benzene | µg/L | 0.5 | EPA 8260 | 02-Oct-19/R | < 0.5 | | | |
| Toluene | µg/L | 0.5 | EPA 8260 | 02-Oct-19/R | < 0.5 | | | |
| Ethylbenzene | µg/L | 0.5 | EPA 8260 | 02-Oct-19/R | < 0.5 | | | |
| Xylene, m,p- | µg/L | 1.0 | EPA 8260 | 02-Oct-19/R | < 1.0 | | | |
| Xylene, o- | µg/L | 0.5 | EPA 8260 | 02-Oct-19/R | < 0.5 | | | |
| Xylene, m,p,o- | µg/L | 1.1 | EPA 8260 | 02-Oct-19/R | < 1.1 | | | |
| Toluene-d8 (SS) | % rec. | | EPA 8260 | 02-Oct-19/R | 99.4 | | | |
| PHC F1 (C6-C10) | µg/L | 50 | MOE E3421 | 02-Oct-19/R | < 50 | | | |
| PHC F2 (>C10-C16) | µg/L | 50 | MOE E3421 | 03-Oct-19/K | < 50 | | | |
| PHC F3 (>C16-C34) | µg/L | 400 | MOE E3421 | 03-Oct-19/K | < 400 | | | |
| PHC F4 (>C34-C50) | µg/L | 400 | MOE E3421 | 03-Oct-19/K | < 400 | | | |
| Oil & Grease-Total | mg/L | 1.0 | SM 5520 | 07-Oct-19/K | 1.0 | | | |

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Lab Manager - Ottawa District

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# CERTIFICATE OF ANALYSIS

Final Report

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**REPORT No. B19-31400**

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9935, rue de Chateauneuf, Entrée 1
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**Attention:** Jennifer Godin

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2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
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DATE RECEIVED: 30-Sep-19
DATE REPORTED: 08-Oct-19
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Water Treatment EWPF.
P.O. NUMBER: 430002892
WATERWORKS NO. Treated Water Batch 2

| | | | Client I.D. | | TW-B2_190928 | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample I.D. | | B19-31400-1 | | | |
| | | | Date Collected | | 28-Sep-19 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Acenaphthene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Acenaphthylene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Anthracene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Benzo(a)anthracene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Benzo(a)pyrene | µg/L | 0.01 | EPA 8270 | 03-Oct-19/K | < 0.01 | | | |
| Benzo(b)fluoranthene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Benzo(b+k)fluoranthene | µg/L | 0.1 | EPA 8270 | 03-Oct-19/K | < 0.1 | | | |
| Benzo(g,h,i)perylene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Benzo(k)fluoranthene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Chrysene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Dibenzo(a,h)anthracene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Fluoranthene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Fluorene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Indeno(1,2,3,-cd)pyrene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Methylnaphthalene,1- | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Methylnaphthalene,2- | µg/L | 0.08 | EPA 8270 | 03-Oct-19/K | < 0.08 | | | |
| Methylnaphthalene 2-(1-) | µg/L | 1 | EPA 8270 | 03-Oct-19/K | < 1 | | | |
| Naphthalene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Phenanthrene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Pyrene | µg/L | 0.05 | EPA 8270 | 03-Oct-19/K | < 0.05 | | | |
| Terphenyl-d14 (SS) | % rec. | 10 | EPA 8270 | 03-Oct-19/K | 94.0 | | | |

**1** . Chromium (VI) result is based on total chromium

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