September 23, 2014

Government of Nunavut
Community and Government Services
P.O. Box 490
Rankin Inlet, NU X0C 0G0

ATTENTION: Megan Lusty

Dear Megan,

RE: QA/QC Plan – Chesterfield Inlet Landfarm, Water Licence No. 1BR-CIL1217

ALS Environmental (Winnipeg) accepts the QA/QC plan indicated above as it relates to sample handling and analysis following the receipt of samples at the laboratory, with the following caveats and clarifications:

- Field sampling does not fall under the laboratory's purview; however, containers and preservatives are provided by the laboratory upon request. In these cases, holding times and preservative options are ALS recommendations, based on the current published references.
- Wherever possible, ALS references the latest versions of published standard methods including, but not limited to, those developed by American Public Health Association. Standard methods published by United States Environmental Protection Agency, NIOSH, Environment Canada, and other international, regional or regulatory organizations, or equipment manufacturers may be referenced where appropriate, as indicated in final test reports, and corresponding to our Scope of Accreditation.
- Based on historical analytical requests, ALS interprets the request for Total Extractable Hydrocarbons (TEH) analysis to refer to the CCME Petroleum Hydrocarbon Fractions 1 thru 4 (F1:C6-C10, F2:C10-C16, F3:C16-C34 and F4:C34-C50) in water samples. This was confirmed by telephone conversation on September 23, 2014.
- The Oil & Grease and Total Phenols tests are subcontracted to ALS Environmental (Waterloo). A copy of their Scope of Accreditation will be provided along with this letter as confirmation of their accreditation for these tests. ALS has policies and procedures that govern the handling and transfer of subcontracted samples which will ensure that the requirements of this plan are met.

Yours sincerely,

Kayla Harold
Quality Systems Coordinator

CALA
Canadian Association for Laboratory Accreditation Inc.

CALA Directory of Laboratories

Membership Number: 3149
Laboratory Name: ALS Environmental (Waterloo)
Parent Institution: ALS Canada Ltd.
Address: 60 Northland Rd. Unit 1 Waterloo ON N2V 2B8
Contact: Mr. Jonathan Fisher
Phone: (519) 886-6910
Fax: (519) 886-9047
Email: ALSWT.Quality@alsglobal.com; linda.neimor@ALSGlobal.com

Standard: Conforms with requirements of ISO/IEC 17025
Clients Served: All Interested Parties
Revised On: August 7, 2014
Valid To: January 21, 2017

Scope of Accreditation

Air (Inorganic)
Fixed Gases - Air (180)
WT-TM-1703; modified from EPA 3C, ASTM D1946-90
- GC/FID & TCD
- Carbon Dioxide
- Carbon Monoxide
- Methane
- Nitrogen
- Oxygen

Biosolids (Microbiology)
Escherichia coli (E. coli) - Biosolids (087)
WT-TM-1200; modified from MOE/LSB-E3433
- MEMBRANE FILTRATION (mFC-BCIG)
- Escherichia coli (E. coli)

Biosolids (Organic)
Nonylphenol and Nonylphenol Ethoxylates - Biosolids (165)
WT-TM-1554; modified from JOURNAL OF CHROMATOGRAPHY A.849 (1999) 467-482
- LC/MS - EXTRACTION
- Bisphenol A
- Nonylphenol Diethoxylate
- Nonylphenol Monoethoxylates
- Nonylphenols
- Nonylphenols Ethoxylates
- Octylphenol
- Octylphenol Diethoxylate
- Octylphenol Monoethoxylate

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Oil (Organic)
Total PCBs - Oil (053)
WT-TM-1306; modified from EPA 8082-M, SW846 3580 A, SW846 3600 C, SW846 8082 A
GC/ECD - EXTRACTION
Total PCB

Soil
Particle Size - Soil (156)
WT-TM-1034; modified from SOIL SAMPLING AND METHODS OF ANALYSIS - CAN. SOCIETY OF SOIL SCIENCE (1993)
SEIVE
Particle Size

Soil
Perchlorate - Soil (176)
WT-TM-1505; modified from EPA 6860
LC-MS/MS
Perchlorate

Soil
Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) - Soil (175)
WT-TM-1557; modified from JOURNAL OF CHROMATOGRAPHY A. 1093 (2005), 89-97
LC-MS/MS
Perfluorooctane Sulfonate (PFOS)
Perfluorooctanoic Acid (PFOA)

Soil (Inorganic)
Hexavalent Chromium - Soil (158)
WT-TM-1035; modified from EPA 1636/EPA 3060
ION CHROMATOGRAPHY
Chromium (Hexavalent)

Soil (Inorganic)
Phenols - Soil (170)
WT-TM-1027; modified from EPA 9066
COLORIMETRIC
Total Phenolics

Soil (Organic)
Alkylated PAH's - Soil (177)
WT-TM-1114/WT-TM-1309; modified from EPA SW846-3500 C & SW846 8270 D
GC/MS - EXTRACTION
Acenaphthene
Acenaphthene
Acenaphthylene
Acridine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
benzo(e)pyrene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Biphenyl
C1-acenaphthenes
C1-Benzofluoroanthenes/Benzo(a)pyrenes
C1-Biphenyl
C1-Chrysenes

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

C1-Dibenzothiopenes
C1-Fluoranthenes/Pyrenes
C1-Fluorenes
C1-Naphthalenes
C1-Phenanthrenes/Anthracene
C2-Benzofluoroanthenes/Benzo(a)pyrenes
C2-Biphenyl
C2-Chrysenes
C2-Dibenzothiopenes
C2-Fluoranthenes/Pyrenes
C2-Fluorenes
C2-Naphthalenes
C2-Phenanthrenes/Anthracene
C3-Chrysenes
C3-Dibenzothiopenes
C3-Fluoranthenes/Pyrenes
C3-Fluorenes
C3-Naphthalenes
C3-Phenanthrenes/Anthracene
C4-Dibenzothiopenes
C4-Fluoranthenes/Pyrenes
C4-Naphthalenes
C4-Phenanthrenes/Anthracene
Chrysene
Dibenzo (a,h) anthracene
Dibenzothiopene
Fluoranthene
Fluorene
Indeno (1,2,3 - cd) pyrene
Naphthalene
Perylene
Phenanthrene
Pyrene
Quinoline
Retene

Solids (Inorganic)
Ammonia - Soil (096)
WT-TM-1013; modified from EPA 350.1
COLORIMETRIC
Ammonia

Solids (Inorganic)
Anions - Soil, Sludge (041)
WT-TM-1008; modified from SM 4110C
ION CHROMATOGRAPHY
Bromide
Chloride
Fluoride
Nitrate
Nitrite
Sulphate

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Solids (Inorganic)
Anions - Solid Waste (136)
NA-TM-1700/WT-TM-1008; EPA 1311 (Leach)/ Modified from SM 4110 C AND EPA 300.0 (Analysis)
ION CHROMATOGRAPHY - TCLP
Fluoride
Nitrate
Nitrite

Solids (Inorganic)
Conductivity - Soil (109)
WT-TM-1028; modified from SM 2510 B, EPA 9050A
CONDUCTIVITY METER
Conductivity (25°C)

Solids (Inorganic)
Cyanide - Soil (079)
NA-TM-1003, WT-TP-2011; modified from SM 4500-CN E, G (SAD), 4500-CN I (WAD), modified from ISO/DIS 14403 & ASTM D7237
AUTO COLOR - DIGESTION
Cyanide (Free)
Cyanide (SAD)
Cyanide (WAD)

Solids (Inorganic)
Mercury - Soil, Sludge, Compost (050)
WT-TM-1018; modified from SW846 7471 B, EPA 245.2
CVAAS
Mercury

Solids (Inorganic)
Mercury - Solid Waste (139)
NA-TM-1700/WI-TM-1018; EPA 1311 (Leach)/ Modified from EPA 7470 A (Analysis)
COLD VAPOUR AA - SPECTROMETRIC - TCLP
Mercury

Solids (Inorganic)
Metals - Soil, Sludge, Compost, Sediment (006)
WT-TM-1038, NA-TP-2004; modified from EPA 6020 A/3050 B modified from 200.2, BC SALM (BC MOE)
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Phosphorus
Potassium
Selenium
Silver
Sodium
Strontium
Sulphur
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc

Solids (Inorganic)
Metals - Solid Waste (138)
NA-TM-1700/WT-TM-1038; EPA 1311 (Leach)/ Modified from EPA 6020 A (Analysis)
ICP/MS - TCLP
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Iron
Lead
Lithium
Magnesium
Manganese
Potassium
Selenium
Silver
Sodium
Strontium
Sulphur
Thallium
Tin
Zinc
Zirconium

Solids (Inorganic)
Oil and Grease - Soil, Sludge (031)
WT-TM-1100; modified from SM 5520 B, D, E, F, EPA 8015
GRAVIMETRIC - EXTRACTION
Mineral Oil and Grease
Total Oil and Grease (Solvent Extractables)

Solids (Inorganic)
pH - Soil (107)
WT-TM-1028; modified from SM 4500-H B
pH METER
pH

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Solids (Inorganic)
Solids - Soils, Sludge, Compost, Sediment (028)
WT-TM-1011; modified from SM 2540 B, E, G
GRAVIMETRIC
Fixed Solids
Total Solids
Volatile Solids

Solids (Inorganic)
Total and Free Cyanide - Solid Waste (140)
NA-TM-1700/NA-TM-1003; EPA 1311 (Leach)/ Modified from 4500-CN I ASTM D7237, ISO/DIS 14403 (Analysis)
COLORIMETRIC - TCLP
Cyanide (SAD)
Cyanide (WAD)

Solids (Inorganic)
Total Kjeldahl Nitrogen (TKN) - Soil (100)
WT-TM-1023; modified from SM 4500-NORG
COLORIMETRIC - DIGESTION
Total Kjeldahl Nitrogen

Solids (Inorganic)
Total Organic Carbon (TOC) - Soil (034)
WT-TM-1005; modified from CSSS METHOD 21.2
WET OXIDATION-REDOX
Total Organic Carbon (TOC)

Solids (Inorganic)
Totol Phosphorus - Soil/Sludge (039)
WT-TM-1020; modified from SM 4500-P E, F
AUTO COLOR - DIGESTION
Total Phosphorus

Solids (Organic)
1,4-Dioxane - Soil (173)
WT-TM-1407; modified from SW 846 8260 C/EPA 5021 A
GC/MS - HEADSPACE
1,4-Dioxane

Solids (Organic)
Base Neutral Acid Extractables (BNA) - Soil, Sediment, Sludge (016)
WT-TM-1101/WT-TM-1300; modified from EPA SW846-3500 C & SW846 8270 D
GC/MS - EXTRACTION
1-Chloronaphthalene
1-Methylnaphthalene
1,2-dichlorobenzene
1,2,4-Trichlorobenzene
1,3-Dichlorobenzene
1,4-dichlorobenzene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Nitrophenol
2,3,4-Trichlorophenol
2,3,4,5-Tetrachlorophenol
2,3,4,6-Tetrachlorophenol
2,3,5-Trichlorophenol
2,3,5,6-Tetrachlorophenol

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,6-Dichlorophenol
2,6-Dinitrotoluene
3,3'-Dichlorobenzidene
4-Bromophenyl Phenyl Ether
4-Chloro-3-Methylphenol
4-chloroaniline
4-Chlorophenyl Phenyl Ether
4-Nitrophenol
4,6-Dinitro-o-Cresol
5-Nitroacenaphthylene
Acenaphthene
Acenaphthylene
Acridine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Benzyl Butyl Phthalate
Biphenyl
Bis (2-Chlorethoxy) Methane
Bis (2-Chloroethyl) Ether
Bis (2-Chloroisopropyl) Ether
Bis (2-ethylhexyl) Phthalate
Camphene
Chrysene
Di-n-Butylphthalate
Di-n-Octylphthalate
Dibenzo (a,h) anthracene
Diethyl Phthalate
Dimethyl Phthalate
Diphenyl Ether
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno (1,2,3 - cd) pyrene
Indole
Isophorone
m/p-cresol
N-Nitrosodi-n-propylamine
Naphthalene
Nitrobenzene
o-Cresol

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

p-chloroaniline
Pentachlorophenol
Perylene
Phenanthrene
Phenol
Pyrene
Quinoline
Total Diphenylamine

Solids (Organic)
Base Neutral Acid Extractables (BNA) - Solid Waste (141)
NA-TM-1700/WT-TM-1300/WT-TM-1101; EPA 1311 (Leach)/ Modified from EPA SW 846 8270 (Analysis)
GC/MS - TCLP
2-Methylphenol
2,3,4,6-Tetrachlorophenol
2,4-Dichlorophenol
2,4-Dinitrotoluene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
3/4-Methylphenol
Benzo (a) pyrene
Hexachlorobenzene
Hexachlorobutadiene
Hexachloroethane
Nitrobenzene
Pentachlorophenol

Solids (Organic)
F1 (C6-C10) - Soil (110)
NA-TM-1102; CCME TIER 1, modified from EPA 5021 A, EPA 8260 C
GC/FID - HEADSPACE
F1: C6-C10

Solids (Organic)
Glycols - Soil, Sediment, Sludge (089)
WT-TM-1601; modified from EPA 8015 B - MODIFIED
GC/FID
1,2 - Propylene Glycol
1,3 - Propylene Glycol
Diethylene Glycol
Ethylene Glycol

Solids (Organic)
Organochlorine Pesticides (OCP) - Soil (020)
WT-TM-1102/WT-TM-1302; modified from EPA SW846 3500 C, SW846 8270 D
GC/MS - EXTRACTION
Aldrin
alpha-BHC
alpha-Chlordane
beta-BHC
Chlordane
delta-BHC
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Endrin

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Endrin Aldehyde
gamma-Chlordane
Heptachlor
Heptachlor Epoxide
Lindane
Mirex
o,p'-DDD
o,p'-DDE
o,p'-DDT
Oxychlordane
p,p'-DDD
p,p'-DDE
p,p'-DDT
p,p'-Methoxychlor

Solids (Organic)
Pesticides - Soil (150)
WT-TM-1107, WT-TM-1302; modified from EPA SW 846 8270, SW 846 3500 C
GC/MS - EXTRACTION
2,4-D
2,4,5-T
2,4,5-TP
Alachlor
Ametryn
Atrazine
Atrazine Desethyl
Azinphos-methyl
Bendiocarb
Bromoxynil
Carbaryl
Carbofuran
Chlorpyrifos
Cyanazine
Diazinon
Dicamba
Diclofop-methyl
Dimethoate
Dinoseb
Malathion
MCPA
Mecoprop
Metolachlor
Metribuzin
Parathion
Phorate
Picloram
Prometon
Prometryne
Propazine
Simazine
Temephos
Terbufos
Terbutryn
Triallate

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Trifluralin

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Soil (065)
WT-TM-1307/WT-TM-1111; CCME TIER 1, MOE: DECPH E3398
GC/FID - EXTRACTION
F2: C10-C16
F3: C16-C34
F4: C34-C50

Solids (Organic)
Petroleum Hydrocarbons (PHC) F4 - Soil (071)
WT-TM-1307; CCME TIER 1, MOE: DECPH E3398
GRAVIMETRIC
F4: Gravimetric

Solids (Organic)
Polychlorinated Biphenyls (PCB) - Soil (018)
WT-TM-1105/WT-TM-1301; modified from EPA SW846 3500 C, SW846 8270 D
GC/MS - EXTRACTION
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Solids (Organic)
Polychlorinated Biphenyls (PCB) - Solid Waste (137)
NA-TM-1700/WT-TM-1301/WT-TM-1105; EPA 1311 (Leach)/ Modified from EPA SW 846 8270 (Analysis)
GC/MS - TCLP
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Solids (Organic)
Pyridine - Solid Waste (167)
WT-TM-1600/NA-TM-1700; modified from SW846 8260 B
GC/MS
Pyridine

Solids (Organic)
Volatile Organic Compounds (VOC) - Soil (093)
WT-TM-1404; modified from EPA SW 846-8260 B
GC/MS - PURGE AND TRAP/EXTRACTION
1,1-Dichloroethane
1,1-dichloroethylene
1,1,1-Trichloroethane
1,1,1,2- Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-dichlorobenzene
1,2-dichloroethane
1,2-Dichloropropane
1,3-Dichlorobenzene
1,4-dichlorobenzene
2-Hexanone

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Acetone (2-Propanone)
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon disulfide
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexane
m/p-xylene
Methyl Ethyl Ketone
Methyl isobutyl Ketone
Methyl t-butyl ether
o-xylene
Styrene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

Solids (Organic)
Volatile Organic Compounds (VOC) - Soil (112)
NA-TM-1102; modified from EPA 5021 A, EPA 8260 C
GC/MS - HEADSPACE
1,1-Dichloroethane
1,1-Dichloroethylene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromomethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2-Hexanone
Acetone (2-Propanone)
Benzene
Bromodichloromethane
Bromoform

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Bromomethane
Carbon Disulfide
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dibromochloromethane
Dibromomethane
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexane
m/p-xylene
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl t-butyl ether
Methylene Chloride
o-xylene
Styrene
Tetrachloroethane
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl chloride

Solids (Organic)
Volatile Organic Compounds (VOC) - Solid Waste (142)
WT-TM-1017/WT-TM-1404; modified from EPA 1311, modified from EPA SW 846 8260 B
GC/MS - TCLP
1,1-Dichloroethylene
1,2-Dichlorobenzene
1,2-Dichloroethane
1,4-Dichlorobenzene
Benzene
Carbon tetrachloride
Chlorobenzene
Chloroform
Chloromethane
Dichloromethane
Ethylbenzene
Methyl ethyl ketone
Tetrachloroethylene
Toluene
Trichloroethylene
Vinyl chloride

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Solids (Organic)
Volatile Organic Compounds (VOC) - Solid Waste (182)
WT-TM-1017/NA-TM-1002; EPA 1311, modified from EPA 846 8260
GC/MS - HEADSPACE - TCLP
1,1-Dichloroethylene
1,2-Dichlorobenzene
1,4-Dichlorobenzene
Benzene
Carbon tetrachloride
Chloroform
Dichloromethane
Ethylbenzene
m&p-xylene
Methyl ethyl ketone
o-xylene
Tetrachloroethylene
Toluene

Swab (Organic)
Polychlorinated Biphenyls - Swabs (164)
WT-TM-1105/WT-TM-1301; SW846 3500C/SW846 8270D
GC/MS - EXTRACTION
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Tissue (Inorganic)
Mercury - Tissue (147)
WT-TM-1018 AND NA-TP-2003; modified from SW 846 7471
COLD VAPOUR AA - SPECTROMETRIC
Mercury

Tissue (Inorganic)
Metals - Tissue (152)
WT-TM-1038/NA-TP-2003; modified from EPA 200.3
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Selenium
Silver
Strontium
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc

Water (Inorganic) OSDWA †
Alkalinity - Water (070)
WT-TM-1012; modified from SM 2320 B
MANUAL TITRATION
Alkalinity (pH 4.5)

Water (Inorganic) OSDWA †
Alkalinity - Water (094)
WT-TM-1032; modified from EPA 310.2
COLORIMETRIC
Alkalinity (pH 4.5)

Water (Inorganic) OSDWA †
Ammonia - Water (095)
WT-TM-1013; modified from EPA 350.1
COLORIMETRIC
Ammonia
Ammonia + ammonium

Water (Inorganic) OSDWA †
Anions - Water, Wastewater (003)
WT-TM-1008; modified from SM 4110C, modified from EPA 300.0
ION CHROMATOGRAPHY
Bromide
Chloride
Fluoride
Nitrate
Nitrite
Sulfate

Water (Inorganic) OSDWA †
Biochemical Oxygen Demand (BOD) - Water (001)
WT-TM-1002; modified from SM 5210B
D.O. METER
BOD (5 day)
CBOD (5 day)

Water (Inorganic) OSDWA †
Bromate - Water (114)
WT-TM-1503/WT-TM-1505; modified from EPA 6850
LC-MS/MS - EXTRACTION
Bromate

Water (Inorganic) OSDWA †
Carbon - Water (047)
WT-TM-1024; modified from SM 5310 B
IR - COMBUSTION
Organic Carbon

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Inorganic) OSDWA †
Chemical Oxygen Demand (COD) - Water (035)
WT-TM-1006; modified from SM 5220 D
REFLUX - COLORIMETRIC
COD

Water (Inorganic) OSDWA †
Chlorine - Water (074)
WT-TM-1021; modified from SM 4500-CL G, EPA 330.5
COLORIMETRIC
Free Chlorine
Total Chlorine

Water (Inorganic) OSDWA †
Colour - Water (097)
WT-TM-1014; modified from SM2120 C
COLORIMETRIC
Apparent Colour
True Colour

Water (Inorganic) OSDWA †
Conductivity - Water (048)
WT-TM-1010; modified from SM 2510 B, EPA 9050A
CONDUCTIVITY METER
Conductivity (25°C)

Water (Inorganic)
Conductivity - Water (108)
WT-TM-1028; modified from SM 2510 B
PC TITRATE
Conductivity (25°C)

Water (Inorganic) OSDWA †
Cyanate - Water (161)
WT-TM-1036; modified from APHA 4500 CN L / 4500NH3 D
SELECTIVE ION ELECTRODE
Cyanate

Water (Inorganic) OSDWA †
Cyanide - Water, Wastewater (004)
NA-TM-1003; modified from SM 4500-CN B, C, E, I
COLOR - DISTILLATION
Cyanide (Free)
Cyanide (SAD)
Cyanide (WAD)

Water (Inorganic) OSDWA †
Dissolved Metals - Water (005)
WT-TM-1038; modified from EPA 200.8/6020 A
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Selenium
Silicon
Silver
Sodium
Strontium
Sulphur
Thallium
Tin
Titanium
Tungsten
Uranium
Vanadium
Zinc
Zirconium

Water (Inorganic) OSDWA †
Hexavalent Chromium - Water (157)
WT-TM-1035; modified from EPA 1636/EPA 7199
ION CHROMATOGRAPHY
Chromium (Hexavalent)

Water (Inorganic) OSDWA †
Hydrogen Sulphide - Water (012)
WT-TM-1003; modified from SM 4500-S2, D, E, F
COLORIMETRIC
Hydrogen Sulfide

Water (Inorganic) OSDWA †
Mercury - Water, Wastewater (049)
WT-TM-1018; modified from EPA 7470A, EPA 245.2
COLD VAPOUR AA - SPECTROMETRIC
Mercury

Water (Inorganic) OSDWA †
Oil and Grease - Water (033)
WT-TM-1100; modified from 5520 B, D, E, F, EPA 1664
GRAVIMETRIC - EXTRACTION
Mineral Oil and Grease
Total Oil and Grease

Water (Inorganic) OSDWA †
Perchlorate - Water (168)
WT-TM-1505; modified from EPA 6850
LC-MS/MS - EXTRACTION
Perchlorate

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Inorganic) OSDWA †
pH - Water (026)
WT-TM-1001; modified from 4500-H B
pH - METER
pH

Water (Inorganic) OSDWA †
pH - Water (106)
WT-TM-1028; modified from SM 4500-H B
PC TITRATE
pH

Water (Inorganic) OSDWA †
Phenols - Water (009)
WT-TM-1027; modified from SM 5530 B, D and modified from EPA 9066
COLORIMETRIC
Total Phenolics

Water (Inorganic) OSDWA †
Phosphorus (Low Level) - Water (098)
WT-TM-1025; modified from SM 4500-P B, F
COLORIMETRIC
Phosphate

Water (Inorganic) OSDWA †
Solids - Water (010)
WT-TM-1011; modified from SM 2540 D, E
GRAVIMETRIC
Total Suspended Solids
Volatile Suspended Solids

Water (Inorganic) OSDWA †
Solids - Water (056)
WT-TM-1011; modified from SM 2540 B, C, E
GRAVIMETRIC
Total Dissolved Solids
Total Solids
Volatile Solids

Water (Inorganic) OSDWA †
Tannin and Lignin - Water (124)
WT-TM-1015; modified from SM 5550 B
COLORIMETRIC
Tannins & Lignins

Water (Inorganic)
Tannin and Lignin - Water (181)
WT-TM-1015; modified from SM 5550 B
COLORIMETRIC - DISCRETE ANALYZER
Tannin and Lignin

Water (Inorganic) OSDWA †
Total Kjeldahl Nitrogen (TKN) - Water (099)
WT-TM-1023; modified from SM 4500-NORG D
COLORIMETRIC - DIGESTION
Total Kjeldahl Nitrogen

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Inorganic) OSDWA †
Total Metals - Water, Wastewater (032)
WT-TM-1038; modified from EPA 200.8/6020
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Selenium
Silicon
Silver
Sodium
Strontium
Sulphur
Thallium
Tin
Titanium
Tungsten
Uranium
Vanadium
Zinc
Zirconium

Water (Inorganic) OSDWA †
Total Phosphorus - Water (011)
WT-TM-1020; modified from SM 4500-P E, F
AUTO COLOR - DIGESTION
Total Phosphorus

Water (Inorganic) OSDWA †
Turbidity - Water (024)
WT-TM-1004; modified from SM 2130B
TURBIDIMETRIC
Turbidity

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Microbiology) OSDWA †
Coliforms - Water (155)
WT-TM-1200; modified from MOE/LSB MICROMFDC-E3407
MEMBRANE FILTRATION (DC)
Escherichia coli (E. coli)
Total Coliforms

Water (Microbiology) OSDWA †
Escherichia coli (E. coli) - Water (052)
WT-TM-1200; modified from ONTARIO MOE COMPARISON EVALUATION AND SM 9222D
MEMBRANE FILTRATION (mFC-BCIG)
Escherichia coli (E. coli)

Water (Microbiology) OSDWA †
Fecal (Thermotolerant) Coliforms - Water (051)
WT-TM-1200; modified from SM 9222 D
MEMBRANE FILTRATION (m FC)
Fecal (Thermotolerant) Coliforms

Water (Microbiology) OSDWA †
Fecal Streptococci - Water (088)
WT-TM-1202; modified from SM 9230 C
MEMBRANE FILTRATION (mENTEROCOCCUS)
Fecal Streptococci

Water (Microbiology) OSDWA †
Heterotrophic Plate Count (HPC) - Water (030)
WT-TM-1200; modified from SM 9215 D
MEMBRANE FILTRATION
Heterotrophic Plate Count (HPC)

Water (Microbiology) OSDWA †
Pseudomonas aeruginosa - Water (091)
WT-TM-1202; modified from SM 9213 E
MEMBRANE FILTRATION (mPAC)
Pseudomonas aeruginosa

Water (Microbiology) OSDWA †
Total Coliforms - Water (002)
WT-TM-1200; modified from SM 9222 B
MEMBRANE FILTRATION (m Endo)
Background Counts
Total Coliforms

Water (Organic) OSDWA †
1,4-Dioxane - Water (172)
WT-TM-1407; modified from SW 846 8260 C/EPA 5021 A
GC/MS - HEADSPACE
1,4-Dioxane

Water (Organic) OSDWA †
Aldicarb and Diuron - Water (135)
WT-TM-1502; modified from MOE E3438 AND E3436
LC-MS/MS - EXTRACTION
Aldicarb
Diuron

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Organic)
Alkylated PAH's - Water (178)
WT-TM-1114/WT-TM-1309; modified from EPA SW 846-8270/SW846 3500 C
GC/MS - EXTRACTION

- Acenaphthene
- Acenaphthene
- Acenaphthylene
- Acenaphthylene
- Acridine
- Anthracene
- Benzo (a) anthracene
- Benzo (a) pyrene
- Benzo (b) fluoranthene
- benzo(e)pyrene
- Benzo (g,h,i) perylene
- Benzo (k) fluoranthene
- Biphenyl
- C1-acenaphthenes
- C1-Benzofluoroanthenes/Benzo(a)pyrenes
- C1-Biphenyl
- C1-Chrysenes
- C1-Dibenzothiopenes
- C1-Fluoranthenes/Pyrenes
- C1-Fluorenes
- C1-Naphthalenes
- C1-Phenanthrenes/Anthracene
- C2-Benzofluoroanthenes/Benzo(a)pyrenes
- C2-Biphenyl
- C2-Chrysenes
- C2-Dibenzothiopenes
- C2-Fluoranthenes/Pyrenes
- C2-Fluorenes
- C2-Naphthalenes
- C2-Phenanthrenes/Anthracene
- C3-Chrysenes
- C3-Dibenzothiopenes
- C3-Fluoranthenes/Pyrenes
- C3-Fluorenes
- C3-Naphthalenes
- C3-Phenanthrenes/Anthracene
- C4-Dibenzothiopenes
- C4-Fluoranthenes/Pyrenes
- C4-Naphthalenes
- C4-Phenanthrenes/Anthracene
- Chrysene
- Dibenzo (a,h) anthracene
- Dibenzothiopene
- Fluoranthene
- Fluorene
- Indeno (1,2,3 - cd) pyrene
- Naphthalene
- Perylene
- Phenanthrene

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Phenanthrene
Pyrene
Quinoline
Retene

Water (Organic) OSDWA †
Base Neutral Acid Extractables (BNA) - Water, Wastewater (015)
WT-TM-1101/WT-TM-1300; modified from EPA SW 846-8270/SW846 3500C
GC/MS - EXTRACTION
1-Chloronaphthalene
1-Methylnaphthalene
1,2,4-Trichlorobenzene
1,3-Dichlorobenzene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Nitrophenol
2,3,4-Trichlorophenol
2,3,4,5-Tetrachlorophenol
2,3,4,6-tetrachlorophenol
2,3,5-Trichlorophenol
2,3,5,6-Tetrachlorophenol
2,4-dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,4,5-Trichlorophenol
2,4,6-trichlorophenol
2,6-Dichlorophenol
2,6-Dinitrotoluene
3,3'-Dichlorobenzidene
4-Bromophenyl Phenyl Ether
4-Chloro-3-Methylphenol
4-chloroaniline
4-Chlorophenyl Phenyl Ether
4-Nitrophenol
4,6-Dinitro-o-Cresol
5-Nitroacenaphthylene
Acenaphthene
Acenaphthylene
Acridine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Benzyl Butyl Phthalate
Biphenyl
Bis (2-Chlorethoxy) Methane
Bis (2-Chloroethyl) Ether
Bis (2-Chloroisopropyl) Ether
Bis (2-ethylhexyl) Phthalate
Camphene

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Chrysene
Di-n-Butylphthalate
Di-n-Octylphthalate
Dibenzo (a,h) anthracene
Diethyl Phthalate
Dimethyl Phthalate
Diphenyl Ether
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno (1,2,3 - cd) pyrene
Indole
Isophorone
m/p-cresol
N-Nitrosodi-n-propylamine
Naphthalene
Nitrobenzene
o-Cresol
p-chloroaniline
Pentachlorophenol
Perylene
Phenanthrene
Phenol
Pyrene
Quinoline
Total Diphenylamine

Water (Organic) OSDWA †
Diquat and Paraquat - Water (134)
WT-TM-1506; modified from MDS SCIEX APPLICATION NOTE DIQUAT AND PARAQUAT
LC-MS/MS - EXTRACTION
Diquat
Paraquat

Water (Organic) OSDWA †
Formaldehyde - Water (162)
WT-TM-1603; modified from EPA 556.1
GC/ECD
Formaldehyde

Water (Organic) OSDWA †
Glycols - Water (090)
WT-TM-1601; modified from EPA 8015 B - MODIFIED
GC/FID
1,2 - Propylene Glycol
1,3 - Propylene Glycol
Diethylene Glycol
Ethylene Glycol

Water (Organic) OSDWA †
Glyphosate - Water (133)
WT-TM-1504; modified from MOE-GLYMS-E3415
LC-MS/MS - EXTRACTION
Glyphosate

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Organic) OSDWA †
Haloacetic Acids - Water (163)
WT-TM-1604; modified from EPA 552.3
GC/ECD
Bromoacetic Acid (BAA)
Bromochloroacetic Acid
Bromodichloroacetic Acid
Chloroacetic Acid (CAA)
Chlorodibromoacetic Acid
Dalapon (2,2-Dichloropropionic Acid)
Dibromoacetic Acid (DBAA)
Dichloroacetic Acid (DCAA)
Tribromoacetic acid (TBAA)
Trichloroacetic Acid (TCAA)

Water (Organic) OSDWA †
Hydrocarbons - Water (062)
WT-TM-1602; modified from EPA 600/R-98/128
GC/FID - HEADSPACE
Ethane
Ethene
Methane

Water (Organic) OSDWA †
Nitrilotriacetic Acid (NTA) - Water (036)
WT-TM-1007; modified from EPA 430.1
COLORIMETRIC
Nitrilotriacetic Acid (NTA)

Water (Organic) OSDWA †
Nonylphenol and Nonylphenol Ethoxylates - Water (116)
WT-TM-1521; IN-HOUSE
LC-MS/MS - EXTRACTION
Bisphenol A
Nonylphenol Diethoxylate
Nonylphenol Monoethoxylates
Nonylphenols
Nonylphenols Ethyoxylates
Octylphenol
Octylphenol Diethoxylate
Octylphenol Monoethoxylate

Water (Organic) OSDWA †
Organochlorine Pesticides (OC) - Water, Wastewater (019)
WT-TM-1102/WT-TM-1302; modified from EPA SW846-8270/SW846-3500C
GC/MS - EXTRACTION
A -BHC
a - Chlordane
Aldrin
beta-BHC
delta-BHC
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Endrin
Endrin Aldehyde

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

g - Chlordane
Heptachlor
Heptachlor Epoxide
Lindane (gamma-BHC)
Mirex
o,p' - DDT
o,p'-DDD
o,p'-DDE
Oxychlordane
p,p' - DDT
p,p' Methoxychlor
p,p'-DDD
p,p'-DDE

Water (Organic)
Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) - Water (174)
WT-TM-1557; modified from JOURNAL OF CHROMATOGRAPHY A,1093 (2005), 89-97
LC-MS/MS
Perfluorooctane Sulfonate (PFOS)
Perfluorooctanoic Acid (PFOA)

Water (Organic) OSDWA †
Pesticides - Water (023)
WT-TM-1107/WT-TM-1109-/WT-TM-1302; modified from EPA SW846-8270/SW846 3500C
GC/MS - EXTRACTION
2,4-dichlorophenoxyacetic acid
2,4,5-trichlorophenoxyacetic acid
Alachlor
Atrazine
Azinphos-methyl
Bendiocarb
Bromoxynil
Carbaryl
Carbofuran
Chlorpyrifos (ethyl)
Cyanazine
De-ethylated atrazine
Diazinon
Dicamba
Diclofop-methyl (as free acid)
Dimethoate
Dinoseb
Malathion
Metolachlor
Metribuzin
Parathion (ethyl)
Phorate
Picloram
Prometryne
Simazine
Temephos
Terbufos
Triallate
Trifluralin

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Organic) OSDWA †
Petroleum Hydrocarbons (PHC) - Water (068)
WT-TM-1307/WT-TM-1112; modified from MOE:DECPH E3421
GC/FID - EXTRACTION
F2 (C10-C16)
F3 (C16-C34)
F4 (C34-C50)

Water (Organic) OSDWA †
Petroleum Hydrocarbons (PHC) - Water (069)
WT-TM-1307/WT-TM-1112; modified from MOE:DECPH E3421
GRAVIMETRIC
F4G (C34-C50)

Water (Organic) OSDWA †
Petroleum Hydrocarbons (PHC) - Water (111)
NA-TM-1102; modified from EPA 8260, EPA 5021 A
GC/FID - HEADSPACE
F1 (C6-C10)

Water (Organic) OSDWA †
Polychlorinated Biphenyls (PCB) - Water, Wastewater (017)
WT-TM-1105/WT-TM-1301; modified from EPA SW 846-8270/SW846-3500 B
GC/MS - EXTRACTION
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Water (Organic)
Steroids and Hormones - Water (166)
WT-TM-1555; modified from EPA 1698
LC/MS - EXTRACTION
17a-Dihydroequilin
17a-Estradiol
17a-Ethinylestradiol
17b-Estradiol
Anderosterone
Androstendion
beta-Sitosterol
beta-Stigmastanol
Betamethasone
Campesterol
Cholestanol
Cholesterol
Coprostanol
Desmosterol
Desogestrel
Epi-coprostanol
Equilenin
Equilin
Ergosterol
Estradiol-3-benzoate
Estriol
Estrone
Mestranol

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Norethindrone
Norgestrel
Progesterone
Stigmasterol
Testosterone

Water (Organic) OSDWA †
Tetraethyl Lead - Water (159)
WT-TM-1308; modified from EPA 3510 C, 8270 D
GC/MS - DIGESTION
Teraethyl lead

Water (Organic) OSDWA †
Volatile Organic Compounds - Water (113)
NA-TM-1102; modified from EPA 8260 C, EPA 5021 A
GC/MS - HEADSPACE
1,1-Dichloroethane
1,1-Dichloroethylene
1,1,1-Trichloroethane
1,1,1,2- Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2-Hexanone
Acetone (2-Propanone)
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon disulfide
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexane
m/p-xylene
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl t-butyl ether
o-xylene
Styrene
Tetrachloroethylene
Toluene

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

Water (Organic) OSDWA †
Volatile Organic Compounds (VOC) - Water (092)
WT-TM-1404; modified from EPA SW 846-8260
GC/MS - PURGE AND TRAP/EXTRACTION
1,1-Dichloroethane
1,1-dichloroethylene
1,1,1-Trichloroethane
1,1,1,2- Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-dichlorobenzene
1,2-dichloroethane
1,2-Dichloropropane
1,3-Dichlorobenzene
1,4-dichlorobenzene
2-Hexanone
Acetone (2-Propanone)
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon disulfide
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexane
m/p-xylene
Methyl Ethyl Ketone
Methyl isobutyl Ketone
Methyl t-butyl ether
o-xylene
Styrene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Quality Assurance/Quality Control Plan
Chesterfield Inlet Landfarm

Water Licence No.: 1BR-CIL1217

Submitted by:

Government of Nunavut
Community and Government Services
P.O. Box 490
Rankin Inlet, Nunavut
X0C 0G0

Date: September 2014

Document Management

	Description	Prepared by	Date
1	Original QA/QC Plan	GN-CGS	September 2014
2			
3			
4			
5			
6			

Table of Contents

1. Introduction 1
1.1 Background 1
1.2 Monitoring and Regulatory Requirement Program 1
1.3 Objectives 2
2. Field Sampling 3
2.1 Sampling Procedures 3
2.2 Sampling Collection 3
2.2.1 Locations 3
2.2.1 Parameters 4
2.2.2 Sampling Equipment 4
2.2.3 Sampling Methods 7
2.3 Sample Handling 8
2.4 Quality Assurance and Quality Control Program 8
3. Laboratory Analysis 9
3.1 Laboratory Accreditation 9
3.1 Laboratory Information 9
3.2 Method Detection Limits 9
4. Reporting Requirements 10
4.1 General Submissions 10
5. References 11
Appendix A – NWB Licence No. 1BR-CIL1217 12
Appendix B – Landfarm Site Plan 35
Appendix C – Field Log 37
Appendix D – Chain of Custody Form 39
Appendix E – CALA Certificate of Accreditation and Scope of Accreditation 41

List of Figures

Figure 1: Sampling Pole 6
Figure 2: Sample Field Log 6

List of Tables

Table 1: Monitoring Program Stations 3
Table 2: Monitoring Station CIL-1 Effluent Quality Limits 4

1. Introduction

The purpose of this document is to provide guidance to ensure that the monitoring program samples collected in the field are done so with a high degree of quality, in order to confirm that they accurately reflect the physical and chemical nature of the matrix being tested.

1.1 Background

The Hamlet of Chesterfield Inlet, or Igluligaarjuk, Nunavut with a population of 332 people is located at latitude 63 degrees 20 minute north and longitude 90 degrees 42 minutes west. The Hamlet lies on the south shore of Chesterfield Inlet and on the west shore of Hudson Bay. In relation to other communities, Chesterfield Inlet is 101 km northeast of Rankin Inlet.

Chesterfield Inlet's topography consists of sand to gravel landscape with low granite outcrops and inland lakes. It is located on a low and narrow coastal strip at elevation of 10 meters. Vegetation is typical arctic tundra and consists of mosses, lichens and grasses. The elevation at the Chesterfield Inlet airstrip is approximately 25 m above sea level. Chesterfield Inlet's average annual precipitation consists of 14.6 cm of rainfall and 112 cm of snowfall. Mean high in July is 13.1 degrees Celsius with a mean low of 4.6 degrees Celsius. In January, mean high is -27.8 degrees Celsius and a mean low of -35.2 degrees Celsius.

Part of the original scope of the Chesterfield Inlet Fuel Facility upgrade was to construct a landfarm to contain hydrocarbon-contaminated soils that were identified the project. The landfarm is located adjacent to the existing Solid Waste Site and is accessed from the same road. The Government of Nunavut in consultation with the Hamlet of Chesterfield Inlet selected this site. The contaminated soils required to be removed exceeded the original estimate and the available storage in the landfarm. An expansion of the landfarm adjacent to the existing landfarm was subsequently required to properly remediate the contaminated soils. The lined-engineered landfarm covers approximately 2500 m^2 and contains 450 m^2 of contaminated soils for remediation.

The Nunavut Water Board (NWB) issued a Type B Water Licence (1BR-CIL1217) to the Government of Nunavut, Community and Government Services (GN-CGS) on August 17, 2012. The water licence governs the deposit of waste for the Chesterfield Inlet landfarm and does not authorize the use of water. A copy of the water licence can be found in Appendix A. An Amendment Application was submitted to the NWB on August 2, 2013 seeking approval for the landfarm expansion.

1.2 Monitoring and Regulatory Requirement Program

Part J of the Water Licence No: 1BR-CIL1217 issued to the GN-CGS outlines Conditions Applying to the Monitoring Program. As per Part J: Item 11, the GN-CGS is required to submit to the NWB a Quality Assurance/Quality Control (QA/QC) Plan for inclusion with the Operation and Maintenance (O&M) Plan.

The submission of the QA/QC Plan shall include a covering letter from an accredited laboratory confirming acceptance of the Plan for analyses to be performed under this licence.

1.3 Objectives

The objectives of this QA/QC Plan are to:

i) ensure the reliability of the data collected during monitoring activities at the locations specified in the water licence; and
ii) satisfy the requirement of the water licence.

1.4 Scope of Work

This QA/QC Plan covers the environmental monitoring undertaken at the Chesterfield Inlet landfarm. A copy of the landfarm site plan can be found in Appendix B.

1.5 Definitions

The following definitions that are relevant to this plan include:

Quality Assurance is a system that ensures that quality control procedures are correctly performed and documented.

Quality Control refers to the established procedures observed both in the field and in the laboratory, designed to ensure that the resulting end data meet intended quality objectives.

Trip Blank is a sample of clean water that was prepared by the analytical laboratory and shipped to the sample site in the cooler along with the empty sample bottles. This trip blank sample remains unopened and is transported back to the laboratory with the monitoring program samples. The trip blanks is analyzed by the laboratory along with the monitoring program samples. The purpose of the trip blank is the assess contamination introduced during shipping and field handling procedures.

CALA refers to the Canadian Association for Laboratory Accreditation, formally known as the Canadian Association for Environmental Analytical Laboratories (CAEAL).

Chain of Custody Documentation refers to the documentation that accompanies samples sent to an analytical laboratory. It is a legal document which ensures that the sample taken at a specific site is the same sample received in the laboratory. It also provides information on the sample condition and integrity as received by the laboratory.

2. Field Sampling

2.1 Sampling Procedures

All sampling, sample preservation and analyses is to be conducted in accordance with methods described in the current edition of Standard Methods for the Examination of Water and Wastewater (American Public Health Association, American Water Works Association, and Water Environment Federation, most current edition).

To obtain meaningful results from the analyses, the following six factors are of particular importance:

i) Sample collection as per schedule and location;
ii) Correct usage of container/sample bottle for parameter being tested;
iii) Correct labelling of sample bottles and filling out record/field sheet;
iv) Correct procedure for field sampling;
v) Proper and timely shipment of samples to the laboratory; and
vi) Timely delivery of samples to the laboratory from the air cargo facility.

2.2 Sampling Collection

2.2.1 Locations

Water Licence No. 1BR-CIL1217 specifies the four monitoring stations identified in the following table.

Table 1: Monitoring Program Stations

Monitoring Program Station	Description	Frequency	Parameters
CIL-1	Any apparent seepage or effluent discharged from the Landfarm	Monthly prior to freeze-up	Volume in accordance with Part J Item 5; Quality in accordance with Part J Item 6
CIL-2	Monitoring well located up-gradient of the Landfarm	Once during spring freshet, and once during late summer	Quality in accordance with Part J Item 7
CIL-3	Monitoring well located down-gradient of the Landfarm	Once during spring freshet, and once during late summer	Quality in accordance with Part J Item 7
CIL-4	Monitoring well down-gradient of the Landfarm	Once during spring freshet, and once during late summer	Quality in accordance with Part J Item 7

2.2.1 Parameters

As per Part J Item 7 of the Water Licence, the following parameters shall be sampled at Monitoring Program Stations CIL-1, CIL-2, CIL-3, and CIL-4:

- Total Suspended Solids
- pH
- Total Hardness
- Total Alkalinity
- Conductivity
- Nitrate-Nitrite
- Ammonia Nitrogen
- Chloride
- Oil and Grease
- Total Phenols
- Calcium
- Magnesium
- Sodium
- Potassium
- Sulphate
- Total Aluminum
- Total Arsenic
- Total Cadmium
- Total Cobalt
- Total Copper
- Total Iron
- Total Lead
- Total Molydbenum
- Total Nickel
- Total Selenium
- Total Silver
- Total Titanium
- Total Zinc
- Total Extractable Hydrocarbons (TEH)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Benzene, Toluene, Ethylbenzene, Xylene (BTEX)

All effluent discharged from the landfarm at Monitoring Program Station CIL-1 shall not exceed the effluent quality limits described in Table 2.

Table 2: Monitoring Station CIL-1 Effluent Quality Limits

Parameter	Maximum Concentration of Any Grab Sample (µg/L)
pH	6 to 9 (pH units)
Oil and Grease	5000
Benzene	370
Toluene	2
Ethylbenzen	90

2.2.2 Sampling Equipment

Dedicated latex or nitrile gloves (i.e., one pair per sample) are to be used during sample handling.

Any sampling equipment used, such as sampling poles (see photo below), are to be cleaned with soap and water after each sample is collected to prevent cross-contamination.

Figure 1: Sampling Pole

A Field Log should be filled-out for every sampling location and kept on file. See below for a sample of a completed Field Log.

Field Log

Name of Sampler(s): *John Doe*

Date of Sampling: *DD/MM/YYYY*

Time of Sampling: *HH:MM*

Monitoring Station Number: *CIL-X*

GPS Coordinates: N *xx* ° *xx* ' *xx.x*" W *xx* ° *xx* ' *xx.x*"

Weather Conditions: *ie. sunny, cloudy, windy, temperature*

Samples:

- [X] 500 mL BOD
- [X] 1 L Routine
- [X] 250 mL Metals + Pres
- [ ] 40 mL Glass Mercury Vial + Pres
- [X] 250 mL Amber Nutrients + Pres
- [X] 250 mL Amber Phenols + Pres
- [X] 125 mL Sterile Bacteria Bottle
- [X] **2 x** 500 mL Glass Oil & Grease + Pres
- [X] 1 L Amber PAH + Pres
- [X] **3 x** 40 mL BTEX, F1 Vials + Pres
- [X] **2 x** 60 mL Amber F2-F4 Vials + Pres

Other:

- [ ] _____
- [ ] _____
- [ ] _____

Other Notes: (any unusual conditions, any deviation from standard procedures, etc.)

ie. No water at sampling site

Figure 2: Sample Field Log

A copy of the Field Log to be completed during sampling can be found in Appendix C.

Environmental monitoring samples collected for analysis of selected chemical parameters are to be placed directly into new pre-cleaned, laboratory-supplied sample bottles. All monitoring samples are to be placed in clean coolers for transportation to the subcontract laboratory.

The samples are transported/submitted under Chain of Custody documentation. Included on a Chain of Custody form is the client information, the sample information, the analyses requested, the relevant regulations, the turnaround time for the analytical results, comments, and temperature of the samples at the time they arrived in the laboratory. An example of a Chain of Custody form is included in Appendix D. The copy page of the Chain of Custody form should be kept on file with the completed Field Logs.

2.2.3 Sampling Methods

Sampling should be done using the following method:

i. Label all bottles prior to going to sampling sites;
ii. Begin sampling at the "cleanest" sampling site;
iii. Complete Field Log at each sampling site;
iv. Put on new pair of gloves at each sampling site;
v. Face bottles upstream when collecting samples;
vi. Fill bottles partially with water and rinse with lid in place, empty water downstream, repeat 3 times;
vii. Do not rinse bottles when sampling for oil & grease, bacteria or if bottles contain preservatives;
viii. Plunge bottle to half depth of water or 15 cm below surface for deeper water, avoid floating debris;
ix. If preservatives are to be added, leave room so there is no overflow;
x. If preservative is already in the bottle, fill slowly so not to wash out preservative;
xi. Put bottles in cooler with ice/icepacks;
xii. Place Chain of Custody (COC) form in plastic bag and put in cooler;
xiii. Send samples to lab as soon as possible;
xiv. Call the lab to notify lab that the sample was shipped and what time it will be arriving; and
xv. Wash your hands when you are done handling samples.

As a general recommendation, please refrain from using insect repellant, disinfection hand gel or other chemical products before and during sample collection. Also refrain from smoking during sample collection.

2.3 Sample Handling

All water samples are to be collected in laboratory-supplied containers with the proper preservative, where applicable. All sample containers are to be tightly sealed and properly labelled with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed. The outside of the bottles are to be cleaned with soap and water after sampling and dried off prior to placing the samples in the cooler. The samples are to be stored on ice in a cooler until delivery to the laboratory. A Chain of Custody form is to be filled out completely and is used to track the samples and placed in the cooler with the samples, in a ziplock bag. The last page of the Chain of Custody is to be kept on file for record.

The following checks are generally performed by the laboratory upon receipt:

i. Verification of the integrity and condition of all sample coolers;
ii. Verification of the integrity and condition of all sample containers;
iii. Checks for leakage, cracked or broken closures or containers, evidence of grossly contaminated container exteriors or shipping cooler interiors, and obvious odours, etc.;
iv. Verification of receipt of complete documentation for each container;
v. Verification that sample identification numbers on sample transmittal forms corresponds to sample identification numbers on the sample containers; and
vi. Verifications that holding times were met and samples were kept cool during transit.

2.4 Quality Assurance and Quality Control Program

Cross contamination is a common source of error in sampling procedures. QC samples help identify when and how contamination might occur. Trip blanks will be used for the purpose of this monitoring program.

It is essential to request a trip blank sample to be prepared when placing the bottle order with the contract laboratory.

3. Laboratory Analysis

3.1 Laboratory Accreditation

As indicated in the Guidelines, the GN-CGS should use an analytical laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA); formally known as the Canadian Association for Environmental Analytical Laboratories (CAEAL) for the monitoring program for NWB Licence.

Appendix E includes a copy of the laboratory's CALA accreditation certificate and a list of the parameters for which they are certified.

3.1 Laboratory Information

The contact information for the laboratory used to analyze the samples to fulfil the Monitoring Program requirements is:

ALS Environmental
1329 Niakwa Road East, Unit 12
Winnipeg, MB
R2J 3T4
Phone: (204) 255-9720

3.2 Method Detection Limits

The method detection limits (MDLs) are provided on the contract laboratory's Certificates of Analysis.

4. Reporting Requirements

4.1 General Submissions

As a condition of NWB Licence (Appendix A), the GN-CGS is required to submit an Annual Report to the NWB, no later than March 31st of the year following the calendar year reported. Among other requirements, the annual report is required to include tabular summaries of all analytical data generated under the Monitoring Program (compared to the Maximum Average Concentrations – provided in Table 2 – where applicable).

5. References

Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "B" Licensees in Collecting Representative Water Samples in the Field and for Submission of a QA/QC Plan, Department of Indian and Northern Affairs Canada, July 1996.

Standard Methods for the Examination of Water and Wastewater, American Public Health Association, American Water Works Association, and Water Environment Federation, 22nd Edition, 2012.

Appendix A – NWB Licence No. 1BR-CIL1217

P.O. Box 119
Gjoa Haven, NU X0B 1J0
Tel: (867) 360-6338
Fax: (867) 360-6369

ᓄᓇᕗᑦ ᐃᒪᓕᕆᔨᑦ ᑲᑎᒪᔨᑦ
NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYIT
OFFICE DES EAUX DU NUNAVUT

File No.: 1BR-CIL1217

August 17, 2012

Government of Nunavut,
Community and Government Services,
Rankin Inlet, Nunavut
C/O Malkiat Aulakh
E-mail: maulakh@gov.nu.ca

Stantec Architecture Ltd.
C/O Arlen Foster, EIT
E-mail: arlen.foster@stantec.com

RE: NWB Licence No. 1BR-CIL1217

Dear Mr. Aulakh and Ms. Foster:

Please find attached Licence No. 1BR-CIL1217 issued to the Government of Nunavut, Community and Government Services by the Nunavut Water Board (NWB) 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*. 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 water use and waste disposal must cease, or the Licensee will be in contravention of the *Nunavut Land Claims Agreement* (NLCA) 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 months prior to the Licence expiry date.

If the Licensee contemplates or requires an amendment to this licence, the NWB may decide, in the public 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 acknowledged by the Manager of Licensing..

The NWB strongly recommends that the Licensee consult the comments received by interested persons on issues identified. This information is attached for your consideration.[1]

Sincerely,

Thomas Kabloona
Nunavut Water Board
Chair

TK/kk/pb

Enclosure:

Licence No. **1BR-CIL1217**
Comments:– AANDC, EC

cc: Distribution – Kivalliq

1 Aboriginal Affairs and Northern Development Canada (AANDC), June 15, 2012; and Environment Canada (EC), June 22, 2012.

DECISION

LICENCE NUMBER 1BR-CIL1217

This is the decision of the Nunavut Water Board (NWB) with respect to an application dated May 11, 2012 for a new Water Licence made by:

GOVERNMENT OF NUNAVUT, COMMUNITY AND GOVERNMENT SERVICES

to allow for the disposal of waste during remediation activities at Chesterfield Inlet Landfarm Project located adjacent to the Chesterfield Inlet Municipal Solid Waste Site at Chesterfield Inlet, approximately 100 km northeast of Rankin Inlet within the Kivalliq Region, Nunavut, generally located at the geographical coordinates as follows:

Project Extents:

NW:	Latitude: 63° 20’ 46’’ N	Longitude: 90° 45’ 12” W
NE:	Latitude: 63° 20’ 46’’ N	Longitude: 90° 45’ 08” W
SE:	Latitude: 63° 20’ 45’’ N	Longitude: 90° 45’ 08” W
SW:	Latitude: 63° 20’ 45’’ N	Longitude: 90° 45’ 12” W

DECISION

After having been satisfied that the application was in conformity with the Keewatin Regional Land Use Plan[2] and subject to a 12.4.4(a) Screening Decision by the Nunavut Impact Review Board[3] in accordance with Article 12 of the *Nunavut Land Claim Agreement* (*NLCA*), the NWB decided that the application could proceed through the regulatory process. In accordance with S.55.1 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (*Act*) and Article 13 of the *NLCA*, 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 *NLCA* and of the *Act*, waived the requirement to hold a public hearing, and determined that:

Licence Number 1BR-CIL1217 be issued subject to the terms and conditions contained therein. (Motion #: 2012-05-L03)

SIGNED this 17th day of August 2012 at Gjoa Haven, NU.

Thomas Kabloona
Nunavut Water Board
Chair

TK/kk/pb

2 NPC Conformity Determination dated June 8, 2012.
3 NIRB Screening Decision dated August 13, 2012.

TABLE OF CONTENTS

DECISION ..... **I**
I. BACKGROUND **1**
II. PROCEDURAL HISTORY **1**
III. GENERAL CONSIDERATIONS **2**

TERM OF LICENCE 2
ANNUAL REPORT 2
WASTE DISPOSAL 2

Effluent Discharge 3

CONSTRUCTION AND OPERATIONS 3
DRILLING 3
SPILL CONTINGENCY PLANNING 4
ABANDONMENT AND RESTORATION 4
MONITORING 4

WATER LICENCE **6**
PART A: SCOPE, DEFINITIONS AND ENFORCEMENT **7**

1. SCOPE 7
2. DEFINITIONS 7
3. ENFORCEMENT 9

PART B: GENERAL CONDITIONS **9**
PART C: CONDITIONS APPLYING TO WATER USE **11**
PART D: CONDITIONS APPLYING TO WASTE DISPOSAL **11**
PART E: CONDITIONS APPLYING TO CONSTRUCTION AND OPERATIONS **12**
PART F: CONDITIONS APPLYING TO DRILLING OPERATIONS **13**
PART G: CONDITIONS APPLYING TO MODIFICATIONS **14**
PART H: CONDITIONS APPLYING TO SPILL CONTINGENCY PLANNING **14**
PART I: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION OR TEMPORARY CLOSING **15**
PART J: CONDITIONS APPLYING TO THE MONITORING PROGRAM **16**

TABLE NO. 1 18

NWB LICENCE No. 1BR-CIL1217

I. BACKGROUND

Stantec Architecture Ltd. (Stantec) was retained by the Government of Nunavut, Community and Government Services (GN-CGS) to complete upgrades to the existing Bulk Fuel Facility in Chesterfield Inlet which involves removal and remediation of petroleum contaminated soils.
As part of the Bulk Fuel Facility's upgrade, approximately 150 cubic meters of hydrocarbon contaminated soils must be removed from the site and remediated. Contaminated soils will be remediated in a lined engineered landfarm.

The landfarm will be located adjacent to the existing Chesterfield Inlet Municipal Solid Waste Site and will be accessed from the same road. The site was selected by the Government of Nunavut in consultation with the Hamlet of Chesterfield Inlet. Stantec indicates that there will be no water used at the site, and there will be no effluent. As needed, water that collects in the landfarm will be pumped back onto the soil where it will evaporate.

The application included FSC Architects & Engineers (FSC) *Issued for Tender* drawings signed and stamped by an engineer. The landfarm is being constructed to accommodate 170 m^3 of Type B Soil. The landfarm area will be bermed and lined and will occupy an area of 750 m^2. It would have a capacity of 380 m^3. The berm will have a 2:1 slope and will be lined with an impervious HDPE 60 mil textured membrane.

II. PROCEDURAL HISTORY

The NWB received a Water Licence Application from Stantec on behalf of GN-CGS on May 15, 2011 for the deposit and treatment of hydrocarbon impacted soil from the Chesterfield Inlet Bulk Fuel Facility for treatment at the proposed Chesterfield Inlet Landfarm.

The Licence Application (Application) included the following documents:

- Cover letter dated May 11, 2012;
- General Water Licence Application;
- Letter – Landfarm Water Licence Application Summary, English and Inuktitut;
- Supplementary Information for Hydrocarbon-Impacted Soil Storage;
- Spill Contingency Plan for Chesterfield Inlet Landfarm;
- Operation & Maintenance Plan for Chesterfield Inlet Landfarm;
- Abandonment and Restoration Plan for Chesterfield Inlet Landfarm;
- Drawings, Maps, Figures; and
- Letter from CGS authorizing Stantec to act on behalf of CGS.

On May 24, 2012, following a preliminary internal technical review, the NWB concluded that the Application met the requirements of section 48(1) of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA or Act) and forwarded notice of the Application to

regulators, council of the municipality most affected by the project and other interested parties. All parties were invited to make representations to the NWB within thirty (30) days.

On or before June 24, 2012, comments were received by Aboriginal Affairs and Northern Development Canada (AANDC), and Environment Canada (EC). No public concern was expressed during the notice period. In consideration of the comments received, the NWB determined that a public hearing would not be required and proceeded with the application process.

On August 13, 2012, the Nunavut Impact Review Board (NIRB) issued a Screening Decision as per Section 12.4.4 of the *Nunavut Land Claim Agreement* (*NLCA*) stating that the proposal may be processed without a review under Part 5 or 6, and recommended project-specific terms and conditions. These have been taken into consideration within the overall review of the Application.

Based upon the results of the detailed assessment of the Application, including consideration of any potential accidents, malfunctions, or impacts to water that the overall project might have in the area, the Board has approved the Application and has issued Water Licence 1BR-CIL1217.

III. GENERAL CONSIDERATIONS

TERM OF LICENCE

In accordance with section 45 of the Act, the NWB may issue a licence for a term not exceeding twenty-five (25) years. The Applicant requested a five-year Licence, which the NWB believes is appropriate for the type of remediation activities proposed in the application. The Board has therefore granted the term requested.

ANNUAL REPORT

Under the General Conditions section of the Licence, Part B, Item 1, the Licensee is required to submit to the Board for information, on an annual basis, a report that pertains to the deposition of wastes. The NWB maintains the annual reporting information on its public registry. The information is also made available to interested persons upon request.

WASTE DISPOSAL

The Applicant stated that no waste will be generated on site during the proposed remediation activities. According to the information provided in the Application, the Applicant is proposing that the liner be deposited to local landfill once remediation is completed.

Effluent Discharge

The Applicant indicated that there will be no effluent discharge, and as necessary, water being collected in the landfarm will be pumped back onto the soil retaining cell where it will evaporate. However, the Board has included effluent discharge criteria with the Licence, should the need for discharge arise. If effluent is required to be discharged it must first meet the discharge levels within Canadian Council of Ministers of Environment (CCME) *Canadian Water Quality Guidelines for the Protection of Aquatic Life* for surface water reception. The Board has decided that in the absence of Nunavut specific guidelines for discharge to groundwater and given the lack of information provided in the Application regarding the permafrost and groundwater regime to maintain that discharge will percolate into the groundwater, the CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME WQG)* for surface water reception shall be applied to effluent discharged from the Landfarm in accordance with the guidelines. As such, the Board has set Effluent quality limits in Part D Item 4 of this Licence for pH, oil and grease, benzene, toluene, and ethylbenzene that are consistent with the CCME Guidelines and other licences previously issued for similar undertakings.

CONSTRUCTION AND OPERATIONS

The Application included an Operation and Maintenance (O&M) Plan entitled "*Operation & Maintenance Plan for Chesterfield Inlet Landfarm*" dated May, 2012. The Board has approved the Plan under Part E, Item 1 of the Licence. However, the Applicant is required, within six (6) months of the issuance of the Licence, to submit an Addendum to the Plan for review of the Board, that will include the following information:

a. Dust controlling measures at the Landfarm;
b. Details regarding the timing, construction and installation of the groundwater monitoring wells; and
c. A Quality Assurance/Quality Control Plan approved by an accredited laboratory as required under Part J, Item 11.

The Applicant is required to provide to the Board, within 90 days of completion of the construction of any dams, dykes or structures to contain, withhold, divert or retain water or waste, including facilities or systems for the treatment and disposal of hydrocarbon contaminated soil, all respective design drawings and construction reports, including all as-built drawings, documentation of field decisions that deviate from original plans and any data used to support these decisions. These plans and drawings shall be stamped by an Engineer.

DRILLING

The Licence includes standard conditions under Part F related to drilling operations for the purpose of installing groundwater monitoring wells.

SPILL CONTINGENCY PLANNING

The Board has approved under Part H, Item 1 of the Licence, the Plan entitled "*Spill Contingency Plan for Chesterfield Inlet Landfarm"*, dated April, 2012 that was submitted as additional information with the Application. However, the Applicant is required, within six (6) months of the issuance of the Licence, to submit an Addendum to the Plan that will address AANDC comments.

The Applicant is required under Part B, Item 1 and as per Part B, Item 7, to submit to the Board for review any revision of the Plan.

ABANDONMENT AND RESTORATION

The Board has approved under Part I, Item 1 of the Licence, the Plan entitled "*Abandonment and Restoration Plan for Chesterfield Inlet Landfarm*" dated May, 2012 that was submitted as additional information with the Application. The Applicant is required to submit, under Part B, Item 1 and as per Part B, Item 7 of the Licence, any revisions of the Plan to the Board for review. In addition, conditions have been included under Part I, Item 3 to ensure that the Licensee removes from the site, all infrastructure and site materials, including all fuel caches, drums, barrels, material and equipment prior to the expiry of this Licence.

MONITORING

In its O&M Plan, the Applicant proposed to conduct field testing once a month, during the snow free season, immediately after the contaminated soil is turned.

Soil sampling program will be conducted at the beginning of each field season to identify the levels of PHC contamination in the soil. The soil criteria used for this site will be under the CCME *Canada Wide Standards for Petroleum Hydrocarbon Contaminated Soils Tier 1: Coarse-Fine Grain Soil, Commercial Site* as proposed by the Applicant.

The O&M Plan indicates that any surface water near the site will be checked monthly until freeze up, and if any sheen on the water is apparent samples will be collected and tested for PHC, BTEX and Total Metals. The Board concurs with the proposal. In addition, the Board included a monitoring station for the possible effluent discharge. The CCME WQG for surface water reception shall be applied to effluent discharged from the Landfarm. The Board has set effluent quality limits in Part D Item 4 of this Licence.

The Application does not provide information about the groundwater. EC recommended that the consultant refer to the *Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils - Science Applications International Corporation (SAIC Canada), March 2006* as it relates to the future operations of the landfarming project. This document recommends that groundwater on-site be monitored and compared to the appropriate CCME EQG. Therefore the Board included a groundwater monitoring program, and requires that

groundwater monitoring be conducted twice per year: once during spring freshet and once during late summer in August-September, at locations that include least one well up-gradient of the Landfarm and two wells down-gradient of the Landfarm. The monitoring well stations have been included in the Licence under Part J, Item 1.

All sampling procedures will be in accordance with the standards contained in the CCME *Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites Volume I & II*.

Under Part J, Item 11 of the Licence, the Applicant is required to submit to the Board for review, within six (6) months of the issuance of the Licence, a Quality Assurance/Quality Control (QA/QC) Plan. The Plan must be approved by an accredited laboratory confirming that the plan is acceptable. The monitoring results are to be provided to the NWB as part of the annual report. This requirement is included under Part J, Item 13 of the Licence.

NUNAVUT WATER BOARD
WATER LICENCE

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

GOVERNMENT OF NUNAVUT, COMMUNITY AND GOVERNMENT SERVICES

(Licensee)

GN-CGS, RANKIN INLET, NUNAVUT

(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:

Licence Number/Type:	**1BR-CIL1217 TYPE "B"**
Water Management Area:	NUNAVUT 06
Location:	CHESTERFIELD INLET LANDFARM PROJECT KIVALLIQ REGION, NUNAVUT
Classification:	INDUSTRIAL UNDERTAKING
Purpose:	DEPOSIT OF WASTE
Quantity of Water use not to Exceed:	NO WATER USE AUTHORIZED
Date of Licence Issuance:	AUGUST 17, 2012
Expiry of Licence:	OCTOBER 31, 2017

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

Thomas Kabloona,
Nunavut Water Board
Chair

PART A: SCOPE, DEFINITIONS AND ENFORCEMENT

1. Scope

This Licence allows for the disposal of waste for an undertaking classified as Industrial as per Schedule II of the *Regulations* at the Chesterfield Inlet Landfarm Project, located adjacent to Chesterfield Inlet Solid Waste Disposal Facility within the Kivalliq Region, Nunavut.

a. This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of waste of any type in any waters or in any place under any conditions where such waste or any other waste that results from the 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;

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

"Effluent" means treated or untreated liquid waste material that is discharged into the environment from a structure such as a settling pond or a treatment facility

"Engineer" means a professional engineer registered to practice in Nunavut in accordance with the Engineering, Geological and Geophysical Act (Nunavut) S.N.W.T. 1998, c.38, s.5;

"Grab Sample" means a single water or wastewater sample taken at a time and place representative of the total discharge;

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

"Landfarm" comprises the area and associated infrastructure, including the soil disposal cell and water retention cell, designed to contain and remediate hydrocarbon impacted soils as described in the application for the water licence received by the Board on May 11, 2012 and as illustrated in drawings no. 2010-1160-C7 and 2010-1160-C8 signed and stamped by FSC Architects & Engineers.

"Licensee" means the holder of this Licence;

"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;

"Nunavut Land Claims Agreement" (NLCA) 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;

"Regulations" means the *Northwest Territories Water Regulations sor/93-303 8th June, 1993*, omitting Section 5, Water Use or Waste Deposit Without a Licence;

"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" means an excavation in impermeable soil for the purpose of catching or storing water or waste;

"Treatment Objective" means the treatment objective for the Land Treatment Unit which is based on the Canadian Council of Ministers of the Environment (CCME) *Canada – Wide Standard for Petroleum Hydrocarbon in Soil*, revised January 2008; and as determined by the Government of Nunavut, Environmental Protection Service based on the 2009 *Environmental Guideline for Site Remediation*; See Table No. 1;

"**Type B Soil**" means soil contaminated with petroleum hydrocarbons in which the primary petroleum product present in the soil as determined by laboratory analysis

consists of fuel oil and /or diesel fuel and /or gasoline; this soil does not contain heavy metals, glycols and heavy oils.

"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.

"Water" or "Waters" means waters as defined in section 4 of the Act.

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. A summary of all waste disposal activities including:
      i. Quantity and quality of effluent discharged from Landfarm; and
      ii. Quantity and characterization of soils placed within the Landfarm for treatment.
   b. A list of unauthorized discharges and a summary of follow-up actions taken;
   c. Any revisions to the Spill Contingency Plan, Abandonment and Restoration Plan, and Operation and Maintenance Plan as required by Part B, Item 7, submitted in the form of an Addendum;
   d. A description of all progressive and or final reclamation work undertaken, including photographic records of site conditions before, during and after completion of operations;
   e. A summary of all information requested and results of the Monitoring Program, an analysis and interpretation of the results, and any follow-up measures that may be required; and

f. Any other details on Waste disposal requested by the Board by November 1 of the year being reported.

2. The Licensee shall comply with the Monitoring Program described in this Licence, and any amendments to the Monitoring Program as may be made from time to time, pursuant to the conditions of this Licence.

3. The Monitoring Program and compliance dates specified in the Licence may be modified at the discretion of the Board.

4. The Licensee shall post signs in the appropriate areas to identify the stations of the Monitoring Program and to inform the public of the location of the Landfarm. All signage postings shall be in the Official Languages of Nunavut.

5. 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.

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

7. The Licensee shall review the Plans referred to in this Licence as required by changes in operation and/or technology and modify the Plans accordingly. Revisions to the Plans are to be submitted in the form of an Addendum to be included with the Annual Report required by Part B, Item 1, complete with a revisions list detailing where significant content changes are made.

8. 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.

9. 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@nunavutwaterboard.org

(b) Inspector Contact:

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

10. The Licensee shall submit one (1) paper copy and one (1) 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.

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

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

13. 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 WATER USE

1. No water use is authorized under this Licence.

2. The Licensee shall not remove any material from below the ordinary high water mark of any water body.

3. The Licensee shall not conduct any activity that will cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

4. The Licensee shall implement and maintain sediment and erosion control measures prior to and during the operation to prevent entry of sediment and/or dust into Water.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall treat, to the Treatment Objective, Type B Soil in the Landfarm, or as otherwise approved by the Board.

2. The Licensee shall maintain the Landfarm to the satisfaction of the Inspector.

3. The Licensee shall provide at least ten (10) days written notice to the Inspector prior to any discharges from the Landfarm. The notice shall include the estimated discharge volume, Effluent quality or results of monitoring under Part J, Item 6, and the proposed location for the discharge.

4. All Effluent discharged from the Landfarm at monitoring station CIL-1, shall not exceed the following Effluent quality limits:

Parameter	Maximum Concentration of any Grab Sample (µg/L)
pH	6 to 9 (pH units)
Oil and Grease	5000
Benzene	370
Toluene	2
Ethylbenzene	90

5. If effluent does not meet the effluent quality limits in Part D, Item 4, it shall be treated until it meets the above-referenced limits, or it shall be considered hazardous waste and disposed off-site at an approved facility, or as otherwise approved by the Board in writing.

6. The discharge location for all Effluents described in Part D Item 4 shall be located at a minimum of thirty one (31) metres from the ordinary high water mark of any water body and where direct or indirect flow into a water body is not possible and no additional impacts are created.

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

8. 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 to meet all legislatively-required treatment objectives.

PART E: CONDITIONS APPLYING TO CONSTRUCTION AND OPERATIONS

1. The Board has approved the Plan entitled *"Operation & Maintenance Plan for Chesterfield Inlet Landfarm"* dated May, 2012.

2. The Licensee shall, within six (6) months of the issuance of the Licence, submit to the Board for review an Addendum to the Plan approved under Part E, Item 1 in accordance with the *"Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories; 1996"*. that shall include or address the following items:

    a. Dust controlling measures at the Landfarm;
    b. Details regarding the construction and installation of the groundwater monitoring wells, locations and methods of sampling; and
    c. A Quality Assurance/Quality Control Plan approved by an accredited laboratory as required under Part J, Item 11.

3. The Licensee shall provide to the Board, within ninety (90) days of completion of the construction of any dams, dykes or structures to contain, withhold, divert or retain water or waste, including facilities or systems for the treatment and disposal of hydrocarbon contaminated soil, all respective design drawings and construction reports, including all as-built drawings, documentation of field decisions that deviate from original plans and any data used to support these decisions. These plans and drawings shall be stamped by an Engineer.

4. The Licensee shall, during the excavation of soils to be treated within the Landfarm, implement measures prior to, during and following the excavation of soils, to prevent migration of sediments from the site that may impact water.

5. The Licensee shall not mix or blend PHC contaminated soils with non-contaminated soils for the expressed purpose of achieving the Treatment Objective.

6. The Licensee shall implement proper handling, storage and transportation procedures for the management of hazardous materials during clean-up activities.

7. The Licensee shall minimize disturbance to terrain, permafrost and drainage during extraction of granular material, movement of contractor's equipment and personnel around the site and removal of site debris.

PART F: CONDITIONS APPLYING TO DRILLING OPERATIONS

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

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 ensure that all drill waste, including water, chips, muds and salts ($CaCl_2$) in any quantity or concentration, from land-based drilling, shall be disposed of in a properly constructed sump or an appropriate natural depression located at a distance of at least thirty one (31) metres from the ordinary high water mark of any adjacent water body, where direct flow into a water body is not possible and no additional impacts are created.

4. If artesian flow is encountered, drill holes shall be immediately sealed and permanently capped to prevent induced contamination of groundwater or salinization of surface waters. The Licensee shall report all artesian flow occurrences within the Annual Report, including the location (GPS coordinates) and dates.

5. The Licensee shall, where drilling activity has penetrated below the permafrost layer,

record the depth of permafrost and location of the drill hole for inclusion in the annual report required by Part B, Item 1.

PART G: CONDITIONS APPLYING TO MODIFICATIONS

1. The Licensee may, without written consent from the Board, carry out Modifications to the Waste Disposal 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 are consistent with the NIRB Screening 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 G, 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.

PART H: CONDITIONS APPLYING TO SPILL CONTINGENCY PLANNING

1. The Board has approved the Plan entitled "*Spill Contingency Plan for Chesterfield Inlet Landfarm"*, dated April, 2012 that was submitted as additional information with the Application.

2. The Licensee shall, within six (6) months of the issuance of the Licence, submit to the Board for review, an Addendum to the Plan approved under Part H, Item 1 that will address the AANDC concerns expressed and submitted to the NWB during the file review.

3. The Licensee shall prevent any chemicals, petroleum products or wastes associated with the project do not enter 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.

4. The Licensee shall ensure that any equipment maintenance and servicing be conducted only in designated areas and shall implement special procedures (such as the use of drip

pans) to manage motor fluids and other waste and contain potential spills.

5. 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 Spill Contingency Plan;
   b. Report the spill immediately to the 24-Hour Spill Line at (867) 920-8130 and to the INAC Manager of Field Operations at (867) 975-4295; and
   c. For each spill occurrence, submit to the Inspector, 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.

PART I: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION OR TEMPORARY CLOSING

1. The Plan entitled *"Abandonment and Restoration Plan for Chesterfield Inlet Landfarm"* dated May, 2012 has been approved by the Board.

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

3. The Licensee shall remove from the site, all infrastructure and site materials, including all fuel caches, drums, barrels, material and equipment prior to the expiry of this Licence.

4. In order to promote growth of vegetation and the needed microclimate for seed deposition, all disturbed surfaces shall be prepared by ripping, grading, or scarifying the surface to conform to the natural topography.

5. Areas that have been contaminated by hydrocarbons from normal fuel transfer procedures shall be reclaimed to meet objectives as outlined in the Government of Nunavut's Environmental Guideline for Site Remediation, January 2009. The use of reclaimed soils for the purpose of back fill or general site grading may be carried out only upon consultation and approval by the Government of Nunavut, Department of Environment and an Inspector.

6. All disturbed areas shall be contoured and stabilized upon completion of work and restored to a pre-disturbed state.

7. The Licensee shall complete all restoration work prior to the expiry of this Licence.

PART J: CONDITIONS APPLYING TO THE MONITORING PROGRAM

1. The Licensee shall maintain the Monitoring Program Stations, sampling and analysis requirements as described in this section, at the following locations:

Monitoring Program Station	Description	Frequency	Parameters
CIL-1	Any apparent seepage or effluent discharged from the Landfarm	Monthly prior to freeze-up	Volume in accordance with Part J Item 5 Quality in accordance with Part J Item 6
CIL-2	Monitoring well up-gradient of the Landfarm	Once during spring freshet, and once during late summer	Quality in accordance with Part J, Item 7
CIL-3	Monitoring well down-gradient of the Landfarm	Once during spring freshet, and once during late summer	Quality in accordance with Part J, Item 7
CIL-4	Monitoring well down-gradient of the Landfarm	Once during spring freshet, and once during late summer	Quality in accordance with Part J, Item 7

2. The Licensee shall confirm the locations and GPS coordinates for all discharges identified and all Monitoring Program Stations referred to in Part H, Item 1 with an Inspector.

3. The Licensee shall measure and record the volume of all soil from all locations entering the Landfarm.

4. The Licensee shall assess and record the concentration of BTEX and F1 – F4 fractions in petroleum hydrocarbon contaminated soil, according to the CCME *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil* that is entering the Landfarm from the Chesterfield Inlet Bulk Fuel Facility.

5. The Licensee shall record the volume of all Effluent discharged from the Landfarm at Monitoring Program Station CIL-1.

6. The Licensee shall sample prior to discharge at Monitoring Program Station CIL-1, to verify compliance with the Effluent quality limits under Part D, Item 4.

7. The Licensee shall sample at Monitoring Program Stations CIL-1, CIL-2, CIL-3 and CIL-4. Samples shall be analyzed for the following parameters:

Total Suspended Solids	pH
Total Hardness	Total Alkalinity

Conductivity	Nitrate-Nitrite
Ammonia Nitrogen	Chloride
Oil and Grease	Total Phenols
Calcium	Magnesium
Sodium	Potassium
Chloride	Sulphate
Total Aluminium	Total Arsenic
Total Cadmium	Total Cobalt
Total Copper	Total Iron
Total Lead	Total Molybdenum
Total Nickel	Total Selenium
Total Silver	Total Titanium
Total Zinc	
Total Extractable Hydrocarbons (TEH)	
Polycyclic Aromatic Hydrocarbons (PAH)	
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	

8. The Licensee shall sample soil being treated in the Landfarm twice per year, in the spring-summer following thaw and prior to freeze-up in the fall, for the period of active land treatment to monitor contaminant levels until analytical results indicate acceptable levels as determined under the CCME Canada Wide Standards for Petroleum Hydrocarbon Contaminated Soils Tier 1, Coarse-Fine grain soil and meeting the Treatment Objective.

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 approved by the Board.

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, within six (6) months following issuance of the Licence, submit to the Board a Quality Assurance/Quality Control (QA/QC) Plan for inclusion with the O&M Plan required under Part E, Item 2. The Plan shall include up-to-date sampling methods to all applicable standards and acceptable to an accredited laboratory as required by Part J, Item 10. The submission shall include a covering letter from the accredited laboratory, confirming acceptance of the Plan for analyses to be performed under this Licence.

12. Additional monitoring requirements may be requested by the Inspector.

13. The Licensee shall include in the Annual Report required under Part B, Item 1 all data, monitoring results and information required by this Part.

14. Modifications to the Monitoring Program may be made only upon written request and subsequent approval of the Board in writing.

Table No. 1

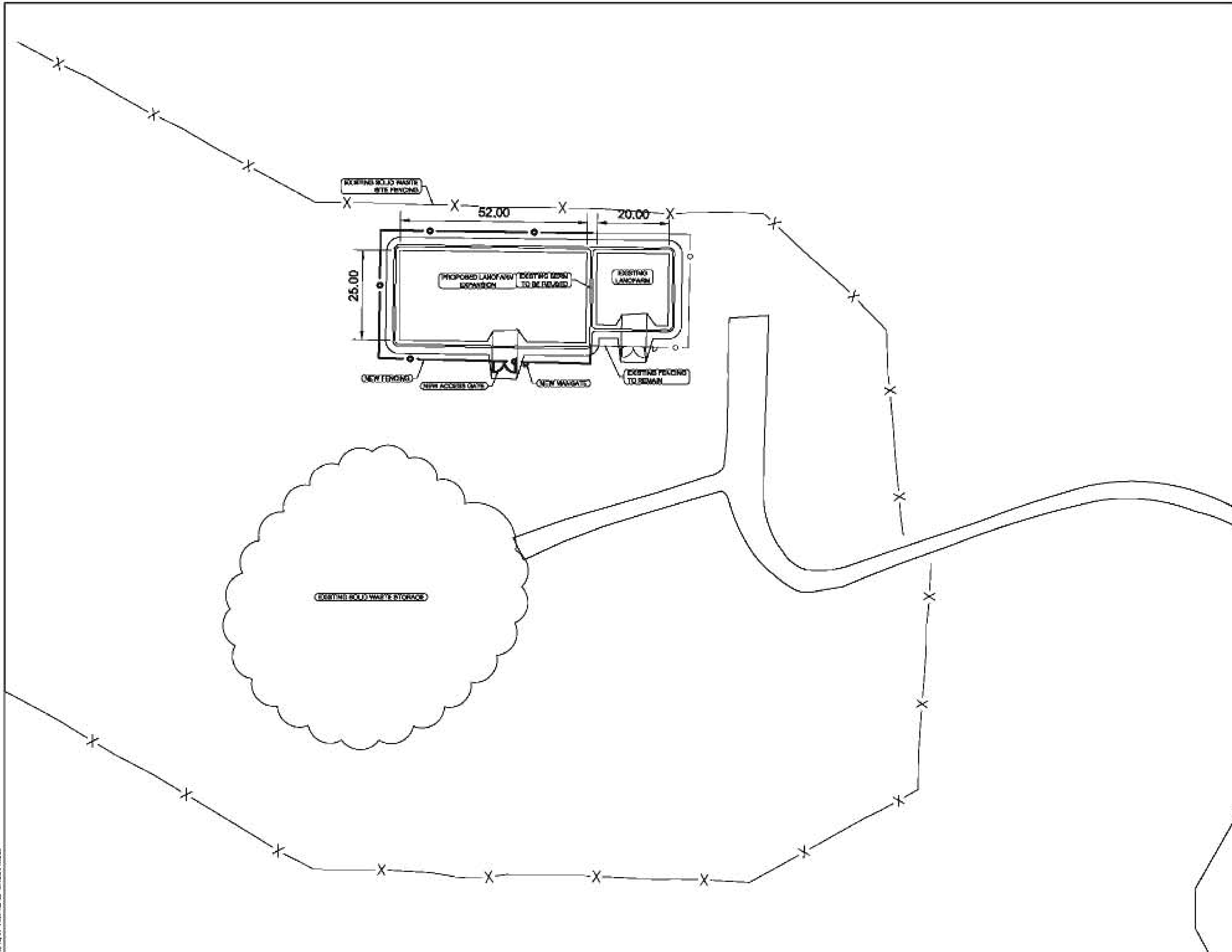
Remediation Requirements

		Agricultural	Residential/Parkland	Commercial	Industrial
Fraction 1	Coarse	30[b]	30[b]	320 (240[a])	320 (240[a])
	Fine	210 (170[a])	210 (170[a])	320 (170[a])	320 (170[a])
Fraction 2	Coarse	150	150	260	260
	Fine	150	150	260 (230[a])	260 (230[a])
Fraction 3	Coarse	300	300	1700	1700
	Fine	1300	1300	2500	2500
Fraction 4	Coarse	2800	2800	3300	3300
	Fine	5600	5600	6600	6600
Benzene		0.05	0.5	5	5
Toluene		0.1	0.8	0.8	0.8
Ethylbenzene		0.1	1.2	20	20
Xylene		0.1	1	17	20
Total Petroleum Hydrocarbons		-	500	2500	2500

Notes: All values are in parts per million (ppm).
a = Where applicable, for protection of potable groundwater.
b = Assumes contamination near residence

Data from CCME *Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil*, (2001) Revised January 2008 and the Government of Nunavut *Environmental Guideline for Site Remediation*, (2009).

Appendix B – Landfarm Site Plan



Stantec
4910 – 53 Street PO Box 1777
Yellowknife, NT, Canada
X1A 2P4
Tel. 867.920.2882
Fax. 867.920.4319
www.stantec.com

Consultants

Permit-Seal

PERMIT TO PRACTICE
STANTEC ARCHITECTURE LTD.
Signature
Date Sept 30/2013
PERMIT NUMBER: P 800
NT/NU Association of Professional Engineers and Geoscientists

REGISTERED PROFESSIONAL ENGINEER
A.F. JOHNSON
NWT/NU

Notes

CONSTRUCTION OF LANDFARM EXPANSION TO FOLLOW DESIGN REQUIREMENTS FROM EXISTING CONTRACT DOCUMENTS

0				
Revision		By	Appd.	YY.MM.DD
1	Revised Drawing			13.10.01
0	Issued for Review			13.07.25
Issued		By	Appd.	YY.MM.DD

File Name: 144901145	DD	AF		13.07.25
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Client/Project

FUEL STORAGE FACILITY UPGRADES

Chesterfield Inlet, NU

Title

Landfarm Expansion

Project No.	Scale
144901145	1:500

Drawing No.	Sheet	Revision
SK01	1 of 1	0

Appendix C – Field Log

Field Log

Name of Sampler(s): _____

Date of Sampling: _____

Time of Sampling: _____

Monitoring Station Number: _____

GPS Coordinates: N _____°_____’_____” W _____°_____’_____”

Weather Conditions: _____

Samples:

- ☐ 1 L Routine
- ☐ 500 mL BOD
- ☐ 250 mL Metals + Pres
- ☐ 250 mL Nutrients + Pres
- ☐ 125 mL Sterile Bacteria Bottle
- ☐ 250 mL Amber Phenols + Pres
- ☐ 1 L Amber Oil & Grease + Pres
- ☐ 100 mL Amber TOC + Pres
- ☐ 1 L Amber PAH + Pres
- ☐ **3 x** 40 mL BTEX, F1 vials + Pres
- ☐ **2 x** 250 mL Amber F2-F4 + Pres

Other:

- ☐ _____
- ☐ _____
- ☐ _____

Other Notes: (any unusual conditions, any deviation from standard procedures, reason sample was not taken, etc.)

_____

_____

_____

_____

_____

Appendix D – Chain of Custody Form

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Report To		**Report Format / Distribution**	**Service Requested** (Rush for routine analysis subject to availability)
Company:	GN-CGS	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	John Doe	☑ PDF ☐ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	P.O.Box 490, Rankin Inlet, NU, X0C 0G0	Email 1: johndoe@gov.nu.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
		Email 2:	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	Fax:	Email 3:	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☐ No	Job #: Chesterfield Inlet Landfarm Monitoring Program	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)		**ALS Contact:**	**Sampler:** John Doe

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BOD	Routine	Total Metals	Total Nutrients	Total Phenols	Bacteria	Oil & Grease	PAH	BTEX, F1	F2-F4			Number of Containers
	CIL-X	dd-mm-yy	hh:mm	Surface Water	X	X	X	X	X	X	X	X	X	X			14

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
John Doe	dd-mm-yy	hh:mm				°C				

Appendix E – CALA Certificate of Accreditation and Scope of Accreditation

Canadian Association for Laboratory Accreditation Inc.

Certificate of Accreditation

ALS Environmental (Winnipeg)
ALS Canada Ltd.
1329 Niakwa Road East
Unit 12
Winnipeg, Manitoba

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Accreditation No.:	A1442
Issued On:	December 5, 2012
Accreditation Date:	January 3, 2005
Expiry Date:	June 5, 2015

President & CEO

CALA
Canadian Association for Laboratory Accreditation Inc.

CALA Directory of Laboratories

Membership Number: 1442
Laboratory Name: ALS Environmental (Winnipeg)
Parent Institution: ALS Canada Ltd.
Address: 1329 Niakwa Road East Unit 12 Winnipeg MB R2J 3T4
Contact: Ms. Kayla Harold
Phone: (204) 255-9745
Fax: (204) 255-9721
Email: kayla.harold@alsglobal.com; linda.neimor@ALSGlobal.com

Standard: Conforms with requirements of ISO/IEC 17025
Clients Served: All Interested Parties
Revised On: August 26, 2014
Valid To: June 5, 2015

Scope of Accreditation

Air (Inorganic)
Radon - Air (142)
WP-TM-1801; modified from EPA 402-R-92-004
ELECTRET RADON MONITOR
Radon

Air (Mycology)
Mold - Air (163)
WP-TM-1704; modified from ASTM D7391
DIRECT MICROSCOPIC EXAMINATION
Biocontaminant Identification
Biocontaminant Quantification

Air (Mycology)
Mould - Air (AGAR Strips) (055)
WP-TM-1703; modified from INTRO. TO FOOD-BOURNE FUNGI
MICROSCOPE
Biocontaminant Identification
Biocontaminant Quantitation

Food (Microbiology)
Coliforms - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (153)
WP-TM-1210; MFHPB-19
MOST PROBABLE NUMBER
Escherichia coli (E.coli)
Fecal Coliforms
Total Coliforms

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Food (Microbiology)
Coliforms - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (157)
WP-TM-1209; MFHPB-31
POUR PLATE
Total Coliforms

Food (Microbiology)
Heterotrophic Plate Count - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (152)
WP-TM-1208; MFHPB-18
POUR PLATE
Heterotrophic Plate Count

Food (Microbiology)
Listeria - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (151)
WP-TM-1202; AOAC 997.03
VISUAL IMMUNOPRECIPITATE ASSAY
Listeria monocytogenes

Food (Microbiology)
Listeria - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (156)
WP-TM-1201; MFHPB-30
SPREAD PLATE
Listeria monocytogenes

Food (Microbiology)
Listeria - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (158)
WP-TM-1203; MFLP-34
VISUAL IMMUNOPRECIPITATE ASSAY
Listeria monocytogenes

Food (Microbiology)
Salmonella - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (154)
WP-TM-1204; MFHPB-20
SPREAD PLATE
Salmonella

Food (Microbiology)
Salmonella - Meat, Poultry and Egg Products (160)
WP-TM-1206; USDA MLG 4
SPREAD PLATE
Salmonella

Food (Microbiology)
Staphylococcus - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (155)
WP-TM-1207; MFHPB-21
SPREAD PLATE
Staphylococcus aureus

Solids (Biology)
Benthic Organisms - Sediment (075)
WP-TM-1301; modified from SM 10500
MICROSCOPE EXAMINATION
Benthos Enumeration
Benthos Identification

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Solids (Inorganic)
Metals - TCLP Leachate - Waste (149)
NA-TM-1002/NA-TM-1700; EPA 1311 (Leach)/ Modified from 200.2 (Analysis)
ICP/MS - TCLP
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Molybdenum
Nickel
Potassium
Selenium
Silver
Strontium
Thallium
Tin
Uranium
Vanadium
Zinc
Zirconium

Solids (Inorganic)
Total Mercury (TCLP Leachate) - Waste (162)
WP-TM-1007/WP-WI-2001/NA-TM-1700; EPA 1311 (Leach)/ Modified from 1631 E I(Analysis)
COLD VAPOUR ATOMIC FLUORESCENCE - TCLP
Mercury

Solids (Inorganic)
Total Mercury - Soil (128)
WP-TM-1007/NA-TP-2004/WP-WI-2001; modified from EPA 1631 E
COLD VAPOUR ATOMIC FLUORESCENCE - DIGESTION
Mercury

Solids (Inorganic)
Total Metals - Solids (131)
NA-TM-1002/NA-TP-2004; modified from EPA 200.2
ICP/MS - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Nickel
Phosphorus
Potassium
Selenium
Silver
Sodium
Strontium
Thallium
Thorium
Tin
Titanium
Uranium
Vanadium
Zinc

Solids (Organic)
Glycols - Soil (145)
WP-TM-1102; modified from ASTM D3695-82
GC/FID
Diethylene Glycol
Ethylene Glycol
Propylene Glycol
Tetraethylene Glycol
Triethylene Glycol

Solids (Organic)
Petroluem Hydrocarbons (PHC) - Soil (148)
NA-TP-2100/NA-TM-1100; modified from CCME TIER 1
GC/FID
F2: C10-C16
F3: C16-C34
F4: C34-C50

Solids (Organic)
Petroluem Hydrocarbons (PHC) - Soil (150)
NA-TP-2100/NA-TM-1100; modified from CCME - TIER 1
GRAVIMETRIC - TUMBLER
F4: Gravimetric

Solids (Organic)
Polychlorinated Biphenyls (PCB) - Soil (045)
WP-TM-0801; modified from EPA SW 846 3550A
GC/ECD - EXTRACTION
Arochlor 1016
Arochlor 1221
Arochlor 1232
Arochlor 1248
Arochlor 1262
Arochlor 1268
Aroclor 1242

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Aroclor 1254
Aroclor 1260
Total PCB

Solids (Organic)
Polycyclic Aromatic Hydrocarbons (PAH) - Soil (051)
NA-TP-2103/WP-TP-2102; modified from EPA SW 846 3550C, 8270D
GC/MS - SHAKE
Acenaphthene
Acenaphthylene
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Chrysene
Dibenzo (a,h) anthracene
Fluoranthene
Fluorene
Indeno (1,2,3 - cd) pyrene
Methyl Anthracene
Naphthalene
Napthalene - Dimethyl
Napthalene - Methyl
Pentachlorophenol
Phenanthrene
Pyrene
Quinoline

Solids (Organic)
Volatile Fatty Acids - Soil (129)
WP-TM-1105; modified from ASTM D3695-
GC/MS - WATER EXTRACTION
Acetic Acid
Butyric Acid
Caproic Acid
Formic Acid
Isobutyric Acid
Isovaleric Acid
Propionic Acid
Valeric Acid

Solids (Organic)
Volatile Organic Compounds (VOC) - Soil (141)
NA-WI-3006/NA-TM-1102; modified from EPA 5021A/8260C
GC/MS - METHANOL EXTRACTION/HEADSPACE
1,1-Dichloroethane
1,1-Dichloroethylene
1,1-Dichloropropene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromo-3-chloropropane
1,2-Dichlorobenzene

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

1,2-Dichloroethane
1,2-Dichloropropane
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Dichlorobenzene
1,3-Dichloropropane
1,3,5-Trimethylbenzene
1,4-Dichlorobenzene
2-Chlorotoluene
2,2-Dichloro-propane
4-Chlorotoluene
4-Isopropyltoluene
Acetone (2-Propanone)
Benzene
Bromobenzene
Bromochloromethane
Bromodichloromethane
Bromoform
Bromomethane
Carbon disulfide
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dibromomethane
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexachlorobutadiene
Hexane
Isopropylbenzene
m/p-xylene
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl n-butyl ketone
Methyl t-butyl ether
n-Butylbenzene
Naphthalene
o-xylene
sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Trichloroethylene
Trichlorofluoromethane
Vinyl chloride

Solids (Organic)
Volatile Petroleum Hydrocarbons (PHC) - Soil (140)
NA-TM-1102/NA-WI-3006; CCME PHC - PERFORMANCE BASED MODIFICATION
GC/FID - METHANOL EXTRACTION/HEADSPACE
F1: C6-C10

Tissue (Inorganic)
Total Mercury - Tissue (082)
NA-TP-2003/WP-TM-1008, WP-TM-1007; modified from EPA 1631 E
COLD VAPOUR ATOMIC FLUORESCENCE - DIGESTION
Mercury

Tissue (Inorganic)
Total Metals - Tissue (070)
NA-TP-2003/NA-TM-1002; modified from EPA 200.3 AND 200.8
ICP/MS - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Rubidium
Selenium
Silver
Sodium
Strontium
Tellurium
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Inorganic)
Acidity - Water (111)
WP-TM-1003; modified from SM 2310 B
TITRIMETRIC
Acidity as CaCO3 - LR

Water (Inorganic)
Alkalinity - Water (001)
WP-TM-1001; modified from SM 2320 B
TITRIMETRIC
Alkalinity (pH 4.5)

Water (Inorganic)
Ammonia - Water (135)
WP-TM-1011/WP-WI-3005; modified from SM 4500-NH3 F
COLORIMETRIC - DISCRETE ANALYZER
Ammonia

Water (Inorganic)
Anions - Water (134)
NA-TM-1001; modified from EPA 300.1
ION CHROMATOGRAPHY
Bromide
Chloride
Fluoride
Nitrate
Nitrite
Sulfate

Water (Inorganic)
Biochemical Oxygen Demand (BOD) - Water (015)
WP-TM-1015; modified from SM 5210 B
D.O. METER
BOD (5 day)
CBOD (5 day)

Water (Inorganic)
Carbon - Water (038)
WP-TM-1024; modified from SM 5310 B
AUTO IR ANALYZER
Inorganic Carbon
Total Carbon

Water (Inorganic)
Chemical Oxygen Demand (COD) - Water (060)
WP-TM-1017; modified from SM 5220D/HACH
COLOR - DIGESTION
COD

Water (Inorganic)
Chlorine - Water (147)
WP-TM-1013; modified from sm 4500-Cl G
COLORIMETRIC
Free Chlorine
Total Chlorine

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Inorganic)
Colour - Water (136)
WP-TM-1010/WP-WI-3005; modified from SM 2120-COLOR
COLORIMETRIC - DISCRETE ANALYZER
True Colour

Water (Inorganic)
Conductivity - Water (003)
WP-TM-1001; modified from SM 2510 B
CONDUCTIVITY METER
Conductivity (25°C)

Water (Inorganic)
Cyanide - Water (018)
WP-TM-1006; EPA 1311 (Leach)/ Modified from SM 4500-CN- O (Analysis)
COLOR - DISTILLATION
Cyanide (SAD)
Cyanide (WAD)

Water (Inorganic)
Dissolved and Extractable Metals - Water (056)
NA-TP-2002/NA-TM-1002; modified from EPA 200.8
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Rubidium
Selenium
Silicon
Silver
Sodium
Strontium
Sulfur
Tellurium
Thallium
Tin
Titanium

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Tungsten
Uranium
Vanadium
Zinc
Zirconium

Water (Inorganic)
Dissolved Oxygen - Water (088)
WP-TM-1018; modified from SM 4500-O- C
IODOMETRIC - AZIDE MODIFICATION
Dissolved Oxygen

Water (Inorganic)
Mercury (Total and Dissolved) - Water (081)
WP-TM-1007/WP-TM-1008/WP-WI-2001/NA-TP-2002, NA-TP-2001; modified from EPA 1631 E
CVAFS - BrCl DIGESTION
Mercury

Water (Inorganic)
Nitrate plus Nitrite - Water (007)
WP-TM-1025; modified from SM 4500-NO3- I
FIA COLORIMETRIC
Nitrate plus Nitrite

Water (Inorganic)
pH - Water (019)
WP-TM-1001; modified from SM 4500-H+ B
pH METER
pH

Water (Inorganic)
Phosphorus - Water (024)
WP-TM-1004; modified from SM 4500-P H
FIA COLORIMETRIC - DIGESTION
Dissolved Phosphate
Phosphate
Total Dissolved Phosphorus
Total Inorganic Phosphorus
Total Phosphorus

Water (Inorganic)
Phosphorus - Water (164)
WP-TM-1016; modified from APHA 4500-P B&E
COLORIMETRIC - DISCRETE ANALYZER
Dissolved Phosphate
Phosphate

Water (Inorganic)
Phosphorus - Water (165)
WP-TM-1016; modified from APHA 4500-P B&E
COLORIMETRIC - DISCRETE ANALYZER - DIGESTION
Total Dissolved Phosphorus
Total Inorganic Phosphorus
Total Phosphorus

Water (Inorganic)
Silica - Water (137)
WP-TM-1012/WP-WI-3005; modified from SM 4500-SiO2
COLORIMETRIC - DISCRETE ANALYZER
Reactive Silica

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html