2019 Annual Report for CFS Eureka, Nunavut

Prepared for:
Nunavut Water Board

Licensee:
RP Ops Group, ADM(IE)
Department of National Defence

Prepared & Submitted by:
8 Wing Environmental Management,
8 Wing Trenton,
Department of National Defence

31 March 2020

Nunavut Water Board
P.O. Box 119
Gjoa Haven, Nunavut, X0B 1J0

Attention: Manager of Licensing

Subject: 2019 Annual Report for CFS Eureka, Nunavut

Please find enclosed a copy of the 2019 Annual Report to the Nunavut Water Board and Executive Summary in English and Inuktitut for the following site:

1. Canadian Forces Station (CFS) Eureka – 8BC-ERK1621 Type B.

The Annual Report is being submitted by the Department of National Defence at 8 Wing/Canadian Forces Base Trenton on behalf of the licensee, the Department of National Defence at RP Ops - ADM (IE). This Annual Report submission reflects the conditions and requirements of the renewed licence 8BC-ERK1621.

Should the Nunavut Water Board have comments or require additional information regarding the Annual Report, please contact Mr. Nathan Koutroulides, 8 Wing Deputy Environment Officer, 8 Wing Environmental Management at (613) 392-2811 x4821 or by e-mail at: Nathan.koutroulides@forces.gc.ca.

Sincerely,

Nathan Koutroulides, B.Sc, CD, PMP.
8 Wing Deputy Environment Officer,
8 Wing Environmental Management
8 Wing/Canadian Forces Base Trenton

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Table of Contents (Electronic Reproduction)

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2019 Annual Report to the Nunavut Water Board

Licensee: Department of National Defence – RP Ops - ADM (IE)
Licence: 8BC-ERK1621 Type "B"
Location: Canadian Forces Station Eureka, Ellesmere Island, Qikiqtani Region, Nunavut.

Report submitted by: Department of National Defence – 8 Wing/Canadian Forces Base Trenton – 8 Wing Environmental Management, 31 March 2020

Executive Summary

The 2019 annual report to the Nunavut Water Board (NWB) is a requirement under the renewed Licence Number 8BC-ERK1621 Type "B", Part B, Paragraph 1. This annual report is for Canadian Forces Station (CFS) Eureka, Nunavut. The oLicence was issued on June 18th, 2010, to the Department of National Defence (DND) – 1 Canadian Air Division (1 Cdn Air Div), Winnipeg, Manitoba. As 8 Wing – Canadian Forces Base (CFB) Trenton, Ontario, oversees CFS Eureka, 8 Wing Trenton is filing the annual report on behalf of the new DND licensee, Real Property Operations (RP Ops) - Assistant Deputy Minister of Infrastructure & Environment (ADM(IE)). The renewed 8BC-ERK1621 Type "B" was received on 25 November 2016.

In 2019, there were no hazardous waste backhaul activities reported from CFS Eureka to CFB Trenton. Domestic and non-hazardous wastes from CFS Eureka were directed to the designated landfill. All sewage and waste water were directed to the Sewage Lagoon.

The sampling requirements for the CFS Eureka Surveillance Network Program were implemented in June and July 2019. Complete runoff or ground seepage sampling was fully conducted in June and July. DND expects a similar operation duration for 2020, and effort is being taken to ensure a successful 2020 Surveillance Network Program.

Rapport annuel 2019 à l'Office des eaux du Nunavut

Détenteur du permis : Ministère de la Défense nationale – Ops Imm - SMA(IE)
Permis : 8BC-ERK1621 Type « B »
Endroit : Station des Forces canadiennes Eureka, île d'Ellesmere, région de Qikiqtani, Nunavut.

Rapport présenté par : Ministère de la Défense nationale –
8e Escadre / Base des Forces canadiennes Trenton –
Gestion environnementale de la 8e Escadre,
31 mars 2020

Sommaire

Le rapport annuel 2019 présenté à l'Office des eaux du Nunavut (OEN), constitue une exigence aux termes du renouvellement du permis 8BC-ERK1621 Type « B », Partie B, paragraphe 1. Le présent rapport vise la Station des Forces canadiennes (SFC) Eureka, au Nunavut. Le permis a été émis le 18 juin 2010 au ministère de la Défense nationale (MDN) – 1re Division aérienne du Canada (1 DAC), à Winnipeg, au Manitoba. Puisque la 8e Escadre / Base des Forces canadiennes (BFC) Trenton, en Ontario, supervise la SFC Eureka, la 8e Escadre présente le rapport annuel au nom du nouveau détenteur de permis du MDN, les Opérations immobilières (Ops Imm) du Sous-ministre adjoint (Infrastructure et Environnement) (SMA[IE]). Le renouvellement du permis 8BC-ERK1621 Type « B » a été reçu le 25 novembre 2016.

En 2019, la SFC Eureka n'a pas signalé d'activités de réacheminent de déchets dangereux à la BFC Trenton. Les déchets domestiques et les déchets non dangereux de la SFC Eureka ont été acheminés au site d'enfouissement désigné. Les eaux usées ont été rejetées dans l'étang d'épuration.

L'échantillonnage exigé pour le programme de réseau de surveillance de la SFC Eureka a été réalisé en juin et en juillet 2019. Un échantillonnage complet du ruissellement ou de l'infiltration des eaux été réalisé en juin et en juillet. Le MDN prévoit une opération d'une durée similaire en 2020, et s'organise pour mener à bien le programme du réseau de surveillance de 2020.

2019 ᐊᕐ ᕌᒍᑕᒫᖅᓯᐅᑦ ᐅᓂᒃ ᑳᖅ ᑐᕌᖅᑐᖅ ᓄᓇᕗᒻᒥ ᐃᒥᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ

ᓚᐃᓴᓐᓯᖃᖅᑎᑕᐅᔪᑦ :	ᐱᓕᕆᕕᖓᑲ ᓇᑕᒥ ᓴᐳᓐ ᓂᐊᑎᒃ ᑯᑦ – RP Ops - ADM (IE)
ᓚᐃᓴᓐᓯ :	8BC-ERK1621 ᓱ ᓇᐅᓂᖓ“B”,
ᐃᓂᖓ	ᑲ ᓇᑕᒥ ᖃᐅᔨᓴᖅᑏᑦ ᐱᓕᕆᕕᖓᐃᐅᓃᑲ , ᐊᐅᓱ ᐃᑦ ᑑᑉ ᕿᕿᖅᑖᓗᐊ, ᕿᑭᖅᑕᓂ, ᓄᓇᕗᑦ .
ᐅᓂᒃ ᑳᓕᐅᖅᑐᑦ :	ᐱᓕᕆᕕᖓᑲ ᓇᑕᒥ ᓴᐳᓐ ᓂᐊᑎᒃ ᑯᑦ – 8 ᑎᖕᒥᔫᖅ/ᑲ ᓇᑕᒥ ᓴᐳᓐ ᓂᐊᑎᒃ ᑯᑦ ᑎᖕᒥᔪᖃᕐ ᕕᖓᑐᓇᐊᓐ ᑕᓐ – 8 ᑎᖕᒥᔫᖅ ᐊᕙᑎᓕᕆᓂᕐ ᒧᑦ ᐊᐅᓚᑦᓯᔪᑦ , 31 ᒫᑦᓯ 2020

ᐊᐅᓚᑦᓯᔾᔪᑦ ᓈᐃᓈᖅᓯᒪᔭᖓ

ᑖᓐᓇ 2019 ᐊᕐ ᕌᒍᑕᒫᖅᓯᐅᑦ ᑐᕌᖅᑐᖅ ᓄᓇᕗᒻᒥ ᐃᒥᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ (NWB) ᐱᔭᕆᐊᓕᒃ ᒪᓕᓪᓗᒍ ᓄᑕᐅᓯᖅᑕᐅᓯᒪᔪᖅ ᓚᐃᓴᓐᓯ ᓈᓴᐅᑎᓕᒃ 8BC-ERK1621 ᓱ ᓇᐅᓂᖓ“B”, ᐃᓚᖓB, ᑎᑎᕋᖅᓯᒪᓂᖓ ᐅᓂᑳᖅᑐᖅ 1. ᐅᓇ ᐊᕐ ᕌᒍᑕᒫᖅᓯᐅᑦ ᐅᓂᒃ ᑳᖅ ᐅᑯᓄᙵᐅᔪᖅ ᑲᓇᑕᒥ ᖃᐅᔨᓴᖅᑏᑦ ᑎᖕᒥᔫᒃ ᑯᑦ ᐱᓕᕆᕕᖓ (CFS) ᐃᐅᓃᑲ , ᓄᓇᕗᑦ . ᑖᓐᓇ oᓚᐃᓴᓐᓯ ᑐᓂᔭᒥᓂᖅ ᔫᓂ 18−ᖑᑎᓪ ᓗᒍ , 2010, ᑲᓇᑕᒥ ᓴᐳᓐ ᓂᐊᑎᒃ ᑯᓐ ᓄᑦ (DND) – 1 ᑲᓇᑕᒥ ᑎᖕᒥᔫᓕᕆᔨᒃ ᑯᓐ ᓄᑦ (1 Cdn Air Div), ᐅᐃᓂᐸᒡ , ᒫᓂᑑᕗ ᕙ.
8 ᑎᖕᒥᔫᖅ – ᑲᓇᑕᒥ ᓴᐳᓐ ᓂᐊᑎᒃ ᑯᑦ ᐃᓂᖓ (CFB) ᑐᕆᐊᓐ ᓇᓐ ᒥ, ᐋᓐ ᑎᐅᕆᔪ , ᑲᒪᙯᓕᒃ ᑲᓇᑕᒥ ᑎᖕᒥᔫᒃ ᑯᑦ ᓴᐳᓐ ᓂᐊᖅᑎᓂᑦ ᐃᐅᓃᑲ , 8 ᑎᖕᒥᔫᖅ ᑐᕆᐊᓐ ᑕᓐ ᑐᓂᓯᔪᖅ ᐊᕐ ᕌᒍᑕᒫᖅᓯᐅᒻ ᒥᒃ ᐅᓂᒃ ᑳᒥᒃ ᑭᒡ ᒐᑐᖅᓱᒍ ᓄᑖᖅ ᑲᓇᑕᒥ ᓴᐳᓐ ᓂᐊᑎᒃ ᑯᑦ ᑎᖕᒥᔫᒃ ᑯᑦ ᓚᐃᓴᓐᓯᖃᖅᑎᑕᐅᔪᖅ, Real−ᑯᑦ ᓇᒻ ᒥᓂᖃᖅᑏᑦ ᐊᐅᓚᓂᖏᑦ (RP Ops) - ᐃᑲᔪᖅᑎᖓᑐᖕᕆᓕᐊᑕᒥᓂᒃ ᑕᐅᑉ ᓴᓇᔪᓕᕆᔨᒃ ᑯᑦ ᐊᒻ ᒪ ᐊᕙᑎᓕᕆᔨᒃ ᑯᑦ (ADM(IE)). ᓄᑕᐅᓯᖅᑕᐅᓯᒪᔪᖅ 8BC-ERK1621 ᓱ ᓇᐅᓂᖓ“B” ᐃᔭᒥᓂᖅ 25−ᖑᑎᓪ ᓗᒍ ᓅᕙᐃᒻ ᕙ 2016.

2019−ᖑᑎᓪ ᓗᒍ , ᓱᕈᕐ ᓇᖅᑐᓕᓐ ᓂᑦ ᓴᓂᕐ ᓂᑦ ᐃᒋ ᑕᐅᔪᖃᕐ ᓂᖏᑦ ᑐᖅ ᐅᖃᐅᓯ ᐅᓯᒪᔪᒥ ᑲᓇᑕᒥ ᓴᐳᓐ ᓂᐊᑎᒃ ᑯᓐ ᓂᑦ ᐃᐅᓃᑲ ᑲᓇᑕᒥ ᓴᐳᓐ ᓂᐊᑎᒃ ᑯᑦ ᑎᖕᒥᔫᒃ ᑯᑦ ᐃᓂᖓᓃ ᓃᖖᑐᒥᒃ , ᑐᕆᐊᓐ ᑕᓐ . ᓴᓃᑦ ᐊᒻ ᒪ ᓱᕈᕐ ᓇᖅᑐᖃᖏᑦ ᑐᑦ ᑲᓇᑕᒥ ᓴᐳᓐ ᓂᐊᑎᒃ ᑯᓐ ᓂᑦ ᐃᐅᓃᑲ ᐊᑦ ᑕᖅᑕᒥ ᓃᑦ ᐊᓯ ᕕᐅᑎᑕᒧᑦ . ᑭ ᓈᓗᒃ ᐊᒻ ᒪ ᐃᒥᖅ ᐊᑐᖅᑕᐅᓐ ᓂᖏᑦ ᑐᖅ ᐊᑦ ᑕᖅᑕᒥ ᓃᑦ ᑭ ᓈᓗᒃ ᑯᕕᒻ ᒧᑦ .

ᖃᐅᔨᓴᕐ ᓂᕐ ᒧᑦ ᐊᑐᖅᑕᐅᔭ ᕆᐊᓖᑦ ᑲᓇᑕᒥ ᓴᐳᓐ ᓂᐊᑎᒃ ᑯᑦ ᑎᖕᒥᔫᒃ ᑯᕕᖃᕐ ᕕᖕᒋ ᐃᐅᓃᖓ ᑎᖕᒥᔫᒃ ᑯᑦ ᖃᐅᔨᓴᖅᑏᑦ ᐱᓕᕆᐊᒧᑦ ᐊᑐᓕᖅᑎᑕᒥᓂᖅ ᔫᓂᒥ ᔪᓚᐃᒥᓗ 2019. ᐊᑕᖏᖅᑐᑦ ᖃᐅᔨᓴᐅᑎᒥ ᓃᑦ ᐅᕝ ᕙᓘᓐ ᓃᑦ ᑭ ᓈᔪᒥᑦ ᖃᐅᔨᓴᕐ ᓂᒥ ᓃᑦ ᐊᐅᓚᑕᒥ ᓂᖅ ᔫᓂᒥ ᐊᒻ ᒪ ᔪᓚᐃᒥ . ᑲᓇᑕᒥ ᓴᐳᓐ ᓂᐊᑎᒃ ᑯᑦ ᓂᕆᐅᑦ ᑐᑦ ᒥᑦ ᓴᐅᑦ ᑐᒥᑦ ᐊᐅᓚᑕᐅᓂᐊᕐ ᓂᖕᓂᒃ ᐊᕐ ᕌᒍᖕᓂ 2020, ᐊᒻ ᒪ ᑲᔪ ᑎᑕᐅᓚ ᓱ ᐊᖅ ᓱ ᓂ ᐱᓕᕆᐊᖑᓂᖓ ᑲᔪ ᓯᑦ ᓱ ᐊᕐᑯᓪ ᓗᒍ 2020−ᒥ ᑎᖕᒥᔫᒃ ᑯᑦ ᖃᐅᔨᓴᕐ ᓂᕐ ᒧᑦ ᐱᓕᕆᐊᖅ .

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

License No: 8BC-ERK1621 **Issued Date:** November 25, 2016
Expiry Date: November 24, 2021

Project Name: Canadian Forces Station (CFS) Eureka, Nunavut

Licensee: Department of National Defence - Real Property Operations-ADM(IE)

Mailing Address:
Real Property Operations Group
Department of National Defence
Assistant Deputy Minister (Infrastructure & Environment)
101 Col By Drive, Ottawa, ON, K1A 0K2

Name of Company filing Annual Report (if different from Name of Licensee please clarify relationship between the two entities, if applicable):
8 Wing Environmental Management
Room 308, Building 22, 74 Polaris Ave.
Department of National Defence - 8 Wing/ CFB Trenton
Box 1000, Stn Forces
Astra, Ontario, K0K 3W0

General Background Information on the Project (*optional):
Formerly 3BC-ERK1015.

Licence Requirements: the licensee must provide the following information in accodance with
Part B Item 1

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

Water Source(s): Eureka ECCC Weather Station

Water Quantity:

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

Waste Management and/or Disposal

- [x] Solid Waste Disposal
- [x] Sewage
- [ ] Drill Waste
- [ ] Greywater
- [x] Hazardous
- [x] Other: Landfarm

Additional Details:

Appendix A: Monitoring Program Station No. ERK-1
Appendix B: Monitoring Program Station No. ERK-2
Appendix C: Monitoring Program Stations No. ERK-3-4-5
Appendix D: List of Waste Disposal Activities
Appendix E: Progressive and Final Reclamation Work Undertaken
Appendix F: Analysis Results from June Runoff 2017
Appendix G: Compliance Plan & Additional Documents

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

Spill No.: 2019-238 and 2019 (as reported to the Spill Hot-line)
Date of Spill: 2019-06-08 and Jul
Date of Notification to an Inspector: June,9, 2019 and July 01 2019
Additional Details: (impacts to water, mitigation measures, short/long term monitoring, etc)

Please see Appendix G for the attached Detailed Spill reports both dated July 24, 2019.

Please see attached response

o the Spill Contingency Plan

SCP submitted and approved - no revision required or proposed

Additional Details:

Revisions to the Abandonment and Restoration Plan

AR plan submitted and approved - no revision required or proposed

Additional Details:

Progressive Reclamation Work Undertaken

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

See Appendix E.

Results of the Monitoring Program including:

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

Not Applicable (N/A)

Additional Details:

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

Details described below

Additional Details:

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

No additional sampling requested by an Inspector or the Board

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

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

No additional sampling requested by an Inspector or the Board

Additional Details: (Attached or provided below)

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

Inspection and Compliance Report received by the Licensee (Date):

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

Please see Appendix G - Compliance Plan with the attached response letter dated 17 Dec, 2019

Any additional comments or information for the Board to consider

A. CFS Eureka was only operational for two months in June and July 2019; the Station was closed/unoccupied for the other 10 months.

Date Submitted:	March 31, 2020	
Submitted/Prepared by:	Nathan Koutroulides, BSc, PMP	
Contact Information:	**Tel:**	613-613-392-2811 x4821
	Fax:	613-965-3368
	email:	Andrew.Tam@forces.gc.ca

GPS Coordinates for water sources utilized

Source Description	Latitude			Longitude		
	Deg °	Min '	Sec "	Deg °	Min '	Sec "

GPS Locations of areas of waste disposal

Location Description (type)	Latitude			Longitude		
	Deg °	Min '	Sec "	Deg °	Min '	Sec "
DND Sewage Lagoon	79	59	39	-85	50	39
East Runway Landfill	79	59	29	-85	46	37
Barrel Dump	79	59	38	-85	49	38
Battery Dump	79	59	44	-85	49	35

Appendix A

Monitoring Program Station No. ERK-1
Year: 2019
Name: Sewage Treatment Facility
Description: Sampling of Effluent prior to release.

Results:

June and July
On June 29th and July 1st, 2019, the Department of National Defence (DND) Sampling Team collected a grab sample from ERK-1, as per **8BC-ERK1621, Part J, Item 3**; the results are shown below:

Parameter	Maximum Concentration of Any Grab Sample	Results from ERK1 June	Results from ERK1 July
BOD5	80 mg/L	**83 mg/L**	**91.1 mg/L**
Total Suspended Solids	70 mg/L	**188 mg/L**	**241 mg/L**
Fecal Coliforms	1 x 10^6 CFU/100 mL	<10 CFU/100mL	<10 CFU/100mL
Oil and Grease	No visible sheen	<5.0 mg/L & No visible sheen	<5.0 mg/L & No visible sheen
pH	Between 6 and 9	**9.45**	**9.38**

A copy of the analytical results are attached in Appendix F.

Additional Notes:
BOD5, TSS and pH were above the NWB criteria. The grab sample was taken within the secondary containment cell of the sewage lagoon.


ERK-1 in June and July 2019; water samples were collected.

Effluent is produced during CFS Eureka operations that begin in early-June and ended by mid-July (1.5 month). CFS Eureka is closed during the winter season period and there is no on-site staff and no waste/effluent generation. It should be noted that the opening and closing dates vary by year due to logistical and military factors.

August

CFS Eureka was closed for the season.

Appendix B

Monitoring Program Station No. ERK-2
Year: 2019
Name: Landfarm Facility
Description: Sampling of Effluent prior to release.

Results:

Department of National Defence had no intentions to discharge any freshet from ERK-2 (Landfarm) in 2019

June and July

The DND Sampling Team visited CFS Eureka on June 28th and July 2nd, 2019. ERK-2 had dry conditions and therefore water samples were not collected for analysis.

ERK-2 in July 2, 2019 showing dry conditions.

August
CFS Eureka was closed for the season.

Appendix C

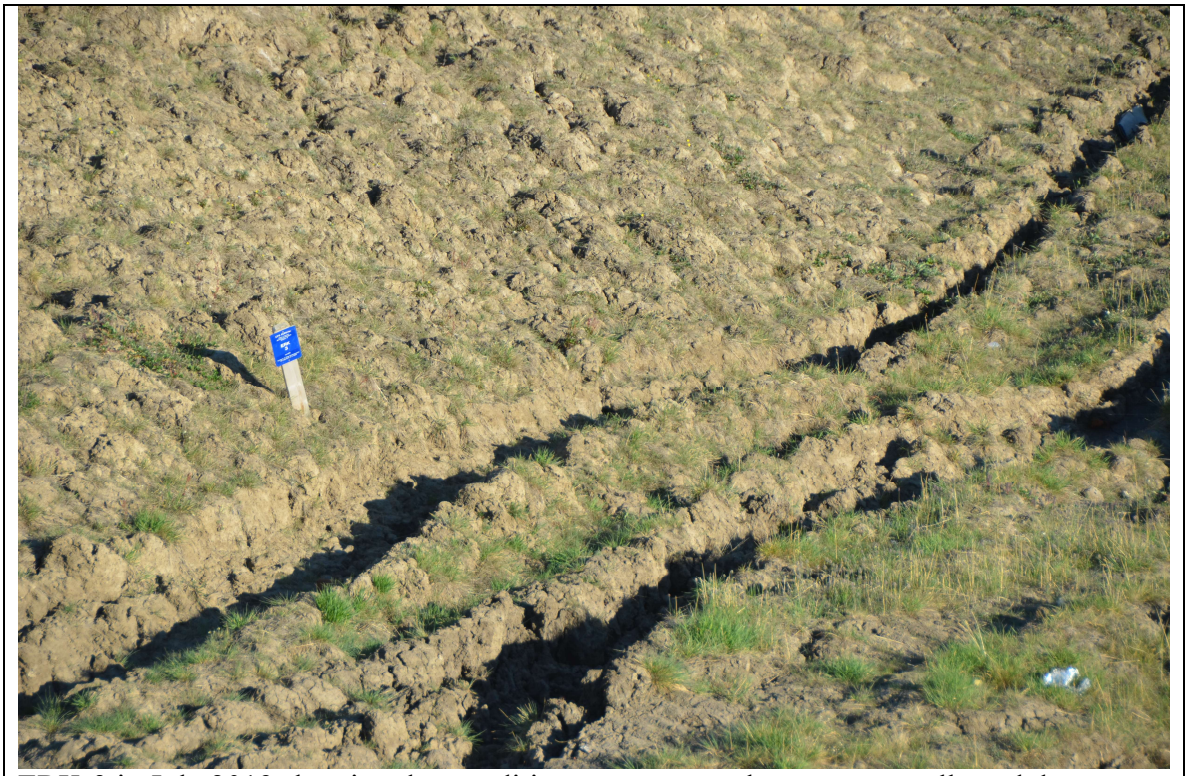
Monitoring Program Stations No. ERK-3-4-5
Year: 2019
Description: Runoff and Leachate.
Reference: 8BC-ERK1621, Part J, Item 5.

Results:

June and July (Runoff Season)

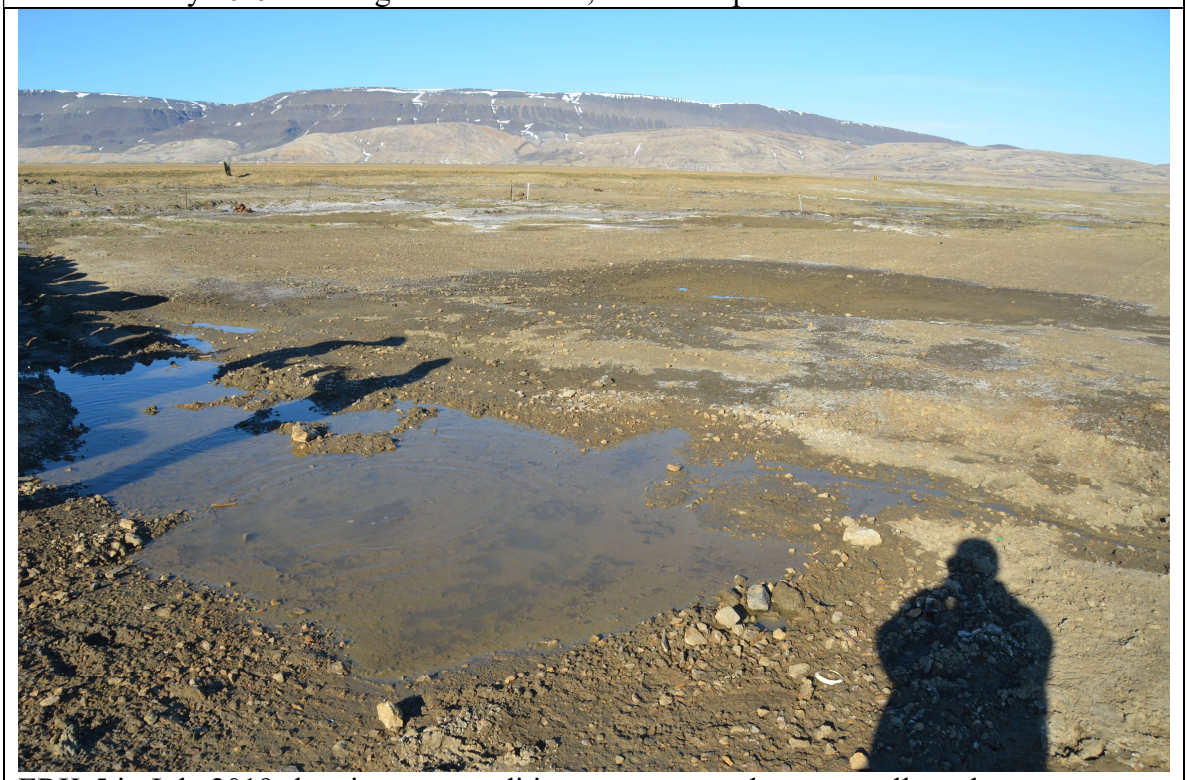
The DND Sampling Team visited CFS Eureka on June 29th and July 1st, 2019. Water samples were collected at ERK 3-4-5 monitoring program stations. Analytical results are attached in Appendix F.

In 2019, CFS Eureka was only open from mid-June to early-July.



ERK-3 in July 2019 showing dry conditions; water samples were not collected due to lack of standing water.

ERK-4 in July 2019 showing wet conditions; water samples were collected.



ERK-5 in July 2019 showing wet conditions; water samples were collected.

August
CFS Eureka was closed for the season.

Appendix D

List of Waste Disposal Activities
Year: 2019
Reference: 8BC-ERK1621, Part B, 1a.

Landfill:
- Deposition of non-hazardous and bulky waste materials to site.

Sewage Treatment Facility:
- The Sewage Lagoon was not decanted in 2019.

Battery Dump:
- No waste was deposited at this site.
- No waste deposition is allowed at this site.

Barrel Dump:
- In cooperation with Environment and Climate Change Canada Eureka Weather Station (EC), empty barrels have not been buried at the Barrel Dump since 2012. The empty barrels are securely placed at this site as directed by Environment and Climate Change Canada. Approximately 500 barrels were cleaned and crushed on site as part of the barrel clean-up efforts.

Landfarm:
- There were no disposal activities at this site in 2019.

Hazardous Waste Backhaul from CFS Eureka in 2019:

- For 2019, there were NO hazardous waste backhaul activities reported to 8 Wing Trenton from CFS Eureka.

Appendix E

Progressive and Final Reclamation Work Undertaken
Year: 2019
Reference: 8BC-ERK1621, Part B, Item 1g.

Progressive Reclamation Work Undertaken in 2019:

No progressive and reclamation works were undertaken in 2019 due to logistical and resource constraints.

Future works proposed for 2020:

There are currently no work proposed for the progressive and reclamation works to be undertaken in 2020 at CFS Eureka, Nunavut.

Appendix F

Analysis Results from June and July Runoff 2019
Year: 2019
Reference: 8BC-ERK1621, Part J, Item 10.

Notes:

Attached in this Annex are the Analytical Results from the June and July 2019 Runoff Sampling at Monitoring Program Stations ERK-1-2-3-4-5.

Defence Construction Canada
ATTN: Kelsey Davidson
780 Midpark Drive
Suit 205
Kingston On K7M7P6

Date Received: 08-JUL-19
Report Date: 18-JUL-19 12:39 (MT)
Version: FINAL REV. 2

Client Phone: 613-384-1256

Certificate of Analysis

Lab Work Order #: L2305709

Project P.O. #: NOT SUBMITTED
Job Reference: SC70923 (DCC)
C of C Numbers: 17-8022023
Legal Site Desc:

N. Gudzak

Nellie Gudzak
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305709-1 ERK1-DND SEWAGE LAGOON Sampled By: NATHAN KOUTROUDES on 29-JUN-19 Matrix: SW							
Physical Tests							
pH	9.45	PEHR	0.10	pH units		11-JUL-19	R4709476
Total Suspended Solids	188	RRR	4.0	mg/L	11-JUL-19	11-JUL-19	R4707880
Bacteriological Tests							
Fecal Coliforms	<10	PEHR	10	CFU/100mL		10-JUL-19	R4702696
Aggregate Organics							
BOD	83	PEHR	30	mg/L	09-JUL-19	14-JUL-19	R4711430
BOD Carbonaceous	87	PEHR	30	mg/L	09-JUL-19	14-JUL-19	R4711495
COD	846		10	mg/L		12-JUL-19	R4708832
Oil and Grease, Total	<5.0		5.0	mg/L	10-JUL-19	10-JUL-19	R4706217
Report Remarks : Dilution required due to high concentration of test analytes Parameter exceeded recommended holding time on receipt: proceed with analysis as requested							
L2305709-2 ERK4-BATTERY DUMP Sampled By: NATHAN KOUTROUDES on 29-JUN-19 Matrix: SW							
Physical Tests							
Conductivity	960		3.0	umhos/cm		11-JUL-19	R4709471
Hardness (as CaCO3)	201	HTC	1.3	mg/L		11-JUL-19	
pH	8.27	PEHR	0.10	pH units		11-JUL-19	R4709471
Total Suspended Solids	2.9	PEHR	2.0	mg/L	11-JUL-19	11-JUL-19	R4707880
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	113		10	mg/L		11-JUL-19	R4709471
Ammonia, Total (as N)	<0.010		0.010	mg/L		12-JUL-19	R4709000
Nitrate (as N)	<0.040	PEHR	0.040	mg/L		09-JUL-19	R4702730
Nitrite (as N)	<0.020	PEHR	0.020	mg/L		09-JUL-19	R4702730
Sulfate (SO4)	176	DLDS	0.60	mg/L		09-JUL-19	R4702730
Bacteriological Tests							
Fecal Coliforms	0	PEHR	0	CFU/100mL		10-JUL-19	R4702696
Total Metals							
Arsenic (As)-Total	0.00058		0.00010	mg/L	09-JUL-19	10-JUL-19	R4702680
Cadmium (Cd)-Total	0.0000051		0.0000050	mg/L	09-JUL-19	10-JUL-19	R4702680
Calcium (Ca)-Total	49.9		0.50	mg/L	09-JUL-19	10-JUL-19	R4702680
Chromium (Cr)-Total	0.00190		0.00050	mg/L	09-JUL-19	10-JUL-19	R4702680
Copper (Cu)-Total	0.0027		0.0010	mg/L	09-JUL-19	10-JUL-19	R4702680
Iron (Fe)-Total	0.267		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Lead (Pb)-Total	0.101		0.050	ug/L	09-JUL-19	10-JUL-19	R4702680
Magnesium (Mg)-Total	18.7		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		10-JUL-19	R4703589
Nickel (Ni)-Total	0.00188		0.00050	mg/L	09-JUL-19	10-JUL-19	R4702680
Potassium (K)-Total	9.90		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Sodium (Na)-Total	121	DLHC	0.50	mg/L	09-JUL-19	10-JUL-19	R4702680
Aggregate Organics							
BOD	3.9	PEHR	3.0	mg/L	09-JUL-19	14-JUL-19	R4711430
BOD Carbonaceous	4.0	PEHR	3.0	mg/L	09-JUL-19	14-JUL-19	R4711495

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305709-2 ERK4-BATTERY DUMP Sampled By: NATHAN KOUTROUDES on 29-JUN-19 Matrix: SW							
Aggregate Organics							
COD	49		10	mg/L		12-JUL-19	R4708832
Oil and Grease, Total	<5.0		5.0	mg/L	10-JUL-19	10-JUL-19	R4706217
Phenols (4AAP)	36.9		1.0	ug/L		10-JUL-19	R4698590
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		12-JUL-19	R4708616
Ethylbenzene	<0.50		0.50	ug/L		12-JUL-19	R4708616
Toluene	<0.50		0.50	ug/L		12-JUL-19	R4708616
o-Xylene	<0.30		0.30	ug/L		12-JUL-19	R4708616
m+p-Xylenes	<0.40		0.40	ug/L		12-JUL-19	R4708616
Xylenes (Total)	<0.50		0.50	ug/L		12-JUL-19	
Surrogate: 4-Bromofluorobenzene	93.8		70-130	%		12-JUL-19	R4708616
Surrogate: 1,4-Difluorobenzene	96.8		70-130	%		12-JUL-19	R4708616
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		12-JUL-19	R4708616
F1-BTEX	<25		25	ug/L		12-JUL-19	
F2 (C10-C16)	<100		100	ug/L	08-JUL-19	09-JUL-19	R4700809
F2-Naphth	<100		100	ug/L		12-JUL-19	
F3 (C16-C34)	<250		250	ug/L	08-JUL-19	09-JUL-19	R4700809
F3-PAH	<250		250	ug/L		12-JUL-19	
F4 (C34-C50)	<250		250	ug/L	08-JUL-19	09-JUL-19	R4700809
Total Hydrocarbons (C6-C50)	<370		370	ug/L		12-JUL-19	
Chrom. to baseline at nC50	YES				08-JUL-19	09-JUL-19	R4700809
Surrogate: 2-Bromobenzotrifluoride	93.5		60-140	%	08-JUL-19	09-JUL-19	R4700809
Surrogate: 3,4-Dichlorotoluene	87.6		60-140	%		12-JUL-19	R4708616
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Acenaphthylene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Acridine	<4.0		4.0	ug/L	08-JUL-19	11-JUL-19	R4708037
Anthracene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(a)anthracene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(a)pyrene	<0.0050		0.0050	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(b)fluoranthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(k)fluoranthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Chrysene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Fluoranthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Fluorene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		12-JUL-19	
1-Methylnaphthalene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
2-Methylnaphthalene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305709-2 ERK4-BATTERY DUMP Sampled By: NATHAN KOUTROUDES on 29-JUN-19 Matrix: SW							
Polycyclic Aromatic Hydrocarbons							
Naphthalene	<0.050		0.050	ug/L	08-JUL-19	11-JUL-19	R4708037
Phenanthrene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Pyrene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Quinoline	<0.040		0.040	ug/L	08-JUL-19	11-JUL-19	R4708037
Surrogate: d10-Acenaphthene	110.6		60-140	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d9-Acridine (SS)	96.1		40-130	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d12-Chrysene	89.5		60-140	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d8-Naphthalene	113.8		60-140	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d10-Phenanthrene	109.5		60-140	%	08-JUL-19	11-JUL-19	R4708037
B(a)P Total Potency Equivalent	<0.060		0.060	ug/L	08-JUL-19	11-JUL-19	R4708037
L2305709-3 ERK5-BARREL DUMP Sampled By: NATHAN KOUTROUDES on 29-JUN-19 Matrix: SW							
Physical Tests							
Conductivity	524		3.0	umhos/cm		11-JUL-19	R4709471
Hardness (as CaCO3)	123	HTC	1.3	mg/L		11-JUL-19	
pH	8.07	PEHR	0.10	pH units		11-JUL-19	R4709471
Total Suspended Solids	63.1	PEHR	2.0	mg/L	11-JUL-19	11-JUL-19	R4707880
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	74		10	mg/L		11-JUL-19	R4709471
Ammonia, Total (as N)	<0.010		0.010	mg/L		12-JUL-19	R4709000
Nitrate (as N)	<0.020	PEHR	0.020	mg/L		09-JUL-19	R4702730
Nitrite (as N)	<0.010	PEHR	0.010	mg/L		09-JUL-19	R4702730
Sulfate (SO4)	87.1		0.30	mg/L		09-JUL-19	R4702730
Bacteriological Tests							
Fecal Coliforms	0	PEHR	0	CFU/100mL		10-JUL-19	R4702696
Total Metals							
Arsenic (As)-Total	0.00281		0.00010	mg/L	09-JUL-19	10-JUL-19	R4702680
Cadmium (Cd)-Total	0.0000768		0.0000050	mg/L	09-JUL-19	10-JUL-19	R4702680
Calcium (Ca)-Total	26.0		0.50	mg/L	09-JUL-19	10-JUL-19	R4702680
Chromium (Cr)-Total	0.00618		0.00050	mg/L	09-JUL-19	10-JUL-19	R4702680
Copper (Cu)-Total	0.0036		0.0010	mg/L	09-JUL-19	10-JUL-19	R4702680
Iron (Fe)-Total	4.15		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Lead (Pb)-Total	1.81		0.050	ug/L	09-JUL-19	10-JUL-19	R4702680
Magnesium (Mg)-Total	14.0		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		10-JUL-19	R4703589
Nickel (Ni)-Total	0.00510		0.00050	mg/L	09-JUL-19	10-JUL-19	R4702680
Potassium (K)-Total	4.64		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Sodium (Na)-Total	55.6		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Aggregate Organics							
BOD	<3.0	BODL	3.0	mg/L	09-JUL-19	14-JUL-19	R4711430
BOD Carbonaceous	<3.0	BODL	3.0	mg/L	09-JUL-19	14-JUL-19	R4711495

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305709-3 ERK5-BARREL DUMP Sampled By: NATHAN KOUTROUDES on 29-JUN-19 Matrix: SW							
Aggregate Organics							
COD	44		10	mg/L		12-JUL-19	R4708832
Oil and Grease, Total	<5.0		5.0	mg/L	10-JUL-19	10-JUL-19	R4706217
Phenols (4AAP)	37.5		1.0	ug/L		10-JUL-19	R4698590
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		12-JUL-19	R4708616
Ethylbenzene	<0.50		0.50	ug/L		12-JUL-19	R4708616
Toluene	<0.50		0.50	ug/L		12-JUL-19	R4708616
o-Xylene	<0.30		0.30	ug/L		12-JUL-19	R4708616
m+p-Xylenes	<0.40		0.40	ug/L		12-JUL-19	R4708616
Xylenes (Total)	<0.50		0.50	ug/L		12-JUL-19	
Surrogate: 4-Bromofluorobenzene	94.1		70-130	%		12-JUL-19	R4708616
Surrogate: 1,4-Difluorobenzene	97.3		70-130	%		12-JUL-19	R4708616
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		12-JUL-19	R4708616
F1-BTEX	<25		25	ug/L		12-JUL-19	
F2 (C10-C16)	<100		100	ug/L	08-JUL-19	09-JUL-19	R4700809
F2-Naphth	<100		100	ug/L		12-JUL-19	
F3 (C16-C34)	<250		250	ug/L	08-JUL-19	09-JUL-19	R4700809
F3-PAH	<250		250	ug/L		12-JUL-19	
F4 (C34-C50)	<250		250	ug/L	08-JUL-19	09-JUL-19	R4700809
Total Hydrocarbons (C6-C50)	<370		370	ug/L		12-JUL-19	
Chrom. to baseline at nC50	YES				08-JUL-19	09-JUL-19	R4700809
Surrogate: 2-Bromobenzotrifluoride	83.1		60-140	%	08-JUL-19	09-JUL-19	R4700809
Surrogate: 3,4-Dichlorotoluene	94.2		60-140	%		12-JUL-19	R4708616
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Acenaphthylene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Acridine	<4.0		4.0	ug/L	08-JUL-19	11-JUL-19	R4708037
Anthracene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(a)anthracene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(a)pyrene	<0.0050		0.0050	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(b)fluoranthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(k)fluoranthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Chrysene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Fluoranthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Fluorene	0.036		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
1+2-Methylnaphthalenes	0.141		0.028	ug/L		12-JUL-19	
1-Methylnaphthalene	0.083		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
2-Methylnaphthalene	0.059		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305709-3 ERK5-BARREL DUMP Sampled By: NATHAN KOUTROUDES on 29-JUN-19 Matrix: SW							
Polycyclic Aromatic Hydrocarbons							
Naphthalene	<0.050		0.050	ug/L	08-JUL-19	11-JUL-19	R4708037
Phenanthrene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Pyrene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Quinoline	<0.040		0.040	ug/L	08-JUL-19	11-JUL-19	R4708037
Surrogate: d10-Acenaphthene	107.2		60-140	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d9-Acridine (SS)	119.8		40-130	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d12-Chrysene	89.8		60-140	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d8-Naphthalene	109.2		60-140	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d10-Phenanthrene	121.1		60-140	%	08-JUL-19	11-JUL-19	R4708037
B(a)P Total Potency Equivalent	<0.060		0.060	ug/L	08-JUL-19	11-JUL-19	R4708037
L2305709-4 ERK 1 Sampled By: NATHAN KOUTROUDES on 01-JUL-19 Matrix: SW							
Physical Tests							
pH	9.38	PEHR	0.10	pH units		11-JUL-19	R4709476
Total Suspended Solids	241	RRR	20	mg/L	11-JUL-19	11-JUL-19	R4707880
Bacteriological Tests							
Fecal Coliforms	<10	PEHR	10	CFU/100mL		10-JUL-19	R4702696
Aggregate Organics							
BOD	91.1	PEHR	2.0	mg/L	09-JUL-19	14-JUL-19	R4711430
BOD Carbonaceous	85	PEHR	30	mg/L	09-JUL-19	14-JUL-19	R4711495
COD	905		10	mg/L		12-JUL-19	R4708832
Oil and Grease, Total	<5.0		5.0	mg/L	10-JUL-19	10-JUL-19	R4706217
Report Remarks : Dilution required due to high concentration of test analytes Parameter exceeded recommended holding time on receipt: proceed with analysis as requested							
L2305709-5 ERK4 Sampled By: NATHAN KOUTROUDES on 01-JUL-19 Matrix: SW							
Physical Tests							
Conductivity	1100		3.0	umhos/cm		11-JUL-19	R4709476
Hardness (as CaCO3)	229	HTC	1.3	mg/L		11-JUL-19	
pH	8.31	PEHR	0.10	pH units		11-JUL-19	R4709476
Total Suspended Solids	3.5	PEHR	2.0	mg/L	11-JUL-19	11-JUL-19	R4707880
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	121		10	mg/L		11-JUL-19	R4709476
Ammonia, Total (as N)	0.012		0.010	mg/L		12-JUL-19	R4709000
Nitrate (as N)	<0.040	PEHR	0.040	mg/L		09-JUL-19	R4702730
Nitrite (as N)	<0.020	PEHR	0.020	mg/L		09-JUL-19	R4702730
Sulfate (SO4)	203	DLDS	0.60	mg/L		09-JUL-19	R4702730
Bacteriological Tests							
Fecal Coliforms	0	PEHR	0	CFU/100mL		10-JUL-19	R4702696
Total Metals							
Arsenic (As)-Total	0.00072		0.00010	mg/L	09-JUL-19	10-JUL-19	R4702680

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305709-5 ERK4 Sampled By: NATHAN KOUTROUDES on 01-JUL-19 Matrix: SW							
Total Metals							
Cadmium (Cd)-Total	0.0000058		0.0000050	mg/L	09-JUL-19	10-JUL-19	R4702680
Calcium (Ca)-Total	55.7		0.50	mg/L	09-JUL-19	10-JUL-19	R4702680
Chromium (Cr)-Total	0.00063		0.00050	mg/L	09-JUL-19	10-JUL-19	R4702680
Copper (Cu)-Total	0.0034		0.0010	mg/L	09-JUL-19	10-JUL-19	R4702680
Iron (Fe)-Total	0.254		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Lead (Pb)-Total	0.121		0.050	ug/L	09-JUL-19	10-JUL-19	R4702680
Magnesium (Mg)-Total	21.9		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		10-JUL-19	R4703589
Nickel (Ni)-Total	0.00202		0.00050	mg/L	09-JUL-19	10-JUL-19	R4702680
Potassium (K)-Total	11.5		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Sodium (Na)-Total	144	DLHC	0.50	mg/L	09-JUL-19	10-JUL-19	R4702680
Aggregate Organics							
BOD	4.9	PEHR	3.0	mg/L	09-JUL-19	14-JUL-19	R4711430
BOD Carbonaceous	4.3	PEHR	3.0	mg/L	09-JUL-19	14-JUL-19	R4711495
COD	64		10	mg/L		12-JUL-19	R4708832
Oil and Grease, Total	<5.0		5.0	mg/L	10-JUL-19	10-JUL-19	R4706217
Phenols (4AAP)	10.4		1.0	ug/L		10-JUL-19	R4698590
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		12-JUL-19	R4708616
Ethylbenzene	<0.50		0.50	ug/L		12-JUL-19	R4708616
Toluene	<0.50		0.50	ug/L		12-JUL-19	R4708616
o-Xylene	<0.30		0.30	ug/L		12-JUL-19	R4708616
m+p-Xylenes	<0.40		0.40	ug/L		12-JUL-19	R4708616
Xylenes (Total)	<0.50		0.50	ug/L		12-JUL-19	
Surrogate: 4-Bromofluorobenzene	94.5		70-130	%		12-JUL-19	R4708616
Surrogate: 1,4-Difluorobenzene	97.0		70-130	%		12-JUL-19	R4708616
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		12-JUL-19	R4708616
F1-BTEX	<25		25	ug/L		12-JUL-19	
F2 (C10-C16)	<100		100	ug/L	08-JUL-19	09-JUL-19	R4700809
F2-Naphth	<100		100	ug/L		12-JUL-19	
F3 (C16-C34)	<250		250	ug/L	08-JUL-19	09-JUL-19	R4700809
F3-PAH	<250		250	ug/L		12-JUL-19	
F4 (C34-C50)	<250		250	ug/L	08-JUL-19	09-JUL-19	R4700809
Total Hydrocarbons (C6-C50)	<370		370	ug/L		12-JUL-19	
Chrom. to baseline at nC50	YES				08-JUL-19	09-JUL-19	R4700809
Surrogate: 2-Bromobenzotrifluoride	90.3		60-140	%	08-JUL-19	09-JUL-19	R4700809
Surrogate: 3,4-Dichlorotoluene	94.8		60-140	%		12-JUL-19	R4708616
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Acenaphthylene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Acridine	<4.0		4.0	ug/L	08-JUL-19	11-JUL-19	R4708037

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305709-5 ERK4 Sampled By: NATHAN KOUTROUDES on 01-JUL-19 Matrix: SW							
Polycyclic Aromatic Hydrocarbons							
Anthracene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(a)anthracene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(a)pyrene	<0.0050		0.0050	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(b)fluoranthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(k)fluoranthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Chrysene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Fluoranthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Fluorene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		12-JUL-19	
1-Methylnaphthalene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
2-Methylnaphthalene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Naphthalene	<0.050		0.050	ug/L	08-JUL-19	11-JUL-19	R4708037
Phenanthrene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Pyrene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Quinoline	<0.040		0.040	ug/L	08-JUL-19	11-JUL-19	R4708037
Surrogate: d10-Acenaphthene	108.7		60-140	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d9-Acridine (SS)	96.2		40-130	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d12-Chrysene	92.9		60-140	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d8-Naphthalene	113.9		60-140	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d10-Phenanthrene	109.5		60-140	%	08-JUL-19	11-JUL-19	R4708037
B(a)P Total Potency Equivalent	<0.060		0.060	ug/L	08-JUL-19	11-JUL-19	R4708037
L2305709-6 ERK5 Sampled By: NATHAN KOUTROUDES on 01-JUL-19 Matrix: SW							
Physical Tests							
Conductivity	2100		3.0	umhos/cm		11-JUL-19	R4709476
Hardness (as CaCO3)	553	HTC	1.3	mg/L		11-JUL-19	
pH	8.33	PEHR	0.10	pH units		11-JUL-19	R4709476
Total Suspended Solids	3.9	PEHR	2.0	mg/L	11-JUL-19	11-JUL-19	R4707880
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	135		10	mg/L		11-JUL-19	R4709476
Ammonia, Total (as N)	<0.010		0.010	mg/L		12-JUL-19	R4709000
Nitrate (as N)	<0.040	PEHR	0.040	mg/L		09-JUL-19	R4702730
Nitrite (as N)	<0.020	PEHR	0.020	mg/L		09-JUL-19	R4702730
Sulfate (SO4)	322	DLDS	0.60	mg/L		09-JUL-19	R4702730
Bacteriological Tests							
Fecal Coliforms	0	PEHR	0	CFU/100mL		10-JUL-19	R4702696
Total Metals							
Arsenic (As)-Total	0.00114		0.00010	mg/L	09-JUL-19	10-JUL-19	R4702680

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305709-6 ERK5 Sampled By: NATHAN KOUTROUDES on 01-JUL-19 Matrix: SW							
Total Metals							
Cadmium (Cd)-Total	0.0000863		0.0000050	mg/L	09-JUL-19	10-JUL-19	R4702680
Calcium (Ca)-Total	118		0.50	mg/L	09-JUL-19	10-JUL-19	R4702680
Chromium (Cr)-Total	0.00104		0.00050	mg/L	09-JUL-19	10-JUL-19	R4702680
Copper (Cu)-Total	0.0023		0.0010	mg/L	09-JUL-19	10-JUL-19	R4702680
Iron (Fe)-Total	0.057		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Lead (Pb)-Total	0.097		0.050	ug/L	09-JUL-19	10-JUL-19	R4702680
Magnesium (Mg)-Total	62.8		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		10-JUL-19	R4703589
Nickel (Ni)-Total	0.00402		0.00050	mg/L	09-JUL-19	10-JUL-19	R4702680
Potassium (K)-Total	10.5		0.050	mg/L	09-JUL-19	10-JUL-19	R4702680
Sodium (Na)-Total	246	DLHC	0.50	mg/L	09-JUL-19	10-JUL-19	R4702680
Aggregate Organics							
BOD	<3.0	BODL	3.0	mg/L	09-JUL-19	14-JUL-19	R4711430
BOD Carbonaceous	<3.0	BODL	3.0	mg/L	09-JUL-19	14-JUL-19	R4711495
COD	47		10	mg/L		12-JUL-19	R4708832
Oil and Grease, Total	<5.0		5.0	mg/L	10-JUL-19	10-JUL-19	R4706217
Phenols (4AAP)	16.8		1.0	ug/L		10-JUL-19	R4698590
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		12-JUL-19	R4708616
Ethylbenzene	<0.50		0.50	ug/L		12-JUL-19	R4708616
Toluene	<0.50		0.50	ug/L		12-JUL-19	R4708616
o-Xylene	<0.30		0.30	ug/L		12-JUL-19	R4708616
m+p-Xylenes	<0.40		0.40	ug/L		12-JUL-19	R4708616
Xylenes (Total)	<0.50		0.50	ug/L		12-JUL-19	
Surrogate: 4-Bromofluorobenzene	93.9		70-130	%		12-JUL-19	R4708616
Surrogate: 1,4-Difluorobenzene	97.0		70-130	%		12-JUL-19	R4708616
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		12-JUL-19	R4708616
F1-BTEX	<25		25	ug/L		12-JUL-19	
F2 (C10-C16)	<100		100	ug/L	08-JUL-19	09-JUL-19	R4700809
F2-Naphth	<100		100	ug/L		12-JUL-19	
F3 (C16-C34)	<250		250	ug/L	08-JUL-19	09-JUL-19	R4700809
F3-PAH	<250		250	ug/L		12-JUL-19	
F4 (C34-C50)	<250		250	ug/L	08-JUL-19	09-JUL-19	R4700809
Total Hydrocarbons (C6-C50)	<370		370	ug/L		12-JUL-19	
Chrom. to baseline at nC50	YES				08-JUL-19	09-JUL-19	R4700809
Surrogate: 2-Bromobenzotrifluoride	83.7		60-140	%	08-JUL-19	09-JUL-19	R4700809
Surrogate: 3,4-Dichlorotoluene	95.0		60-140	%		12-JUL-19	R4708616
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Acenaphthylene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Acridine	<4.0		4.0	ug/L	08-JUL-19	11-JUL-19	R4708037

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305709-6 ERK5 Sampled By: NATHAN KOUTROUDES on 01-JUL-19 Matrix: SW							
Polycyclic Aromatic Hydrocarbons							
Anthracene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(a)anthracene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(a)pyrene	<0.0050		0.0050	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(b)fluoranthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Benzo(k)fluoranthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Chrysene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Fluoranthene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Fluorene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
1+2-Methylnaphthalenes	0.040		0.028	ug/L		12-JUL-19	
1-Methylnaphthalene	0.040		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
2-Methylnaphthalene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Naphthalene	<0.050		0.050	ug/L	08-JUL-19	11-JUL-19	R4708037
Phenanthrene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Pyrene	<0.020		0.020	ug/L	08-JUL-19	11-JUL-19	R4708037
Quinoline	<0.040		0.040	ug/L	08-JUL-19	11-JUL-19	R4708037
Surrogate: d10-Acenaphthene	109.4		60-140	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d9-Acridine (SS)	107.2		40-130	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d12-Chrysene	89.5		60-140	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d8-Naphthalene	115.5		60-140	%	08-JUL-19	11-JUL-19	R4708037
Surrogate: d10-Phenanthrene	113.4		60-140	%	08-JUL-19	11-JUL-19	R4708037
B(a)P Total Potency Equivalent	<0.060		0.060	ug/L	08-JUL-19	11-JUL-19	R4708037

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	COD	MS-B	L2305709-1, -2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Total	MS-B	L2305709-2, -3, -5, -6
Matrix Spike	Copper (Cu)-Total	MS-B	L2305709-2, -3, -5, -6
Matrix Spike	Iron (Fe)-Total	MS-B	L2305709-2, -3, -5, -6
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2305709-2, -3, -5, -6
Matrix Spike	Sodium (Na)-Total	MS-B	L2305709-2, -3, -5, -6

Sample Parameter Qualifier key listed:

Qualifier	Description
BODL	Limit of Reporting for BOD was increased to account for the largest volume of sample tested.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.
RRR	Refer to Report Remarks for issues regarding this analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

BOD-C-WT	Water	BOD Carbonaceous	APHA 5210 B (CBOD)

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

BOD-WT	Water	BOD	APHA 5210 B

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

COD-T-WT	Water	Chemical Oxygen Demand	APHA 5220 D

This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

Reference Information

1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT Water F1-O.Reg 153/04 (July 2011) E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT Water F2-F4-O.Reg 153/04 (July 2011) EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

FC-MF-WT Water Fecal Coliforms SM 9222D

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mFC agar and incubated at 24–2h@44.5–0.2°C. Method ID: WT-TM-1200

HARDNESS-CALC-WT Water Hardness APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-T-CVAA-WT Water Total Mercury in Water by CVAAS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

METHYLNAPS-CALC-WT Water PAH-Calculated Parameters SW846 8270

NH3-F-WT Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-WT Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-WT Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

OGG-TOT-WT Water Oil and Grease, Total APHA 5520 B

The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease.

PAH-CCME-WT Water CCME PAHs SW846 8270

Sample is extracted at neutral pH using separate aliquots of dichloromethane with a modified separatory funnel technique, extracts are then concentrated and analyzed by GC/MSD. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

PH-WT Water pH APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

PHENOLS-4AAP-WT Water Phenol (4AAP) EPA 9066

An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.

SO4-IC-N-WT Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-8022023

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2305709 Report Date: 18-JUL-19

Client: Defence Construction Canada
780 Midpark Drive Suit 205
Kingston On K7M7P6
Contact: Kelsey Davidson

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4709471								
WG3101986-4 DUP		**WG3101986-3**						
Alkalinity, Total (as CaCO3)		74	74		mg/L	0.4	20	11-JUL-19
WG3101986-2 LCS								
Alkalinity, Total (as CaCO3)			103.1		%		85-115	11-JUL-19
WG3101986-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	11-JUL-19
Batch R4709476								
WG3101993-4 DUP		**WG3101993-3**						
Alkalinity, Total (as CaCO3)		155	155		mg/L	0.0	20	11-JUL-19
WG3101993-2 LCS								
Alkalinity, Total (as CaCO3)			102.6		%		85-115	11-JUL-19
WG3101993-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	11-JUL-19
BOD-C-WT	**Water**							
Batch R4711495								
WG3100096-2 DUP		**L2305562-1**						
BOD Carbonaceous		<3.0	<3.0	RPD-NA	mg/L	N/A	20	14-JUL-19
WG3100096-6 DUP		**L2305549-1**						
BOD Carbonaceous		2.1	2.0		mg/L	4.9	20	14-JUL-19
WG3100096-3 LCS								
BOD Carbonaceous			108.6		%		85-115	14-JUL-19
WG3100096-7 LCS								
BOD Carbonaceous			106.1		%		85-115	14-JUL-19
WG3100096-1 MB								
BOD Carbonaceous			<2.0		mg/L		2	14-JUL-19
WG3100096-5 MB								
BOD Carbonaceous			<2.0		mg/L		2	14-JUL-19
BOD-WT	**Water**							
Batch R4711430								
WG3100092-2 DUP		**L2305898-2**						
BOD		<2.0	<2.0	RPD-NA	mg/L	N/A	20	14-JUL-19
WG3100092-6 DUP		**L2305898-1**						
BOD		<2.0	<2.0	RPD-NA	mg/L	N/A	20	14-JUL-19
WG3100092-3 LCS								
BOD			108.1		%		85-115	14-JUL-19
WG3100092-7 LCS								
BOD			105.1		%		85-115	14-JUL-19
WG3100092-1 MB								

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BOD-WT	**Water**							
Batch R4711430								
WG3100092-1 MB								
BOD			<2.0		mg/L		2	14-JUL-19
WG3100092-5 MB								
BOD			<2.0		mg/L		2	14-JUL-19
BTX-511-HS-WT	**Water**							
Batch R4708616								
WG3102873-4 DUP		**WG3102873-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	12-JUL-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	12-JUL-19
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	12-JUL-19
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	12-JUL-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	12-JUL-19
WG3102873-1 LCS								
Benzene			97.8		%		70-130	12-JUL-19
Ethylbenzene			101.5		%		70-130	12-JUL-19
m+p-Xylenes			99.6		%		70-130	12-JUL-19
o-Xylene			98.4		%		70-130	12-JUL-19
Toluene			102.4		%		70-130	12-JUL-19
WG3102873-2 MB								
Benzene			<0.50		ug/L		0.5	12-JUL-19
Ethylbenzene			<0.50		ug/L		0.5	12-JUL-19
m+p-Xylenes			<0.40		ug/L		0.4	12-JUL-19
o-Xylene			<0.30		ug/L		0.3	12-JUL-19
Toluene			<0.50		ug/L		0.5	12-JUL-19
Surrogate: 1,4-Difluorobenzene			95.3		%		70-130	12-JUL-19
Surrogate: 4-Bromofluorobenzene			93.3		%		70-130	12-JUL-19
WG3102873-5 MS		**L2305709-6**						
Benzene			98.2		%		50-140	12-JUL-19
Ethylbenzene			94.6		%		50-140	12-JUL-19
m+p-Xylenes			93.7		%		50-140	12-JUL-19
o-Xylene			94.1		%		50-140	12-JUL-19
Toluene			97.3		%		50-140	12-JUL-19
COD-T-WT	**Water**							

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COD-T-WT	**Water**							
Batch R4708832								
WG3103299-3 DUP		**L2305709-1**						
COD		846	836		mg/L	1.2	20	12-JUL-19
WG3103299-2 LCS								
COD			91.1		%		85-115	12-JUL-19
WG3103299-1 MB								
COD			<10		mg/L		10	12-JUL-19
WG3103299-4 MS		**L2305709-1**						
COD			N/A	MS-B	%		-	12-JUL-19
EC-WT	**Water**							
Batch R4709471								
WG3101986-4 DUP		**WG3101986-3**						
Conductivity		524	523		umhos/cm	0.2	10	11-JUL-19
WG3101986-2 LCS								
Conductivity			97.6		%		90-110	11-JUL-19
WG3101986-1 MB								
Conductivity			<3.0		umhos/cm		3	11-JUL-19
Batch R4709476								
WG3101993-4 DUP		**WG3101993-3**						
Conductivity		725	728		umhos/cm	0.4	10	11-JUL-19
WG3101993-2 LCS								
Conductivity			97.8		%		90-110	11-JUL-19
WG3101993-1 MB								
Conductivity			<3.0		umhos/cm		3	11-JUL-19
F1-HS-511-WT	**Water**							
Batch R4708616								
WG3102873-4 DUP		**WG3102873-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	12-JUL-19
WG3102873-1 LCS								
F1 (C6-C10)			98.1		%		80-120	12-JUL-19
WG3102873-2 MB								
F1 (C6-C10)			<25		ug/L		25	12-JUL-19
Surrogate: 3,4-Dichlorotoluene			80.5		%		60-140	12-JUL-19
WG3102873-5 MS		**L2305709-6**						
F1 (C6-C10)			91.8		%		60-140	12-JUL-19
F2-F4-511-WT	**Water**							

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Water**							
Batch R4700809								
WG3099274-2 LCS								
F2 (C10-C16)			91.8		%		70-130	09-JUL-19
F3 (C16-C34)			96.0		%		70-130	09-JUL-19
F4 (C34-C50)			97.2		%		70-130	09-JUL-19
WG3099274-1 MB								
F2 (C10-C16)			<100		ug/L		100	09-JUL-19
F3 (C16-C34)			<250		ug/L		250	09-JUL-19
F4 (C34-C50)			<250		ug/L		250	09-JUL-19
Surrogate: 2-Bromobenzotrifluoride			87.7		%		60-140	09-JUL-19
FC-MF-WT	**Water**							
Batch R4702696								
WG3099785-1 MB								
Fecal Coliforms			0		CFU/100mL		1	10-JUL-19
HG-T-CVAA-WT	**Water**							
Batch R4703589								
WG3100694-6 DUP		**WG3100694-5**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	10-JUL-19
WG3100694-2 LCS								
Mercury (Hg)-Total			101.0		%		80-120	10-JUL-19
WG3100694-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	10-JUL-19
WG3100694-8 MS		**WG3100694-7**						
Mercury (Hg)-Total			91.7		%		70-130	10-JUL-19
MET-T-CCMS-WT	**Water**							
Batch R4702680								
WG3099326-4 DUP		**WG3099326-3**						
Arsenic (As)-Total		0.0118	0.0119		mg/L	1.5	20	10-JUL-19
Cadmium (Cd)-Total		0.0000260	0.0000261		mg/L	0.4	20	10-JUL-19
Calcium (Ca)-Total		58.3	57.3		mg/L	1.6	20	10-JUL-19
Chromium (Cr)-Total		0.00232	0.00237		mg/L	2.5	20	10-JUL-19
Copper (Cu)-Total		0.0136	0.0137		mg/L	0.2	20	10-JUL-19
Iron (Fe)-Total		2.47	2.47		mg/L	0.1	20	10-JUL-19
Lead (Pb)-Total		0.00398	0.00397		mg/L	0.1	20	10-JUL-19
Magnesium (Mg)-Total		31.8	30.6		mg/L	3.8	20	10-JUL-19
Nickel (Ni)-Total		0.00243	0.00246		mg/L	1.3	20	10-JUL-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4702680								
WG3099326-4 DUP		**WG3099326-3**						
Potassium (K)-Total		1.53	1.54		mg/L	0.1	20	10-JUL-19
Sodium (Na)-Total		54.9	54.1		mg/L	1.6	20	10-JUL-19
WG3099326-2 LCS								
Arsenic (As)-Total			101.7		%		80-120	10-JUL-19
Cadmium (Cd)-Total			102.6		%		80-120	10-JUL-19
Calcium (Ca)-Total			95.7		%		80-120	10-JUL-19
Chromium (Cr)-Total			106.5		%		80-120	10-JUL-19
Copper (Cu)-Total			102.9		%		80-120	10-JUL-19
Iron (Fe)-Total			105.1		%		80-120	10-JUL-19
Lead (Pb)-Total			98.3		%		80-120	10-JUL-19
Magnesium (Mg)-Total			109.4		%		80-120	10-JUL-19
Nickel (Ni)-Total			104.3		%		80-120	10-JUL-19
Potassium (K)-Total			104.9		%		80-120	10-JUL-19
Sodium (Na)-Total			109.8		%		80-120	10-JUL-19
WG3099326-1 MB								
Arsenic (As)-Total			<0.00010		mg/L		0.0001	10-JUL-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	10-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	10-JUL-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	10-JUL-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	10-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	10-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	10-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	10-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	10-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	10-JUL-19
Sodium (Na)-Total			<0.050		mg/L		0.05	10-JUL-19
WG3099326-5 MS		**WG3099326-3**						
Arsenic (As)-Total			99.3		%		70-130	10-JUL-19
Cadmium (Cd)-Total			101.3		%		70-130	10-JUL-19
Calcium (Ca)-Total			N/A	MS-B	%		-	10-JUL-19
Chromium (Cr)-Total			99.96		%		70-130	10-JUL-19
Copper (Cu)-Total			N/A	MS-B	%		-	10-JUL-19
Iron (Fe)-Total			N/A	MS-B	%		-	10-JUL-19
Lead (Pb)-Total			89.1		%		70-130	10-JUL-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4702680								
WG3099326-5 MS		**WG3099326-3**						
Magnesium (Mg)-Total			N/A	MS-B	%		-	10-JUL-19
Nickel (Ni)-Total			95.7		%		70-130	10-JUL-19
Potassium (K)-Total			103.3		%		70-130	10-JUL-19
Sodium (Na)-Total			N/A	MS-B	%		-	10-JUL-19
NH3-F-WT	**Water**							
Batch R4709000								
WG3103451-27 DUP		**L2305709-2**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	12-JUL-19
WG3103451-26 LCS								
Ammonia, Total (as N)			96.6		%		85-115	12-JUL-19
WG3103451-25 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	12-JUL-19
WG3103451-28 MS		**L2305709-2**						
Ammonia, Total (as N)			93.2		%		75-125	12-JUL-19
NO2-IC-WT	**Water**							
Batch R4702730								
WG3099831-4 DUP		**WG3099831-3**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	09-JUL-19
WG3099831-2 LCS								
Nitrite (as N)			103.3		%		90-110	09-JUL-19
WG3099831-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	09-JUL-19
WG3099831-5 MS		**WG3099831-3**						
Nitrite (as N)			102.1		%		75-125	09-JUL-19
NO3-IC-WT	**Water**							
Batch R4702730								
WG3099831-4 DUP		**WG3099831-3**						
Nitrate (as N)		0.250	0.252		mg/L	0.6	20	09-JUL-19
WG3099831-2 LCS								
Nitrate (as N)			102.0		%		90-110	09-JUL-19
WG3099831-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	09-JUL-19
WG3099831-5 MS		**WG3099831-3**						
Nitrate (as N)			98.2		%		75-125	09-JUL-19
OGG-TOT-WT	**Water**							

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OGG-TOT-WT	**Water**							
Batch R4706217								
WG3101129-2 LCS								
Oil and Grease, Total			98.3		%		70-130	10-JUL-19
WG3101129-1 MB								
Oil and Grease, Total			<5.0		mg/L		5	10-JUL-19
PAH-CCME-WT	**Water**							
Batch R4708037								
WG3099274-2 LCS								
1-Methylnaphthalene			105.9		%		50-140	11-JUL-19
2-Methylnaphthalene			102.9		%		50-140	11-JUL-19
Acenaphthene			116.3		%		50-140	11-JUL-19
Acenaphthylene			111.0		%		50-140	11-JUL-19
Acridine			111.6		%		60-130	11-JUL-19
Anthracene			116.9		%		50-140	11-JUL-19
Benzo(a)anthracene			124.2		%		50-140	11-JUL-19
Benzo(a)pyrene			115.2		%		60-130	11-JUL-19
Benzo(b)fluoranthene			110.8		%		50-140	11-JUL-19
Benzo(g,h,i)perylene			117.1		%		50-140	11-JUL-19
Benzo(k)fluoranthene			113.8		%		50-140	11-JUL-19
Chrysene			117.0		%		50-140	11-JUL-19
Dibenzo(ah)anthracene			112.9		%		50-140	11-JUL-19
Fluoranthene			118.3		%		50-140	11-JUL-19
Fluorene			115.5		%		50-140	11-JUL-19
Indeno(1,2,3-cd)pyrene			116.5		%		50-140	11-JUL-19
Naphthalene			118.5		%		50-130	11-JUL-19
Phenanthrene			120.6		%		50-140	11-JUL-19
Pyrene			121.3		%		50-140	11-JUL-19
Quinoline			113.6		%		50-150	11-JUL-19
WG3099274-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	12-JUL-19
2-Methylnaphthalene			<0.020		ug/L		0.02	12-JUL-19
Acenaphthene			<0.020		ug/L		0.02	12-JUL-19
Acenaphthylene			<0.020		ug/L		0.02	12-JUL-19
Acridine			<4.0		ug/L		4	12-JUL-19
Anthracene			<0.020		ug/L		0.02	12-JUL-19
Benzo(a)anthracene			<0.020		ug/L		0.02	12-JUL-19

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PAH-CCME-WT	**Water**							
Batch R4708037								
WG3099274-1 MB								
Benzo(a)pyrene			<0.0050		ug/L		0.005	12-JUL-19
Benzo(b)fluoranthene			<0.020		ug/L		0.02	12-JUL-19
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	12-JUL-19
Benzo(k)fluoranthene			<0.020		ug/L		0.02	12-JUL-19
Chrysene			<0.020		ug/L		0.02	12-JUL-19
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	12-JUL-19
Fluoranthene			<0.020		ug/L		0.02	12-JUL-19
Fluorene			<0.020		ug/L		0.02	12-JUL-19
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	12-JUL-19
Naphthalene			<0.050		ug/L		0.05	12-JUL-19
Phenanthrene			<0.020		ug/L		0.02	12-JUL-19
Pyrene			<0.020		ug/L		0.02	12-JUL-19
Quinoline			<0.040		ug/L		0.04	12-JUL-19
Surrogate: d8-Naphthalene			120.1		%		60-140	12-JUL-19
Surrogate: d10-Phenanthrene			111.1		%		60-140	12-JUL-19
Surrogate: d12-Chrysene			89.6		%		60-140	12-JUL-19
Surrogate: d10-Acenaphthene			115.5		%		60-140	12-JUL-19
Surrogate: d9-Acridine (SS)			88.3		%		40-130	12-JUL-19
PH-WT	**Water**							
Batch R4709471								
WG3101986-4 DUP		**WG3101986-3**						
pH		8.07	8.06	J	pH units	0.01	0.2	11-JUL-19
WG3101986-2 LCS								
pH			7.02		pH units		6.9-7.1	11-JUL-19
Batch R4709476								
WG3101993-4 DUP		**WG3101993-3**						
pH		8.26	8.27	J	pH units	0.01	0.2	11-JUL-19
WG3101993-2 LCS								
pH			7.01		pH units		6.9-7.1	11-JUL-19
PHENOLS-4AAP-WT	**Water**							
Batch R4698590								
WG3099616-11 DUP		**L2304115-1**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
WG3099616-7 DUP		**L2305058-1**						
Phenols (4AAP)		0.0011	0.0011					

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PHENOLS-4AAP-WT	**Water**							
Batch R4698590								
WG3099616-7 DUP		**L2305058-1**						
Phenols (4AAP)		0.0011	0.0011		mg/L	0.0	20	09-JUL-19
WG3099616-10 LCS								
Phenols (4AAP)			103.2		%		85-115	09-JUL-19
WG3099616-6 LCS								
Phenols (4AAP)			106.8		%		85-115	09-JUL-19
WG3099616-5 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	09-JUL-19
WG3099616-9 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	09-JUL-19
WG3099616-12 MS		**L2304115-1**						
Phenols (4AAP)			107.7		%		75-125	09-JUL-19
WG3099616-8 MS		**L2305058-1**						
Phenols (4AAP)			102.7		%		75-125	09-JUL-19
SO4-IC-N-WT	**Water**							
Batch R4702730								
WG3099831-4 DUP		**WG3099831-3**						
Sulfate (SO4)		8.37	8.42		mg/L	0.5	20	09-JUL-19
WG3099831-2 LCS								
Sulfate (SO4)			102.4		%		90-110	09-JUL-19
WG3099831-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	09-JUL-19
WG3099831-5 MS		**WG3099831-3**						
Sulfate (SO4)			102.6		%		75-125	09-JUL-19
SOLIDS-TSS-WT	**Water**							
Batch R4707880								
WG3101825-3 DUP		**L2306338-6**						
Total Suspended Solids		6670	6530		mg/L	2.1	20	11-JUL-19
WG3101825-2 LCS								
Total Suspended Solids			100.4		%		85-115	11-JUL-19
WG3101825-1 MB								
Total Suspended Solids			<2.0		mg/L		2	11-JUL-19

Quality Control Report

Workorder: L2305709 Report Date: 18-JUL-19

Client: Defence Construction Canada
780 Midpark Drive Suit 205
Kingston On K7M7P6
Contact: Kelsey Davidson

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2305709 Report Date: 18-JUL-19

Client: Defence Construction Canada
780 Midpark Drive Suit 205
Kingston On K7M7P6
Contact: Kelsey Davidson

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Suspended solids							
	1	29-JUN-19	11-JUL-19 00:00	7	12	days	EHTR
	2	29-JUN-19	11-JUL-19 00:00	7	12	days	EHTR
	3	29-JUN-19	11-JUL-19 00:00	7	12	days	EHTR
	4	01-JUL-19	11-JUL-19 00:00	7	10	days	EHTR
	5	01-JUL-19	11-JUL-19 00:00	7	10	days	EHTR
	6	01-JUL-19	11-JUL-19 00:00	7	10	days	EHTR
pH							
	1	29-JUN-19	11-JUL-19 16:00	4	12	days	EHTR
	2	29-JUN-19	11-JUL-19 13:00	4	12	days	EHTR
	3	29-JUN-19	11-JUL-19 13:00	4	12	days	EHTR
	4	01-JUL-19	11-JUL-19 16:00	4	10	days	EHTR
	5	01-JUL-19	11-JUL-19 16:00	4	10	days	EHTR
	6	01-JUL-19	11-JUL-19 16:00	4	10	days	EHTR
Leachable Anions & Nutrients							
Nitrate in Water by IC							
	2	29-JUN-19	09-JUL-19 00:00	7	10	days	EHTR
	3	29-JUN-19	09-JUL-19 00:00	7	10	days	EHTR
	5	01-JUL-19	09-JUL-19 00:00	7	8	days	EHTR
	6	01-JUL-19	09-JUL-19 00:00	7	8	days	EHTR
Nitrite in Water by IC							
	2	29-JUN-19	09-JUL-19 00:00	7	10	days	EHTR
	3	29-JUN-19	09-JUL-19 00:00	7	10	days	EHTR
	5	01-JUL-19	09-JUL-19 00:00	7	8	days	EHTR
	6	01-JUL-19	09-JUL-19 00:00	7	8	days	EHTR
Bacteriological Tests							
Fecal Coliforms							
	1	29-JUN-19	09-JUL-19 12:10	48	240	hours	EHTR
	2	29-JUN-19	09-JUL-19 12:10	48	240	hours	EHTR
	3	29-JUN-19	09-JUL-19 12:10	48	240	hours	EHTR
	4	01-JUL-19	09-JUL-19 12:10	48	192	hours	EHTR
	5	01-JUL-19	09-JUL-19 12:10	48	192	hours	EHTR
	6	01-JUL-19	09-JUL-19 12:10	48	192	hours	EHTR
Aggregate Organics							
BOD							
	1	29-JUN-19	14-JUL-19 12:00	4	15	days	EHTR
	2	29-JUN-19	14-JUL-19 12:00	4	15	days	EHTR
	3	29-JUN-19	14-JUL-19 12:00	4	15	days	EHTR
	4	01-JUL-19	14-JUL-19 12:00	4	13	days	EHTR
	5	01-JUL-19	14-JUL-19 12:00	4	13	days	EHTR
	6	01-JUL-19	14-JUL-19 12:00	4	13	days	EHTR
BOD Carbonaceous							
	1	29-JUN-19	14-JUL-19 12:00	4	15	days	EHTR
	2	29-JUN-19	14-JUL-19 12:00	4	15	days	EHTR
	3	29-JUN-19	14-JUL-19 12:00	4	15	days	EHTR
	4	01-JUL-19	14-JUL-19 12:00	4	13	days	EHTR
	5	01-JUL-19	14-JUL-19 12:00	4	13	days	EHTR
	6	01-JUL-19	14-JUL-19 12:00	4	13	days	EHTR

Legend & Qualifier Definitions:

Quality Control Report

Workorder: L2305709 Report Date: 18-JUL-19

Client: Defence Construction Canada
780 Midpark Drive Suit 205
Kingston On K7M7P6
Contact: Kelsey Davidson

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2305709 were received on 08-JUL-19 14:40.

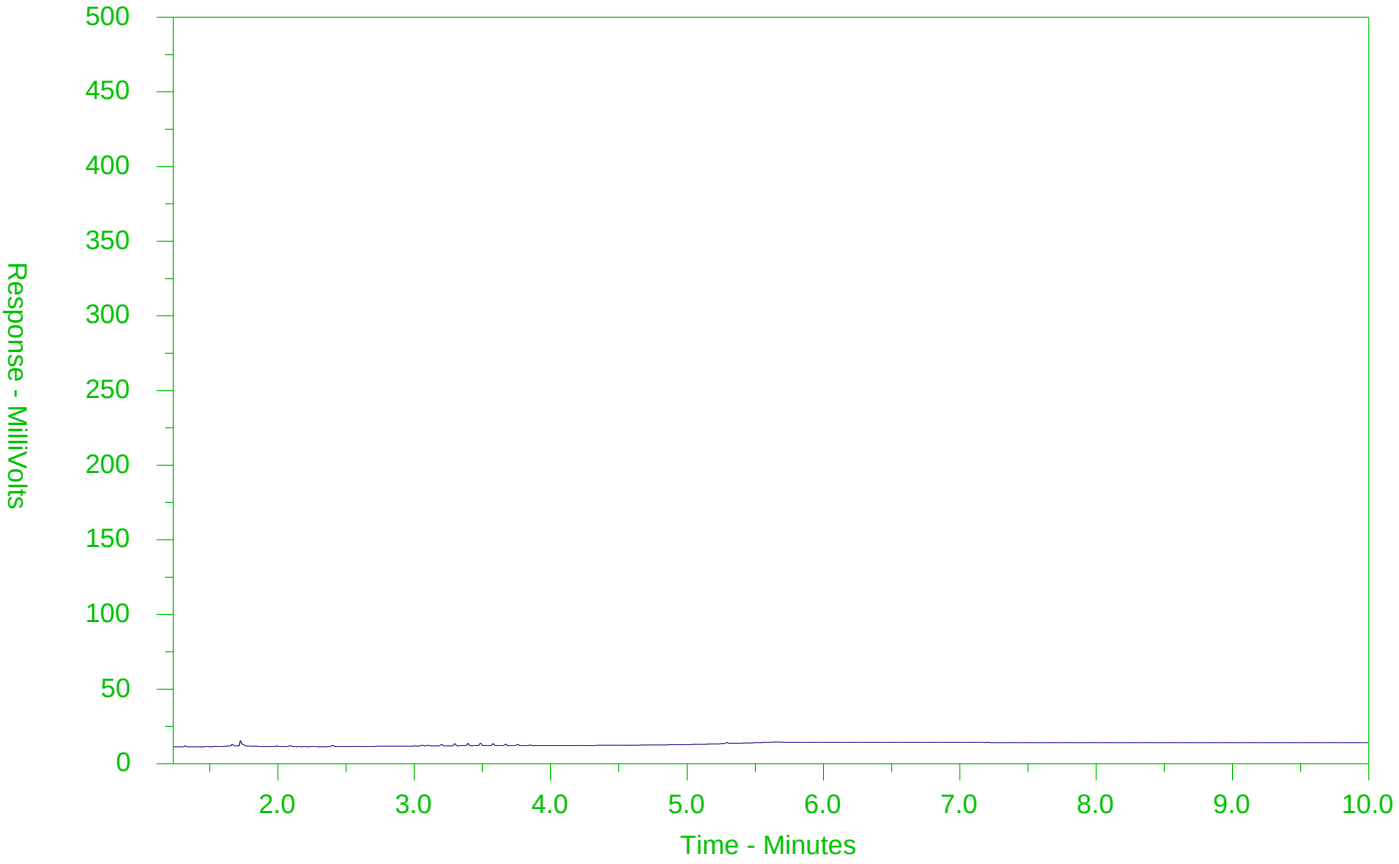
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2305709-2
Client Sample ID: ERK4-BATTERY DUMP



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

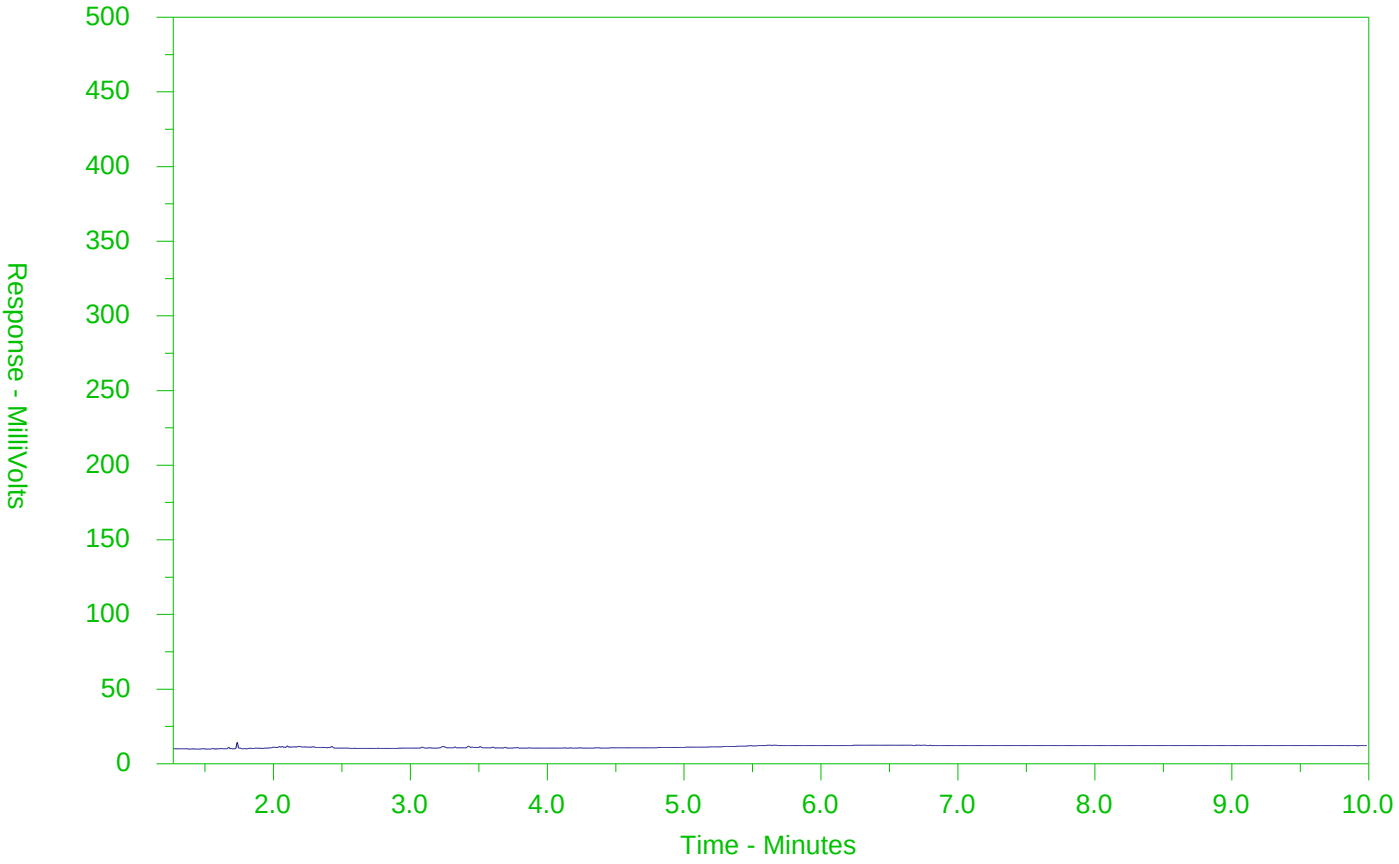
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2305709-3
Client Sample ID: ERK5-BARREL DUMP



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

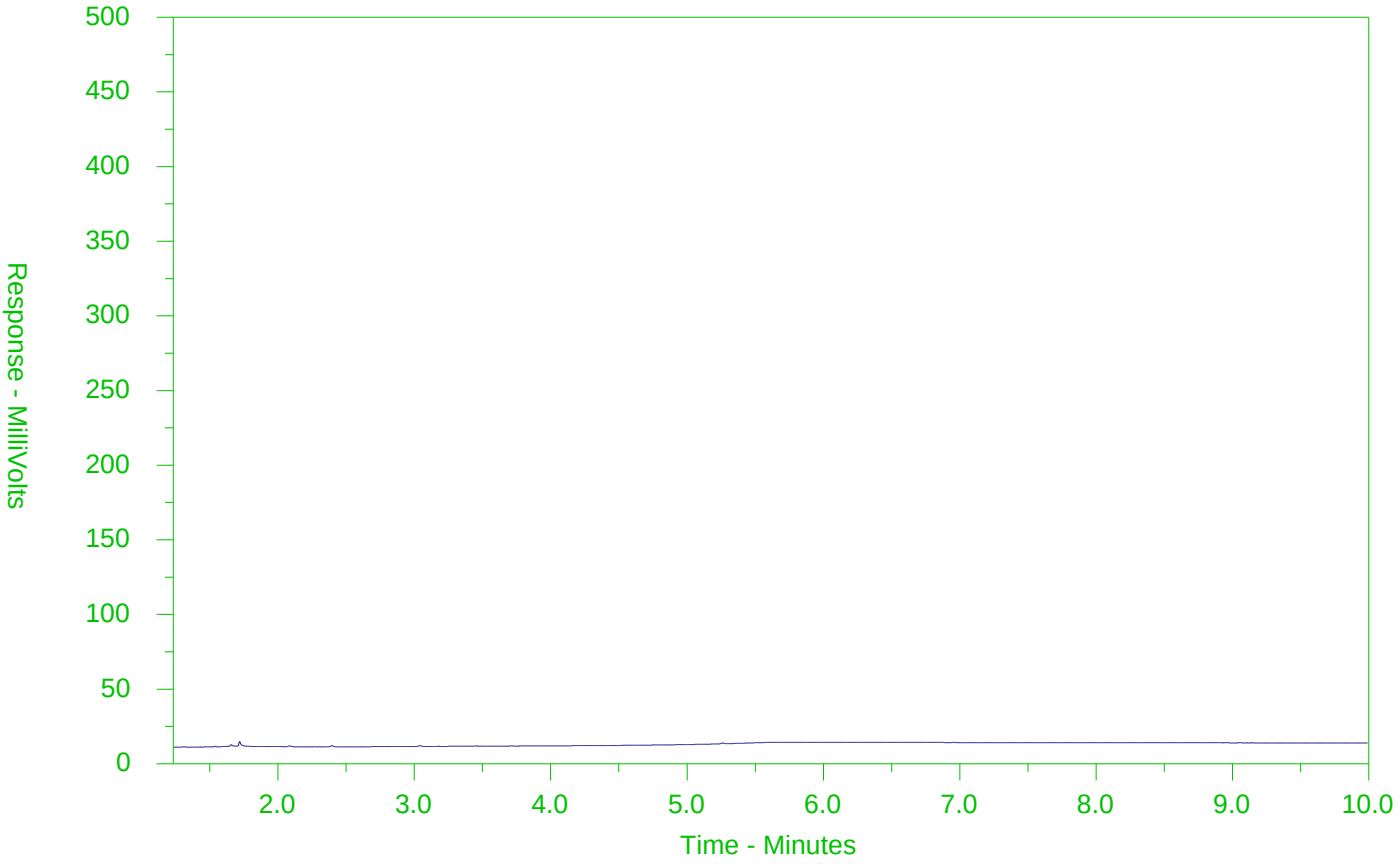
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2305709-5
Client Sample ID: ERK4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

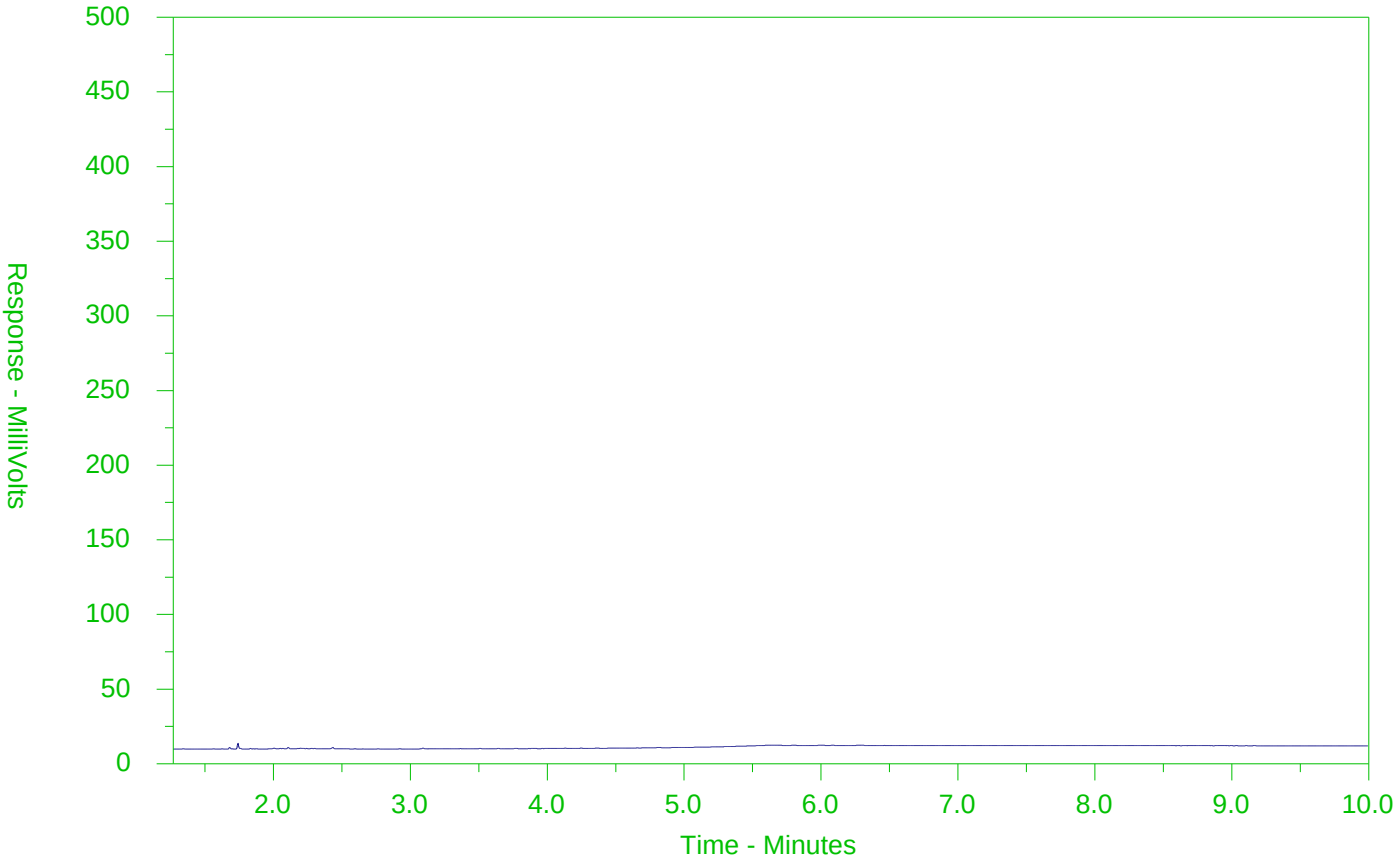
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2305709-6
Client Sample ID: ERK5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2305709-COFC

COC Number: 17 - 822023

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Defence Construction Canada
Contact:	Kelsey Davidson
Phone:	613 392 2811 x 5249
	Company address below will appear on the final report
Street:	14 ALERT BLVD
City/Province:	TRENTON, ONTARIO
Postal Code:	K0K 3W0
Invoice To	Same as Report To [X] YES [ ] NO
	Copy of Invoice with Report [ ] YES [X] NO
Company:	
Contact:	

Project Information

ALS Account # / Quote #: SC40925 (DCC)

Job #:

PO / AFE:

LSD:

ALS Lab Work Order # (lab use only): L2305709 SM

Report Format / Distribution

Select Report Format: [X] PDF [X] EXCEL [ ] EDD (DIGITAL)

Quality Control (QC) Report with Report [X] YES [ ] NO

[ ] Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: [X] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax: kelsey.davidson@dcc-cdc.gc.ca

Email 2: nathan.koutroulides@forces.gc.ca

Email 3: clive.woodfield@dcc-cdc.gc.ca

Invoice Distribution

Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax: nathan.koutroulides@forces.gc.ca

Email 2: kelsey.davidson@dcc-cdc.gc.ca

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#

Major/Minor Code: | Routing Code:

Requisitioner:

Location:

ALS Contact: | Sampler: NATHAN KOUTROULIDES

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] [X] Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] [ ] / 3 day [P3-25%] [ ] / 2 day [P2-50%] [ ]

EMERGENCY: 1 Business day [E - 100%] [ ] / Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	BTEX / F1	F2-F4 / PAH (CCME)	NH_3 / PHENOLS / COD	CBOD / BOD	ALK/EC/PH/TSS/ANIONS/NO₃/SO₄	O&G	Fecal COLIFORMS	PH/TSS	Oil + GREASE	COD	BTEX	LEAD	PHENOLS	Metal-Hardness (As, Cd, Cr, Cu, Fe, Pb, Ni, Ca, Mg, K, Na)	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	ERK1 - DND Sewage Lagoon	light blue cooler	July 29		SW	6				X			X	X	X	X						
	~~ERK2 [illegible]~~				~~SW~~	~~6~~						~~X~~					~~X~~	~~X~~	~~X~~			
	~~ERK3 LANDFILL~~				~~SW~~	~~12~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~							~~X~~		
	ERK 4 - BATTERY DUMP		↓		SW	12	X	X	X	X	X	X	X							X		
	ERK 5 - BARREL DUMP				SW	12	X	X	X	X	X	X	X							X		
	ERK 1	dark blue cooler	July 1		SW	6				X			X	X	X	X						
	ERK 4		July 1		SW	12	X	X	X	X	X	X	X							X		
	ERK 5		July 1	—	SW	12	X	X	X	X	X	X	X							X		

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] YES [ ] NO

Are samples for human consumption/ use? [ ] YES [ ] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

HOLDTIMES HAVE EXPIRED PLEASE PROCEED ANYWAYS

please report units as per CCME

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations Yes [ ] No [ ]

Ice Packs [X] Ice Cubes [ ] Custody seal intact Yes [ ] No [ ]

Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C: 8.4°c

FINAL COOLER TEMPERATURES °C: 7.8

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Clive Woodfield	Date: July 5/2019	Time: 2:40	Received by: Breanne Doucet	Date: 5-JULY-19	Time: 14:40	Received by: SM	Date: 08-JUL-19	Time: 1636

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Appendix G

Compliance Plan & Additional Documents.
Year: 2019
Reference: 8BC-ERK1621.

DND Response Letter to CIRNAC Inspection dated 17 Dec 2019
Year: 2019
Reference: CIRNAC 2019 Inspection Report for **8BC-ERK1621.**

Please see the attached detailed responses to the CIRNAC Inspection Report 2019; DND treats the commitments as the Compliance Plan for 8BC-ERK1621.

Please see attached Detailed Spill Reports (dated 24 Jul 2019) for the two reported spill incidents on 08 Jun 2019 and 01 Jul 2019.

National Défense
Defence nationale

8 Wing Environmental Management
Canadian Forces Base Trenton
74 Polaris Avenue, Room 305
PO Box 1000 Stn Main
Astra ON K0K 3W0

24 July 2019

Water Resources Officer, CIRNAC
Field Operations Unit
Nunavut Regional Office
P.O. Box 100
Iqaluit, NU X0A 0H0

DETAILED REPORT: JP8 FUEL SPILL FUEL DISPENSING PUMP AT CFS EUREKA, 08 JUNE 2019

INTRODUCTION

1. This report is intended to detail the discovery and follow-up actions taken in response to the 08 June 2019 spill of Jet-Propulsion 8 (JP8) fuel. The site is located at the North Apron Airstrip Fuel Tank Farm of the Canadian Forces Station (CFS) Eureka, Nunavut. This spill was a result of drips from a damaged gasket in the pump assembly of the fuel dispensing system connected to the fuel storage tank system EC Identification #: EC00002418. The damaged gasket in the pump was immediately replaced after discovery by the Canadian Armed Forces (CAF) on site for Operation NEVUS 2019.

2. This original spill report was submitted on 09 Jun 2019, as required under the conditions in Part G, Section 5 of CFS Eureka's Nunavut Water Board (NWB) Licence, 8BC-ERK1621 pursuant to the Nunavut Waters and Nunavut Surface Rights Tribunal Act.

3. This spill was reported as required under the Arctic Waters Pollution Prevention Act, Subsection 5(1).

4. This spill was reported as required under the Canadian Environmental Protection Act, Part 9 section 212(1). As this spill is less than 100L, a written report under Part 9 section 212(1)(a) is not required, this detailed spill report is produced as required under Part G, Section 5(c) of the CFS Eureka's Nunavut Water Board (NWB) Licence, 8BC-ERK1621.

5. This spill was reported as required by the Government of Nunavut's Environmental Protection Act paragraph 5.1(a).

DETAILS

6. Time, date, and location of the spill occurrence.

    a. The spill was discovered at 1415 CST on 08 Jun 2019. The spill location is located at 79°N 99’ 66” and 85°W 84’ 04”.

7. Amount and type of spilled product.

    b. 20 Litres of JP8 aviation fuel was spilled.

8. Root cause(s) of the spill.

    c. A leaking gasket in the pump of the fuel dispensing unit was the root cause of the spill.

9. Measures taken to contain and clean up the spill site.

    a. Upon discovery, DND deployed spill kits and absorbent material, and repaired the gasket by replacement. The immediate spill response team excavated by hand more than the spill due to the unknown fact at the time that the spill was in a registered Federal Contaminated Site for historical hydrocarbon contamination. The immediate spill response team had completely recovered the 20L spilled fuel but had dug into the contaminated site. On 29 Jun 2019, DND 8 Wing Environment Stall visited the spill site and transferred their excavated contaminated soil (0.2 cu.m / 200 L) that was contained in a 205L drum into the DND Eureka Biopile Landfarm (Location ERK-2 of the Nunavut Water Licence 8BC-ERK1621) for containment and hydrocarbon bioremediation. The original team placed clean gravel over the excavated location.

    b. DND also collected soil samples of the contaminated soils for PHC concentrations entering the ERK-2 Landfarm, as per DND's Water Licence condition, and will include the results in the 2019 Annual Report.

    c. The leak was repaired immediate after discover by replacing the gasket seal in the pump unit.

    d. As requested by the visiting CIRNAC Inspected, DND provided an updated spill report to the NT-NU Spill Report Number 2019-238 to include additional information.

10. Recurrence prevention.

    a. This spill occurrence was due to a physical breakdown of the gasket within a pump system, likely due to weather and wear and tear from usage.

b. As the fuel pump system is part of the Storage Tank EC Identification #: EC00002418; monthly visual checks were performed by contractors (as DND is only at CFS Eureka for 4 weeks of the year in June and July) on the system and fuel dispenser system before and during the spill month. However, as the required inspection is visual, the gasket would not have been observed to be damaged until the pump is turned on and pressurized.

c. A drip tray was placed beneath the pump system assembly in the event of future potential spills and new spill kits will be ordered to resupply CFS Alert for 2020 Operation NEVUS.

11. Summary.

a. A spill of 20 Litres of JP8 fuel was discovered on 08 Jun 2019 at the North Apron Airstrip Fuel Tank Farm Dispensing Pump at CFS Eureka.

b. The spill was originally reported to the NT-NU 24-Hour Spill Report Line on 09 June 2019 by the Canadian Armed Forces Operation NEVUS 2019. An updated spill report was submitted to the NT-NU 24-Hour Spill Report Line on 24 July 2019 by 8 Wing Environmental Management.

c. This spill was recovered and the contaminated soil from the site was transferred into DND's Landfarm Facility for treatment. The leaking gasket was replaced to repair the system.

Report compiled by:

//Andrew Tam//

Andrew Tam, Ph.D.
8 Wing Trenton
8 Wing Environment Officer

Figure 1- DND North Apron Fuel Dispensing Pump Container.

Figure 2 Clean up material and contained contaminated soil from the spill area in front of the Fuel Pump Container (right) within the light yellow hazmat overpack; dark yellow overpack is a spill kit.

Figure 3 After placement of the contaminated soils into the ERK-2 DND Landfarm, DND collected soil samples for petroleum hydrocarbon concentration analysis – results pending at this time.

National Défense
Defence nationale

8 Wing Environmental Management
Canadian Forces Base Trenton
74 Polaris Avenue, Room 305
PO Box 1000 Stn Main
Astra ON K0K 3W0

24 July 2019

Water Resources Officer, INAC
Field Operations Unit
Nunavut Regional Office
P.O. Box 100
Iqaluit, NU X0A 0H0

DETAILED REPORT: WASTE DIESEL SPILL-CFS EUREKA 2019-164, 01 JULY 2019

INTRODUCTION

1. This report is intended to detail the discovery and follow-up actions taken in response to the 01 July 2019 spill of diesel fuel on the ground located east of Canadian Forces Station (CFS) Eureka at the Drum Washer & Crusher Facility. This spill was a result of a faulty/damaged ball-valve on ECCC's Drum Washer & Crusher's waste fuel containment area; the valve has since been removed and replaced with an endcap.

2. This spill was reported under the conditions in Part G, Section 5 of CFS Eureka's Nunavut Water Board (NWB) Licence, 8BC-ERK1621 pursuant to the Nunavut Waters and Nunavut Surface Rights Tribunal Act.

3. This spill was being reported as required under the Arctic Waters Pollution Prevention Act, section 5(1).

4. This spill was being reported as required under the Canadian Environmental Protection Act, Part 9 section 212(1).

5. This spill is being reported as required by the Government of Nunavut's, Environmental Protection Act paragraph 5.1(a). The spill was reported to the Northwest Territories/Nunavut (NT/NU) 24-Hour Spill Report Line on 2 July 2019. The spill report reference number is 2019-164.

DETAILS

1. Time, date, and location of the spill occurrence.

   a. The spill was discovered at 1800 EST on 1 July 2019. The spill location is located at 85°N 49’ 28” and 79°W 59’ 39”.

2. Amount and type of spilled product.

   a. 300 Litres of waste diesel fuel was spilled on to the ground.

3. Root cause(s) of the spill.

   a. A secondary containment faulty ball valve was the root cause of the spill.

4. Measures taken to contain and clean up the spill site.

   a. Upon discovery of the spill, two spill pad packs were deployed to absorb fuels; a portable electric pump recovered 180L of fuel into a waste drum. Further drained 360L from the containment into 2 drums. The Water Fuel Environment (WFE) Technician to replace the compromised ball-valve with an end cap. (figure 1)

   b. The spill area was 30 square metres.

   c. ECCC to assist with backhaul disposal of contaminated soil via retrograde sea-lift. Contaminated Soils to be placed in DND Biopile Landfarm (ERK-2). On known FCSAP site

   d. Further preventive actions were taken to completely drain remaining waste fuel/water from containment area and is slated to be removed as hazardous waste.

5. Recurrence prevention.

   a. This spill occurrence was due to a physical malfunction that could not have been foreseen.

   b. For prevention, DND replaced the ball valve with and endcap. Secondary containment will now be pumped from containment. Previously this valve was used to drain secondary from ball valve.

6. Summary.

a. A spill of 300 Litres of diesel fuel was discovered on 1 July 2019 on the ground adjacent to the drum washer crusher east of CFS Eureka. Actions were taken clean up the spill site and repair the faulty/broken valve. Contaminated soil recovered for hazardous waste disposal.

b. The spill was reported to the NT-NU 24-Hour Spill Report Line on 2 July 2019 by 8 Wing Environmental Management.

c. This spill occurrence was a result of faulty/broken ball valve that has since been replaced with an end cap as a preventative action. Preventative action was taken completely drain/pump off remaining waste fuel/water from the containment area.

Report compiled by:

//Nathan Koutroulides//

Nathan Koutroulides
8 Wing Trenton
Deputy Environment Officer

Figure 1 – Photo of the spill at site CFS Eureka (1 July 2019).

8 Wing Environmental Management
74 Polaris Avenue, Room 305
PO Box 1000 Stn Forces
Astra, ON K0K 3W0

20 December 2019

Licensing Department,
Nunavut Water Board
P.O. Box 119
Gjoa Haven, Nunavut X0B 1J0

Re: DND RESPONSE TO THE CIRNAC WATER LICENCE INSPECTION FORM: CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA (CIRNAC), 8BC-ERK1621 - CANADIAN FORCES STATION EUREKA; DEPARTMENT OF NATIONAL DEFENCE-8 WING TRENTON ENVIRONMENTAL MANAGEMENT OFFICE

Dear Director of Licensing,

The Department of National Defence (DND) - 8 Wing Trenton Environmental Management Office is providing this response letter to the CIRNAC Water Licence Inspection Form, Canadian Forces Station (CFS) Eureka electronic mail attachment dated December 2, 2019.

DND - 8 Wing Trenton Environmental Management Office appreciates the dedicated efforts of the NWB and the constructive action items by CIRNAC to address action items as identified during their water licence inspection for CFS Eureka.

Please see DND - 8 Wing Trenton Environmental Management Office's responses to the CIRNAC Inspection Form. For the purposes of this letter, only action items as indicated in the inspection form will be addressed as specified in their above noted water licence inspection form:

1) **Landfill:** "DND eureka station is authorized by the water licence to operate a landfill including a burn pan authorizing open burning of food waste, non-treated wood, and cardboard. The landfill appears to be operating as intended, however it was noted that plastics and metals were in the burn pan mixed with ash and food waste (see photo 3). This is a violation of the Water Licence Part D Item 4."

   DND Response: Environment and Climate Change Canada (ECCC) and DND will work together to ensure the only approved items, as specified in the Eureka Water Licence, are burned in the burn pan. DND will issue administrative directions and continue to provide internal regulatory

oversight to all military operations using CFS Eureka for compliance to the established water licence conditions. DND will continue to collaborate with ECCC on the mutual usage and management of this landfill facility.

DND - 8 Wing Trenton Environmental Management Office is committed to work with the NWB and CIRNAC; we are supportive of all inter-departmental communications to collaboratively help support continued environmental stewardship in CFS Eureka.

Should you have any further questions or comments, please do not hesitate to contact me.

Yours truly,

//Nathan Koutroulides//

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