

June 26, 2019  
PGL File: 5588-01.01

**Via E-mail:** [jbower@lowrysales.com](mailto:jbower@lowrysales.com)

Ship-2-Shore  
109 - 7337 North Fraser Way  
Burnaby, BC  
V5J 0G7

**Attention:** **John Bower**

**RE: SHIP-2-SHORE ANTI-CORROSION PRODUCT TESTING**

PGL Environmental Consultants (PGL) has prepared this letter for Ship-2-Shore (S2S) for recent testing of their anti-corrosion products: Float-Coat and Chain-Coat/PLID Industrial Thick.

Based on the results of field scale testing and chemical analysis, the discharge water in contact with these products meets Canadian Federal and British Columbia Provincial Marine Water Quality Guidelines for petroleum hydrocarbons and metals. The discharge water quality also meets the California Environmental Protection Agency Ocean Marine Water Quality Objectives. Freshwater environments have lower guidelines than marine environments for some constituents of the discharge water. Discharge to a freshwater environment is not recommended without further review.

## **CONTEXT**

S2S has two products used to prevent corrosion and fouling in marine vessel applications. Float-Coat is applied as a lining to void spaces, and Chain-Coat or PLID Industrial Thick (same product, different trade names) is applied to anchor chains. The products are applied using a flotation method where the product “floats” on a water surface as it drains a space or chamber and “coats” the surface. The water that drains out of the space is discharged to the ambient water where the process takes place.

## **ASSIGNMENT**

A test procedure was set-up by S2S at their Burnaby location where a shipping container was filled with municipally supplied tap water. In separate tests, each product was added to the shipping container water in the specified application amount for each product. The water was allowed to drain from the container, simulating the coating process. A sample of the drainage water for each product was collected by PGL for analysis. Prior to the product tests, PGL collected a control sample of tap water drained from the container.

The tap water control, Float-Coat and Chain-Coat/PLID Industrial Thick discharge samples were collected and submitted to Caro Analytical Laboratory for analysis of:

- Light and heavy extractable petroleum hydrocarbons (LEPH/HEPH);
- Petroleum hydrocarbon fractions F1 to F4 (F1 – F4);
- Volatile hydrocarbons and volatile petroleum hydrocarbons (VH/VPH);
- Benzene, ethylbenzene, toluene, styrene, and xylenes (BTEX); and
- Total metals.

We compared the chemical analysis results to Canadian Federal and Provincial Surface Water Quality Guidelines for protection of marine aquatic life. Summary Tables 1 and 2 are attached to this letter.

All chemical analysis results meet the Canadian Federal and Provincial Surface Water Quality Guidelines for protection of marine aquatic life except for cadmium and copper in the tap water control sample and copper in the product discharge samples. We attribute the copper in the discharge samples to the tap water.

We also compared the analytical results to the California Environmental Protection Agency, State Water Control Board, 2012 California Ocean Plan, Table 1 Objectives for protection of marine aquatic life. The results also meet these standards. California State water regulations may vary depending on regional water control board authority. We recommend contacting a regulator in the region where the product is used for further clarification of applicable regulations.

### LIMITATIONS

This report is accurate at a high level for reasonably foreseeable conditions. The limitations of the work are not always obvious, and the best way to understand them is discussion with the authors in the context of your intended use. This work is a snapshot in time, so any use must consider that conclusions may change materially because of changes in site condition or regulatory context.

Only the addressee, our client, and their agents may rely on this report for the stated purpose. We warrant only that the work was done as described and is similar to the work that would be done by other qualified consultants in this area. Our contract includes limitations on liability related to professional errors and omissions.

### CLOSING

We trust that this meets your needs. If you have any questions or require clarification, please contact Dave Bell or Tom Berger at 604-895-7635 and 604-895-7605, respectively.

### PGL ENVIRONMENTAL CONSULTANTS

Per:



Dave Bell, P.Ag., LEED AP®  
Environmental Consultant



Tom Berger, B.Sc., P.Geo.  
Senior Environmental Consultant

DWB/TEB/slr/mtl

\\ppl-van-file1\Project Files\5500-5599\5588 - Ship 2 Shore Corrosion\01-01\_Client Docs\I-5588-01-01-Product Testing-v2.docx

Attachments: Tables 1 and 2  
Laboratory Certificates



**PGL Environmental Consultants  
Standard Table Notes  
Groundwater Samples**

**Groundwater sample results are presented as µg/l (ppb).**

EPH	Extractable Petroleum Hydrocarbons, not corrected for PAH
MTBE	Methyl tert-butyl ether
VH C6-C10	Volatile hydrocarbons
VPH C6-C10	Volatile petroleum hydrocarbons excluding benzene, ethylbenzene, toluene and xylenes
MAH	Monocyclic aromatic hydrocarbons (benzene, ethylbenzene, toluene and xylenes)
RDL	Reportable detection limit
<	Less than the stated detection limit
-	Not analyzed
CSR	Contaminated Sites Regulation (1997, and amendments)
WQG	Water Quality Guidelines
CWQG	Canadian Water Quality Guidelines
AW	Aquatic Life Use
GVS&DD	Greater Vancouver Sewerage and Drainage District
~	No Standard
1	Result is for total chromium, standard shown is the more stringent of either the chromium VI or chromium III standard
2	The standard is hardness dependant, the sample specific standard has been applied
<b>Bold</b>	Detection limit greater than standard
<b>Shaded &amp; Bold</b>	Greater than the most stringent applicable Standard or Guideline

**Table 1**  
**Water Results - Hydrocarbons**  
**109 - 7337 North Fraser Way**  
**Ship 2 Shore Corrosion Prevention Coatings, PGL File 5588-01**

	EPH		PHC Fractions				MAH							
	EPH C10-C19	EPH C19-C32	F1 (C6-C10)	F2 (C10-C16)	F3 (C16-C34)	F4 (C34-C50)	benzene	ethylbenzene	toluene	styrene	xylenes, total	VH6-10	VPH	methyl tert-butyl ether [MTBE]
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
RDL	250	250	100	400	400	400	0.5	1	1	1	2	100	100	1
BC Approved WQG Marine Aquatic Life	~	~	~	~	~	~	110	250	~	~	~	~	~	440
BC Working WQG Marine Aquatic Life	~	~	~	~	~	~	~	~	~	~	~	~	~	~
CWQG Marine Aquatic Life	~	~	~	~	~	~	110	25	215	~	~	~	~	5000
CSR Sch 3.2 AW (Marine)	5000	~	~	~	~	~	1000	2500	2000	720	300	15000	1500	4400
Fed Intrm GW, Comm/Industrial, Marine Life, Coarse Soil	~	~	~	~	~	~	200	11000	8900	~	~	~	~	5000
Fed Intrm GW, Comm/Industrial, Marine Life, Fine Soil	~	~	~	~	~	~	9800	~	~	~	~	~	~	5000
GVS&DD Sewer Use By-law No. 229, 2007	5000	5000	~	~	~	~	100	~	~	~	~	15000	1500	~
California Objectives for Protection of Human Health - Ocean Water	~	~	~	~	~	~	5.9	4100	85,000	~	~	~	~	~

Location	Date	EPH C10-C19	EPH C19-C32	F1 (C6-C10)	F2 (C10-C16)	F3 (C16-C34)	F4 (C34-C50)	benzene	ethylbenzene	toluene	styrene	xylenes, total	VH6-10	VPH	methyl tert-butyl ether [MTBE]
Tap Water Contol Sample	May 14, 2019	<250	<250	<100	<400	<400	<400	<0.5	<1	<1	<1	<2	<100	<100	<1
Chain Coat/PLID Industrial Thick Discharge	May 14, 2019	<250	<250	<100	<400	<400	<400	<0.5	<1	<1	<1	<2	<100	<100	<1
Float Coat Discharge	May 17, 2019	324	1130	180	<400	1260	<400	<0.5	1.5	1.7	<1	11.5	179	165	<1

**Table 2**  
**Water Results - Total Metals**  
**109 - 7337 North Fraser Way**  
**Ship 2 Shore Corrosion Prevention Coatings, PGL File 5588-01**

	Metals																													
	hardness as CaCO3	aluminium	antimony	arsenic	barium	beryllium	boron	cadmium	chromium <sup>1</sup>	cobalt	copper	iron	lead	lithium	magnesium	manganese	mercury	molybdenum	nickel	selenium	silver	sodium	strontium	thallium	tin	titanium	tungsten	uranium	vanadium	zinc
	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
RDL	0.5	5	0.2	0.5	5	0.1	5	0.01	0.5	0.1	0.4	10	0.2	0.1	10	0.2	0.04	0.1	0.4	0.5	0.05	100	1	0.02	0.2	5	1	0.02	1	4
BC Approved WQG Marine Aquatic Life	~	~	~	12.5	~	~	1200	0.03	~	~	2-3	~	2-140	~	~	~	~	~	~	2	1.5-3	~	~	~	~	~	~	~	~	10
BC Working WQG Marine Aquatic Life	~	~	270	~	~	100	~	0.12	1.5	~	~	~	~	~	~	100	~	~	8.3	~	~	~	~	~	~	~	~	~	50	~
CWQG Marine Aquatic Life	~	~	~	12.5	~	~	~	0.12	~	~	~	~	~	~	~	~	0.016	~	~	~	~	~	~	~	~	~	~	~	~	~
CSR Sch 3.2 AW (Marine)	~	~	2500	125	5000	1000	12000	15	15	40	20	~	20	~	~	~	0.25	10000	83	20	15	~	~	3	~	1000	~	85	~	100
Fed Intrm GW, Comm/Industrial, Marine Life, Coarse Soil	~	~	~	12.5	500	100	5000	0.12	56	~	2	~	2	~	~	~	0.016	~	83	54	1.5	~	~	~	~	~	~	~	~	10
Fed Intrm GW, Comm/Industrial, Marine Life, Fine Soil	~	~	~	12.5	500	100	5000	0.12	56	~	2	~	2	~	~	~	0.016	~	83	54	1.5	~	~	~	~	~	~	~	~	10
GVS&DD Sewer Use By-law No. 229, 2007	~	50000	~	1000	~	~	50000	200	4000	5000	2000	10000	1000	~	~	5000	50	1000	2000	1000	1000	~	~	~	~	~	~	~	~	3000
California Table 1 Ocean Water Quality Objectives - 6-month median	~	~	~	8	~	~	~	1	2	~	3	~	2	~	~	~	0.04	~	5	15	0.7	~	~	~	~	~	~	~	~	20
California Table 1 Ocean Water Quality Objectives - Daily maximum	~	~	~	32	~	~	~	4	8	~	12	~	8	~	~	~	0.16	~	20	60	2.8	~	~	~	~	~	~	~	~	80
California Table 1 Ocean Water Quality Objectives - Instantaneous maximum	~	~	~	80	~	~	~	10	20	~	30	~	20	~	~	~	0.4	~	50	150	7	~	~	~	~	~	~	~	~	200

Location	Date	hardness as CaCO3	aluminium	antimony	arsenic	barium	beryllium	boron	cadmium	chromium <sup>1</sup>	cobalt	copper	iron	lead	lithium	magnesium	manganese	mercury	molybdenum	nickel	selenium	silver	sodium	strontium	thallium	tin	titanium	tungsten	uranium	vanadium	zinc
Tap Water Contol Sample	May 14, 2019	5.68	82.4	<0.2	<0.5	<5	<0.1	12.9	0.04	0.96	<0.1	3.23	157	0.35	0.19	117	6.58	<0.04	0.15	<0.4	<0.5	<0.05	4540	6.7	<0.02	<0.2	<5	<1	0.042	<1	9.8
Chain Coat/PLID Industrial Thick Discharge	May 14, 2019	6.07	70.6	<0.2	<0.5	<5	<0.1	7.5	<0.01	0.79	0.11	3.4	171	0.38	0.19	135	7.07	<0.04	0.14	<0.4	<0.5	<0.05	4690	7.4	<0.02	<0.2	<5	<1	0.045	<1	10
Float Coat Discharge	May 17, 2019	7.4	46.6	<0.2	<0.5	<5	<0.1	10.5	<0.01	1.33	<0.1	7.13	163	0.33	0.12	132	6	<0.04	0.21	<0.4	<0.5	<0.05	3270	8.9	<0.02	<0.2	<5	<1	0.025	<1	9.6

## CERTIFICATE OF ANALYSIS

**REPORTED TO** Pottinger Gaherty Environmental Consultants  
1500 - 1185 West Georgia  
Vancouver, BC V6E 4E6

**ATTENTION** Tom Berger

**PO NUMBER**

**PROJECT** 5588-01.01

**PROJECT INFO**

**WORK ORDER** 9051431

**RECEIVED / TEMP** 2019-05-15 14:14 / 18°C

**REPORTED** 2019-05-22 15:21

**COC NUMBER** B80545

### Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

#### *Big Picture Sidekicks*



You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

#### *We've Got Chemistry*



It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

#### *Ahead of the Curve*



Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

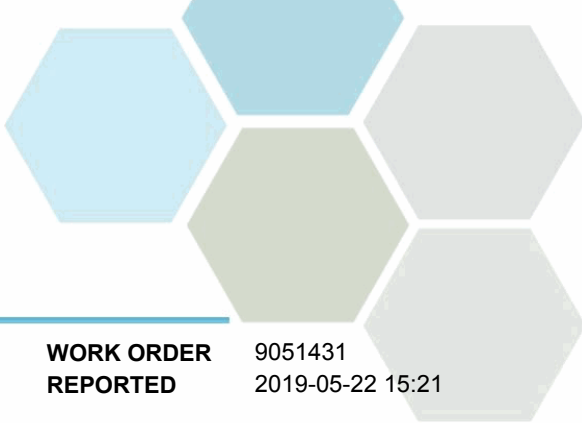
If you have any questions or concerns, please contact me at [bshaw@caro.ca](mailto:bshaw@caro.ca)

#### Authorized By:

Bryan Shaw, Ph.D., P.Chem.  
Client Service Coordinator

1-888-311-8846 | [www.caro.ca](http://www.caro.ca)

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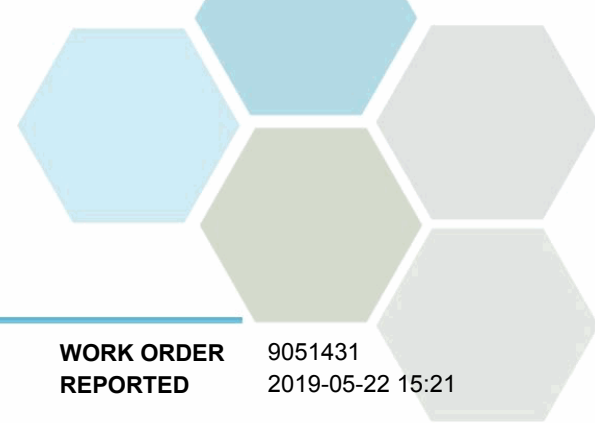


# TEST RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051431  
2019-05-22 15:21

Analyte	Result	RL	Units	Analyzed	Qualifier
<b>Tap (9051431-01)   Matrix: Water   Sampled: 2019-05-14 13:40</b>					
<b>BCMOE Aggregate Hydrocarbons</b>					
VHw (6-10)	< 100	100	µg/L	2019-05-22	
VPHw	< 100	100	µg/L	N/A	
EPHw10-19	< 250	250	µg/L	2019-05-17	
EPHw19-32	< 250	250	µg/L	2019-05-17	
Surrogate: 2-Methylnonane (EPH/F2-4)	76	60-140	%	2019-05-17	
<b>Calculated Parameters</b>					
Hardness, Total (as CaCO3)	5.68	0.500	mg/L	N/A	
<b>CCME CWS Petroleum Hydrocarbons</b>					
PHC F1 (C6-C10)	< 0.10	0.10	mg/L	2019-05-22	
PHC F2 (C10-C16)	< 0.40	0.40	mg/L	2019-05-17	
PHC F3 (C16-C34)	< 0.40	0.40	mg/L	2019-05-17	
PHC F4 (C34-C50)	< 0.40	0.40	mg/L	2019-05-17	
Reached Baseline at nC50	Yes		mg/L	2019-05-17	
Surrogate: 2-Methylnonane (EPH/F2-4)	71	60-140	%	2019-05-17	
<b>Total Metals</b>					
Aluminum, total	0.0824	0.0050	mg/L	2019-05-16	
Antimony, total	< 0.00020	0.00020	mg/L	2019-05-16	
Arsenic, total	< 0.00050	0.00050	mg/L	2019-05-16	
Barium, total	< 0.0050	0.0050	mg/L	2019-05-16	
Beryllium, total	< 0.00010	0.00010	mg/L	2019-05-16	
Boron, total	0.0129	0.0050	mg/L	2019-05-16	
Cadmium, total	0.000040	0.000010	mg/L	2019-05-16	
Calcium, total	2.08	0.20	mg/L	2019-05-16	
Chromium, total	0.00096	0.00050	mg/L	2019-05-16	
Cobalt, total	< 0.00010	0.00010	mg/L	2019-05-16	
Copper, total	0.00323	0.00040	mg/L	2019-05-16	
Iron, total	0.157	0.010	mg/L	2019-05-16	
Lead, total	0.00035	0.00020	mg/L	2019-05-16	
Lithium, total	0.00019	0.00010	mg/L	2019-05-16	
Magnesium, total	0.117	0.010	mg/L	2019-05-16	
Manganese, total	0.00658	0.00020	mg/L	2019-05-16	
Mercury, total	< 0.000040	0.000040	mg/L	2019-05-16	CT5
Molybdenum, total	0.00015	0.00010	mg/L	2019-05-16	
Nickel, total	< 0.00040	0.00040	mg/L	2019-05-16	
Selenium, total	< 0.00050	0.00050	mg/L	2019-05-16	
Silver, total	< 0.000050	0.000050	mg/L	2019-05-16	
Sodium, total	4.54	0.10	mg/L	2019-05-16	
Strontium, total	0.0067	0.0010	mg/L	2019-05-16	
Thallium, total	< 0.000020	0.000020	mg/L	2019-05-16	
Tin, total	< 0.00020	0.00020	mg/L	2019-05-16	



## TEST RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051431  
2019-05-22 15:21

Analyte	Result	RL	Units	Analyzed	Qualifier
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**Tap (9051431-01) | Matrix: Water | Sampled: 2019-05-14 13:40, Continued**

**Total Metals, Continued**

Titanium, total	< 0.0050	0.0050	mg/L	2019-05-16	
Tungsten, total	< 0.0010	0.0010	mg/L	2019-05-16	
Uranium, total	<b>0.000042</b>	0.000020	mg/L	2019-05-16	
Vanadium, total	< 0.0010	0.0010	mg/L	2019-05-16	
Zinc, total	<b>0.0098</b>	0.0040	mg/L	2019-05-16	

**Volatile Organic Compounds (VOC)**

Benzene	< 0.5	0.5	µg/L	2019-05-22	
Ethylbenzene	< 1.0	1.0	µg/L	2019-05-22	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-05-22	
Styrene	< 1.0	1.0	µg/L	2019-05-22	
Toluene	< 1.0	1.0	µg/L	2019-05-22	
Xylenes (total)	< 2.0	2.0	µg/L	2019-05-22	
Surrogate: Toluene-d8	96	70-130	%	2019-05-22	
Surrogate: 4-Bromofluorobenzene	89	70-130	%	2019-05-22	

**Chain Coating (9051431-02) | Matrix: Water | Sampled: 2019-05-14 13:40**

**BCMOE Aggregate Hydrocarbons**

VHw (6-10)	< 100	100	µg/L	2019-05-22	
VPHw	< 100	100	µg/L	N/A	
EPHw10-19	< 250	250	µg/L	2019-05-17	
EPHw19-32	< 250	250	µg/L	2019-05-17	
Surrogate: 2-Methylnonane (EPH/F2-4)	78	60-140	%	2019-05-17	

**Calculated Parameters**

Hardness, Total (as CaCO3)	<b>6.07</b>	0.500	mg/L	N/A	
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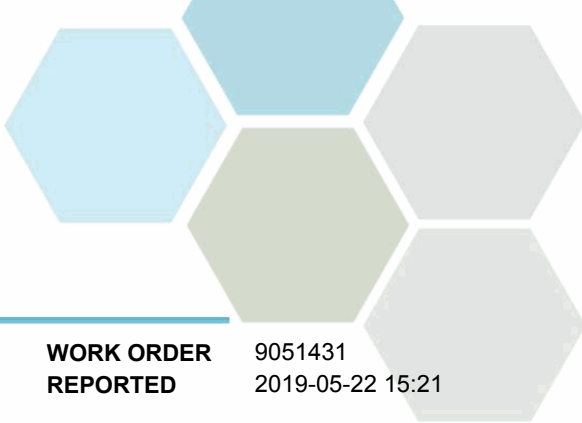
**CCME CWS Petroleum Hydrocarbons**

PHC F1 (C6-C10)	< 0.10	0.10	mg/L	2019-05-22	
PHC F2 (C10-C16)	< 0.40	0.40	mg/L	2019-05-17	
PHC F3 (C16-C34)	< 0.40	0.40	mg/L	2019-05-17	
PHC F4 (C34-C50)	< 0.40	0.40	mg/L	2019-05-17	
Reached Baseline at nC50	<b>Yes</b>		mg/L	2019-05-17	
Surrogate: 2-Methylnonane (EPH/F2-4)	72	60-140	%	2019-05-17	

**Total Metals**

Aluminum, total	<b>0.0706</b>	0.0050	mg/L	2019-05-16	
Antimony, total	< 0.00020	0.00020	mg/L	2019-05-16	
Arsenic, total	< 0.00050	0.00050	mg/L	2019-05-16	
Barium, total	< 0.0050	0.0050	mg/L	2019-05-16	
Beryllium, total	< 0.00010	0.00010	mg/L	2019-05-16	
Boron, total	<b>0.0075</b>	0.0050	mg/L	2019-05-16	





# TEST RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051431  
2019-05-22 15:21

Analyte	Result	RL	Units	Analyzed	Qualifier
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**Chain Coating (9051431-02) | Matrix: Water | Sampled: 2019-05-14 13:40, Continued**

**Total Metals, Continued**

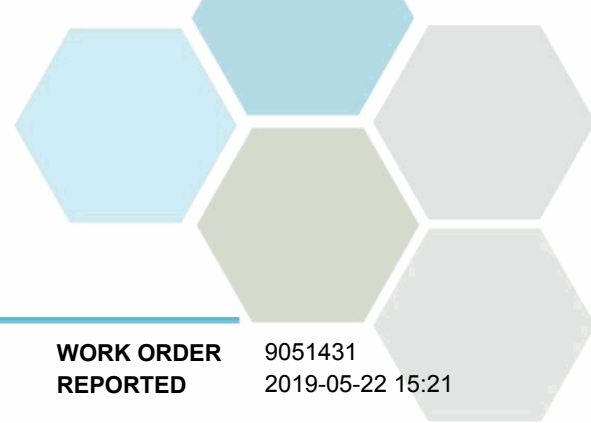
Cadmium, total	< 0.000010	0.000010	mg/L	2019-05-16	
Calcium, total	<b>2.21</b>	0.20	mg/L	2019-05-16	
Chromium, total	<b>0.00079</b>	0.00050	mg/L	2019-05-16	
Cobalt, total	<b>0.00011</b>	0.00010	mg/L	2019-05-16	
Copper, total	<b>0.00340</b>	0.00040	mg/L	2019-05-16	
Iron, total	<b>0.171</b>	0.010	mg/L	2019-05-16	
Lead, total	<b>0.00038</b>	0.00020	mg/L	2019-05-16	
Lithium, total	<b>0.00019</b>	0.00010	mg/L	2019-05-16	
Magnesium, total	<b>0.135</b>	0.010	mg/L	2019-05-16	
Manganese, total	<b>0.00707</b>	0.00020	mg/L	2019-05-16	
Mercury, total	< 0.000040	0.000040	mg/L	2019-05-16	CT5
Molybdenum, total	<b>0.00014</b>	0.00010	mg/L	2019-05-16	
Nickel, total	< 0.00040	0.00040	mg/L	2019-05-16	
Selenium, total	< 0.00050	0.00050	mg/L	2019-05-16	
Silver, total	< 0.000050	0.000050	mg/L	2019-05-16	
Sodium, total	<b>4.69</b>	0.10	mg/L	2019-05-16	
Strontium, total	<b>0.0074</b>	0.0010	mg/L	2019-05-16	
Thallium, total	< 0.000020	0.000020	mg/L	2019-05-16	
Tin, total	< 0.00020	0.00020	mg/L	2019-05-16	
Titanium, total	< 0.0050	0.0050	mg/L	2019-05-16	
Tungsten, total	< 0.0010	0.0010	mg/L	2019-05-16	
Uranium, total	<b>0.000045</b>	0.000020	mg/L	2019-05-16	
Vanadium, total	< 0.0010	0.0010	mg/L	2019-05-16	
Zinc, total	<b>0.0100</b>	0.0040	mg/L	2019-05-16	

**Volatile Organic Compounds (VOC)**

Benzene	< 0.5	0.5	µg/L	2019-05-22	
Ethylbenzene	< 1.0	1.0	µg/L	2019-05-22	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-05-22	
Styrene	< 1.0	1.0	µg/L	2019-05-22	
Toluene	< 1.0	1.0	µg/L	2019-05-22	
Xylenes (total)	< 2.0	2.0	µg/L	2019-05-22	
Surrogate: Toluene-d8	99	70-130	%	2019-05-22	
Surrogate: 4-Bromofluorobenzene	90	70-130	%	2019-05-22	

**Sample Qualifiers:**

CT5 This sample has been incorrectly preserved for Mercury analysis



## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051431  
2019-05-22 15:21

Analysis Description	Method Ref.	Technique	Location
BTEX in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	Richmond
CCME PHC F1 in Water	EPA 5030B / CCME CWS PHC*	Purge&Trap / Gas Chromatography (GC-FID)	Richmond
CCME PHC F2-F4 in Water	EPA 3511* / CCME CWS PHC*	Hexane MicroExtraction (Base/Neutral) / Gas Chromatography (GC-FID)	Richmond
EPH in Water	EPA 3511* / BCMOE EPHw	Hexane MicroExtraction (Base/Neutral) / Gas Chromatography (GC-FID)	Richmond
Hardness in Water	SM 2340 B* (2017)	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)	N/A
Total Metals in Water	EPA 200.2* / EPA 6020B	HNO <sub>3</sub> +HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
VH in Water	EPA 5030B / BCMOE VHw	Purge&Trap / Gas Chromatography (GC-FID)	Richmond
VPHw in Water	BCMOE VPH	Calculation: VH - (Benzene + Toluene + Ethylbenzene + Xylenes + Styrene)	N/A

*Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method*

### Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/L	Milligrams per litre
µg/L	Micrograms per litre
BCMOE	British Columbia Environmental Laboratory Manual, British Columbia Ministry of Environment
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

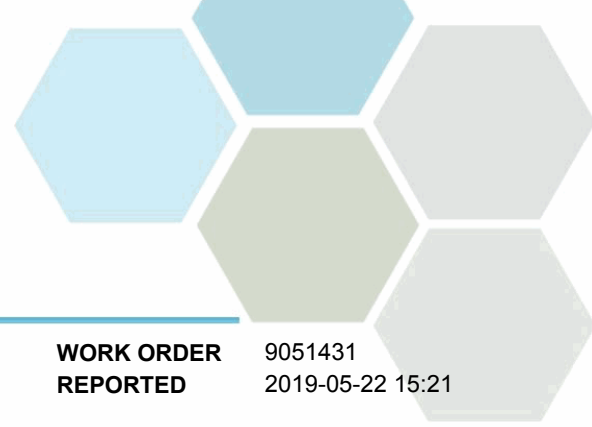
### CCME Petroleum Hydrocarbon Comments:

CARO's methods comply with the Reference Method for the CWS PHC and are validated for use.

In cases where results for both F4 and F4G are reported, the greater of the two numbers must be used in any application of the CWS PHC guidelines. The gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

Unless otherwise qualified, the following quality control criteria were adhered to:

1. All extraction and analysis holding times were met.
2. F1: The C6 and C10 response factors were within 30% of the response factor for toluene.
3. F2-F4: The C10, C16, and C34 response factors were within 10% of their average.
4. F4: The C50 response factor was at least 70% of the average of the C10, C16 and C34 response factors.
5. Linearity of the gasoline and/or diesel+motor oil response was within 15% throughout the calibration range.



## APPENDIX 1: SUPPORTING INFORMATION

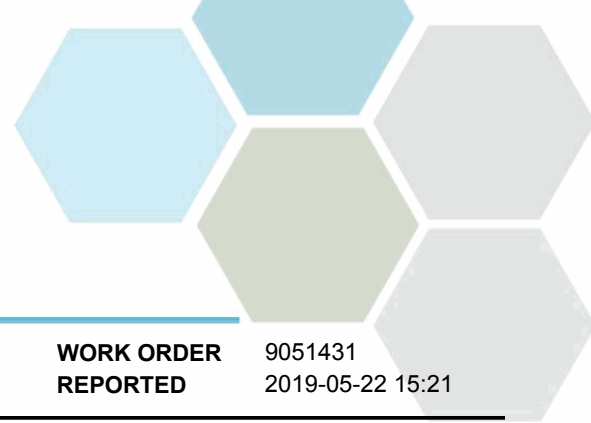
**REPORTED TO** Pottinger Gaherty Environmental Consultants  
**PROJECT** 5588-01.01

**WORK ORDER** 9051431  
**REPORTED** 2019-05-22 15:21

### General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: [bshaw@caro.ca](mailto:bshaw@caro.ca)



## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051431  
2019-05-22 15:21

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk):** A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup):** An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS):** A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS):** A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM):** A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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### BCMOE Aggregate Hydrocarbons, Batch B9E1405

Blank (B9E1405-BLK1)		Prepared: 2019-05-16, Analyzed: 2019-05-17							
EPHw10-19	< 250	250 µg/L							
EPHw19-32	< 250	250 µg/L							
Surrogate: 2-Methylnonane (EPH/F2-4)	332	µg/L	444		75	60-140			
LCS (B9E1405-BS2)		Prepared: 2019-05-16, Analyzed: 2019-05-17							
EPHw10-19	11200	250 µg/L	15400		72	70-130			
EPHw19-32	18400	250 µg/L	22100		83	70-130			
Surrogate: 2-Methylnonane (EPH/F2-4)	358	µg/L	444		81	60-140			

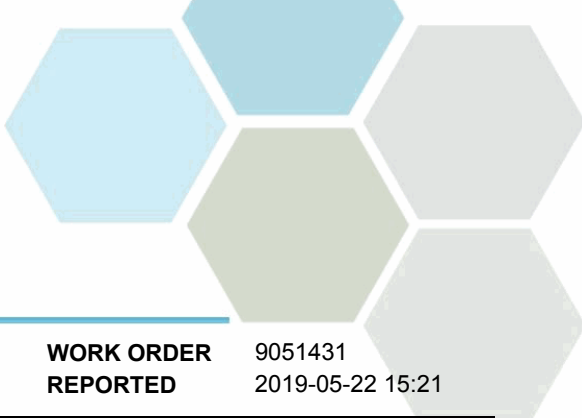
### BCMOE Aggregate Hydrocarbons, Batch B9E1496

Blank (B9E1496-BLK1)		Prepared: 2019-05-18, Analyzed: 2019-05-18							
VHw (6-10)	< 100	100 µg/L							
LCS (B9E1496-BS2)		Prepared: 2019-05-18, Analyzed: 2019-05-18							
VHw (6-10)	4070	100 µg/L	3280		124	70-130			

### CCME CWS Petroleum Hydrocarbons, Batch B9E1405

Blank (B9E1405-BLK1)		Prepared: 2019-05-16, Analyzed: 2019-05-17							
PHC F2 (C10-C16)	< 0.40	0.40 mg/L							
PHC F3 (C16-C34)	< 0.40	0.40 mg/L							
PHC F4 (C34-C50)	< 0.40	0.40 mg/L							
Reached Baseline at nC50	Yes	mg/L							
Surrogate: 2-Methylnonane (EPH/F2-4)	0.328	mg/L	0.444		74	60-140			
LCS (B9E1405-BS2)		Prepared: 2019-05-16, Analyzed: 2019-05-17							
PHC F2 (C10-C16)	9.18	0.40 mg/L	9.11		101	60-140			
PHC F3 (C16-C34)	23.8	0.40 mg/L	33.1		72	60-140			
PHC F4 (C34-C50)	2.68	0.40 mg/L	2.22		121	60-140			
Surrogate: 2-Methylnonane (EPH/F2-4)	0.385	mg/L	0.444		87	60-140			

### CCME CWS Petroleum Hydrocarbons, Batch B9E1496



## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051431  
2019-05-22 15:21

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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**CCME CWS Petroleum Hydrocarbons, Batch B9E1496, Continued**

**Blank (B9E1496-BLK1)**

Prepared: 2019-05-18, Analyzed: 2019-05-18

PHC F1 (C6-C10) < 0.10 0.10 mg/L

**LCS (B9E1496-BS2)**

Prepared: 2019-05-18, Analyzed: 2019-05-18

PHC F1 (C6-C10) 5.27 0.10 mg/L 3.38 156 70-130 SPK1

**Total Metals, Batch B9E1342**

**Blank (B9E1342-BLK1)**

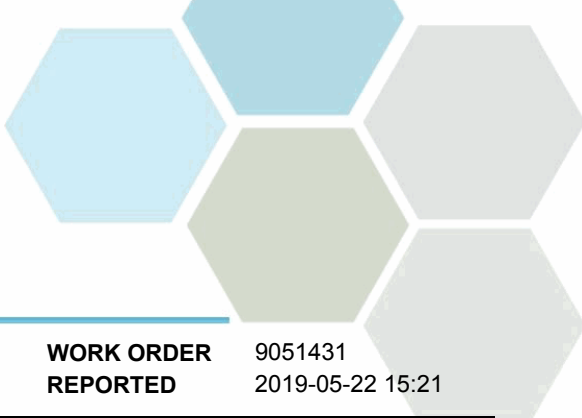
Prepared: 2019-05-16, Analyzed: 2019-05-16

Aluminum, total	< 0.0050	0.0050 mg/L
Antimony, total	< 0.00020	0.00020 mg/L
Arsenic, total	< 0.00050	0.00050 mg/L
Barium, total	< 0.0050	0.0050 mg/L
Beryllium, total	< 0.00010	0.00010 mg/L
Boron, total	< 0.0050	0.0050 mg/L
Cadmium, total	< 0.000010	0.000010 mg/L
Calcium, total	< 0.20	0.20 mg/L
Chromium, total	< 0.00050	0.00050 mg/L
Cobalt, total	< 0.00010	0.00010 mg/L
Copper, total	< 0.00040	0.00040 mg/L
Iron, total	< 0.010	0.010 mg/L
Lead, total	< 0.00020	0.00020 mg/L
Lithium, total	< 0.00010	0.00010 mg/L
Magnesium, total	< 0.010	0.010 mg/L
Manganese, total	< 0.00020	0.00020 mg/L
Mercury, total	< 0.000040	0.000040 mg/L
Molybdenum, total	< 0.00010	0.00010 mg/L
Nickel, total	< 0.00040	0.00040 mg/L
Selenium, total	< 0.00050	0.00050 mg/L
Silver, total	< 0.000050	0.000050 mg/L
Sodium, total	< 0.10	0.10 mg/L
Strontium, total	< 0.0010	0.0010 mg/L
Thallium, total	< 0.000020	0.000020 mg/L
Tin, total	< 0.00020	0.00020 mg/L
Titanium, total	< 0.0050	0.0050 mg/L
Tungsten, total	< 0.0010	0.0010 mg/L
Uranium, total	< 0.000020	0.000020 mg/L
Vanadium, total	< 0.0010	0.0010 mg/L
Zinc, total	< 0.0040	0.0040 mg/L

**Blank (B9E1342-BLK2)**

Prepared: 2019-05-16, Analyzed: 2019-05-16

Aluminum, total	< 0.0050	0.0050 mg/L
Antimony, total	< 0.00020	0.00020 mg/L
Arsenic, total	< 0.00050	0.00050 mg/L
Barium, total	< 0.0050	0.0050 mg/L
Beryllium, total	< 0.00010	0.00010 mg/L
Boron, total	< 0.0050	0.0050 mg/L
Cadmium, total	< 0.000010	0.000010 mg/L
Calcium, total	< 0.20	0.20 mg/L
Chromium, total	< 0.00050	0.00050 mg/L
Cobalt, total	< 0.00010	0.00010 mg/L
Copper, total	< 0.00040	0.00040 mg/L
Iron, total	< 0.010	0.010 mg/L
Lead, total	< 0.00020	0.00020 mg/L
Lithium, total	< 0.00010	0.00010 mg/L
Magnesium, total	< 0.010	0.010 mg/L



## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051431  
2019-05-22 15:21

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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**Total Metals, Batch B9E1342, Continued**

**Blank (B9E1342-BLK2), Continued**

Prepared: 2019-05-16, Analyzed: 2019-05-16

Manganese, total	< 0.00020	0.00020 mg/L							
Mercury, total	< 0.000040	0.000040 mg/L							
Molybdenum, total	< 0.00010	0.00010 mg/L							
Nickel, total	< 0.00040	0.00040 mg/L							
Selenium, total	< 0.00050	0.00050 mg/L							
Silver, total	< 0.000050	0.000050 mg/L							
Sodium, total	< 0.10	0.10 mg/L							
Strontium, total	< 0.0010	0.0010 mg/L							
Thallium, total	< 0.000020	0.000020 mg/L							
Tin, total	< 0.00020	0.00020 mg/L							
Titanium, total	< 0.0050	0.0050 mg/L							
Tungsten, total	< 0.0010	0.0010 mg/L							
Uranium, total	< 0.000020	0.000020 mg/L							
Vanadium, total	< 0.0010	0.0010 mg/L							
Zinc, total	< 0.0040	0.0040 mg/L							

**Blank (B9E1342-BLK3)**

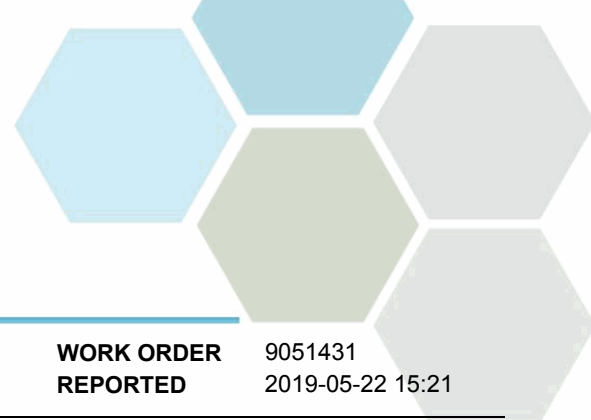
Prepared: 2019-05-16, Analyzed: 2019-05-16

Aluminum, total	< 0.0050	0.0050 mg/L							
Antimony, total	< 0.00020	0.00020 mg/L							
Arsenic, total	< 0.00050	0.00050 mg/L							
Barium, total	< 0.0050	0.0050 mg/L							
Beryllium, total	< 0.00010	0.00010 mg/L							
Boron, total	< 0.0050	0.0050 mg/L							
Cadmium, total	< 0.000010	0.000010 mg/L							
Calcium, total	< 0.20	0.20 mg/L							
Chromium, total	< 0.00050	0.00050 mg/L							
Cobalt, total	< 0.00010	0.00010 mg/L							
Copper, total	< 0.00040	0.00040 mg/L							
Iron, total	< 0.010	0.010 mg/L							
Lead, total	< 0.00020	0.00020 mg/L							
Lithium, total	< 0.00010	0.00010 mg/L							
Magnesium, total	< 0.010	0.010 mg/L							
Manganese, total	< 0.00020	0.00020 mg/L							
Mercury, total	< 0.000040	0.000040 mg/L							
Molybdenum, total	< 0.00010	0.00010 mg/L							
Nickel, total	< 0.00040	0.00040 mg/L							
Selenium, total	< 0.00050	0.00050 mg/L							
Silver, total	< 0.000050	0.000050 mg/L							
Sodium, total	< 0.10	0.10 mg/L							
Strontium, total	< 0.0010	0.0010 mg/L							
Thallium, total	< 0.000020	0.000020 mg/L							
Tin, total	< 0.00020	0.00020 mg/L							
Titanium, total	< 0.0050	0.0050 mg/L							
Tungsten, total	< 0.0010	0.0010 mg/L							
Uranium, total	< 0.000020	0.000020 mg/L							
Vanadium, total	< 0.0010	0.0010 mg/L							
Zinc, total	< 0.0040	0.0040 mg/L							

**LCS (B9E1342-BS1)**

Prepared: 2019-05-16, Analyzed: 2019-05-16

Aluminum, total	0.0228	0.0050 mg/L	0.0200		114	80-120			
Antimony, total	0.0212	0.00020 mg/L	0.0200		106	80-120			
Arsenic, total	0.0207	0.00050 mg/L	0.0200		103	80-120			
Barium, total	0.0205	0.0050 mg/L	0.0200		102	80-120			
Beryllium, total	0.0215	0.00010 mg/L	0.0200		107	80-120			
Boron, total	0.0217	0.0050 mg/L	0.0200		108	80-120			
Cadmium, total	0.0210	0.000010 mg/L	0.0200		105	80-120			



## APPENDIX 2: QUALITY CONTROL RESULTS

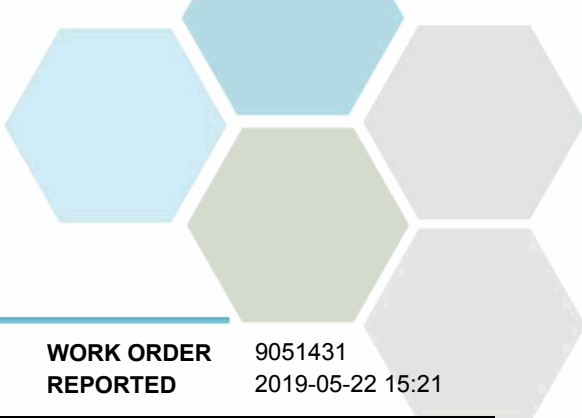
**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051431  
2019-05-22 15:21

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
<b>Total Metals, Batch B9E1342, Continued</b>									
<b>LCS (B9E1342-BS1), Continued</b>					Prepared: 2019-05-16, Analyzed: 2019-05-16				
Calcium, total	2.32	0.20 mg/L	2.00		116	80-120			
Chromium, total	0.0200	0.00050 mg/L	0.0200		100	80-120			
Cobalt, total	0.0202	0.00010 mg/L	0.0200		101	80-120			
Copper, total	0.0213	0.00040 mg/L	0.0200		107	80-120			
Iron, total	1.96	0.010 mg/L	2.00		98	80-120			
Lead, total	0.0210	0.00020 mg/L	0.0200		105	80-120			
Lithium, total	0.0217	0.00010 mg/L	0.0200		109	80-120			
Magnesium, total	2.01	0.010 mg/L	2.00		101	80-120			
Manganese, total	0.0202	0.00020 mg/L	0.0200		101	80-120			
Mercury, total	0.000993	0.000040 mg/L	0.00100		99	80-120			
Molybdenum, total	0.0197	0.00010 mg/L	0.0200		99	80-120			
Nickel, total	0.0204	0.00040 mg/L	0.0200		102	80-120			
Selenium, total	0.0227	0.00050 mg/L	0.0200		114	80-120			
Silver, total	0.0208	0.000050 mg/L	0.0200		104	80-120			
Sodium, total	2.08	0.10 mg/L	2.00		104	80-120			
Strontium, total	0.0199	0.0010 mg/L	0.0200		100	80-120			
Thallium, total	0.0213	0.000020 mg/L	0.0200		107	80-120			
Tin, total	0.0210	0.00020 mg/L	0.0200		105	80-120			
Titanium, total	0.0202	0.0050 mg/L	0.0200		101	80-120			
Tungsten, total	0.0204	0.0010 mg/L	0.0200		102	80-120			
Uranium, total	0.0222	0.000020 mg/L	0.0200		111	80-120			
Vanadium, total	0.0199	0.0010 mg/L	0.0200		100	80-120			
Zinc, total	0.0218	0.0040 mg/L	0.0200		109	80-120			

<b>Reference (B9E1342-SRM1)</b>					Prepared: 2019-05-16, Analyzed: 2019-05-16				
Aluminum, total	0.300	0.0050 mg/L	0.303		99	82-114			
Antimony, total	0.0513	0.00020 mg/L	0.0511		100	88-115			
Arsenic, total	0.121	0.00050 mg/L	0.118		102	88-111			
Barium, total	0.788	0.0050 mg/L	0.823		96	83-110			
Beryllium, total	0.0531	0.00010 mg/L	0.0496		107	80-119			
Boron, total	3.41	0.0050 mg/L	3.45		99	80-118			
Cadmium, total	0.0504	0.000010 mg/L	0.0495		102	90-110			
Calcium, total	10.9	0.20 mg/L	11.6		94	85-113			
Chromium, total	0.246	0.00050 mg/L	0.250		98	88-111			
Cobalt, total	0.0383	0.00010 mg/L	0.0377		102	90-114			
Copper, total	0.512	0.00040 mg/L	0.486		105	90-117			
Iron, total	0.489	0.010 mg/L	0.488		100	90-116			
Lead, total	0.208	0.00020 mg/L	0.204		102	90-110			
Lithium, total	0.426	0.00010 mg/L	0.403		106	79-118			
Magnesium, total	3.88	0.010 mg/L	3.79		102	88-116			
Manganese, total	0.107	0.00020 mg/L	0.109		98	88-108			
Mercury, total	0.00461	0.000040 mg/L	0.00489		94	80-120			
Molybdenum, total	0.196	0.00010 mg/L	0.198		99	88-110			
Nickel, total	0.245	0.00040 mg/L	0.249		99	90-112			
Selenium, total	0.137	0.00050 mg/L	0.121		113	90-122			
Sodium, total	7.58	0.10 mg/L	7.54		100	86-118			
Strontium, total	0.370	0.0010 mg/L	0.375		99	86-110			
Thallium, total	0.0847	0.000020 mg/L	0.0805		105	90-113			
Uranium, total	0.0305	0.000020 mg/L	0.0306		100	88-112			
Vanadium, total	0.382	0.0010 mg/L	0.386		99	87-110			
Zinc, total	2.67	0.0040 mg/L	2.49		107	90-113			

**Volatile Organic Compounds (VOC), Batch B9E1496**



## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051431  
2019-05-22 15:21

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
<b>Volatile Organic Compounds (VOC), Batch B9E1496, Continued</b>									
<b>Blank (B9E1496-BLK1)</b>					Prepared: 2019-05-18, Analyzed: 2019-05-18				
Benzene	< 0.5	0.5 µg/L							
Ethylbenzene	< 1.0	1.0 µg/L							
Methyl tert-butyl ether	< 1.0	1.0 µg/L							
Styrene	< 1.0	1.0 µg/L							
Toluene	< 1.0	1.0 µg/L							
Xylenes (total)	< 2.0	2.0 µg/L							
Surrogate: Toluene-d8	20.0	µg/L	26.2		76	70-130			
Surrogate: 4-Bromofluorobenzene	15.8	µg/L	25.0		63	70-130			S02
<b>LCS (B9E1496-BS1)</b>					Prepared: 2019-05-18, Analyzed: 2019-05-18				
Benzene	20.5	0.5 µg/L	20.1		102	70-130			
Ethylbenzene	20.3	1.0 µg/L	20.1		101	70-130			
Methyl tert-butyl ether	19.1	1.0 µg/L	20.0		95	70-130			
Styrene	22.9	1.0 µg/L	20.1		114	70-130			
Toluene	22.2	1.0 µg/L	20.1		110	70-130			
Xylenes (total)	58.3	2.0 µg/L	60.1		97	70-130			
Surrogate: Toluene-d8	25.7	µg/L	26.2		98	70-130			
Surrogate: 4-Bromofluorobenzene	22.5	µg/L	25.0		90	70-130			

**QC Qualifiers:**

S02 Surrogate recovery outside of control limits. Data accepted based on acceptable recovery of other surrogates.  
 SPK1 The recovery of this analyte was outside of established control limits. The data was accepted based on performance of other batch QC.



## CERTIFICATE OF ANALYSIS

**REPORTED TO** Pottinger Gaherty Environmental Consultants  
1500 - 1185 West Georgia  
Vancouver, BC V6E 4E6

**ATTENTION** Tom Berger

**PO NUMBER**

**PROJECT** 5588-01.01

**PROJECT INFO**

**WORK ORDER** 9051689

**RECEIVED / TEMP** 2019-05-17 13:55 / 20°C

**REPORTED** 2019-05-24 14:11

**COC NUMBER** B80546

### Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

#### *Big Picture Sidekicks*



You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

#### *We've Got Chemistry*



It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

#### *Ahead of the Curve*



Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

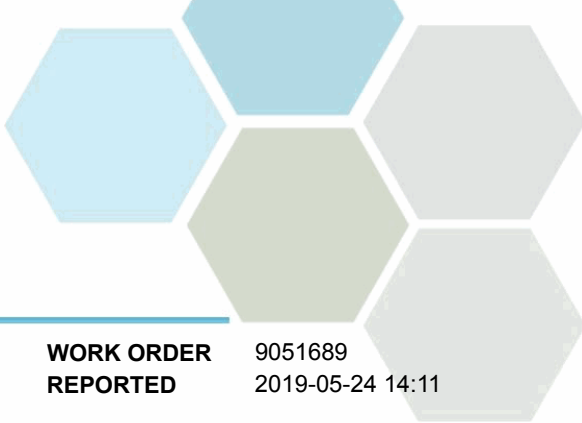
If you have any questions or concerns, please contact me at [bshaw@caro.ca](mailto:bshaw@caro.ca)

#### Authorized By:

Bryan Shaw, Ph.D., P.Chem.  
Client Service Coordinator

1-888-311-8846 | [www.caro.ca](http://www.caro.ca)

#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7

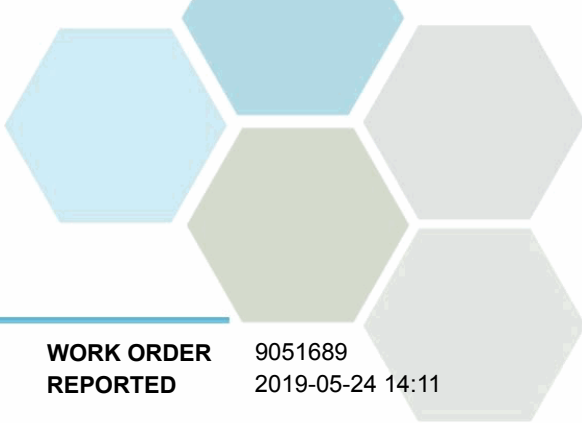


# TEST RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051689  
2019-05-24 14:11

Analyte	Result	RL	Units	Analyzed	Qualifier
<b>Float Coat Discharge (9051689-01)   Matrix: Water   Sampled: 2019-05-17 01:15</b>					
<b>BCMOE Aggregate Hydrocarbons</b>					
VHw (6-10)	179	100	µg/L	2019-05-23	
VPHw	165	100	µg/L	N/A	
EPHw10-19	324	250	µg/L	2019-05-21	
EPHw19-32	1130	250	µg/L	2019-05-21	
Surrogate: 2-Methylnonane (EPH/F2-4)	85	60-140	%	2019-05-21	
<b>Calculated Parameters</b>					
Hardness, Total (as CaCO3)	7.40	0.500	mg/L	N/A	
<b>CCME CWS Petroleum Hydrocarbons</b>					
PHC F1 (C6-C10)	0.18	0.10	mg/L	2019-05-23	
PHC F2 (C10-C16)	< 0.40	0.40	mg/L	2019-05-21	
PHC F3 (C16-C34)	1.26	0.40	mg/L	2019-05-21	
PHC F4 (C34-C50)	< 0.40	0.40	mg/L	2019-05-21	
Reached Baseline at nC50	Yes		mg/L	2019-05-21	
Surrogate: 2-Methylnonane (EPH/F2-4)	86	60-140	%	2019-05-21	
<b>Total Metals</b>					
Aluminum, total	0.0466	0.0050	mg/L	2019-05-22	
Antimony, total	< 0.00020	0.00020	mg/L	2019-05-22	
Arsenic, total	< 0.00050	0.00050	mg/L	2019-05-22	
Barium, total	< 0.0050	0.0050	mg/L	2019-05-22	
Beryllium, total	< 0.00010	0.00010	mg/L	2019-05-22	
Boron, total	0.0105	0.0050	mg/L	2019-05-22	
Cadmium, total	< 0.000010	0.000010	mg/L	2019-05-22	
Calcium, total	2.74	0.20	mg/L	2019-05-22	
Chromium, total	0.00133	0.00050	mg/L	2019-05-22	
Cobalt, total	< 0.00010	0.00010	mg/L	2019-05-22	
Copper, total	0.00713	0.00040	mg/L	2019-05-22	
Iron, total	0.163	0.010	mg/L	2019-05-22	
Lead, total	0.00033	0.00020	mg/L	2019-05-22	
Lithium, total	0.00012	0.00010	mg/L	2019-05-22	
Magnesium, total	0.132	0.010	mg/L	2019-05-22	
Manganese, total	0.00600	0.00020	mg/L	2019-05-22	
Mercury, total	< 0.000040	0.000040	mg/L	2019-05-22	
Molybdenum, total	0.00021	0.00010	mg/L	2019-05-22	
Nickel, total	< 0.00040	0.00040	mg/L	2019-05-22	
Selenium, total	< 0.00050	0.00050	mg/L	2019-05-22	
Silver, total	< 0.000050	0.000050	mg/L	2019-05-22	
Sodium, total	3.27	0.10	mg/L	2019-05-22	
Strontium, total	0.0089	0.0010	mg/L	2019-05-22	
Thallium, total	< 0.000020	0.000020	mg/L	2019-05-22	
Tin, total	< 0.00020	0.00020	mg/L	2019-05-22	

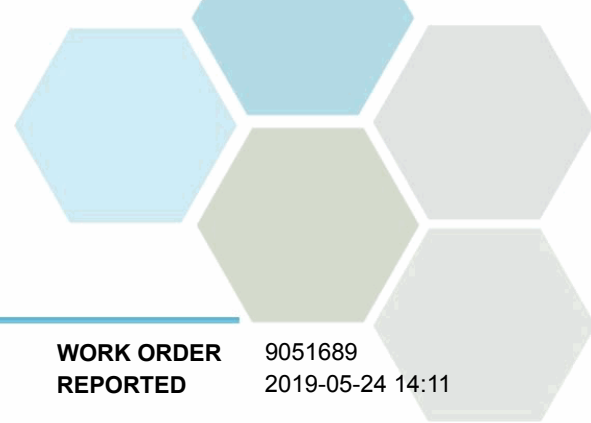


## TEST RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051689  
2019-05-24 14:11

Analyte	Result	RL	Units	Analyzed	Qualifier
<b>Float Coat Discharge (9051689-01)   Matrix: Water   Sampled: 2019-05-17 01:15, Continued</b>					
<i>Total Metals, Continued</i>					
Titanium, total	< 0.0050	0.0050	mg/L	2019-05-22	
Tungsten, total	< 0.0010	0.0010	mg/L	2019-05-22	
Uranium, total	<b>0.000025</b>	0.000020	mg/L	2019-05-22	
Vanadium, total	< 0.0010	0.0010	mg/L	2019-05-22	
Zinc, total	<b>0.0096</b>	0.0040	mg/L	2019-05-22	
<i>Volatile Organic Compounds (VOC)</i>					
Benzene	< 0.5	0.5	µg/L	2019-05-23	
Ethylbenzene	<b>1.5</b>	1.0	µg/L	2019-05-23	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-05-23	
Styrene	< 1.0	1.0	µg/L	2019-05-23	
Toluene	<b>1.7</b>	1.0	µg/L	2019-05-23	
Xylenes (total)	<b>11.5</b>	2.0	µg/L	2019-05-23	
Surrogate: Toluene-d8	97	70-130	%	2019-05-23	
Surrogate: 4-Bromofluorobenzene	100	70-130	%	2019-05-23	



## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051689  
2019-05-24 14:11

Analysis Description	Method Ref.	Technique	Location
BTEX in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	Richmond
CCME PHC F1 in Water	EPA 5030B / CCME CWS PHC*	Purge&Trap / Gas Chromatography (GC-FID)	Richmond
CCME PHC F2-F4 in Water	EPA 3511* / CCME CWS PHC*	Hexane MicroExtraction (Base/Neutral) / Gas Chromatography (GC-FID)	Richmond
EPH in Water	EPA 3511* / BCMOE EPHw	Hexane MicroExtraction (Base/Neutral) / Gas Chromatography (GC-FID)	Richmond
Hardness in Water	SM 2340 B* (2017)	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)	N/A
Total Metals in Water	EPA 200.2* / EPA 6020B	HNO <sub>3</sub> +HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
VH in Water	EPA 5030B / BCMOE VHw	Purge&Trap / Gas Chromatography (GC-FID)	Richmond
VPHw in Water	BCMOE VPH	Calculation: VH - (Benzene + Toluene + Ethylbenzene + Xylenes + Styrene)	N/A

*Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method*

### Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/L	Milligrams per litre
µg/L	Micrograms per litre
BCMOE	British Columbia Environmental Laboratory Manual, British Columbia Ministry of Environment
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

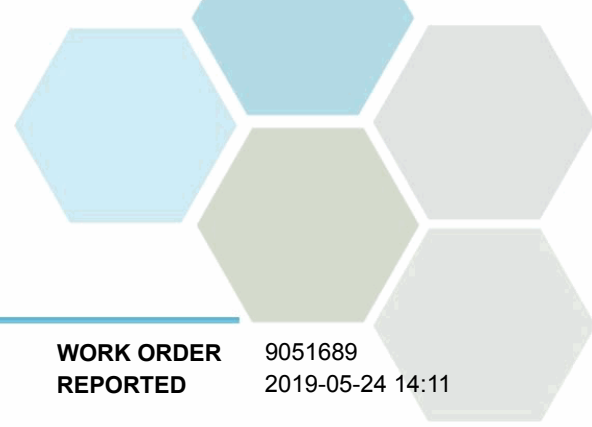
### CCME Petroleum Hydrocarbon Comments:

CARO's methods comply with the Reference Method for the CWS PHC and are validated for use.

In cases where results for both F4 and F4G are reported, the greater of the two numbers must be used in any application of the CWS PHC guidelines. The gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

Unless otherwise qualified, the following quality control criteria were adhered to:

1. All extraction and analysis holding times were met.
2. F1: The C6 and C10 response factors were within 30% of the response factor for toluene.
3. F2-F4: The C10, C16, and C34 response factors were within 10% of their average.
4. F4: The C50 response factor was at least 70% of the average of the C10, C16 and C34 response factors.
5. Linearity of the gasoline and/or diesel+motor oil response was within 15% throughout the calibration range.



## APPENDIX 1: SUPPORTING INFORMATION

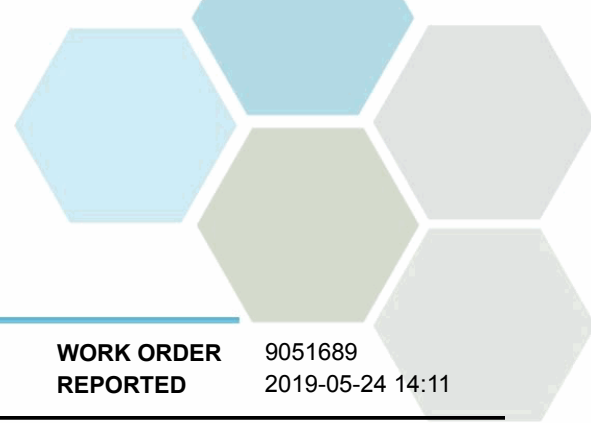
**REPORTED TO** Pottinger Gaherty Environmental Consultants  
**PROJECT** 5588-01.01

**WORK ORDER** 9051689  
**REPORTED** 2019-05-24 14:11

### General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: [bshaw@caro.ca](mailto:bshaw@caro.ca)



## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051689  
2019-05-24 14:11

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk):** A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup):** An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS):** A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS):** A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM):** A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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### BCMOE Aggregate Hydrocarbons, Batch B9E1586

Blank (B9E1586-BLK1)		Prepared: 2019-05-19, Analyzed: 2019-05-21							
EPHw10-19	< 250	250 µg/L							S09
EPHw19-32	< 250	250 µg/L							S09
Surrogate: 2-Methylnonane (EPH/F2-4)	226	µg/L	444		51	60-140			S09
LCS (B9E1586-BS2)		Prepared: 2019-05-19, Analyzed: 2019-05-21							
EPHw10-19	14700	250 µg/L	15400		95	70-130			
EPHw19-32	19000	250 µg/L	22100		86	70-130			
Surrogate: 2-Methylnonane (EPH/F2-4)	308	µg/L	444		69	60-140			

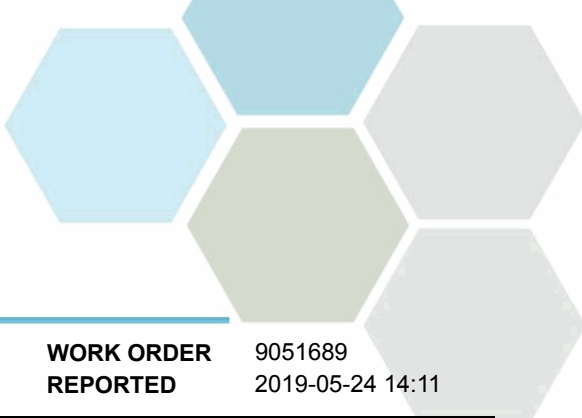
### BCMOE Aggregate Hydrocarbons, Batch B9E1764

Blank (B9E1764-BLK1)		Prepared: 2019-05-22, Analyzed: 2019-05-22							
VHw (6-10)	< 100	100 µg/L							
LCS (B9E1764-BS2)		Prepared: 2019-05-22, Analyzed: 2019-05-22							
VHw (6-10)	3810	100 µg/L	3280		116	70-130			

### CCME CWS Petroleum Hydrocarbons, Batch B9E1586

Blank (B9E1586-BLK1)		Prepared: 2019-05-19, Analyzed: 2019-05-21							
PHC F2 (C10-C16)	< 0.40	0.40 mg/L							
PHC F3 (C16-C34)	< 0.40	0.40 mg/L							
PHC F4 (C34-C50)	< 0.40	0.40 mg/L							
Reached Baseline at nC50	Yes	mg/L							
Surrogate: 2-Methylnonane (EPH/F2-4)	0.319	mg/L	0.444		72	60-140			
LCS (B9E1586-BS2)		Prepared: 2019-05-19, Analyzed: 2019-05-21							
PHC F2 (C10-C16)	9.21	0.40 mg/L	9.11		101	60-140			
PHC F3 (C16-C34)	22.4	0.40 mg/L	33.1		68	60-140			
PHC F4 (C34-C50)	2.80	0.40 mg/L	2.22		126	60-140			
Surrogate: 2-Methylnonane (EPH/F2-4)	0.338	mg/L	0.444		76	60-140			

### CCME CWS Petroleum Hydrocarbons, Batch B9E1764



## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051689  
2019-05-24 14:11

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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**CCME CWS Petroleum Hydrocarbons, Batch B9E1764, Continued**

**Blank (B9E1764-BLK1)**

Prepared: 2019-05-22, Analyzed: 2019-05-22

PHC F1 (C6-C10) < 0.10 0.10 mg/L

**LCS (B9E1764-BS2)**

Prepared: 2019-05-22, Analyzed: 2019-05-22

PHC F1 (C6-C10) 4.72 0.10 mg/L 3.38 140 70-130 SPK1

**Total Metals, Batch B9E1633**

**Blank (B9E1633-BLK1)**

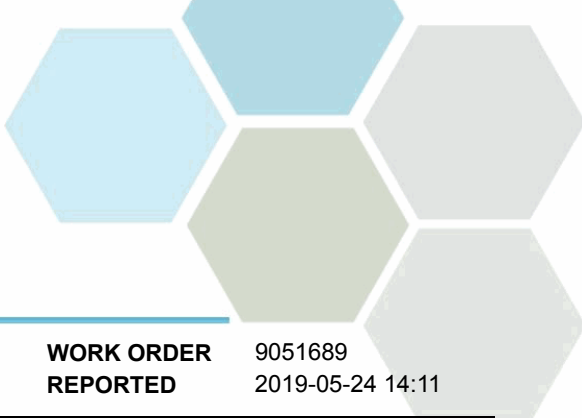
Prepared: 2019-05-21, Analyzed: 2019-05-22

Aluminum, total	< 0.0050	0.0050 mg/L
Antimony, total	< 0.00020	0.00020 mg/L
Arsenic, total	< 0.00050	0.00050 mg/L
Barium, total	< 0.0050	0.0050 mg/L
Beryllium, total	< 0.00010	0.00010 mg/L
Boron, total	< 0.0050	0.0050 mg/L
Cadmium, total	< 0.000010	0.000010 mg/L
Calcium, total	< 0.20	0.20 mg/L
Chromium, total	< 0.00050	0.00050 mg/L
Cobalt, total	< 0.00010	0.00010 mg/L
Copper, total	< 0.00040	0.00040 mg/L
Iron, total	< 0.010	0.010 mg/L
Lead, total	< 0.00020	0.00020 mg/L
Lithium, total	< 0.00010	0.00010 mg/L
Magnesium, total	< 0.010	0.010 mg/L
Manganese, total	< 0.00020	0.00020 mg/L
Mercury, total	< 0.000040	0.000040 mg/L
Molybdenum, total	< 0.00010	0.00010 mg/L
Nickel, total	< 0.00040	0.00040 mg/L
Selenium, total	< 0.00050	0.00050 mg/L
Silver, total	< 0.000050	0.000050 mg/L
Sodium, total	< 0.10	0.10 mg/L
Strontium, total	< 0.0010	0.0010 mg/L
Thallium, total	< 0.000020	0.000020 mg/L
Tin, total	< 0.00020	0.00020 mg/L
Titanium, total	< 0.0050	0.0050 mg/L
Tungsten, total	< 0.0010	0.0010 mg/L
Uranium, total	< 0.000020	0.000020 mg/L
Vanadium, total	< 0.0010	0.0010 mg/L
Zinc, total	< 0.0040	0.0040 mg/L

**Blank (B9E1633-BLK2)**

Prepared: 2019-05-21, Analyzed: 2019-05-22

Aluminum, total	< 0.0050	0.0050 mg/L
Antimony, total	< 0.00020	0.00020 mg/L
Arsenic, total	< 0.00050	0.00050 mg/L
Barium, total	< 0.0050	0.0050 mg/L
Beryllium, total	< 0.00010	0.00010 mg/L
Boron, total	< 0.0050	0.0050 mg/L
Cadmium, total	< 0.000010	0.000010 mg/L
Calcium, total	< 0.20	0.20 mg/L
Chromium, total	< 0.00050	0.00050 mg/L
Cobalt, total	< 0.00010	0.00010 mg/L
Copper, total	< 0.00040	0.00040 mg/L
Iron, total	< 0.010	0.010 mg/L
Lead, total	< 0.00020	0.00020 mg/L
Lithium, total	< 0.00010	0.00010 mg/L
Magnesium, total	< 0.010	0.010 mg/L



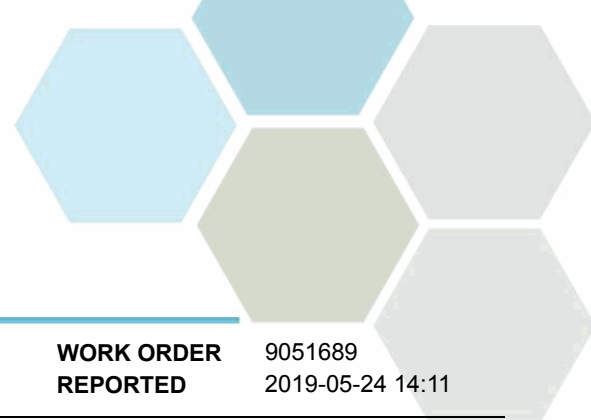
## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051689  
2019-05-24 14:11

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
<b>Total Metals, Batch B9E1633, Continued</b>									
<b>Blank (B9E1633-BLK2), Continued</b>					Prepared: 2019-05-21, Analyzed: 2019-05-22				
Manganese, total	< 0.00020	0.00020 mg/L							
Mercury, total	< 0.000040	0.000040 mg/L							
Molybdenum, total	< 0.00010	0.00010 mg/L							
Nickel, total	< 0.00040	0.00040 mg/L							
Selenium, total	< 0.00050	0.00050 mg/L							
Silver, total	< 0.000050	0.000050 mg/L							
Sodium, total	< 0.10	0.10 mg/L							
Strontium, total	< 0.0010	0.0010 mg/L							
Thallium, total	< 0.000020	0.000020 mg/L							
Tin, total	< 0.00020	0.00020 mg/L							
Titanium, total	< 0.0050	0.0050 mg/L							
Tungsten, total	< 0.0010	0.0010 mg/L							
Uranium, total	< 0.000020	0.000020 mg/L							
Vanadium, total	< 0.0010	0.0010 mg/L							
Zinc, total	< 0.0040	0.0040 mg/L							
<b>Blank (B9E1633-BLK3)</b>					Prepared: 2019-05-21, Analyzed: 2019-05-22				
Aluminum, total	< 0.0050	0.0050 mg/L							
Antimony, total	< 0.00020	0.00020 mg/L							
Arsenic, total	< 0.00050	0.00050 mg/L							
Barium, total	< 0.0050	0.0050 mg/L							
Beryllium, total	< 0.00010	0.00010 mg/L							
Boron, total	< 0.0050	0.0050 mg/L							
Cadmium, total	< 0.000010	0.000010 mg/L							
Calcium, total	< 0.20	0.20 mg/L							
Chromium, total	< 0.00050	0.00050 mg/L							
Cobalt, total	< 0.00010	0.00010 mg/L							
Copper, total	< 0.00040	0.00040 mg/L							
Iron, total	< 0.010	0.010 mg/L							
Lead, total	< 0.00020	0.00020 mg/L							
Lithium, total	< 0.00010	0.00010 mg/L							
Magnesium, total	< 0.010	0.010 mg/L							
Manganese, total	< 0.00020	0.00020 mg/L							
Mercury, total	< 0.000040	0.000040 mg/L							
Molybdenum, total	< 0.00010	0.00010 mg/L							
Nickel, total	< 0.00040	0.00040 mg/L							
Selenium, total	< 0.00050	0.00050 mg/L							
Silver, total	< 0.000050	0.000050 mg/L							
Sodium, total	< 0.10	0.10 mg/L							
Strontium, total	< 0.0010	0.0010 mg/L							
Thallium, total	< 0.000020	0.000020 mg/L							
Tin, total	< 0.00020	0.00020 mg/L							
Titanium, total	< 0.0050	0.0050 mg/L							
Tungsten, total	< 0.0010	0.0010 mg/L							
Uranium, total	< 0.000020	0.000020 mg/L							
Vanadium, total	< 0.0010	0.0010 mg/L							
Zinc, total	< 0.0040	0.0040 mg/L							
<b>LCS (B9E1633-BS1)</b>					Prepared: 2019-05-21, Analyzed: 2019-05-22				
Aluminum, total	0.0219	0.0050 mg/L	0.0200		109	80-120			
Antimony, total	0.0202	0.00020 mg/L	0.0200		101	80-120			
Arsenic, total	0.0204	0.00050 mg/L	0.0200		102	80-120			
Barium, total	0.0194	0.0050 mg/L	0.0200		97	80-120			
Beryllium, total	0.0205	0.00010 mg/L	0.0200		102	80-120			
Boron, total	0.0226	0.0050 mg/L	0.0200		113	80-120			
Cadmium, total	0.0199	0.000010 mg/L	0.0200		99	80-120			



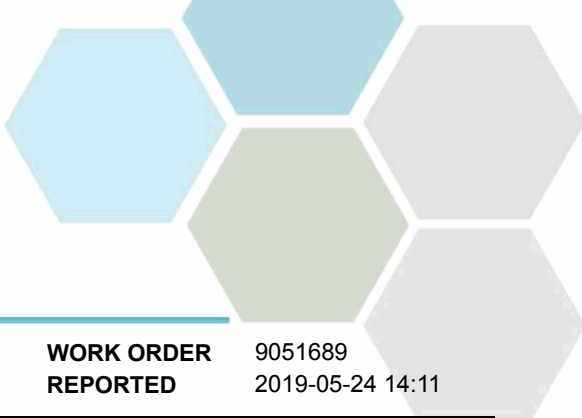


## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051689  
2019-05-24 14:11

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
<b>Total Metals, Batch B9E1633, Continued</b>									
<b>LCS (B9E1633-BS1), Continued</b>					Prepared: 2019-05-21, Analyzed: 2019-05-22				
Calcium, total	1.85	0.20 mg/L	2.00		92	80-120			
Chromium, total	0.0208	0.00050 mg/L	0.0200		104	80-120			
Cobalt, total	0.0209	0.00010 mg/L	0.0200		104	80-120			
Copper, total	0.0218	0.00040 mg/L	0.0200		109	80-120			
Iron, total	1.93	0.010 mg/L	2.00		96	80-120			
Lead, total	0.0204	0.00020 mg/L	0.0200		102	80-120			
Lithium, total	0.0215	0.00010 mg/L	0.0200		107	80-120			
Magnesium, total	2.00	0.010 mg/L	2.00		100	80-120			
Manganese, total	0.0198	0.00020 mg/L	0.0200		99	80-120			
Mercury, total	0.000890	0.000040 mg/L	0.00100		89	80-120			
Molybdenum, total	0.0198	0.00010 mg/L	0.0200		99	80-120			
Nickel, total	0.0212	0.00040 mg/L	0.0200		106	80-120			
Selenium, total	0.0210	0.00050 mg/L	0.0200		105	80-120			
Silver, total	0.0191	0.000050 mg/L	0.0200		95	80-120			
Sodium, total	2.00	0.10 mg/L	2.00		100	80-120			
Strontium, total	0.0198	0.0010 mg/L	0.0200		99	80-120			
Thallium, total	0.0206	0.000020 mg/L	0.0200		103	80-120			
Tin, total	0.0203	0.00020 mg/L	0.0200		101	80-120			
Titanium, total	0.0217	0.0050 mg/L	0.0200		108	80-120			
Tungsten, total	0.0206	0.0010 mg/L	0.0200		103	80-120			
Uranium, total	0.0215	0.000020 mg/L	0.0200		108	80-120			
Vanadium, total	0.0210	0.0010 mg/L	0.0200		105	80-120			
Zinc, total	0.0222	0.0040 mg/L	0.0200		111	80-120			
<b>Duplicate (B9E1633-DUP1)</b>					Source: 9051689-01 Prepared: 2019-05-21, Analyzed: 2019-05-22				
Aluminum, total	0.0465	0.0050 mg/L		0.0466			< 1	20	
Antimony, total	< 0.00020	0.00020 mg/L		< 0.00020				20	
Arsenic, total	< 0.00050	0.00050 mg/L		< 0.00050				15	
Barium, total	< 0.0050	0.0050 mg/L		< 0.0050				9	
Beryllium, total	< 0.00010	0.00010 mg/L		< 0.00010				16	
Boron, total	0.0118	0.0050 mg/L		0.0105				20	
Cadmium, total	< 0.000010	0.000010 mg/L		< 0.000010				20	
Calcium, total	2.70	0.20 mg/L		2.74			2	12	
Chromium, total	0.00141	0.00050 mg/L		0.00133				12	
Cobalt, total	< 0.00010	0.00010 mg/L		< 0.00010				13	
Copper, total	0.00393	0.00040 mg/L		0.00713			58	20	RPD
Iron, total	0.165	0.010 mg/L		0.163			1	18	
Lead, total	0.00033	0.00020 mg/L		0.00033				20	
Lithium, total	0.00013	0.00010 mg/L		0.00012				19	
Magnesium, total	0.130	0.010 mg/L		0.132			2	10	
Manganese, total	0.00599	0.00020 mg/L		0.00600			< 1	13	
Mercury, total	< 0.000040	0.000040 mg/L		< 0.000040				20	
Molybdenum, total	0.00020	0.00010 mg/L		0.00021				20	
Nickel, total	< 0.00040	0.00040 mg/L		< 0.00040				20	
Selenium, total	< 0.00050	0.00050 mg/L		< 0.00050				20	
Silver, total	< 0.000050	0.000050 mg/L		< 0.000050				18	
Sodium, total	3.13	0.10 mg/L		3.27			4	10	
Strontium, total	0.0089	0.0010 mg/L		0.0089			< 1	9	
Thallium, total	< 0.000020	0.000020 mg/L		< 0.000020				20	
Tin, total	< 0.00020	0.00020 mg/L		< 0.00020				20	
Titanium, total	< 0.0050	0.0050 mg/L		< 0.0050				20	
Tungsten, total	< 0.0010	0.0010 mg/L		< 0.0010				20	
Uranium, total	0.000025	0.000020 mg/L		0.000025				14	
Vanadium, total	< 0.0010	0.0010 mg/L		< 0.0010				17	
Zinc, total	0.0091	0.0040 mg/L		0.0096				8	



## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Pottinger Gaherty Environmental Consultants  
5588-01.01

**WORK ORDER REPORTED** 9051689  
2019-05-24 14:11

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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**Total Metals, Batch B9E1633, Continued**

**Reference (B9E1633-SRM1)**

Prepared: 2019-05-21, Analyzed: 2019-05-22

Aluminum, total	0.307	0.0050 mg/L	0.303		101	82-114			
Antimony, total	0.0510	0.00020 mg/L	0.0511		100	88-115			
Arsenic, total	0.125	0.00050 mg/L	0.118		106	88-111			
Barium, total	0.787	0.0050 mg/L	0.823		96	83-110			
Beryllium, total	0.0531	0.00010 mg/L	0.0496		107	80-119			
Boron, total	3.59	0.0050 mg/L	3.45		104	80-118			
Cadmium, total	0.0499	0.000010 mg/L	0.0495		101	90-110			
Calcium, total	10.7	0.20 mg/L	11.6		92	85-113			
Chromium, total	0.270	0.00050 mg/L	0.250		108	88-111			
Cobalt, total	0.0412	0.00010 mg/L	0.0377		109	90-114			
Copper, total	0.544	0.00040 mg/L	0.486		112	90-117			
Iron, total	0.499	0.010 mg/L	0.488		102	90-116			
Lead, total	0.209	0.00020 mg/L	0.204		102	90-110			
Lithium, total	0.431	0.00010 mg/L	0.403		107	79-118			
Magnesium, total	3.97	0.010 mg/L	3.79		105	88-116			
Manganese, total	0.109	0.00020 mg/L	0.109		100	88-108			
Mercury, total	0.00506	0.000040 mg/L	0.00489		103	80-120			
Molybdenum, total	0.205	0.00010 mg/L	0.198		103	88-110			
Nickel, total	0.265	0.00040 mg/L	0.249		107	90-112			
Selenium, total	0.132	0.00050 mg/L	0.121		109	90-122			
Sodium, total	7.70	0.10 mg/L	7.54		102	86-118			
Strontium, total	0.382	0.0010 mg/L	0.375		102	86-110			
Thallium, total	0.0842	0.000020 mg/L	0.0805		105	90-113			
Uranium, total	0.0308	0.000020 mg/L	0.0306		101	88-112			
Vanadium, total	0.408	0.0010 mg/L	0.386		106	87-110			
Zinc, total	2.62	0.0040 mg/L	2.49		105	90-113			

**Volatile Organic Compounds (VOC), Batch B9E1764**

**Blank (B9E1764-BLK1)**

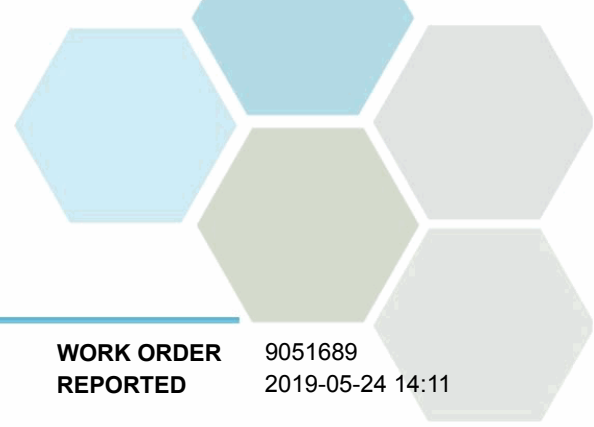
Prepared: 2019-05-22, Analyzed: 2019-05-22

Benzene	< 0.5	0.5 µg/L							
Ethylbenzene	< 1.0	1.0 µg/L							
Methyl tert-butyl ether	< 1.0	1.0 µg/L							
Styrene	< 1.0	1.0 µg/L							
Toluene	< 1.0	1.0 µg/L							
Xylenes (total)	< 2.0	2.0 µg/L							
Surrogate: Toluene-d8	25.0	µg/L	26.2		96	70-130			
Surrogate: 4-Bromofluorobenzene	21.4	µg/L	25.0		85	70-130			

**LCS (B9E1764-BS1)**

Prepared: 2019-05-22, Analyzed: 2019-05-22

Benzene	21.4	0.5 µg/L	20.1		107	70-130			
Ethylbenzene	20.3	1.0 µg/L	20.1		101	70-130			
Methyl tert-butyl ether	21.8	1.0 µg/L	20.0		109	70-130			
Styrene	23.9	1.0 µg/L	20.1		119	70-130			
Toluene	22.0	1.0 µg/L	20.1		110	70-130			
Xylenes (total)	60.0	2.0 µg/L	60.1		100	70-130			
Surrogate: Toluene-d8	25.6	µg/L	26.2		98	70-130			
Surrogate: 4-Bromofluorobenzene	26.5	µg/L	25.0		106	70-130			



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**QC Qualifiers:**

RPD Relative percent difference (RPD) of duplicate analysis are outside of control limits for unknown reason(s).  
S09 The surrogate recovery for this sample is outside of established control limits .  
SPK1 The recovery of this analyte was outside of established control limits. The data was accepted based on performance of other batch QC.