

SGS

AXYS

2045 Mills Road West

TEL: (250) 655-5800

Sidney, BC, Canada V8L5X2

TOLL-FREE: 1-888-373-0881

SGS AXYS Client No.: 4972

Client Address: AECOM
1111 Third Avenue, Suite 1600
Seattle, WA, US, 98101

The SGS AXYS contact for these data is Sean Campbell.

BATCH SUMMARY

Batch ID: WG66477	Date: 13-Feb-2019
Analysis Type: PAH	Matrix Type: XAD
BATCH MAKEUP	
Contract: 4972 Samples: L30522-1 PDI-WS-T05-1811 L30522-2 PDI-WS-T01-1811 L30522-3 PDI-WS-T03-1811 L30522-4 PDI-WS-T07-1811 L30522-5 PDI-WS-T02-1811 L30522-6 PDI-WS-T04-1812 L30522-7 PDI-WS-T06-1811 L30522-8 PDI-RB-XD-181129	Blank: WG66477-101 Reference or Spike: WG66477-102
Comments: <p>Resubmission on Feb 14, 2019: Data are being resubmitted to correct the extraction date from 29-Jan-2019 to 28-Jan-2019 for the whole batch. No other substantial results have been changed.</p> <ol style="list-style-type: none"> 1. Data are considered final. 2. Data are not blank corrected. Blank data should be taken into consideration when evaluating sample data. 3. Blank data should be evaluated against specifications using the same blank sample size as the size of the client samples. 4. The recoveries of some of isotope labeled surrogates in the lab blank (AXYS ID: WG66477-101) fell below the lower method control limits, as indicated by the V flags on the report Form 2. The results are recovery corrected. 	

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February 2017

FQA-006 Rev. 4. 20-Sep-2013

SGS AXYS METHOD MLA-021 Rev 12

Form 1A
ANALYSIS REPORTCLIENT SAMPLE NO.
PDI-WS-T05-1811
Sample Collection:
27-Nov-2018 15:44

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: 04-Dec-2018

Extraction Date: 28-Jan-2019

Analysis Date: 01-Feb-2019 Time: 19:53:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: N/A

Concentration Units: ng/sample

Project No.

Lab Sample I.D.:

Sample Size:

Initial Calibration Date:

Instrument ID:

GC Column ID:

Sample Data Filename:

Blank Data Filename:

Cal. Ver. Data Filename:

PORTLAND HARBOR PDI AND
BASELINE WATER
L30522-1

1 sample

02-Jan-2019

LR GC/MS

RTX5

PH9S0551.D

PH9S0550.D

PH9S0545.D

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	MAX	1800	7.25 (S)	0.07	1.006
Benz[a]anthracene ³	56-55-3	K J	12.0	2.26 (S)	0.55	1.002
Chrysene ⁴	218-01-9	J	32.6	2.39 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2	J	3.99	2.58 (S)	0.26	1.004
Benzo[j,k]fluoranthenes		K J	3.40	2.98 (S)	0.43	1.003
Benzo[a]pyrene	50-32-8	U		3.98 (S)		
Dibenz[a,h]anthracene ⁵	53-70-3	U		1.82 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	K J	2.78	2.39 (S)	2.64	1.003
Benzo[ghi]perylene	191-24-2	K J	2.69	2.19 (S)	0.65	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent; MAX = concentration is an estimated maximum value.

(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

(3) May co-elute with Cyclopenta(cd)pyrene.

(4) May co-elute with Triphenylene.

(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 2
ANALYSIS REPORT

CLIENT SAMPLE NO.
PDI-WS-T05-1811
Sample Collection:
27-Nov-2018 15:44

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4972	Project No.	PORTLAND HARBOR PDI AND BASELINE WATER
Matrix:	XAD	Lab Sample I.D.:	L30522-1
Sample Receipt Date:	04-Dec-2018	Sample Size:	1 sample
Extraction Date:	28-Jan-2019	Initial Calibration Date:	02-Jan-2019
Analysis Date:	01-Feb-2019 Time: 19:53:00	Instrument ID:	LR GC/MS
Extract Volume (uL):	400	GC Column ID:	RTX5
Injection Volume (uL):	1.0	Sample Data Filename:	PH9S0551.D
Dilution Factor:	N/A	Blank Data Filename:	PH9S0550.D
Concentration Units:	ng absolute	Cal. Ver. Data Filename:	PH9S0545.D

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This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	ION ABUND. RATIO	RRT
Naphthalene d-8		6000	3580	59.7	0.09	0.608
2-Methylnaphthalene d-10		5910	4240	71.7	0.20	0.755
2,6-Dimethylnaphthalene d-12		6170	4930	79.9	0.76	0.896
Acenaphthylene d-8		6180	5260	85.1	0.15	0.961
Dibenzothiophene d-8		6110	5240	85.8	0.09	0.792
Phenanthrene d-10		5420	4900	90.6	0.14	0.808
Fluoranthene d-10		5960	5260	88.4	0.18	0.971
Benzo[a]anthracene d-12		6090	4870	79.9	0.23	1.164
Chrysene d-12		5880	5160	87.8	0.26	1.169
Benzo[b]fluoranthene d-12		5910	5240	88.6	0.20	0.958
Benzo[k]fluoranthene d-12		6000	5520	92.1	0.19	0.962
Benzo[a]pyrene d-12		6210	5400	86.9	0.19	1.009
Perylene d-12		6450	5630	87.2	0.24	1.024
Dibenzo[a,h]anthracene d-14		5750	4430	77.1	0.28	1.212
Indeno[1,2,3-cd]pyrene d-12		5970	4590	76.8	0.17	1.207
Benzo[ghi]perylene d-12		5940	4960	83.4	0.18	1.238
	LAB FLAG ¹	SPIKE CONC. (ng/sample)	CONC. FOUND (ng/sample)	REPORTING LIMIT (RL) ³ (ng/sample)	R(%) ²	ION ABUND. RATIO

CLIENT STANDARD

Anthracene d-10		1990	1860	6.74 (S)	93.2	0.12
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(1) Where applicable, custom lab flags have been used on this report.

(2) R% = percent recovery.

(3) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 1A
ANALYSIS REPORTCLIENT SAMPLE NO.
PDI-WS-T01-1811
Sample Collection:
28-Nov-2018 14:26

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: 04-Dec-2018

Extraction Date: 28-Jan-2019

Analysis Date: 01-Feb-2019 Time: 20:41:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: N/A

Project No. PORTLAND HARBOR PDI AND
BASELINE WATER

Lab Sample I.D.: L30522-2

Sample Size: 1 sample

Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS

GC Column ID: RTX5

Sample Data Filename: PH9S0552.D

Blank Data Filename: PH9S0550.D

Cal. Ver. Data Filename: PH9S0545.D

Concentration Units: ng/sample

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COMPOUND	CAS NO.	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	MAX	1010	29.6 (S)	0.07	1.006
Benz[a]anthracene ³	56-55-3	K J	14.6	1.21 (S)	0.47	1.003
Chrysene ⁴	218-01-9	J	29.9	1.31 (S)	0.27	1.003
Benzo[b]fluoranthene	205-99-2	K J	1.98	1.96 (S)	0.34	1.004
Benzo[j,k]fluoranthenes		K J	5.27	2.32 (S)	0.40	1.002
Benzo[a]pyrene	50-32-8	U		3.21 (S)		
Dibenz[a,h]anthracene ⁵	53-70-3	U		2.81 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	U		2.85 (S)		
Benzo[ghi]perylene	191-24-2	U		2.55 (S)		

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent; MAX = concentration is an estimated maximum value.

(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

(3) May co-elute with Cyclopenta(cd)pyrene.

(4) May co-elute with Triphenylene.

(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 2
ANALYSIS REPORT

CLIENT SAMPLE NO.
PDI-WS-T01-1811
Sample Collection:
28-Nov-2018 14:26

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4972	Project No.	PORTLAND HARBOR PDI AND BASELINE WATER
Matrix:	XAD	Lab Sample I.D.:	L30522-2
Sample Receipt Date:	04-Dec-2018	Sample Size:	1 sample
Extraction Date:	28-Jan-2019	Initial Calibration Date:	02-Jan-2019
Analysis Date:	01-Feb-2019 Time: 20:41:00	Instrument ID:	LR GC/MS
Extract Volume (uL):	400	GC Column ID:	RTX5
Injection Volume (uL):	1.0	Sample Data Filename:	PH9S0552.D
Dilution Factor:	N/A	Blank Data Filename:	PH9S0550.D
Concentration Units:	ng absolute	Cal. Ver. Data Filename:	PH9S0545.D

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LABELED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	ION ABUND. RATIO	RRT
Naphthalene d-8		6000	2490	41.6	0.10	0.608
2-Methylnaphthalene d-10		5910	3090	52.2	0.20	0.755
2,6-Dimethylnaphthalene d-12		6170	3870	62.8	0.77	0.896
Acenaphthylene d-8		6180	4070	65.8	0.18	0.961
Dibenzothiophene d-8		6110	4710	77.2	0.09	0.792
Phenanthrene d-10		5420	4600	85.0	0.14	0.808
Fluoranthene d-10		5960	5120	85.9	0.17	0.971
Benzo[a]anthracene d-12		6090	4240	69.6	0.23	1.164
Chrysene d-12		5880	4780	81.3	0.24	1.170
Benzo[b]fluoranthene d-12		5910	4950	83.8	0.20	0.958
Benzo[k]fluoranthene d-12		6000	5300	88.4	0.19	0.962
Benzo[a]pyrene d-12		6210	4860	78.3	0.19	1.009
Perylene d-12		6450	5360	83.0	0.24	1.024
Dibenzo[a,h]anthracene d-14		5750	4090	71.2	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		5970	4270	71.5	0.17	1.207
Benzo[ghi]perylene d-12		5940	4640	78.1	0.19	1.238
	LAB FLAG ¹	SPIKE CONC. (ng/sample)	CONC. FOUND (ng/sample)	REPORTING LIMIT (RL) ³ (ng/sample)	R(%) ²	ION ABUND. RATIO

CLIENT STANDARD

Anthracene d-10		1990	1790	10.1 (S)	89.8	0.12
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(1) Where applicable, custom lab flags have been used on this report.

(2) R% = percent recovery.

(3) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 1A
ANALYSIS REPORTCLIENT SAMPLE NO.
PDI-WS-T03-1811
Sample Collection:
27-Nov-2018 16:22

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: 04-Dec-2018

Extraction Date: 28-Jan-2019

Analysis Date: 01-Feb-2019 **Time:** 21:30:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: N/A

Project No. PORTLAND HARBOR PDI AND
BASELINE WATER

Lab Sample I.D.: L30522-3

Sample Size: 1 sample

Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS

GC Column ID: RTX5

Sample Data Filename: PH9S0553.D

Blank Data Filename: PH9S0550.D

Cal. Ver. Data Filename: PH9S0545.D

Concentration Units: ng/sample

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	MAX	1470	44.4 (S)	0.08	1.007
Benz[a]anthracene ³	56-55-3	K J	15.8	1.68 (S)	1.04	1.003
Chrysene ⁴	218-01-9	J	32.0	1.79 (S)	0.30	1.003
Benzo[b]fluoranthene	205-99-2	J	5.72	2.47 (S)	0.24	1.004
Benzo[j,k]fluoranthenes		K J	4.95	2.92 (S)	0.44	1.002
Benzo[a]pyrene	50-32-8	K J	6.11	3.88 (S)	0.38	1.004
Dibenz[a,h]anthracene ⁵	53-70-3	U		2.39 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	K J	7.45	1.85 (S)	1.03	1.003
Benzo[ghi]perylene	191-24-2	K J	18.7	1.70 (S)	0.32	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent; MAX = concentration is an estimated maximum value.

(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

(3) May co-elute with Cyclopenta(cd)pyrene.

(4) May co-elute with Triphenylene.

(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: PAH_PAH_LO_LPAR_L30522-3_Form1A_PH9S0553.D_SJ2508293.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 2
ANALYSIS REPORTCLIENT SAMPLE NO.
PDI-WS-T03-1811
Sample Collection:
27-Nov-2018 16:22

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: 04-Dec-2018

Extraction Date: 28-Jan-2019

Analysis Date: 01-Feb-2019 Time: 21:30:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: N/A

Concentration Units: ng absolute

Project No. PORTLAND HARBOR PDI AND
BASELINE WATER

Lab Sample I.D.: L30522-3

Sample Size: 1 sample

Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS

GC Column ID: RTX5

Sample Data Filename: PH9S0553.D

Blank Data Filename: PH9S0550.D

Cal. Ver. Data Filename: PH9S0545.D

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	ION ABUND. RATIO	RRT
Naphthalene d-8		6000	2630	43.8	0.10	0.608
2-Methylnaphthalene d-10		5910	3200	54.2	0.20	0.755
2,6-Dimethylnaphthalene d-12		6170	3860	62.7	0.76	0.896
Acenaphthylene d-8		6180	4540	73.5	0.18	0.961
Dibenzothiophene d-8		6110	4590	75.1	0.09	0.792
Phenanthrene d-10		5420	4430	81.9	0.14	0.808
Fluoranthene d-10		5960	4880	81.9	0.17	0.971
Benzo[a]anthracene d-12		6090	4040	66.4	0.23	1.164
Chrysene d-12		5880	4500	76.5	0.25	1.169
Benzo[b]fluoranthene d-12		5910	5110	86.4	0.20	0.958
Benzo[k]fluoranthene d-12		6000	5350	89.2	0.19	0.962
Benzo[a]pyrene d-12		6210	5190	83.6	0.19	1.009
Perylene d-12		6450	5490	85.1	0.23	1.024
Dibenzo[a,h]anthracene d-14		5750	4050	70.5	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		5970	4160	69.7	0.17	1.207
Benzo[ghi]perylene d-12		5940	4610	77.7	0.19	1.238
	LAB FLAG ¹	SPIKE CONC. (ng/sample)	CONC. FOUND (ng/sample)	REPORTING LIMIT (RL) ³ (ng/sample)	R(%) ²	ION ABUND. RATIO

CLIENT STANDARD

Anthracene d-10 1990 1700 13.0 (S) 85.1 0.12

(1) Where applicable, custom lab flags have been used on this report.

(2) R% = percent recovery.

(3) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 1A
ANALYSIS REPORTCLIENT SAMPLE NO.
PDI-WS-T07-1811
Sample Collection:
28-Nov-2018 13:18

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: 04-Dec-2018

Extraction Date: 28-Jan-2019

Analysis Date: 01-Feb-2019 Time: 22:19:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: N/A

Concentration Units: ng/sample

Project No.

Lab Sample I.D.:

Sample Size:

Initial Calibration Date:

Instrument ID:

GC Column ID:

Sample Data Filename:

Blank Data Filename:

Cal. Ver. Data Filename:

PORTLAND HARBOR PDI AND
BASELINE WATER
L30522-4

1 sample

02-Jan-2019

LR GC/MS

RTX5

PH9S0554.D

PH9S0550.D

PH9S0545.D

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	MAX	991	18.9 (S)	0.08	1.006
Benz[a]anthracene ³	56-55-3	K J	7.53	1.18 (S)	0.41	1.003
Chrysene ⁴	218-01-9	J	18.7	1.28 (S)	0.28	1.003
Benzo[b]fluoranthene	205-99-2	J	2.09	1.74 (S)	0.26	1.004
Benzo[j,k]fluoranthenes		K J	2.81	2.11 (S)	0.40	1.002
Benzo[a]pyrene	50-32-8	U		2.79 (S)		
Dibenz[a,h]anthracene ⁵	53-70-3	U		2.07 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	U		2.45 (S)		
Benzo[ghi]perylene	191-24-2	K J	2.35	2.20 (S)	1.53	1.002

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent; MAX = concentration is an estimated maximum value.

(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

(3) May co-elute with Cyclopenta(cd)pyrene.

(4) May co-elute with Triphenylene.

(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: PAH_PAH_LO_LPAR_L30522-4_Form1A_PH9S0554.D_SJ2508294.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 2
ANALYSIS REPORT

CLIENT SAMPLE NO.
PDI-WS-T07-1811
Sample Collection:
28-Nov-2018 13:18

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4972	Project No.	PORTLAND HARBOR PDI AND BASELINE WATER
Matrix:	XAD	Lab Sample I.D.:	L30522-4
Sample Receipt Date:	04-Dec-2018	Sample Size:	1 sample
Extraction Date:	28-Jan-2019	Initial Calibration Date:	02-Jan-2019
Analysis Date:	01-Feb-2019 Time: 22:19:00	Instrument ID:	LR GC/MS
Extract Volume (uL):	400	GC Column ID:	RTX5
Injection Volume (uL):	1.0	Sample Data Filename:	PH9S0554.D
Dilution Factor:	N/A	Blank Data Filename:	PH9S0550.D
Concentration Units:	ng absolute	Cal. Ver. Data Filename:	PH9S0545.D

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	ION ABUND. RATIO	RRT
Naphthalene d-8		6000	3790	63.1	0.10	0.608
2-Methylnaphthalene d-10		5910	4270	72.3	0.20	0.755
2,6-Dimethylnaphthalene d-12		6170	4860	78.8	0.77	0.896
Acenaphthylene d-8		6180	5030	81.4	0.15	0.961
Dibenzothiophene d-8		6110	4920	80.5	0.09	0.792
Phenanthrene d-10		5420	4770	88.0	0.14	0.808
Fluoranthene d-10		5960	5180	86.9	0.18	0.971
Benzo[a]anthracene d-12		6090	4740	77.8	0.23	1.164
Chrysene d-12		5880	5250	89.3	0.25	1.169
Benzo[b]fluoranthene d-12		5910	5020	84.9	0.21	0.958
Benzo[k]fluoranthene d-12		6000	5300	88.4	0.19	0.962
Benzo[a]pyrene d-12		6210	5120	82.5	0.19	1.009
Perylene d-12		6450	5540	85.9	0.23	1.024
Dibenzo[a,h]anthracene d-14		5750	4220	73.5	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		5970	4340	72.6	0.17	1.207
Benzo[ghi]perylene d-12		5940	4750	80.0	0.20	1.238
	LAB FLAG ¹	SPIKE CONC. (ng/sample)	CONC. FOUND (ng/sample)	REPORTING LIMIT (RL) ³ (ng/sample)	R(%) ²	ION ABUND. RATIO

CLIENT STANDARD

Anthracene d-10		1990	1830	14.5 (S)	91.8	0.11
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(1) Where applicable, custom lab flags have been used on this report.

(2) R% = percent recovery.

(3) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 1A
ANALYSIS REPORTCLIENT SAMPLE NO.
PDI-WS-T02-1811
Sample Collection:
30-Nov-2018 15:06

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: 04-Dec-2018

Extraction Date: 28-Jan-2019

Analysis Date: 01-Feb-2019 Time: 23:08:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: N/A

Concentration Units: ng/sample

Project No.

Lab Sample I.D.:

Sample Size:

Initial Calibration Date:

Instrument ID:

GC Column ID:

Sample Data Filename:

Blank Data Filename:

Cal. Ver. Data Filename:

PORTLAND HARBOR PDI AND
BASELINE WATER
L30522-5

1 sample

02-Jan-2019

LR GC/MS

RTX5

PH9S0555.D

PH9S0550.D

PH9S0545.D

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	MAX	989	24.3 (S)	0.07	1.007
Benz[a]anthracene ³	56-55-3	K J	12.4	1.66 (S)	0.35	1.003
Chrysene ⁴	218-01-9	J	26.1	1.86 (S)	0.32	1.003
Benzo[b]fluoranthene	205-99-2	J	4.01	1.64 (S)	0.23	1.004
Benzo[j,k]fluoranthenes		K J	3.31	2.05 (S)	0.48	1.002
Benzo[a]pyrene	50-32-8	U		2.69 (S)		
Dibenz[a,h]anthracene ⁵	53-70-3	U		1.94 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	K J	2.91	1.64 (S)	2.99	1.003
Benzo[ghi]perylene	191-24-2	K J	2.44	1.49 (S)	0.70	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent; MAX = concentration is an estimated maximum value.

(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

(3) May co-elute with Cyclopenta(cd)pyrene.

(4) May co-elute with Triphenylene.

(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: PAH_PAH_LO_LPAR_L30522-5_Form1A_PH9S0555.D_SJ2508295.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 2
ANALYSIS REPORTCLIENT SAMPLE NO.
PDI-WS-T02-1811
Sample Collection:
30-Nov-2018 15:06

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: 04-Dec-2018

Extraction Date: 28-Jan-2019

Analysis Date: 01-Feb-2019 Time: 23:08:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: N/A

Concentration Units: ng absolute

Project No. PORTLAND HARBOR PDI AND
BASELINE WATER

Lab Sample I.D.: L30522-5

Sample Size: 1 sample

Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS

GC Column ID: RTX5

Sample Data Filename: PH9S0555.D

Blank Data Filename: PH9S0550.D

Cal. Ver. Data Filename: PH9S0545.D

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	ION ABUND. RATIO	RRT
Naphthalene d-8		6000	2650	44.2	0.11	0.608
2-Methylnaphthalene d-10		5910	3130	52.9	0.20	0.755
2,6-Dimethylnaphthalene d-12		6170	3690	59.8	0.77	0.896
Acenaphthylene d-8		6180	3800	61.5	0.16	0.961
Dibenzothiophene d-8		6110	4090	67.1	0.09	0.792
Phenanthrene d-10		5420	3830	70.6	0.15	0.808
Fluoranthene d-10		5960	4560	76.6	0.17	0.971
Benzo[a]anthracene d-12		6090	4690	77.1	0.23	1.164
Chrysene d-12		5880	5140	87.4	0.24	1.169
Benzo[b]fluoranthene d-12		5910	4990	84.4	0.20	0.958
Benzo[k]fluoranthene d-12		6000	5010	83.5	0.21	0.962
Benzo[a]pyrene d-12		6210	5020	80.8	0.19	1.009
Perylene d-12		6450	5440	84.3	0.24	1.024
Dibenzo[a,h]anthracene d-14		5750	4190	72.9	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		5970	4320	72.4	0.17	1.207
Benzo[ghi]perylene d-12		5940	4580	77.0	0.19	1.238
	LAB FLAG ¹	SPIKE CONC. (ng/sample)	CONC. FOUND (ng/sample)	REPORTING LIMIT (RL) ³ (ng/sample)	R(%) ²	ION ABUND. RATIO

CLIENT STANDARD

Anthracene d-10		1990	1920	4.90 (S)	96.2	0.12
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(1) Where applicable, custom lab flags have been used on this report.

(2) R% = percent recovery.

(3) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 1A
ANALYSIS REPORTCLIENT SAMPLE NO.
PDI-WS-T04-1812
Sample Collection:
01-Dec-2018 13:10

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: 04-Dec-2018

Extraction Date: 28-Jan-2019

Analysis Date: 01-Feb-2019 **Time:** 23:57:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: N/A

Project No. PORTLAND HARBOR PDI AND
BASELINE WATER

Lab Sample I.D.: L30522-6

Sample Size: 1 sample

Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS

GC Column ID: RTX5

Sample Data Filename: PH9S0556.D

Blank Data Filename: PH9S0550.D

Cal. Ver. Data Filename: PH9S0545.D

Concentration Units: ng/sample

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	MAX	832	16.1 (S)	0.07	1.006
Benz[a]anthracene ³	56-55-3	K J	11.4	1.65 (S)	0.39	1.003
Chrysene ⁴	218-01-9	J	28.5	1.93 (S)	0.28	1.002
Benzo[b]fluoranthene	205-99-2	J	3.67	1.68 (S)	0.25	1.004
Benzo[j,k]fluoranthenes		K J	3.61	2.02 (S)	0.51	1.002
Benzo[a]pyrene	50-32-8	U		2.77 (S)		
Dibenz[a,h]anthracene ⁵	53-70-3	U		1.62 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	U		1.76 (S)		
Benzo[ghi]perylene	191-24-2	K J	2.58	1.59 (S)	1.04	1.002

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent; MAX = concentration is an estimated maximum value.

(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

(3) May co-elute with Cyclopenta(cd)pyrene.

(4) May co-elute with Triphenylene.

(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 2
ANALYSIS REPORT

CLIENT SAMPLE NO.
PDI-WS-T04-1812
Sample Collection:
01-Dec-2018 13:10

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4972	Project No.	PORTLAND HARBOR PDI AND BASELINE WATER
Matrix:	XAD	Lab Sample I.D.:	L30522-6
Sample Receipt Date:	04-Dec-2018	Sample Size:	1 sample
Extraction Date:	28-Jan-2019	Initial Calibration Date:	02-Jan-2019
Analysis Date:	01-Feb-2019 Time: 23:57:00	Instrument ID:	LR GC/MS
Extract Volume (uL):	400	GC Column ID:	RTX5
Injection Volume (uL):	1.0	Sample Data Filename:	PH9S0556.D
Dilution Factor:	N/A	Blank Data Filename:	PH9S0550.D
Concentration Units:	ng absolute	Cal. Ver. Data Filename:	PH9S0545.D

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	ION ABUND. RATIO	RRT
Naphthalene d-8		6000	3310	55.2	0.10	0.608
2-Methylnaphthalene d-10		5910	4000	67.7	0.20	0.755
2,6-Dimethylnaphthalene d-12		6170	4630	75.2	0.77	0.895
Acenaphthylene d-8		6180	5090	82.3	0.15	0.961
Dibenzothiophene d-8		6110	4620	75.7	0.09	0.792
Phenanthrene d-10		5420	4530	83.7	0.14	0.808
Fluoranthene d-10		5960	5140	86.3	0.17	0.971
Benzo[a]anthracene d-12		6090	4870	79.9	0.23	1.164
Chrysene d-12		5880	4970	84.5	0.27	1.170
Benzo[b]fluoranthene d-12		5910	5030	85.2	0.20	0.958
Benzo[k]fluoranthene d-12		6000	5330	88.8	0.20	0.962
Benzo[a]pyrene d-12		6210	5150	83.0	0.19	1.009
Perylene d-12		6450	5600	86.8	0.23	1.024
Dibenzo[a,h]anthracene d-14		5750	4340	75.5	0.30	1.211
Indeno[1,2,3-cd]pyrene d-12		5970	4420	74.0	0.17	1.207
Benzo[ghi]perylene d-12		5940	4920	82.9	0.19	1.238
	LAB FLAG ¹	SPIKE CONC. (ng/sample)	CONC. FOUND (ng/sample)	REPORTING LIMIT (RL) ³ (ng/sample)	R(%) ²	ION ABUND. RATIO

CLIENT STANDARD

Anthracene d-10		1990	1800	16.5 (S)	90.4	0.12
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(1) Where applicable, custom lab flags have been used on this report.

(2) R% = percent recovery.

(3) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 1A
ANALYSIS REPORTCLIENT SAMPLE NO.
PDI-WS-T06-1811
Sample Collection:
30-Nov-2018 16:26

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: 04-Dec-2018

Extraction Date: 28-Jan-2019

Analysis Date: 02-Feb-2019 **Time:** 00:46:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: N/A

Project No. PORTLAND HARBOR PDI AND
BASELINE WATER

Lab Sample I.D.: L30522-7

Sample Size: 1 sample

Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS

GC Column ID: RTX5

Sample Data Filename: PH9S0557.D

Blank Data Filename: PH9S0550.D

Cal. Ver. Data Filename: PH9S0545.D

Concentration Units: ng/sample

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	MAX	1020	27.9 (S)	0.08	1.006
Benz[a]anthracene ³	56-55-3	U		4.02 (S)		
Chrysene ⁴	218-01-9	J	15.6	4.32 (S)	0.26	1.003
Benzo[b]fluoranthene	205-99-2	U		1.48 (S)		
Benzo[j,k]fluoranthenes		U		1.76 (S)		
Benzo[a]pyrene	50-32-8	U		2.29 (S)		
Dibenz[a,h]anthracene ⁵	53-70-3	U		1.67 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	U		1.74 (S)		
Benzo[ghi]perylene	191-24-2	K J	1.67	1.66 (S)	0.80	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent; MAX = concentration is an estimated maximum value.

(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

(3) May co-elute with Cyclopenta(cd)pyrene.

(4) May co-elute with Triphenylene.

(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 2
ANALYSIS REPORT

CLIENT SAMPLE NO.
PDI-WS-T06-1811
Sample Collection:
30-Nov-2018 16:26

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4972	Project No.	PORTLAND HARBOR PDI AND BASELINE WATER
Matrix:	XAD	Lab Sample I.D.:	L30522-7
Sample Receipt Date:	04-Dec-2018	Sample Size:	1 sample
Extraction Date:	28-Jan-2019	Initial Calibration Date:	02-Jan-2019
Analysis Date:	02-Feb-2019 Time: 00:46:00	Instrument ID:	LR GC/MS
Extract Volume (uL):	400	GC Column ID:	RTX5
Injection Volume (uL):	1.0	Sample Data Filename:	PH9S0557.D
Dilution Factor:	N/A	Blank Data Filename:	PH9S0550.D
Concentration Units:	ng absolute	Cal. Ver. Data Filename:	PH9S0545.D

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	ION ABUND. RATIO	RRT
Naphthalene d-8		6000	1720	28.6	0.11	0.608
2-Methylnaphthalene d-10		5910	2360	39.9	0.20	0.755
2,6-Dimethylnaphthalene d-12		6170	3180	51.6	0.76	0.896
Acenaphthylene d-8		6180	3500	56.6	0.18	0.961
Dibenzothiophene d-8		6110	4090	66.9	0.09	0.792
Phenanthrene d-10		5420	3840	70.9	0.15	0.808
Fluoranthene d-10		5960	4710	79.1	0.17	0.971
Benzo[a]anthracene d-12		6090	5080	83.5	0.23	1.164
Chrysene d-12		5880	5360	91.2	0.26	1.169
Benzo[b]fluoranthene d-12		5910	4910	83.0	0.20	0.958
Benzo[k]fluoranthene d-12		6000	5090	84.9	0.19	0.962
Benzo[a]pyrene d-12		6210	5010	80.7	0.19	1.009
Perylene d-12		6450	5340	82.7	0.24	1.024
Dibenzo[a,h]anthracene d-14		5750	4490	78.2	0.25	1.211
Indeno[1,2,3-cd]pyrene d-12		5970	4670	78.2	0.17	1.207
Benzo[ghi]perylene d-12		5940	4760	80.2	0.19	1.238
	LAB FLAG ¹	SPIKE CONC. (ng/sample)	CONC. FOUND (ng/sample)	REPORTING LIMIT (RL) ³ (ng/sample)	R(%) ²	ION ABUND. RATIO

CLIENT STANDARD

Anthracene d-10		1990	1820	14.5 (S)	91.4	0.13
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(1) Where applicable, custom lab flags have been used on this report.

(2) R% = percent recovery.

(3) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 1A
ANALYSIS REPORTCLIENT SAMPLE NO.
PDI-RB-XD-181129
Sample Collection:
29-Nov-2018 09:50

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: 04-Dec-2018

Extraction Date: 28-Jan-2019

Analysis Date: 02-Feb-2019 **Time:** 01:35:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: N/A

Project No. PORTLAND HARBOR PDI AND
BASELINE WATER

Lab Sample I.D.: L30522-8

Sample Size: 1 sample

Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS

GC Column ID: RTX5

Sample Data Filename: PH9S0558.D

Blank Data Filename: PH9S0550.D

Cal. Ver. Data Filename: PH9S0545.D

Concentration Units: ng/sample

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	E MAX				
Benz[a]anthracene ³	56-55-3	U		2.87 (S)		
Chrysene ⁴	218-01-9	U		3.11 (S)		
Benzo[b]fluoranthene	205-99-2	U		1.80 (S)		
Benzo[j,k]fluoranthenes		U		2.23 (S)		
Benzo[a]pyrene	50-32-8	U		3.03 (S)		
Dibenz[a,h]anthracene ⁵	53-70-3	U		3.27 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	U		1.66 (S)		
Benzo[ghi]perylene	191-24-2	U		1.43 (S)		

- (1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; E = exceeds calibrated linear range, see dilution data; MAX = concentration is an estimated maximum value.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

For Axy Internal Use Only [XSL Template: Pest1A.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: PAH_PAH_LO_LPAR_L30522-8_Form1A_PH9S0558.D_SJ2508298.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 1A
ANALYSIS REPORTCLIENT SAMPLE NO.
PDI-RB-XD-181129
Sample Collection:
29-Nov-2018 09:50

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: 04-Dec-2018

Extraction Date: 28-Jan-2019

Analysis Date: 06-Feb-2019 Time: 18:00:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: 5

Concentration Units: ng/sample

Project No.

Lab Sample I.D.:

Sample Size:

Initial Calibration Date:

Instrument ID:

GC Column ID:

Sample Data Filename:

Blank Data Filename:

Cal. Ver. Data Filename:

PORTLAND HARBOR PDI AND
BASELINE WATER
L30522-8 N

1 sample

02-Jan-2019

LR GC/MS

RTX5

PH9S0619.D

PH9S0550.D

PH9S0605.D

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	D MAX	93500	312 (S)	0.07	1.006
Benz[a]anthracene ³	56-55-3	X				
Chrysene ⁴	218-01-9	X				
Benzo[b]fluoranthene	205-99-2	X				
Benzo[j,k]fluoranthenes		X				
Benzo[a]pyrene	50-32-8	X				
Dibenz[a,h]anthracene ⁵	53-70-3	X				
Indeno[1,2,3-cd]pyrene	193-39-5	X				
Benzo[ghi]perylene	191-24-2	X				

(1) Where applicable, custom lab flags have been used on this report; D = dilution data; X = result reported separately; MAX = concentration is an estimated maximum value.

(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

(3) May co-elute with Cyclopenta(cd)pyrene.

(4) May co-elute with Triphenylene.

(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

For Axy Internal Use Only [XSL Template: Pest1A.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: PAH_PAH_LO_LPAR_L30522-8_Form1A_PH9S0619.D_SJ2509626.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 2
ANALYSIS REPORT

CLIENT SAMPLE NO.
PDI-RB-XD-181129
Sample Collection:
29-Nov-2018 09:50

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4972	Project No.	PORTLAND HARBOR PDI AND BASELINE WATER
Matrix:	XAD	Lab Sample I.D.:	L30522-8
Sample Receipt Date:	04-Dec-2018	Sample Size:	1 sample
Extraction Date:	28-Jan-2019	Initial Calibration Date:	02-Jan-2019
Analysis Date:	02-Feb-2019 Time: 01:35:00	Instrument ID:	LR GC/MS
Extract Volume (uL):	400	GC Column ID:	RTX5
Injection Volume (uL):	1.0	Sample Data Filename:	PH9S0558.D
Dilution Factor:	N/A	Blank Data Filename:	PH9S0550.D
Concentration Units:	ng absolute	Cal. Ver. Data Filename:	PH9S0545.D

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	ION ABUND. RATIO	RRT
Naphthalene d-8	X					
2-Methylnaphthalene d-10		5910	2990	50.6	0.19	0.755
2,6-Dimethylnaphthalene d-12		6170	4040	65.5	0.73	0.895
Acenaphthylene d-8		6180	4500	72.9	0.15	0.961
Dibenzothiophene d-8		6110	4530	74.3	0.09	0.792
Phenanthrene d-10		5420	4530	83.7	0.14	0.808
Fluoranthene d-10		5960	4920	82.6	0.18	0.971
Benzo[a]anthracene d-12		6090	4480	73.5	0.23	1.164
Chrysene d-12		5880	5100	86.7	0.25	1.169
Benzo[b]fluoranthene d-12		5910	4940	83.6	0.20	0.958
Benzo[k]fluoranthene d-12		6000	5250	87.5	0.19	0.962
Benzo[a]pyrene d-12		6210	5120	82.4	0.18	1.009
Perylene d-12		6450	5420	84.1	0.23	1.024
Dibenzo[a,h]anthracene d-14		5750	4070	70.9	0.28	1.212
Indeno[1,2,3-cd]pyrene d-12		5970	4330	72.5	0.17	1.207
Benzo[ghi]perylene d-12		5940	4610	77.7	0.18	1.238
	LAB FLAG ¹	SPIKE CONC. (ng/sample)	CONC. FOUND (ng/sample)	REPORTING LIMIT (RL) ³ (ng/sample)	R(%) ²	ION ABUND. RATIO

CLIENT STANDARD

Anthracene d-10	1990	1750	10.5 (S)	87.9	0.11
------------------------	------	------	----------	------	------

(1) Where applicable, custom lab flags have been used on this report; X = result reported separately.

(2) R% = percent recovery.

(3) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 2
ANALYSIS REPORTCLIENT SAMPLE NO.
PDI-RB-XD-181129
Sample Collection:
29-Nov-2018 09:50

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: 04-Dec-2018

Extraction Date: 28-Jan-2019

Analysis Date: 06-Feb-2019 Time: 18:00:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: 5

Concentration Units: ng absolute

Project No. PORTLAND HARBOR PDI AND
BASELINE WATER

Lab Sample I.D.: L30522-8 N

Sample Size: 1 sample

Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS

GC Column ID: RTX5

Sample Data Filename: PH9S0619.D

Blank Data Filename: PH9S0550.D

Cal. Ver. Data Filename: PH9S0605.D

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	ION ABUND. RATIO	RRT
Naphthalene d-8	D	6000	1860	31.1	0.08	0.607
2-Methylnaphthalene d-10	X					
2,6-Dimethylnaphthalene d-12	X					
Acenaphthylene d-8	X					
Dibenzothiophene d-8	X					
Phenanthrene d-10	X					
Fluoranthene d-10	X					
Benzo[a]anthracene d-12	X					
Chrysene d-12	X					
Benzo[b]fluoranthene d-12	X					
Benzo[k]fluoranthene d-12	X					
Benzo[a]pyrene d-12	X					
Perylene d-12	X					
Dibenzo[a,h]anthracene d-14	X					
Indeno[1,2,3-cd]pyrene d-12	X					
Benzo[ghi]perylene d-12	X					
	LAB FLAG ¹	SPIKE CONC. (ng/sample)	CONC. FOUND (ng/sample)	REPORTING LIMIT (RL) ³ (ng/sample)	R(%) ²	ION ABUND. RATIO

CLIENT STANDARD

Anthracene d-10 X

(1) Where applicable, custom lab flags have been used on this report; D = dilution data; X = result reported separately.

(2) R% = percent recovery.

(3) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 1A
ANALYSIS REPORTCLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: N/A

Extraction Date: 28-Jan-2019

Analysis Date: 01-Feb-2019 Time: 19:04:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: N/A

Project No.:

Lab Sample I.D.:

Sample Size:

Initial Calibration Date:

Instrument ID:

GC Column ID:

Sample Data Filename:

Blank Data Filename:

Cal. Ver. Data Filename:

N/A

WG66477-101

1 sample

02-Jan-2019

LR GC/MS

RTX5

PH9S0550.D

PH9S0550.D

PH9S0545.D

Concentration Units: ng/sample

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	K J	51.3	13.4 (S)	0.10	1.007
Benz[a]anthracene ³	56-55-3	K J	2.24	0.956 (S)	0.18	1.003
Chrysene ⁴	218-01-9	J	3.00	0.923 (S)	0.25	1.002
Benzo[b]fluoranthene	205-99-2	U		1.19 (S)		
Benzo[j,k]fluoranthenes		K J	1.92	1.50 (S)	0.87	1.003
Benzo[a]pyrene	50-32-8	U		2.02 (S)		
Dibenz[a,h]anthracene ⁵	53-70-3	U		3.34 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	U		3.22 (S)		
Benzo[ghi]perylene	191-24-2	K J	4.38	2.19 (S)	1.14	1.002

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent.

(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

(3) May co-elute with Cyclopenta(cd)pyrene.

(4) May co-elute with Triphenylene.

(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 2
ANALYSIS REPORTCLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

Matrix: XAD

Sample Receipt Date: N/A

Extraction Date: 28-Jan-2019

Analysis Date: 01-Feb-2019 Time: 19:04:00

Extract Volume (uL): 400

Injection Volume (uL): 1.0

Dilution Factor: N/A

Concentration Units: ng absolute

Project No. N/A

Lab Sample I.D.: WG66477-101

Sample Size: 1 sample

Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS

GC Column ID: RTX5

Sample Data Filename: PH9S0550.D

Blank Data Filename: PH9S0550.D

Cal. Ver. Data Filename: PH9S0545.D

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	ION ABUND. RATIO	RRT
Naphthalene d-8		6000	939	15.6	0.10	0.610
2-Methylnaphthalene d-10	V	5910	1060	17.9	0.20	0.756
2,6-Dimethylnaphthalene d-12	V	6170	1220	19.8	0.77	0.896
Acenaphthylene d-8		6180	1310	21.2	0.16	0.961
Dibenzothiophene d-8	V	6110	1540	25.3	0.09	0.792
Phenanthrene d-10	V	5420	1470	27.2	0.14	0.808
Fluoranthene d-10		5960	1800	30.2	0.19	0.971
Benzo[a]anthracene d-12		6090	1890	31.1	0.22	1.164
Chrysene d-12		5880	2100	35.8	0.25	1.170
Benzo[b]fluoranthene d-12		5910	2280	38.7	0.20	0.958
Benzo[k]fluoranthene d-12		6000	2420	40.4	0.18	0.962
Benzo[a]pyrene d-12		6210	2370	38.1	0.19	1.009
Perylene d-12		6450	2430	37.6	0.23	1.024
Dibenzo[a,h]anthracene d-14	V	5750	1320	23.0	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12	V	5970	1490	24.9	0.17	1.208
Benzo[ghi]perylene d-12	V	5940	1670	28.1	0.18	1.239
	LAB FLAG ¹	SPIKE CONC. (ng/sample)	CONC. FOUND (ng/sample)	REPORTING LIMIT (RL) ³ (ng/sample)	R(%) ²	ION ABUND. RATIO

CLIENT STANDARD

Anthracene d-10 24900 23800 77.8 (S) 95.5 0.13

(1) Where applicable, custom lab flags have been used on this report; V = surrogate recovery is not within method/contract control limits.

(2) R% = percent recovery.

(3) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

SGS AXYS METHOD MLA-021 Rev 12

Form 8A
ONGOING PRECISION AND RECOVERY (OPR)

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
 V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

OPR Data Filename: PH9S0547.D

Matrix: XAD

Lab Sample I.D.: WG66477-102

Extraction Date: 28-Jan-2019

Analysis Date: 01-Feb-2019 **Time:** 16:38:00

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON 100 uL EXTRACT.

COMPOUND	CAS NO.	LAB FLAG ¹	ION ABUND. RATIO	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS (ng/mL)	% RECOVERY
Naphthalene	91-20-3	MAX	0.07	59200	55600	41400 - 76900	94.0
Benz[a]anthracene	56-55-3		0.27	60400	60200	42300 - 78500	99.6
Chrysene	218-01-9		0.30	60300	61500	42200 - 78400	102
Benzo[b]fluoranthene	205-99-2		0.22	60400	58400	42300 - 78500	96.6
Benzo[j,k]fluoranthenes			0.22	60500	61200	42300 - 78600	101
Benzo[a]pyrene	50-32-8		0.22	60000	60400	42000 - 78000	101
Dibenz[a,h]anthracene	53-70-3		0.14	59200	59300	41400 - 76900	100
Indeno[1,2,3-cd]pyrene	193-39-5		0.19	60400	59400	42300 - 78500	98.5
Benzo[ghi]perylene	191-24-2		0.21	59100	60600	41400 - 76900	102

(1) Where applicable, custom lab flags have been used on this report; MAX = concentration is an estimated maximum value.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Peter Chen _____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: Pest8A.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6; Report Filename: PAH_PAH_LO_LPAR_WG66477-102_Form8A_SJ2508285.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 8B
ONGOING PRECISION AND RECOVERY (OPR)

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
 V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4972

OPR Data Filename: PH9S0547.D

Matrix: XAD

Lab Sample I.D.: WG66477-102

Extraction Date: 28-Jan-2019

Analysis Date: 01-Feb-2019 Time: 16:38:00

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON 100 uL EXTRACT.

LABELLED COMPOUND	CAS NO.	LAB FLAG ¹	ION ABUND. RATIO	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS (ng/mL)	% RECOVERY
Naphthalene d-8	1146-65-2		0.09	60000	22900	9000-78000	38.2
2-Methylnaphthalene d-10	7297-45-2		0.20	59100	25300	11800-76800	42.8
2,6-Dimethylnaphthalene d-12	350820-12-1		0.73	61700	28300	12300-80100	45.9
Acenaphthylene d-8	93951-97-4		0.15	61800	29400	12400-80300	47.5
Dibenzothiophene d-8	33262-29-2		0.09	61100	30400	18300-79400	49.8
Phenanthrene d-10	1517-22-2		0.16	54200	30900	16200-70400	57.1
Fluoranthene d-10	93951-69-0		0.17	59600	40400	17900-77400	67.8
Benzo[a]anthracene d-12	1718-53-2		0.23	60900	43900	18300-79200	72.0
Chrysene d-12	1719-03-5		0.26	58800	43000	17600-76400	73.1
Benzo[b]fluoranthene d-12	93951-98-5		0.20	59100	47300	17700-76800	80.0
Benzo[k]fluoranthene d-12	93952-01-3		0.19	60000	46900	18000-78000	78.1
Benzo[a]pyrene d-12	63466-71-7		0.20	62100	47600	18600-80700	76.6
Perylene d-12	1520-96-3		0.24	64500	49800	19400-83900	77.2
Dibenzo[a,h]anthracene d-14	13250-98-1		0.28	57500	40700	17200-74700	70.9
Indeno[1,2,3-cd]pyrene d-12	203578-33-0		0.17	59700	41800	17900-77600	70.1
Benzo[ghi]perylene d-12	93951-66-7		0.19	59400	42300	17800-77200	71.1

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Peter Chen_____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: Pest8B.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6; Report Filename: PAH_PAH_LO_LPAR_WG66477-102_Form8B_SJ2508285.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 3A
INITIAL CALIBRATION RELATIVE RESPONSES

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
 V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS

GC Column ID: RTX5

CS0 Data Filename: N/A

CS1 Data Filename: PH9S0006.D

CS2 Data Filename: PH9S0007.D

CS3 Data Filename: PH9S0008.D

CS4 Data Filename: PH9S0009.D

CS5 Data Filename: PH9S0010.D

CS6 Data Filename: N/A

COMPOUND	LAB FLAG ¹	RELATIVE RESPONSE (RR)						MEAN RR	CV (%RSD) ²
		CS0	CS1	CS2	CS3	CS4	CS5		
Naphthalene			1.24	1.19	1.23	1.19	1.18	1.20	2.42
Benz[a]anthracene			1.33	1.25	1.31	1.25	1.23	1.27	3.33
Chrysene			1.29	1.21	1.26	1.22	1.20	1.24	3.08
Benzo[b]fluoranthene			1.54	1.43	1.46	1.37	1.37	1.43	5.08
Benzo[j,k]fluoranthenes			1.35	1.26	1.30	1.29	1.26	1.29	2.83
Benzo[a]pyrene			1.29	1.26	1.33	1.31	1.31	1.30	2.04
Dibenz[a,h]anthracene			1.33	1.24	1.30	1.27	1.28	1.28	2.58
Indeno[1,2,3-cd]pyrene			1.32	1.24	1.26	1.21	1.22	1.25	3.53
Benzo[ghi]perylene			1.26	1.17	1.22	1.19	1.19	1.21	2.86

(1) Where applicable, custom lab flags have been used on this report.

(2) QC limit is 20% for native compounds with a labeled analog, 35% for those without a labeled analog.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Anita Riggs _____

For Axys Internal Use Only [XSL Template: Form3A.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
 Report Filename: GENERIC-SPECS_PAH_LO_02-Jan-2019_PH9S__Form3A_GS80199.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 3B
INITIAL CALIBRATION RELATIVE RESPONSES

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
 V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS

GC Column ID: RTX5

CS0 Data Filename: N/A

CS1 Data Filename: PH9S0006.D

CS2 Data Filename: PH9S0007.D

CS3 Data Filename: PH9S0008.D

CS4 Data Filename: PH9S0009.D

CS5 Data Filename: PH9S0010.D

CS6 Data Filename: N/A

LABELED COMPOUND	LAB FLAG ¹	RELATIVE RESPONSE (RR)						MEAN RR	CV (%RSD) ²
		CS0	CS1	CS2	CS3	CS4	CS5		
Naphthalene d-8			1.46	1.48	1.48	1.43	1.45	1.46	1.46
2-Methylnaphthalene d-10			1.00	1.01	1.01	0.99	1.01	1.01	0.89
2,6-Dimethylnaphthalene d-12			0.94	0.95	0.95	0.93	0.95	0.94	0.86
Acenaphthylene d-8			1.76	1.79	1.77	1.58	1.77	1.73	4.98
Dibenzothiophene d-8			0.86	0.84	0.86	0.87	0.89	0.86	1.90
Phenanthrene d-10			0.96	0.94	0.97	0.99	1.01	0.98	2.72
Fluoranthene d-10			0.94	0.96	0.96	0.95	0.97	0.96	0.93
Benzo[a]anthracene d-12			0.89	0.90	0.87	0.85	0.86	0.88	2.37
Chrysene d-12			0.93	0.93	0.91	0.86	0.89	0.90	3.51
Benzo[b]fluoranthene d-12			0.93	0.94	0.94	0.95	0.95	0.94	0.68
Benzo[k]fluoranthene d-12			1.02	1.02	1.04	1.02	1.06	1.03	1.72
Benzo[a]pyrene d-12			0.91	0.91	0.92	0.91	0.94	0.92	1.52
Perylene d-12			0.88	0.88	0.89	0.88	0.90	0.89	1.06
Dibenzo[a,h]anthracene d-14			0.89	0.90	0.91	0.94	0.96	0.92	3.28
Indeno[1,2,3-cd]pyrene d-12			0.99	0.99	0.99	1.02	1.02	1.00	1.73
Benzo[ghi]perylene d-12			1.08	1.09	1.10	1.11	1.12	1.10	1.39

(1) Where applicable, custom lab flags have been used on this report.

(2) QC limit is 35% for labeled compounds.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Anita Riggs _____

For Axys Internal Use Only [XSL Template: Form3B.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
 Report Filename: GENERIC-SPECS_PAH_LO_02-Jan-2019_PH9S__Form3B_GS80199.html; Workgroup: WG66477; Design ID: 3400]

Form 3C
INITIAL CALIBRATION ION ABUNDANCE RATIOS

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS

GC Column ID: RTX5

CS0 Data Filename: N/A

CS1 Data Filename: PH9S0006.D

CS2 Data Filename: PH9S0007.D

CS3 Data Filename: PH9S0008.D

CS4 Data Filename: PH9S0009.D

CS5 Data Filename: PH9S0010.D

CS6 Data Filename: N/A

COMPOUND	LAB FLAG ¹	M/Z's FORMING RATIO	ION ABUNDANCE RATIO						
			CS0	CS1	CS2	CS3	CS4	CS5	CS6
Naphthalene		128,102		0.08	0.08	0.07	0.07	0.07	
Benz[a]anthracene		228,226		0.26	0.26	0.27	0.27	0.27	
Chrysene		228,226		0.29	0.30	0.30	0.30	0.30	
Benzo[b]fluoranthene		252,253		0.22	0.22	0.22	0.22	0.22	
Benzo[j,k]fluoranthenes		252,253		0.20	0.20	0.22	0.22	0.22	
Benzo[a]pyrene		252,253		0.21	0.22	0.21	0.22	0.22	
Dibenz[a,h]anthracene		278,139		0.15	0.14	0.15	0.15	0.16	
Indeno[1,2,3-cd]pyrene		276,138		0.22	0.22	0.20	0.20	0.19	
Benzo[ghi]perylene		276,138		0.21	0.22	0.21	0.21	0.21	

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Anita Riggs _____

For Axys Internal Use Only [XSL Template: Form3C.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: GENERIC-SPECS_PAH_LO_02-Jan-2019_PH9S__Form3C_GS80199.html; Workgroup: WG66477; Design ID: 3400]

Form 3D
INITIAL CALIBRATION ION ABUNDANCE RATIOS

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811
Initial Calibration Date: 02-Jan-2019

Instrument ID: LR GC/MS**GC Column ID:** RTX5

CS0 Data Filename: N/A
CS1 Data Filename: PH9S0006.D
CS2 Data Filename: PH9S0007.D
CS3 Data Filename: PH9S0008.D
CS4 Data Filename: PH9S0009.D
CS5 Data Filename: PH9S0010.D
CS6 Data Filename: N/A

LABELED COMPOUND	LAB FLAG ¹	M/Z's FORMING RATIO	ION ABUNDANCE RATIO						
			CS0	CS1	CS2	CS3	CS4	CS5	CS6
Naphthalene d-8		136,134		0.09	0.09	0.09	0.09	0.09	
2-Methylnaphthalene d-10		152,151		0.19	0.19	0.19	0.19	0.19	
2,6-Dimethylnaphthalene d-12		168,150		0.74	0.74	0.74	0.74	0.74	
Acenaphthylene d-8		160,158		0.15	0.15	0.15	0.15	0.15	
Dibenzothiophene d-8		192,160		0.09	0.09	0.09	0.09	0.09	
Phenanthrene d-10		188,184		0.14	0.14	0.14	0.14	0.14	
Fluoranthene d-10		212,208		0.16	0.16	0.16	0.16	0.17	
Benzo[a]anthracene d-12		240,236		0.23	0.23	0.23	0.23	0.23	
Chrysene d-12		240,236		0.26	0.26	0.26	0.26	0.26	
Benzo[b]fluoranthene d-12		264,260		0.20	0.20	0.20	0.20	0.20	
Benzo[k]fluoranthene d-12		264,260		0.20	0.19	0.20	0.20	0.19	
Benzo[a]pyrene d-12		264,260		0.20	0.20	0.20	0.20	0.20	
Perylene d-12		264,260		0.24	0.24	0.24	0.24	0.24	
Dibenzo[a,h]anthracene d-14		292,288		0.29	0.31	0.31	0.30	0.29	
Indeno[1,2,3-cd]pyrene d-12		288,284		0.18	0.18	0.18	0.18	0.18	
Benzo[ghi]perylene d-12		288,284		0.19	0.19	0.19	0.19	0.19	

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Anita Riggs _____

For Axys Internal Use Only [XSL Template: Form3D.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: GENERIC-SPECS_PAH_LO_02-Jan-2019_PH9S__Form3D_GS80199.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 4A
CALIBRATION VERIFICATION

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 02-Jan-2019 VER Data Filename: PH9S0545.D
Instrument ID: LR GC/MS Analysis Date: 01-Feb-2019
GC Column ID: RTX5 Analysis Time: 15:00:00

COMPOUND	CAS NO.	LAB FLAG ¹	m/e ION CHANNELS	ION ABUND. RATIO	SAMPLE QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene	91-20-3		128,102	0.07	0.06-0.08	2100	1480-2470
Benz[a]anthracene	56-55-3		228,226	0.27	0.22-0.32	1930	1510-2520
Chrysene	218-01-9		228,226	0.29	0.23-0.35	2020	1510-2510
Benzo[b]fluoranthene	205-99-2		252,253	0.22	0.18-0.26	1880	1510-2520
Benzo[j,k]fluoranthenes			252,253	0.22	0.18-0.26	2010	1510-2520
Benzo[a]pyrene	50-32-8		252,253	0.22	0.18-0.26	1990	1500-2500
Dibenz[a,h]anthracene	53-70-3		278,139	0.15	0.10-0.20	1970	1480-2470
Indeno[1,2,3-cd]pyrene	193-39-5		276,138	0.19	0.12-0.26	1860	1510-2520
Benzo[ghi]perylene	191-24-2		276,138	0.21	0.14-0.28	1980	1480-2460

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Leanne Henley _____

For Axy Internal Use Only [XSL Template: Pest4A.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: GENERIC-SPECS_PAH_LO_PH9S0545.D_Form4A_SJ2507815.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 4B
CALIBRATION VERIFICATION

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 02-Jan-2019 VER Data Filename: PH9S0545.D
 Instrument ID: LR GC/MS Analysis Date: 01-Feb-2019
 GC Column ID: RTX5 Analysis Time: 15:00:00

LABELLED COMPOUND	CAS NO.	LAB FLAG ¹	m/e ION CHANNELS	ION ABUND. RATIO	SAMPLE QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene d-8	1146-65-2		136,134	0.10	0.08-0.12	1890	1500-2500
2-Methylnaphthalene d-10	7297-45-2		152,151	0.19	0.15-0.23	1890	1480-2460
2,6-Dimethylnaphthalene d-12	350820-12-1		168,150	0.74	0.59-0.89	2010	1540-2570
Acenaphthylene d-8	93951-97-4		160,158	0.15	0.12-0.18	1790	1550-2580
Dibenzothiophene d-8	33262-29-2		192,160	0.09	0.07-0.11	1910	1530-2540
Phenanthrene d-10	1517-22-2		188,184	0.14	0.11-0.17	1680	1350-2260
Fluoranthene d-10	93951-69-0		212,208	0.16	0.13-0.19	1930	1490-2480
Benzo[a]anthracene d-12	1718-53-2		240,236	0.23	0.18-0.28	2070	1520-2540
Chrysene d-12	1719-03-5		240,236	0.26	0.21-0.31	1930	1470-2450
Benzo[b]fluoranthene d-12	93951-98-5		264,260	0.20	0.16-0.24	1960	1480-2460
Benzo[k]fluoranthene d-12	93952-01-3		264,260	0.19	0.15-0.23	1950	1500-2500
Benzo[a]pyrene d-12	63466-71-7		264,260	0.20	0.16-0.24	2000	1550-2590
Perylene d-12	1520-96-3		264,260	0.24	0.19-0.29	2120	1610-2690
Dibenzo[a,h]anthracene d-14	13250-98-1		292,288	0.27	0.18-0.36	1890	1440-2390
Indeno[1,2,3-cd]pyrene d-12	203578-33-0		288,284	0.17	0.11-0.23	2050	1490-2490
Benzo[ghi]perylene d-12	93951-66-7		288,284	0.19	0.12-0.26	1940	1490-2480

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Leanne Henley _____

For Axys Internal Use Only [XSL Template: Pest4B.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
 Report Filename: GENERIC-SPECS_PAH_LO_PH9S0545.D_Form4B_SJ2507815.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 4A
CALIBRATION VERIFICATION

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 02-Jan-2019 VER Data Filename: PH9S0560.D
Instrument ID: LR GC/MS Analysis Date: 02-Feb-2019
GC Column ID: RTX5 Analysis Time: 02:44:00

COMPOUND	CAS NO.	LAB FLAG ¹	m/e ION CHANNELS	ION ABUND. RATIO	SAMPLE QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene	91-20-3		128,102	0.07	0.06-0.08	2110	1480-2470
Benz[a]anthracene	56-55-3		228,226	0.27	0.22-0.32	1940	1510-2520
Chrysene	218-01-9		228,226	0.30	0.24-0.36	1990	1510-2510
Benzo[b]fluoranthene	205-99-2		252,253	0.22	0.18-0.26	1890	1510-2520
Benzo[j,k]fluoranthenes			252,253	0.22	0.18-0.26	1990	1510-2520
Benzo[a]pyrene	50-32-8		252,253	0.22	0.18-0.26	1970	1500-2500
Dibenz[a,h]anthracene	53-70-3		278,139	0.14	0.09-0.19	1960	1480-2470
Indeno[1,2,3-cd]pyrene	193-39-5		276,138	0.19	0.12-0.26	1880	1510-2520
Benzo[ghi]perylene	191-24-2		276,138	0.20	0.13-0.27	1970	1480-2460

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Leanne Henley _____

For Axys Internal Use Only [XSL Template: Pest4A.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: GENERIC-SPECS_PAH_LO_PH9S0560.D_Form4A_SJ2508308.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 4B
CALIBRATION VERIFICATION

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 02-Jan-2019 VER Data Filename: PH9S0560.D
Instrument ID: LR GC/MS Analysis Date: 02-Feb-2019
GC Column ID: RTX5 Analysis Time: 02:44:00

LABELLED COMPOUND	CAS NO.	LAB FLAG ¹	m/e ION CHANNELS	ION ABUND. RATIO	SAMPLE QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene d-8	1146-65-2		136,134	0.09	0.07-0.11	1900	1500-2500
2-Methylnaphthalene d-10	7297-45-2		152,151	0.19	0.15-0.23	1890	1480-2460
2,6-Dimethylnaphthalene d-12	350820-12-1		168,150	0.74	0.59-0.89	1970	1540-2570
Acenaphthylene d-8	93951-97-4		160,158	0.15	0.12-0.18	1770	1550-2580
Dibenzothiophene d-8	33262-29-2		192,160	0.09	0.07-0.11	1860	1530-2540
Phenanthrene d-10	1517-22-2		188,184	0.14	0.11-0.17	1670	1350-2260
Fluoranthene d-10	93951-69-0		212,208	0.16	0.13-0.19	1950	1490-2480
Benzo[a]anthracene d-12	1718-53-2		240,236	0.23	0.18-0.28	2120	1520-2540
Chrysene d-12	1719-03-5		240,236	0.25	0.20-0.30	2010	1470-2450
Benzo[b]fluoranthene d-12	93951-98-5		264,260	0.20	0.16-0.24	1970	1480-2460
Benzo[k]fluoranthene d-12	93952-01-3		264,260	0.19	0.15-0.23	1970	1500-2500
Benzo[a]pyrene d-12	63466-71-7		264,260	0.20	0.16-0.24	2000	1550-2590
Perylene d-12	1520-96-3		264,260	0.24	0.19-0.29	2100	1610-2690
Dibenzo[a,h]anthracene d-14	13250-98-1		292,288	0.28	0.18-0.38	1810	1440-2390
Indeno[1,2,3-cd]pyrene d-12	203578-33-0		288,284	0.17	0.11-0.23	1960	1490-2490
Benzo[ghi]perylene d-12	93951-66-7		288,284	0.19	0.12-0.26	1900	1490-2480

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Leanne Henley _____

For Axys Internal Use Only [XSL Template: Pest4B.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: GENERIC-SPECS_PAH_LO_PH9S0560.D_Form4B_SJ2508308.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 4A
CALIBRATION VERIFICATION

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 02-Jan-2019 VER Data Filename: PH9S0605.D
Instrument ID: LR GC/MS Analysis Date: 06-Feb-2019
GC Column ID: RTX5 Analysis Time: 07:34:00

COMPOUND	CAS NO.	LAB FLAG ¹	m/e ION CHANNELS	ION ABUND. RATIO	SAMPLE QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene	91-20-3		128,102	0.07	0.06-0.08	2100	1480-2470
Benz[a]anthracene	56-55-3		228,226	0.27	0.22-0.32	1960	1510-2520
Chrysene	218-01-9		228,226	0.29	0.23-0.35	2000	1510-2510
Benzo[b]fluoranthene	205-99-2		252,253	0.22	0.18-0.26	1910	1510-2520
Benzo[j,k]fluoranthenes			252,253	0.22	0.18-0.26	2000	1510-2520
Benzo[a]pyrene	50-32-8		252,253	0.22	0.18-0.26	1990	1500-2500
Dibenz[a,h]anthracene	53-70-3		278,139	0.15	0.10-0.20	2020	1480-2470
Indeno[1,2,3-cd]pyrene	193-39-5		276,138	0.20	0.13-0.27	1900	1510-2520
Benzo[ghi]perylene	191-24-2		276,138	0.21	0.14-0.28	1990	1480-2460

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Leanne Henley _____

For Axys Internal Use Only [XSL Template: Pest4A.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: GENERIC-SPECS_PAH_LO_PH9S0605.D_Form4A_SJ2509593.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 4B
CALIBRATION VERIFICATION

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 02-Jan-2019 VER Data Filename: PH9S0605.D
Instrument ID: LR GC/MS Analysis Date: 06-Feb-2019
GC Column ID: RTX5 Analysis Time: 07:34:00

LABELLED COMPOUND	CAS NO.	LAB FLAG ¹	m/e ION CHANNELS	ION ABUND. RATIO	SAMPLE QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene d-8	1146-65-2		136,134	0.09	0.07-0.11	1900	1500-2500
2-Methylnaphthalene d-10	7297-45-2		152,151	0.19	0.15-0.23	1890	1480-2460
2,6-Dimethylnaphthalene d-12	350820-12-1		168,150	0.73	0.58-0.88	2010	1540-2570
Acenaphthylene d-8	93951-97-4		160,158	0.15	0.12-0.18	1770	1550-2580
Dibenzothiophene d-8	33262-29-2		192,160	0.09	0.07-0.11	2070	1530-2540
Phenanthrene d-10	1517-22-2		188,184	0.14	0.11-0.17	1850	1350-2260
Fluoranthene d-10	93951-69-0		212,208	0.16	0.13-0.19	2010	1490-2480
Benzo[a]anthracene d-12	1718-53-2		240,236	0.23	0.18-0.28	1830	1520-2540
Chrysene d-12	1719-03-5		240,236	0.26	0.21-0.31	1720	1470-2450
Benzo[b]fluoranthene d-12	93951-98-5		264,260	0.20	0.16-0.24	1950	1480-2460
Benzo[k]fluoranthene d-12	93952-01-3		264,260	0.19	0.15-0.23	1930	1500-2500
Benzo[a]pyrene d-12	63466-71-7		264,260	0.20	0.16-0.24	1940	1550-2590
Perylene d-12	1520-96-3		264,260	0.24	0.19-0.29	2060	1610-2690
Dibenzo[a,h]anthracene d-14	13250-98-1		292,288	0.28	0.18-0.38	1720	1440-2390
Indeno[1,2,3-cd]pyrene d-12	203578-33-0		288,284	0.18	0.12-0.24	1910	1490-2490
Benzo[ghi]perylene d-12	93951-66-7		288,284	0.19	0.12-0.26	1850	1490-2480

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Leanne Henley _____

For Axys Internal Use Only [XSL Template: Pest4B.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: GENERIC-SPECS_PAH_LO_PH9S0605.D_Form4B_SJ2509593.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 4A
CALIBRATION VERIFICATION

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 02-Jan-2019 VER Data Filename: PH9S0621.D
Instrument ID: LR GC/MS Analysis Date: 06-Feb-2019
GC Column ID: RTX5 Analysis Time: 19:09:00

COMPOUND	CAS NO.	LAB FLAG ¹	m/e ION CHANNELS	ION ABUND. RATIO	SAMPLE QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene	91-20-3		128,102	0.07	0.06-0.08	2100	1480-2470
Benz[a]anthracene	56-55-3		228,226	0.27	0.22-0.32	1940	1510-2520
Chrysene	218-01-9		228,226	0.29	0.23-0.35	2050	1510-2510
Benzo[b]fluoranthene	205-99-2		252,253	0.22	0.18-0.26	1900	1510-2520
Benzo[j,k]fluoranthenes			252,253	0.21	0.17-0.25	2000	1510-2520
Benzo[a]pyrene	50-32-8		252,253	0.22	0.18-0.26	2010	1500-2500
Dibenz[a,h]anthracene	53-70-3		278,139	0.15	0.10-0.20	1960	1480-2470
Indeno[1,2,3-cd]pyrene	193-39-5		276,138	0.20	0.13-0.27	1870	1510-2520
Benzo[ghi]perylene	191-24-2		276,138	0.21	0.14-0.28	1980	1480-2460

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Leanne Henley _____

For Axys Internal Use Only [XSL Template: Pest4A.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: GENERIC-SPECS_PAH_LO_PH9S0621.D_Form4A_SJ2509625.html; Workgroup: WG66477; Design ID: 3400]

SGS AXYS METHOD MLA-021 Rev 12

Form 4B
CALIBRATION VERIFICATION

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 02-Jan-2019 VER Data Filename: PH9S0621.D
Instrument ID: LR GC/MS Analysis Date: 06-Feb-2019
GC Column ID: RTX5 Analysis Time: 19:09:00

LABELLED COMPOUND	CAS NO.	LAB FLAG ¹	m/e ION CHANNELS	ION ABUND. RATIO	SAMPLE QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene d-8	1146-65-2		136,134	0.09	0.07-0.11	1880	1500-2500
2-Methylnaphthalene d-10	7297-45-2		152,151	0.19	0.15-0.23	1910	1480-2460
2,6-Dimethylnaphthalene d-12	350820-12-1		168,150	0.74	0.59-0.89	2000	1540-2570
Acenaphthylene d-8	93951-97-4		160,158	0.15	0.12-0.18	1790	1550-2580
Dibenzothiophene d-8	33262-29-2		192,160	0.09	0.07-0.11	1990	1530-2540
Phenanthrene d-10	1517-22-2		188,184	0.14	0.11-0.17	1770	1350-2260
Fluoranthene d-10	93951-69-0		212,208	0.16	0.13-0.19	2020	1490-2480
Benzo[a]anthracene d-12	1718-53-2		240,236	0.23	0.18-0.28	1990	1520-2540
Chrysene d-12	1719-03-5		240,236	0.25	0.20-0.30	1820	1470-2450
Benzo[b]fluoranthene d-12	93951-98-5		264,260	0.20	0.16-0.24	1970	1480-2460
Benzo[k]fluoranthene d-12	93952-01-3		264,260	0.19	0.15-0.23	1910	1500-2500
Benzo[a]pyrene d-12	63466-71-7		264,260	0.20	0.16-0.24	1960	1550-2590
Perylene d-12	1520-96-3		264,260	0.24	0.19-0.29	2100	1610-2690
Dibenzo[a,h]anthracene d-14	13250-98-1		292,288	0.25	0.16-0.34	1790	1440-2390
Indeno[1,2,3-cd]pyrene d-12	203578-33-0		288,284	0.17	0.11-0.23	1970	1490-2490
Benzo[ghi]perylene d-12	93951-66-7		288,284	0.19	0.12-0.26	1870	1490-2480

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Leanne Henley _____

For Axys Internal Use Only [XSL Template: Pest4B.xsl; Created: 14-Feb-2019 11:46:23; Application: XMLTransformer-1.17.6;
Report Filename: GENERIC-SPECS_PAH_LO_PH9S0621.D_Form4B_SJ2509625.html; Workgroup: WG66477; Design ID: 3400]

Accreditation Scope

SGS AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev. 41

Compound Class	Compound	Accredited Method ID	SGS AXYS Method ID	Serum		Solids							Tissue		Urine		Water		Water, Non-Potable																					
				CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB ISO 17025	ANAB DoD **	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB ISO 17025	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE *	Maine DOH	Pennsylvania DEP	ANAB ISO 17025	ANAB DoD **						
BFR	BTBPE	SGS AXYS MLA-033	MLA-033		Y									Y																										
	DBDPE	SGS AXYS MLA-033	MLA-033		Y									Y																										
	HBB	SGS AXYS MLA-033	MLA-033		Y									Y																										
	PBEB	SGS AXYS MLA-033	MLA-033		Y									Y																										
Bisphenols	Bisphenol A	SGS AXYS MLA-113	MLA-113		Y																																			
	Bisphenol AF	SGS AXYS MLA-113	MLA-113		Y																																			
	Bisphenol B	SGS AXYS MLA-113	MLA-113		Y																																			
	Bisphenol E	SGS AXYS MLA-113	MLA-113		Y																																			
	Bisphenol F	SGS AXYS MLA-113	MLA-113		Y																																			
	Bisphenol S	SGS AXYS MLA-113	MLA-113		Y																																			
BPA and MPE	4,4'-dihydroxy-2,2-diphenylpropane (Bisphenol A) (BPA)	SGS AXYS MLA-059	MLA-059																																					
	Mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP)	SGS AXYS MLA-059	MLA-059																																					
	Mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP)	SGS AXYS MLA-059	MLA-059																																					
	Mono-(3-carboxypropyl) phthalate (MCPP)	SGS AXYS MLA-059	MLA-059																																					
	Mono-2-ethylhexyl phthalate (MEHP)	SGS AXYS MLA-059	MLA-059																																					
	Mono-benzyl phthalate (MBzP)	SGS AXYS MLA-059	MLA-059																																					
	Mono-butyl phthalate (MBP) (n + iso)	SGS AXYS MLA-059	MLA-059																																					
	Mono-cyclohexyl phthalate (MCHP)	SGS AXYS MLA-059	MLA-059																																					
	Mono-ethyl phthalate (MEP)	SGS AXYS MLA-059	MLA-059																																					
	Mono-iso-nonyl phthalate (MINP)	SGS AXYS MLA-059	MLA-059																																					
	Mono-methyl phthalate (MMP)	SGS AXYS MLA-059	MLA-059																																					
HBCDD	alpha-hexabromocyclododecane (a-HBCDD)	SGS AXYS MLA-070	MLA-070	Y																																				
	beta-hexabromocyclododecane (b-HBCDD)	SGS AXYS MLA-070	MLA-070	Y																																				
	gamma-hexabromocyclododecane (g-HBCDD)	SGS AXYS MLA-070	MLA-070	Y																																				
OC Pesticides	*Organochlorine Pesticides* category (CA only)		EPA 608	MLA-007																																				
			EPA 625	MLA-007																																				
			EPA 8081	MLA-007						Y																														
	Pesticides category (CA only)		EPA 8270	MLA-007						Y																														
	2,4'-DDD			EPA 625	MLA-007																																			
				EPA 8270	MLA-007					Y																														
				EPA 1699	MLA-028					Y																														
				SGS AXYS MLA-028	MLA-028	Y	Y	Y			Y	Y	Y		Y																									
				SGS AXYS MLA-007	MLA-007	Y	Y	Y							Y	Y																								
				EPA 625	MLA-007																																			
				EPA 8270	MLA-007					Y																														
	2,4'-DDE			EPA 625	MLA-007																																			
				EPA 8270	MLA-007					Y																														
				EPA 1699	MLA-028					Y																														
				SGS AXYS MLA-028	MLA-028	Y	Y	Y			Y	Y	Y		Y																									
				SGS AXYS MLA-007	MLA-007	Y	Y	Y							Y	Y																								
				EPA 625	MLA-007																																			
				EPA 8270	MLA-007					Y																														
	2,4'-DDT			EPA 625	MLA-007																																			
				EPA 8270	MLA-007					Y																														
				EPA 1699	MLA-028					Y																														
				SGS AXYS MLA-028	MLA-028	Y	Y	Y			Y	Y	Y		Y																									
				SGS AXYS MLA-007	MLA-007	Y	Y	Y							Y	Y																								
				EPA 625	MLA-007																																			
				EPA 8270	MLA-007					Y																														
	4,4'-DDD			EPA 625	MLA-007																																			
				EPA 8270	MLA-007					Y																														
		EPA 1699	MLA-028					Y																																
		SGS AXYS MLA-028	MLA-028	Y	Y	Y			Y	Y	Y		Y																											
		SGS AXYS MLA-00																																						

Accreditation Scope

SGS AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev. 41

Accreditation Scope				Serum		Solids										Tissue		Urine		Water		Water, Non-Potable																	
Compound Class	Compound	Accredited Method ID	SGS AXYS Method ID	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB ISO 17025	ANAB DoD **	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB ISO 17025	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE *	Maine DOH	Pennsylvania DEP	ANAB ISO 17025	ANAB DoD **					
Oxychloridane	SGS AXYS MLA-007	MLA-007		Y	Y									Y		Y							Y																
	EPA 8270	MLA-007				Y						Y													Y														
	EPA 1699	MLA-028					Y							Y											Y														
	SGS AXYS MLA-028	MLA-028		Y	Y	Y						Y		Y											Y														
	SGS AXYS MLA-007	MLA-007		Y	Y	Y											Y							Y															
	EPA 8270	MLA-007										Y																											
	SGS AXYS MLA-007	MLA-007			Y												Y																						
	EPA 8270	MLA-007					Y			Y		Y	Y	Y											Y														
	EPA 1699	MLA-028					Y							Y											Y														
	SGS AXYS MLA-028	MLA-028		Y	Y	Y						Y		Y			Y							Y															
	SGS AXYS MLA-007	MLA-007		Y	Y	Y								Y			Y							Y															
	EPA 8270	MLA-007					Y					Y		Y											Y														
	EPA 1699	MLA-028						Y						Y											Y														
	SGS AXYS MLA-028	MLA-028		Y	Y	Y						Y		Y			Y							Y															
	SGS AXYS MLA-007	MLA-007		Y	Y	Y								Y			Y							Y															
EPA 8270	MLA-007					Y					Y		Y											Y															
EPA 1699	MLA-028						Y						Y											Y															
SGS AXYS MLA-028	MLA-028		Y	Y	Y						Y		Y			Y							Y																
SGS AXYS MLA-007	MLA-007		Y	Y	Y								Y			Y							Y																
1,2,6-Trimethylphenanthrene	SGS AXYS MLA-021	MLA-021			Y																		Y																
1,2-Dimethylnaphthalene	SGS AXYS MLA-021	MLA-021			Y																		Y																
1,4,6,7-Tetramethylnaphthalene	SGS AXYS MLA-021	MLA-021			Y																		Y																
1,7-Dimethylfluorene	SGS AXYS MLA-021	MLA-021			Y																		Y																
1,7-Dimethylphenanthrene	SGS AXYS MLA-021	MLA-021			Y																		Y																
1,8-Dimethylphenanthrene	SGS AXYS MLA-021	MLA-021			Y																		Y																
1-Methylchrysene	SGS AXYS MLA-021	MLA-021			Y																		Y																
1-Methylnaphthalene	SGS AXYS MLA-021	MLA-021			Y																		Y																
1-Methylphenanthrene	SGS AXYS MLA-021	MLA-021			Y																		Y																
2,3,5-Trimethylnaphthalene	SGS AXYS MLA-021	MLA-021			Y																		Y																
2,3,6-Trimethylnaphthalene	SGS AXYS MLA-021	MLA-021			Y																		Y																
2,4-Dimethyldibenzothiophene	SGS AXYS MLA-021	MLA-021			Y																		Y																
2,6-Dimethylnaphthalene	SGS AXYS MLA-021	MLA-021			Y																		Y																
2,6-Dimethylphenanthrene	SGS AXYS MLA-021	MLA-021			Y																		Y																
2-Methylantracene	SGS AXYS MLA-021	MLA-021			Y																		Y																
2-Methyldibenzothiophene	SGS AXYS MLA-021	MLA-021			Y																		Y																
2-Methylfluorene	SGS AXYS MLA-021	MLA-021			Y																		Y																
2-Methylnaphthalene	EPA 1625	MLA-021																																					
	EPA 8270	MLA-021					Y		Y					Y											Y														
	SGS AXYS MLA-021	MLA-021			Y	Y								Y									Y																
2-Methylphenanthrene	SGS AXYS MLA-021	MLA-021			Y																		Y																
3,6-Dimethylphenanthrene	SGS AXYS MLA-021	MLA-021			Y																		Y																
3-Methyldibenzothiophene	SGS AXYS MLA-021	MLA-021			Y																		Y																
3-Methylfluoranthene/ Benzo(a)fluorene	SGS AXYS MLA-021	MLA-021			Y																		Y																
3-Methylphenanthrene	SGS AXYS MLA-021	MLA-021			Y																		Y																
5,9-Dimethylchrysene	SGS AXYS MLA-021	MLA-021			Y																		Y																
5/6-Methylchrysenes	SGS AXYS MLA-021	MLA-021			Y																		Y																
7-Methylbenzo(a)pyrene	SGS AXYS MLA-021	MLA-021			Y																		Y																
9/4-Methylphenanthrenes	SGS AXYS MLA-021	MLA-021			Y																		Y																
Acenaphthene	EPA 1625	MLA-021																							Y		Y	Y											
	EPA 8270	MLA-021					Y			Y	Y		Y	Y											Y														
	SGS AXYS MLA-021	MLA-021			Y	Y								Y									Y																
Acenaphthylene	EPA 1625	MLA-021		</																																			

Accreditation Scope

SGS AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev. 41

Compound Class	Compound	Accredited Method ID	SGS AXYS Method ID	Solids								Tissue					Water, Non-Potable																								
				CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB ISO 17025	ANAB DoD **	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB ISO 17025	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE *	Maine DOH	Pennsylvania DEP	ANAB ISO 17025	ANAB DoD **							
	BDE 99 2,2',4,4',5-pentabromodiphenylether	EPA 1614 SGS AXYS MLA-033	MLA-033		Y	Y									Y								Y																		
PCB Aroclors	*PCBs* category (CA only)	EPA 625 EPA 8270	MLA-007 MLA-007				Y																																		
	PCB Aroclor 1016	EPA 1668	MLA-010				Y								Y	Y																									
		EPA 625	MLA-007																																						
		EPA 8270	MLA-007																																						
		SGS AXYS MLA-010	MLA-010																																						
		SGS AXYS MLA-007	MLA-007																																						
	PCB Aroclor 1016/1242	EPA 8270	MLA-007																																						
		EPA 1668	MLA-010																																						
		EPA 625	MLA-007																																						
		SGS AXYS MLA-010	MLA-010																																						
	PCB Aroclor 1221	SGS AXYS MLA-007	MLA-007																																						
		EPA 1668	MLA-010																																						
		EPA 625	MLA-007																																						
		EPA 8270	MLA-007																																						
	PCB Aroclor 1232	SGS AXYS MLA-010	MLA-010																																						
		SGS AXYS MLA-007	MLA-007																																						
		EPA 1668	MLA-010																																						
		EPA 625	MLA-007																																						
	PCB Aroclor 1242	EPA 8270	MLA-007																																						
		SGS AXYS MLA-010	MLA-010																																						
		SGS AXYS MLA-007	MLA-007																																						
		EPA 1668	MLA-010																																						
	PCB Aroclor 1248	EPA 625	MLA-007																																						
		EPA 8270	MLA-007																																						
		SGS AXYS MLA-010	MLA-010																																						
		SGS AXYS MLA-007	MLA-007																																						
	PCB Aroclor 1254	EPA 1668	MLA-010																																						
		EPA 625	MLA-007																																						
		EPA 8270	MLA-007																																						
		SGS AXYS MLA-010	MLA-010																																						
	PCB Aroclor 1260	SGS AXYS MLA-007	MLA-007																																						
		EPA 1668	MLA-010																																						
		EPA 625	MLA-007																																						
		EPA 8270	MLA-007																																						
	PCB Aroclor 1268	SGS AXYS MLA-010	MLA-010																																						
		SGS AXYS MLA-007	MLA-007																																						
		EPA 1668	MLA-010																																						
		EPA 8270	MLA-007																																						
	PCB congeners	PCB 1 2-Chlorobiphenyl	EPA 1668 EPA 8270 SGS AXYS MLA-010	MLA-010 MLA-007 MLA-010																																					
		PCB 10 2,6-Dichlorobiphenyl	EPA 1668	MLA-010																																					
			SGS AXYS MLA-010	MLA-010																																					
		PCB 100 2,2',4,4',6-Pentachlorobiphenyl	EPA 1668	MLA-010																																					
	EPA 8270		MLA-007																																						
	PCB 101 2,2',4,5,5'-Pentachlorobiphenyl	SGS AXYS MLA-010	MLA-010																																						
		EPA 1668	MLA-010																																						

Legend

Y	Accreditation scope
BFR	Brominated flame retardants (non-PBDPE)
BPA and mPE	Bisphenol A and mono-Phthalate Esters
HBCDD	Hexabromocyclododecane
OC Pesticides	Organochlorine Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PBDPE	Polybrominated diphenylethers
PCB	Polychlorinated Biphenyls
PCDDF	Polychlorinated dibenzodioxins/furans
PFAS	Per- and Polyfluoroalkyl Substances
PPCP	Pharmaceutical and Personal Care Products
TBBPA	Tetrabromobisphenol A
TOP	Total Oxidizable Precursors
California DPH	California Department of Public Health, Lab ID 2911
Florida DOH	Florida Department of Health, Lab ID E871007, (NELAC Standard)
Pennsylvania DEP	Pennsylvania Department of Environmental Protection
Minnesota DOH	Minnesota Department of Health, Lab ID 232-999-430, (NELAC Standard)
New Jersey DEP	New Jersey Department of Environmental Protection, Lab ID CANA005, (NELAC Standard)
New York DOH	New York Department of Health, Lab ID 11674, (NELAC Standard)
Washington DE	Washington Department of Ecology, Lab ID C404
Virginia DGS	Virginia Department of General Services, Division of Consolidated Laboratory Services, Lab ID 460224, (NELAC Standard)
Maine DOH	Maine Center for Disease Control and Prevention, Department of Health and Human Services, Lab ID CN00003

ANAB DoD ANSI-ASQ National Accreditation Board, certificate ADE-1861, (US DoD QSM 5.1 Standard)



CALA Canadian Association for Laboratory Accreditation Inc., Lab ID A2637, (ISO/IEC 17025:2005 Standard)



ANAB ISO 17025 ANSI-ASQ National Accreditation Board, certificate ADE-1861.01, (ISO/IEC 17025:2005 Standard)

