Stantec

Memo

To:	Darren Lawless	From:	Gillian Hatcher Stantec Consulting Ltd.
File:	121415686	Date:	August 26, 2021

Reference: Interim Ambient Air Monitoring Results – Polycyclic Aromatic Hydrocarbons (July 21, 2021) Data

This interim ambient air monitoring report presents the preliminary results of the monitoring that took place at the Fixed Monitoring Station located in Pictou Landing First Nation (PLFN) on July 21, 2021, for polycyclic aromatic hydrocarbons (PAHs).

The PAH analysis results were not included in the previously submitted interim report for July 21, 2021, because the analysis for the PAH samples collected on this sampling date were delayed due to an equipment failure at the analytical laboratory, AGAT Laboratories Ltd (AGAT). AGAT subcontracted the PAH analysis to the ALS Burlington Laboratory in Ontario. The ALS Burlington facility is a state-of-the-art facility equipped with advanced instrumentation suitable for high quality, ultra-trace quantification of a broad range of analytical targets, specializing in air analysis and ambient air monitoring.

A summary of the ambient air monitoring results for PAHs for the July 21, 2021 sampling event, along with the corresponding regulatory criteria are presented in Table 1. During this time, field blanks were collected as per the approved Work Plan for the Independent Ambient Air Monitoring Program (IAAMP) for the Boat Harbour Remediation Project.

Reference: **Interim Ambient Air Monitoring Results – Polycyclic Aromatic Hydrocarbons (July 21, 2021) Data**

Table 1 Ambient Air Monitoring Results for PAHs – July 21, 2021 Sampling Event

Air Contaminant	Units	Regulatory Criteria for the 24-hour Time Averaging Period				Sampling Date
		Nova Scotia *Air Quality Regulations*	Canadian Ambient Air Quality Standards (CAAQS)	Ontario's Ambient Air Quality Criteria (AAQC)	Ontario's Air Contaminant Benchmark List (ACB List), B1 Value	21-July-21
Naphthalene	ng/m³	-	-	22,500	22,500	13.6
2-Methylnaphthalene	ng/m³	-	-	-	-	0.82
1-Methylnaphthalene[1]	ng/m³	-	-	-	-	0.65
2-Chloronaphthalene	ng/m³	-	-	-	-	<0.01
1-Chloronaphthalene	ng/m³	-	-	-	-	<0.01
2,3,5-Trimethylnaphthalene	ng/m³	-	-	-	-	0.23
2,6-Dimethylnaphthalene	ng/m³	-	-	-	-	0.27
1,3-Dimethylnaphthalene[2]	ng/m³	-	-	-	-	0.27
Benzo(c)phenanthrene	ng/m³	-	-	-	-	<0.01
2-Methylfluoranthene[3]	ng/m³	-	-	-	-	0.03
Acenaphthylene	ng/m³	-	-	-	-	0.11
Acenaphthene	ng/m³	-	-	-	-	0.22
Fluorene	ng/m³	-	-	-	-	0.37
Phenanthrene	ng/m³	-	-	-	-	0.82
Anthracene	ng/m³	-	-	-	-	0.41
Fluoroanthene[4]	ng/m³	-	-	-	-	0.26
Pyrene	ng/m³	-	-	-	-	0.167
Benzo[a]Anthracene	ng/m³	-	-	-	-	<0.01
Chrysene[5]	ng/m³	-	-	-	-	0.048
7,12-Dimethylbenzanthracene[6]	ng/m³	-	-	-	-	<0.01

Reference: **Interim Ambient Air Monitoring Results – Polycyclic Aromatic Hydrocarbons (July 21, 2021) Data**

Table 1 Ambient Air Monitoring Results for PAHs – July 21, 2021 Sampling Event

Air Contaminant	Units	Regulatory Criteria for the 24-hour Time Averaging Period				Sampling Date
		Nova Scotia *Air Quality Regulations*	Canadian Ambient Air Quality Standards (CAAQS)	Ontario's Ambient Air Quality Criteria (AAQC)	Ontario's Air Contaminant Benchmark List (ACB List), B1 Value	21-July-21
7H-Dibenzo(c,g)carbazole	ng/m³	-	-	-	-	<0.01
Anthanthrene	ng/m³	-	-	-	-	<0.01
Dibenzo(a,h)acridine	ng/m³	-	-	-	-	<0.01
Dibenzo(a,j)anthracene	ng/m³	-	-	-	-	<0.01
Benzo(b+j)fluoranthene[7]	ng/m³	-	-	-	-	<0.01
Benzo[k]Fluoranthene	ng/m³	-	-	-	-	<0.01
Benzo[a]Pyrene	ng/m³	-	-	0.05[8]	-	<0.0025
Indeno[1,2,3,c-d]Pyrene	ng/m³	-	-	-	-	<0.01
Benzo[g,h,i]Perylene	ng/m³	-	-	-	-	<0.01
Dibenzo[a,h]Anthracene	ng/m³	-	-	-	-	<0.01
Benzo(e)pyrene	ng/m³	-	-	-	-	<0.01
Perylene	ng/m³	-	-	-	-	<0.01
Quinoline	ng/m³	-	-	-	-	<0.01
Acridine	ng/m³	-	-	-	-	Not available

1 Spelled "1-Methylnapthalene" in the lab reports
2 1,3-Dimethylnaphthalene results are merged with 2,6-Dimethylnaphthalene as 1,3/2,6-Dimethylnaphthalene
3 These results are reported as 1/2-Methylfluoranthene
4 Spelled as "Fluoranthene" on lab reports
5 This lab result is for Chrysene/Triphenylene
6 These results are reported as 7,12-Dimethylbenz(a)anthracene in the lab reports
7 Isomers reported differently (Benzo(b)fluoranthene and Benzo(k)fluoranthene)
8 As a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs)

Reference: **Interim Ambient Air Monitoring Results – Polycyclic Aromatic Hydrocarbons (July 21, 2021) Data**

There are a few differences between the previously reported PAH results from AGAT and ALS. They are as follows:

- For all compounds except Benzo[a]Pyrene, the ALS reporting detection limit (RDL) is 2 nanograms (ng). The RDL for Benzo[a]Pyrene is 0.5 ng, which still meets the regulatory criteria for Ontario (listed in the table above).
- The only PAH compound that could not be reported by ALS is Acridine. The October 2020, November 2020, December 2020, and January 2021 Acridine sample results for Boat Harbour were low, ranging between <0.002 to <0.02 ng/m^3.
- Some of the results reported by ALS are for different isomers than those reported previously by AGAT (1,3-Dimethylnaphthalene, 2,6-Dimethylnaphthalene, 2-Methylfluoranthene, Chrysene, 7,12-Dimethylbenzanthracene, and Benzo(b+j)fluoranthene), as noted in Table 1. Isomers are compounds with the same formula but a different arrangement of atoms in the molecule, resulting in different properties.

The reported PAHs concentrations in the sample collected on July 21, 2021 were below the Ontario Ambient Air Quality Criteria and the Ontario Air Contaminant Benchmark List, B1 Values.

Additional details pertaining to the ambient air monitoring results for the July 21, 2021 sampling event, including meteorological data, can be found in the previously submitted interim report.

Regards,

Stantec Consulting Ltd.

DRAFT

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Attachment: Lab Analysis Reports

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1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6
Phone: 905-331-3111, FAX: 905-331-4567

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	AGAT Laboratories Ltd
ALS Project ID:	AGA100	**Client Address:**	11 Morris Drive
ALS WO#:	L2619094		Unit 122
Date of Report	24-Aug-21		Dartmouth, NS B3B 1M2
Date of Sample Receipt	27-Jul-21	**Client Contact:**	Joyce MacDonald
		Client Project ID:	21X778174

COMMENTS: **Parent and Alkylated PAH by SIM GC/LRMS**

Certified by:

Ron McLeod, PhD.
Technical Director

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Media Blank		Method Blank		21X778174 - 2768388 - PUF-005-2021-07-21		21X778174 - 2768389 - PUF-006-2021-07-21 BLANK		Laboratory Control Sample	
ALS Sample ID	WG3584747-1		WG3584747-4		L2619094-1		L2619094-2		WG3584747-2	
Sample Size	300		300		329.568		300		1	
Sample units	m3		m3		m3		m3		n/a	
Moisture Content/Lipid Content	n/a		n/a		n/a		n/a		n/a	
Matrix	QC		QC		PUF		PUF		QC	
Sampling Date	n/a		n/a		21-Jul-21		21-Jul-21		n/a	
Extraction Date	28-Jul-21		28-Jul-21		28-Jul-21		28-Jul-21		28-Jul-21	
Target Analytes	**ng/m3**		**ng/m3**		**ng/m3**		**ng/m3**		**% Rec**	
Naphthalene	9.89	M	0.02	M	13.6	M,B	15.0	M,B	67	M
Quinoline	<0.01	U	<0.01	U	<0.01	U	<0.01	U		
2-Methylnaphthalene	0.03		<0.01	U	0.82		0.06	B	101	
1-Methylnapthalene	0.02		<0.01	U	0.65		0.05	B	114	
1,2-Dimethylnaphthalene	<0.01	U	<0.01	U	0.24	M	<0.01	U		
2,6/1,3-Dimethylnaphthalene	<0.01	U	<0.01	U	0.27		<0.01	U	116	
2,3,5-Trimethylnaphthalene	<0.01	U	<0.01	U	0.23		<0.01	U	136	
2,3,6-Trimethylnaphthalene	<0.01	U	<0.01	U	0.16		<0.01	U		
1,4,6,7-Tetramethylnaphthalene	<0.01	U	<0.01	U	0.10		<0.01	U		
2-Chloronaphthalene	<0.01	U	<0.01	U	<0.01	U	<0.01	U		
1-Chloronaphthalene	<0.01	U	<0.01	U	<0.01	U	<0.01	U		
Biphenyl	0.06		<0.01	U	0.42	B	0.12	B	91	
Acenaphthylene	<0.01	U	<0.01	U	0.11		<0.01	U	122	
Acenaphthene	<0.01	U	<0.01	U	0.22		<0.01	U	111	
Fluorene	<0.01	U	<0.01	U	0.37		0.02	M	130	
Phenanthrene	0.021		<0.01	U	0.82		0.05	B	125	
Anthracene	0.255	M	<0.01	U	0.41	B	0.59	M,B	124	
Fluoranthene	<0.01	U	<0.01	U	0.26		0.02		119	
1/2-Methylfluoranthene	<0.01	U	<0.01	U	0.03		<0.01	U		
3-Methylfluoranthene/Benzo(a)fluorene	<0.01	U	<0.01	U	<0.01	U	<0.01	U		
Pyrene	<0.01	U	<0.01	U	0.167		0.03		126	
Benzo(a)anthracene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	95	
7,12-Dimethylbenz(a)anthracene	<0.01	U	<0.01	U	<0.01	U	<0.01	U		
Benzo(c)phenanthrene	<0.01	U	<0.01	U	<0.01	U	<0.01	U		
Chrysene/Triphenylene	<0.01	U	<0.01	U	0.048		0.018		122	
Benzo(b)flouranthene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	74	
Benzo(k)fluoranthene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	124	
Benzo(e)Pyrene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	101	
7H-Dibenzo(c,g)carbazole	<0.01	U	<0.01	U	<0.01	U	<0.01	U		
Anthanthrene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	91	
Benzo(a)pyrene	<0.0025	U	<0.0025	U	<0.0025	U	<0.0025	U	114	
7-Methylbenzo(a)pyrene	<0.01	U	<0.01	U	<0.01	U	<0.01	U		
Perylene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	102	
Indeno(1,2,3-cd)pyrene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	71	M
Dibenz(ah)anthracene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	73	
Dibenzo(a,h)acridine	<0.01	U	<0.01	U	<0.01	U	<0.01	U		
Dibenzo(a,j)anthracene	<0.01	U	<0.01	U	<0.01	U	<0.01	U		
Benzo(ghi)perylene	<0.01		<0.01	U	<0.01	MU	<0.01	U	73	
Field Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
d10-1-Methylnapthalene	NS		NS		60.3		63.5		NS	
d10-Fluorene	NS		NS		78.1		78.6		NS	
d14-Terphenyl	NS		NS		89.1		93.9		NS	
Extraction Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
d8-Naphthalene(ES)	66.3		63.8		58.0		64.2		64.3	
d10-2-Methylnaphthalene(ES)	54.5		55.5		50.8		51.3		52.3	
d8-Acenapthylene(ES)	88.8	M	83.6	M	85.8		87.7	M	100.1	
d10-Phenanthrene(ES)	69.0		67.2		64.1		70.1		68.6	
d10-Fluoranthene(ES)	94.6		83.0		90.9		100.5		92.5	
d12-Benzo(a)anthracene(ES)	106.9		85.5		98.8		107.9		104.6	
d12-Chrysene(ES)	94.1		85.1		83.5		96.3		89.3	
d12-Benzo(b)fluoranthene(ES)	112.0		91.9		102.3		120.6		111.0	
d12-Benzo(k)fluoranthene(ES)	112.3		92.0		105.1		129.4		110.1	
d12-Benzo(a)pyrene(ES)	104.6	M	94.3		82.8	M	109.2	M	108.7	M
d12-Perylene(ES)	90.3	M	73.7		91.7		94.4	M	77.0	M
d12-Indeno(1,2,3-cd)pyrene(ES)	103.0	M	77.7	M	96.5		108.0		95.1	
d14-Dibenz(ah)anthracene(ES)	84.1		64.5		80.7		87.3		78.9	
d12-Benzo(ghi)perylene(ES)	130.7		105.7		122.1		122.6	M	113.7	

U	Indicates that this compound was not detected above the LOD.
M	Indicates that a peak has been manually integrated.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.
NS	Indicates that this compound was not spiked in

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Laboratory Method Blank Analysis Report

Sample Name	**Media Blank**	Sampling Date	n/a
ALS Sample ID	WG3584747-1	Extraction Date	28-Jul-21
Analysis Method	PAH by GCMS		
Analysis Type	blank		
Sample Matrix	QC		
Sample Size	300 m3		
Percent Moisture/Lipid	n/a		
Split Ratio	2	Workgroup	WG3584747

Approved:
Andrew Reid
--e-signature--
19-Aug-2021

Run Information	**Run 1**
Filename	21081730.D
Run Date	8/17/2021 21:39
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/m3
Instrument	MSD-5
Column	HP5MS US1276541H

Target Analytes	**Ret. Time**	**Concentration ng/m3**	**Flags**
Naphthalene	3.70	9.89	M
Quinoline	NotFnd	<0.01	U
2-Methylnaphthalene	4.41	0.03	
1-Methylnapthalene	4.54	0.02	
1,2-Dimethylnaphthalene	NotFnd	<0.01	U
2,6/1,3-Dimethylnaphthalene	NotFnd	<0.01	U
2,3,5-Trimethylnaphthalene	NotFnd	<0.01	U
2,3,6-Trimethylnaphthalene	NotFnd	<0.01	U
1,4,6,7-Tetramethylnaphthalene	NotFnd	<0.01	U
2-Chloronaphthalene	NotFnd	<0.01	U
1-Chloronaphthalene	NotFnd	<0.01	U
Biphenyl	5.01	0.06	
Acenaphthylene	NotFnd	<0.01	U
Acenaphthene	NotFnd	<0.01	U
Fluorene	7.06	<0.01	U
Phenanthrene	9.40	0.02	
Anthracene	9.50	0.26	M
Fluoranthene	12.91	<0.01	U
1/2-Methylfluoranthene	NotFnd	<0.01	U
3-Methylfluoranthene/Benzo(a)fluor	NotFnd	<0.01	U
Pyrene	NotFnd	<0.01	U
Benzo(a)anthracene	NotFnd	<0.01	U
7,12-Dimethylbenz(a)anthracene	NotFnd	<0.01	U
Benzo(c)phenanthrene	NotFnd	<0.01	U
Chrysene/Triphenylene	NotFnd	<0.01	U
Benzo(b)flouranthene	NotFnd	<0.01	U
Benzo(k)fluoranthene	NotFnd	<0.01	U
Benzo(e)Pyrene	NotFnd	<0.01	U
7H-Dibenzo(c,g)carbazole	NotFnd	<0.01	U
Anthanthrene	NotFnd	<0.01	U
Benzo(a)pyrene	NotFnd	<0.0025	U
7-Methylbenzo(a)pyrene	NotFnd	<0.01	U
Perylene	NotFnd	<0.01	U
Indeno(1,2,3-cd)pyrene	NotFnd	<0.01	U
Dibenz(ah)anthracene	NotFnd	<0.01	U
Dibenzo(a,h)acridine	NotFnd	<0.01	U
Dibenzo(a,j)anthracene	NotFnd	<0.01	U
Benzo(ghi)perylene	27.15	<0.01	

Field Standards	**% Rec**	**Limits**
d10-1-Methylnapthalene	NS	
d10-Fluorene	NS	
d14-Terphenyl	NS	

Extraction Standards			**% Rec**		**Limits**
d8-Naphthalene(ES)	200	3.68	66.3		5-150
d10-2-Methylnaphthalene(ES)	200	4.37	54.5		5-150
d8-Acenapthylene(ES)	200	5.69	88.8	M	5-150
d10-Phenanthrene(ES)	200	9.34	69.0		5-150
d10-Fluoranthene(ES)	200	12.86	94.6		5-150
d12-Benzo(a)anthracene(ES)	200	17.46	106.9		5-150
d12-Chrysene(ES)	200	17.58	94.1		5-150
d12-Benzo(b)fluoranthene(ES)	200	20.83	112.0		5-150
d12-Benzo(k)fluoranthene(ES)	200	20.92	112.3		5-150
d12-Benzo(a)pyrene(ES)	200	21.78	104.6	M	5-150
d12-Perylene(ES)	200	22.05	90.3	M	5-150
d12-Indeno(1,2,3-cd)pyrene(ES)	200	26.18	103.0	M	5-150
d14-Dibenz(ah)anthracene(ES)	200	26.37	84.1		5-150
d12-Benzo(ghi)perylene(ES)	200	27.15	130.7		5-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
NS	Indicates that this compound was not spiked in

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3584747-4	Extraction Date	28-Jul-21
Analysis Method	PAH by GCMS		
Analysis Type	blank		
Sample Matrix	QC		
Sample Size	300 m3		
Percent Moisture/Lipid	n/a		
Split Ratio	2	Workgroup	WG3584747

Approved:
Andrew Reid
--e-signature--
19-Aug-2021

Run Information	**Run 1**
Filename	21081731.D
Run Date	8/17/2021 22:13
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/m3
Instrument	MSD-5
Column	HP5MS US1276541H

Target Analytes	**Ret. Time**	**Concentration ng/m3**	**Flags**
Naphthalene	3.70	0.02	M
Quinoline	NotFnd	<0.01	U
2-Methylnaphthalene	4.42	<0.01	U
1-Methylnapthalene	NotFnd	<0.01	U
1,2-Dimethylnaphthalene	NotFnd	<0.01	U
2,6/1,3-Dimethylnaphthalene	NotFnd	<0.01	U
2,3,5-Trimethylnaphthalene	NotFnd	<0.01	U
2,3,6-Trimethylnaphthalene	NotFnd	<0.01	U
1,4,6,7-Tetramethylnaphthalene	NotFnd	<0.01	U
2-Chloronaphthalene	NotFnd	<0.01	U
1-Chloronaphthalene	NotFnd	<0.01	U
Biphenyl	NotFnd	<0.01	U
Acenaphthylene	NotFnd	<0.01	U
Acenaphthene	NotFnd	<0.01	U
Fluorene	NotFnd	<0.01	U
Phenanthrene	NotFnd	<0.01	U
Anthracene	NotFnd	<0.01	U
Fluoranthene	12.92	<0.01	U
1/2-Methylfluoranthene	NotFnd	<0.01	U
3-Methylfluoranthene/Benzo(a)fluor	NotFnd	<0.01	U
Pyrene	NotFnd	<0.01	U
Benzo(a)anthracene	NotFnd	<0.01	U
7,12-Dimethylbenz(a)anthracene	NotFnd	<0.01	U
Benzo(c)phenanthrene	NotFnd	<0.01	U
Chrysene/Triphenylene	NotFnd	<0.01	U
Benzo(b)flouranthene	NotFnd	<0.01	U
Benzo(k)fluoranthene	NotFnd	<0.01	U
Benzo(e)Pyrene	NotFnd	<0.01	U
7H-Dibenzo(c,g)carbazole	NotFnd	<0.01	U
Anthanthrene	NotFnd	<0.01	U
Benzo(a)pyrene	NotFnd	<0.0025	U
7-Methylbenzo(a)pyrene	NotFnd	<0.01	U
Perylene	NotFnd	<0.01	U
Indeno(1,2,3-cd)pyrene	NotFnd	<0.01	U
Dibenz(ah)anthracene	NotFnd	<0.01	U
Dibenzo(a,h)acridine	NotFnd	<0.01	U
Dibenzo(a,j)anthracene	NotFnd	<0.01	U
Benzo(ghi)perylene	NotFnd	<0.01	U

Field Standards	**% Rec**	**Limits**
d10-1-Methylnapthalene	NS	
d10-Fluorene	NS	
d14-Terphenyl	NS	

Extraction Standards			**% Rec**		**Limits**
d8-Naphthalene(ES)	200	3.68	63.8		5-150
d10-2-Methylnaphthalene(ES)	200	4.37	55.5		5-150
d8-Acenapthylene(ES)	200	5.69	83.6	M	5-150
d10-Phenanthrene(ES)	200	9.34	67.2		5-150
d10-Fluoranthene(ES)	200	12.86	83.0		5-150
d12-Benzo(a)anthracene(ES)	200	17.47	85.5		5-150
d12-Chrysene(ES)	200	17.58	85.1		5-150
d12-Benzo(b)fluoranthene(ES)	200	20.85	91.9		5-150
d12-Benzo(k)fluoranthene(ES)	200	20.93	92.0		5-150
d12-Benzo(a)pyrene(ES)	200	21.79	94.3		5-150
d12-Perylene(ES)	200	22.06	73.7		5-150
d12-Indeno(1,2,3-cd)pyrene(ES)	200	26.20	77.7	M	5-150
d14-Dibenz(ah)anthracene(ES)	200	26.37	64.5		5-150
d12-Benzo(ghi)perylene(ES)	200	27.16	105.7		5-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
NS	Indicates that this compound was not spiked in

ALS Life Sciences

Sample Analysis Report

Sample Name	**21X778174 - 2768388 - PUF-005-2021-07-21**		Sampling Date	21-Jul-21	
ALS Sample ID	L2619094-1		Extraction Date	28-Jul-21	
Analysis Method	PAH by GCMS				
Analysis Type	sample				
Sample Matrix	PUF				Approved:
Sample Size	329.568	m3			*Andrew Reid*
Percent Moisture/Lipid	n/a				--e-signature--
Split Ratio	2		Workgroup	WG3584747	19-Aug-2021

Run Information	**Run 1**
Filename	21081736.D
Run Date	8/18/2021 1:00
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/m3
Instrument	MSD-5
Column	HP5MS US1276541H

Target Analytes	**Ret. Time**	**Concentration ng/m3**	**Flags**	
Naphthalene	3.70	13.57	M	B
Quinoline	NotFnd	<0.01	U	
2-Methylnaphthalene	4.41	0.82		
1-Methylnapthalene	4.54	0.65		
1,2-Dimethylnaphthalene	5.39	0.24	M	
2,6/1,3-Dimethylnaphthalene	5.25	0.27		
2,3,5-Trimethylnaphthalene	6.84	0.23		
2,3,6-Trimethylnaphthalene	7.00	0.16		
1,4,6,7-Tetramethylnaphthalene	8.46	0.10		
2-Chloronaphthalene	NotFnd	<0.01	U	
1-Chloronaphthalene	NotFnd	<0.01	U	
Biphenyl	5.02	0.42		B
Acenaphthylene	5.71	0.11		
Acenaphthene	6.04	0.22		
Fluorene	7.06	0.37		
Phenanthrene	9.39	0.82		
Anthracene	9.50	0.41		B
Fluoranthene	12.91	0.26		
1/2-Methylfluoranthene	14.76	0.03		
3-Methylfluoranthene/Benzo(a)fluor	14.96	<0.01	U	
Pyrene	13.57	0.17		
Benzo(a)anthracene	NotFnd	<0.01	U	
7,12-Dimethylbenz(a)anthracene	NotFnd	<0.01	U	
Benzo(c)phenanthrene	16.87	<0.01	U	
Chrysene/Triphenylene	17.64	0.05		
Benzo(b)flouranthene	NotFnd	<0.01	U	
Benzo(k)fluoranthene	NotFnd	<0.01	U	
Benzo(e)Pyrene	NotFnd	<0.01	U	
7H-Dibenzo(c,g)carbazole	NotFnd	<0.01	U	
Anthanthrene	NotFnd	<0.01	U	
Benzo(a)pyrene	NotFnd	<0.0025	U	
7-Methylbenzo(a)pyrene	NotFnd	<0.01	U	
Perylene	NotFnd	<0.01	U	
Indeno(1,2,3-cd)pyrene	NotFnd	<0.01	U	
Dibenz(ah)anthracene	NotFnd	<0.01	U	
Dibenzo(a,h)acridine	NotFnd	<0.01	U	
Dibenzo(a,j)anthracene	NotFnd	<0.01	U	
Benzo(ghi)perylene	NotFnd	<0.01	M U	

Field Standards			**% Rec**	**Limits**
d10-1-Methylnapthalene	300	4.50	60.3	10-145
d10-Fluorene	300	7.00	78.1	10-145
d14-Terphenyl	300	14.35	89.1	10-145

Extraction Standards			**% Rec**	**Limits**
d8-Naphthalene(ES)	200	3.68	58.0	5-150
d10-2-Methylnaphthalene(ES)	200	4.37	50.8	5-150
d8-Acenapthylene(ES)	200	5.69	85.8	5-150
d10-Phenanthrene(ES)	200	9.34	64.1	5-150
d10-Fluoranthene(ES)	200	12.86	90.9	5-150
d12-Benzo(a)anthracene(ES)	200	17.46	98.8	5-150
d12-Chrysene(ES)	200	17.58	83.5	5-150
d12-Benzo(b)fluoranthene(ES)	200	20.83	102.3	5-150
d12-Benzo(k)fluoranthene(ES)	200	20.91	105.1	5-150
d12-Benzo(a)pyrene(ES)	200	21.78	82.8 M	5-150
d12-Perylene(ES)	200	22.05	91.7	5-150
d12-Indeno(1,2,3-cd)pyrene(ES)	200	26.18	96.5	5-150
d14-Dibenz(ah)anthracene(ES)	200	26.37	80.7	5-150
d12-Benzo(ghi)perylene(ES)	200	27.15	122.1	5-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

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Sample Analysis Report

Sample Name	**21X778174 - 2768389 - PUF-006-2021-07-21-BLANK**	Sampling Date	21-Jul-21
ALS Sample ID	L2619094-2	Extraction Date	28-Jul-21
Analysis Method	PAH by GCMS		
Analysis Type	sample		
Sample Matrix	PUF		
Sample Size	300 m3		
Percent Moisture/Lipid	n/a		
Split Ratio	2	Workgroup	WG3584747

Approved:
Andrew Reid
--e-signature--
19-Aug-2021

Run Information	**Run 1**
Filename	21081734.D
Run Date	8/17/2021 23:53
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/m3
Instrument	MSD-5
Column	HP5MS US1276541H

Target Analytes	**Ret. Time**	**Concentration ng/m3**	**Flags**	
Naphthalene	3.70	14.99	M	B
Quinoline	NotFnd	<0.01	U	
2-Methylnaphthalene	4.41	0.06		B
1-Methylnapthalene	4.54	0.05		B
1,2-Dimethylnaphthalene	NotFnd	<0.01	U	
2,6/1,3-Dimethylnaphthalene	NotFnd	<0.01	U	
2,3,5-Trimethylnaphthalene	NotFnd	<0.01	U	
2,3,6-Trimethylnaphthalene	NotFnd	<0.01	U	
1,4,6,7-Tetramethylnaphthalene	NotFnd	<0.01	U	
2-Chloronaphthalene	NotFnd	<0.01	U	
1-Chloronaphthalene	NotFnd	<0.01	U	
Biphenyl	5.01	0.12		B
Acenaphthylene	NotFnd	<0.01	U	
Acenaphthene	NotFnd	<0.01	U	
Fluorene	7.06	0.02	M	
Phenanthrene	9.40	0.05		B
Anthracene	9.50	0.59	M	B
Fluoranthene	12.91	0.02		
1/2-Methylfluoranthene	14.78	<0.01	U	
3-Methylfluoranthene/Benzo(a)fluor	14.98	<0.01	U	
Pyrene	13.57	0.03		
Benzo(a)anthracene	NotFnd	<0.01	U	
7,12-Dimethylbenz(a)anthracene	NotFnd	<0.01	U	
Benzo(c)phenanthrene	NotFnd	<0.01	U	
Chrysene/Triphenylene	17.64	0.02		
Benzo(b)flouranthene	NotFnd	<0.01	U	
Benzo(k)fluoranthene	NotFnd	<0.01	U	
Benzo(e)Pyrene	NotFnd	<0.01	U	
7H-Dibenzo(c,g)carbazole	NotFnd	<0.01	U	
Anthanthrene	NotFnd	<0.01	U	
Benzo(a)pyrene	NotFnd	<0.0025	U	
7-Methylbenzo(a)pyrene	NotFnd	<0.01	U	
Perylene	NotFnd	<0.01	U	
Indeno(1,2,3-cd)pyrene	NotFnd	<0.01	U	
Dibenz(ah)anthracene	NotFnd	<0.01	U	
Dibenzo(a,h)acridine	NotFnd	<0.01	U	
Dibenzo(a,j)anthracene	NotFnd	<0.01	U	
Benzo(ghi)perylene	NotFnd	<0.01	U	

Field Standards			**% Rec**	**Limits**
d10-1-Methylnapthalene	300	4.50	63.5	10-145
d10-Fluorene	300	7.00	78.6	10-145
d14-Terphenyl	300	14.35	93.9	10-145

Extraction Standards			**% Rec**		**Limits**
d8-Naphthalene(ES)	200	3.68	64.2		5-150
d10-2-Methylnaphthalene(ES)	200	4.37	51.3		5-150
d8-Acenapthylene(ES)	200	5.69	87.7	M	5-150
d10-Phenanthrene(ES)	200	9.34	70.1		5-150
d10-Fluoranthene(ES)	200	12.86	100.5		5-150
d12-Benzo(a)anthracene(ES)	200	17.46	107.9		5-150
d12-Chrysene(ES)	200	17.58	96.3		5-150
d12-Benzo(b)fluoranthene(ES)	200	20.83	120.6		5-150
d12-Benzo(k)fluoranthene(ES)	200	20.91	129.4		5-150
d12-Benzo(a)pyrene(ES)	200	21.78	109.2	M	5-150
d12-Perylene(ES)	200	22.05	94.4	M	5-150
d12-Indeno(1,2,3-cd)pyrene(ES)	200	26.18	108.0		5-150
d14-Dibenz(ah)anthracene(ES)	200	26.35	87.3		5-150
d12-Benzo(ghi)perylene(ES)	200	27.14	122.6	M	5-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

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Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3584747-2	Extraction Date	28-Jul-21
Analysis Method	PAH by GCMS		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 m3		
Percent Moisture/Lipid	n/a		
Split Ratio	2	Workgroup	WG3584747

Approved:
Andrew Reid
--e-signature--
19-Aug-2021

Run Information	**Run 1**
Filename	21081727.D
Run Date	8/17/2021 19:59
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/m3
Instrument	MSD-5
Column	HP5MS US1276541H

Target Analytes	**ng spiked**	**Ret. Time**	**% Rec**	**Flags**	**Limits**
Naphthalene	200	3.70	67	M	50-150
Quinoline					
2-Methylnaphthalene	200	4.41	101		50-150
1-Methylnapthalene	200	4.54	114		50-150
1,2-Dimethylnaphthalene					
2,6/1,3-Dimethylnaphthalene	200	5.25	116		50-150
2,3,5-Trimethylnaphthalene	200	6.81	136		50-150
2,3,6-Trimethylnaphthalene					
1,4,6,7-Tetramethylnaphthalene					
2-Chloronaphthalene					
1-Chloronaphthalene					
Biphenyl	200	5.01	91		50-150
Acenaphthylene	200	5.71	122		50-150
Acenaphthene	200	6.04	111		50-150
Fluorene	200	7.06	130		50-150
Phenanthrene	200	9.40	125		50-150
Anthracene	200	9.51	124		50-150
Fluoranthene	200	12.92	119		50-150
1/2-Methylfluoranthene					
3-Methylfluoranthene/Benzo(a)fluorene					
Pyrene	200	13.57	126		50-150
Benzo(a)anthracene	200	17.53	95		50-150
7,12-Dimethylbenz(a)anthracene					
Benzo(c)phenanthrene					
Chrysene/Triphenylene	200	17.66	122		50-150
Benzo(b)flouranthene	200	20.90	74		50-150
Benzo(k)fluoranthene	200	20.97	124		50-150
Benzo(e)Pyrene	200	21.69	101		50-150
7H-Dibenzo(c,g)carbazole					
Anthanthrene	200	27.55	91		50-150
Benzo(a)pyrene	200	21.84	114		50-150
7-Methylbenzo(a)pyrene					
Perylene	200	22.11	102		50-150
Indeno(1,2,3-cd)pyrene	200	26.29	71	M	50-150
Dibenz(ah)anthracene	200	26.51	73		50-150
Dibenzo(a,h)acridine					
Dibenzo(a,j)anthracene					
Benzo(ghi)perylene	200	27.21	73.0		50-150

Field Standards	**% Rec**	**Limits**
d10-1-Methylnapthalene	NS	
d10-Fluorene	NS	
d14-Terphenyl	NS	

Extraction Standards			**% Rec**	**Limits**
d8-Naphthalene(ES)	200	3.68	64.3	10-150
d10-2-Methylnaphthalene(ES)	200	4.37	52.3	10-150
d8-Acenapthylene(ES)	200	5.99	100.1	10-150
d10-Phenanthrene(ES)	200	9.34	68.6	10-150
d10-Fluoranthene(ES)	200	12.86	92.5	10-150
d12-Benzo(a)anthracene(ES)	200	17.46	104.6	10-150
d12-Chrysene(ES)	200	17.58	89.3	10-150
d12-Benzo(b)fluoranthene(ES)	200	20.83	111.0	10-150
d12-Benzo(k)fluoranthene(ES)	200	20.92	110.1	10-150
d12-Benzo(a)pyrene(ES)	200	21.78	108.7 M	10-150
d12-Perylene(ES)	200	22.05	77.0 M	10-150
d12-Indeno(1,2,3-cd)pyrene(ES)	200	26.18	95.1	10-150
d14-Dibenz(ah)anthracene(ES)	200	26.35	78.9	10-150
d12-Benzo(ghi)perylene(ES)	200	27.15	113.7	10-150

M	Indicates that a peak has been manually integrated.
NS	Indicates that this compound was not spiked in