

Data Validation Report

Project:	Portland Harbor
Laboratory:	Alpha Analytical Laboratory
Environmental Test Record (ETR):	1510017
Analyses/Method:	Polycyclic Aromatic Hydrocarbons (PAH), and n-Alkanes and Total Petroleum Hydrocarbons (TPH), and Total Organic Carbon (TOC)

Summary

Twenty sediment samples were collected in Portland Harbor, Oregon between October 19 2015 and October 21, 2015. Samples were analyzed for polycyclic aromatic hydrocarbons (PAH) by EPA Method 8270D modified by selected ion monitoring mode (SIM), n-alkanes and total petroleum hydrocarbons (TPH) by EPA Method 8015D, and total organic carbon (TOC) by EPA Method 9060A by Alpha Analytical Laboratory located in Mansfield, Massachusetts. The laboratory provided Level 4 data packages containing samples results and associated quality assurance (QA) and quality control (QC) data, preparation logs, and raw instrument output. The following sediment samples are associated with the laboratory ETR 1510017.

Sample ID	Lab ID	Matrix
PH15-01-A	1510017-01	Sediment
PH15-03-A	1510017-02	Sediment
PH15-06-A	1510017-03	Sediment
PH15-06-B	1510017-04	Sediment
PH15-07-A	1510017-05	Sediment
PH15-07-B	1510017-06	Sediment
PH15-07-C	1510017-07	Sediment
PH15-08-A	1510017-08	Sediment
PH15-08-B	1510017-09	Sediment
PH15-13-A	1510017-10	Sediment
PH15-13-D	1510017-11	Sediment
PH15-14-A	1510017-12	Sediment
PH15-14-A-FD	1510017-13	Sediment
PH15-15-A	1510017-14X	Sediment
PH15-17-A	1510017-15	Sediment
PH15-18-A	1510017-16X	Sediment
PH15-20-A	1510017-17	Sediment
PH15-21-A	1510017-18	Sediment
PH15-23-A	1510017-19	Sediment
PH15-25-A	1510017-20	Sediment

The data have been independently validated using *USEPA Contact Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review* EPA-540-R-2017-002, dated January 2017. Validation includes reconstruction of the analytical data to verify that data are traceable and



sufficiently complete in order for a qualified individual other than the originator to perform reconstruction of the data. The validation included the following checks:

- Sample Receipt/Transcription error check
- Sample preservation
- Sample holding times
- Tune Summary
- Initial calibration
- Continuing calibration verification (CCV)
- Laboratory blank contamination
- Equipment blank contamination
- Surrogate spike recoveries
- Internal Standard recoveries
- Matrix spike/Matrix spike duplicate (MS/MSD) recoveries, relative percent difference (RPD)
- Standard Reference Material Sediment accuracy check
- Laboratory control sample (LCS), LCS Duplicate (LCSD) recoveries, RPD values
- Calculation checks
- Contract Required Quantitation Limit (CRQL)
- Field duplicate results
- Laboratory duplicate results
- Overall assessment of the data

Data validation is based on the QC criteria documented in *Portland Harbor Supplemental Sediment Study, Portland Oregon Quality Assurance Project Plan (QAPP)*,¹ dated October 14, 2015, and the *Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling Quality Assurance Project Plan (QAPP)*,² dated March 23, 2018. Data qualifiers assigned to results reported in this sample set are included in Table 1. Reason codes and explanations for qualified data are provided in Table 2.

Sample Receipt

Chain of custody documentation were reviewed for completeness of information relevant to the samples and requested analysis. Sample IDs and sample collection dates from the chain of custody records were matched to the reported data. No discrepancies noted.

All coolers were received within $4 \pm 2^\circ\text{C}$.

ORGANIC ANALYSES

Holding Time and Sample Preservation

All samples were extracted and analyzed within holding times.

GC/MS Instrument Performance Check – Acceptable

¹ NewFields. (2015). Portland Harbor Supplemental Sediment Study, Portland Oregon Quality Assurance Project Plan (QAPP). October 14, 2015.

² AECOM and Geosyntec. 2018. Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling Portland Harbor Superfund Site, Quality Assurance Project Plan. March 23, 2018,



Initial Calibration and Continuing Calibration Verifications – Acceptable

Blanks – Acceptable except as noted below:

Method Blank: The method blank SS110515B01 is associated with samples: PH15-01-A, PH15-03-A, PH15-06-A, PH15-06-B, PH15-07-A, PH15-07-B, PH15-07-C, PH15-08-A, PH15-08-B, PH15-13-A, PH15-13-D, PH15-14-A, PH15-14-A-F, D, PH15-17-A, PH15-20-A, PH15-21-A, PH15-23-A, and PH15-25-A. The method blank SS111615B02 is associated with samples: PH15-15-A and PH15-18-A.

The method blank SS110515B01 met the QC acceptance criteria for PAH. PAH were detected in the method blank below the reporting limit. However, the associated sample results were either non-detect or were greater than 10X the blank concentration. Data were not qualified based on method blank results.

The method blank SS111615B02 met the QC acceptance criteria for PAH. PAH were detected in the method blank below the reporting limit. However, the associated sample results were either non-detect or were greater than 10X the blank concentration. Data were not qualified based on method blank results.

The method blank SS110515B01 met the QC acceptance criteria for n-alkanes and TPH. n-Alkanes were detected in the method blank below the reporting limit. However, with the exception of the analytes below, the associated sample results were either non-detect or were greater than 10X the blank concentration. Samples containing the below listed analytes at concentrations below the reporting limit were qualified as not detected, and were flagged “U” at the reporting limit based on the method blank result.

n-Alkanes and TPH Compounds	Result	Unit	Lab Qualifier
n-Decane (C10)	0.00440	mg/Kg	J
n-Octadecane (C18)	0.0334	mg/Kg	CJ
n-Pentacosane (C25)	0.0283	mg/Kg	CJ
n-Hexacosane (C26)	0.000733	mg/Kg	J
n-Octacosane (C28)	0.00327	mg/Kg	J

The method blank SS111615B02 met the QC acceptance criteria for n-alkanes and TPH. n-Decane was detected in samples PH15-15-A and PH15-18-A at concentrations below the reporting limit were qualified as not detected, and were flagged “U” at the reporting limit based on the method blank result.

Rinsate Blank: Three rinsate blanks were collected on October 21, 2015, October 22, and October 23, 2015 (PH15-01-RB, PH15-02-RB, PH15-03-RB, respectively [ETR 1510012]) and are associated with the samples in this ETR.

- PH15-01-RB is associated with: PH15-01-A, PH15-03-A, PH15-06-A, PH15-06-B, PH15-07-A, PH15-07-B, PH15-07-C, PH15-08-A, and PH15-08-B.
- PH15-02-RB is associated with: PH15-14-A, PH15-14-A-FD, PH15-15-A, PH15-17-A, PH15-18-A, PH15-20-A, PH15-21-A, PH15-23-A, and PH15-25-A.
- PH15-03-RB is associated with: PH15-13-A and PH15-13-D.



Detections of target compounds in rinsate blanks were evaluated relative to sediment method detection limits (MDL). No target analytes were found in rinsate blanks at relative concentrations at, or above, the sediment MDL. No data were qualified based on the rinsate blank results.

Surrogate Spikes – Acceptable.

Internal Standard Areas – Acceptable.

Laboratory Control Samples – Acceptable except as noted below:

Analytes	LCS (%)	LCSD (%)	QC Limit (%)	RPD (%)	QC Limit (%)
Benzo[b]fluoranthene	ok	127	50 - 125	ok	30

The results for Benzo[b]fluoranthene were qualified as estimated and “J” flagged on the low LCS/LCSD recoveries.

Matrix Spike/Spike Duplicate – Acceptable except as noted below:

The following percent recoveries were outside QC limits:

Sample ID	Analyte	MS (%)	MSD (%)	QC Limit (%)	RPD (%)	QC Limit (%)
PH15-06-A	n-Nonadecane (C19)	152	201	50 - 125	ok	30
	n-Eicosane (C20)	-75	214	50 - 125	59	30
	n-Hexacosane (C26)	133	ok	50 - 125	ok	30
	n-Octacosane (C28)	ok	130	50 - 125	ok	30
	n-Triacontane (C30)	134	162	50 - 125	ok	30

The results for analytes listed above in the native sample were qualified as estimated and flagged “J” based on these MS/MSD results.

The PAH concentration found in the parent sample was greater than five times the spiking concentration. Data qualification was not necessary. The samples contained highly elevated PAHs indicative tar-derived residues. Heterogeneity of sample matrix expected and reconciles with QC exceedance. The precision and accuracy of the method was demonstrated by the results of the LCS/LCSD. In addition, a PAH standard reference material (SRM 1941b), was reported with this ETR and met the QC acceptance criteria. The results of the SRM demonstrate accuracy has been achieved for this ETR.

Standard Reference Material – Acceptable.

Field Duplicate– Acceptable.

Laboratory Duplicate– Acceptable except as noted below:

Sample ID	Analytes	RPD (%)	QC Limit (%)
PH15-01-A	n-Pentadecane (C15)	161	30
	n-Hexadecane (C16)	166	30
	Pristane	158	30



Sample ID	Analytes	RPD (%)	QC Limit (%)
	n-Eicosane (C20)	171	30
	n-Pentacosane (C25)	153	30
	n-Heptacosane (C27)	164	30
	n-Tritriacontane (C33)	149	30
	Total Saturated Hydrocarbons	177	30
	Total Petroleum Hydrocarbons (C9-C44)	158	30

All of the PAH results for the laboratory duplicates exceeded the QC limit of 30%. The samples contained elevated PAHs indicative tar-derived residues. Heterogeneity of sample matrix expected and reconciles with QC exceedance. The results for the analytes were qualified as estimated and flagged “J” based on elevated laboratory duplicates.

Target Compound Identifications– Acceptable.

Compound Quantitation and CRQLs – Acceptable.

CONVENTIONAL ANALYSES

Holding Time and Sample Preservation – Acceptable.

Initial Calibration and Continuing Calibration Verifications – Acceptable.

Blanks– Acceptable.

Matrix Spike/Spike Duplicate – Acceptable.

Standard Reference Material – Acceptable.

Field Duplicate– Acceptable.

Laboratory Duplicate– Acceptable.

Compound Quantitation and CRQLs – Acceptable

OVERALL ASSESSMENT OF DATA

The data reported in this laboratory ETR is considered usable for meeting the project objectives.

The completeness is calculated by the number of usable data points divided by the total number of data points generated, multiplied by 100. The completeness for the laboratory ETR is 100%.

Validation performed by and Date:

George Desreuisseau, Mike Mitchel and Kerylynn Krahforst, December 2018.



Staff Scientists - NewFields

Table 1. QA/QC Summary Review

Sdg	SoilSampID	Lab_ID	AnalMeth	Analyte	Result	Lab_Flag	Units	NFG Result	NFG Qualifier	validator_reason_code
1510017	PH15-15-A	1510017-14	EPA 8270D	Benzo[b]fluoranthene	7620 D		µg/Kg	J		I
1510017	PH15-18-A	1510017-16	EPA 8270D	Benzo[b]fluoranthene	26300 D		µg/Kg	J		I
1510017	PH15-01-A	1510017-01	EPA 8270D	C4-Naphthalenes	91.6		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Retene	81.5		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Naphthobenzothiophenes	203		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Naphthalene	25.1		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Dibenzofuran	7.89		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Dibenz[ah]anthracene/Dibenz[ac]anthracene	88.4		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	cis/trans-Decalin	1.46		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Carbazole	3.88		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C4-Phenanthrenes/Anthracenes	49.5		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C4-Naphthobenzothiophenes	11.9		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Benzo[b]fluoranthene	470 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Pyrene	2040 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Phenanthrene	1750 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Perylene	205 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Indeno[1,2,3-cd]pyrene	519 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Fluorene	211 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Fluoranthene	1730 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Dibenzothiophene	237 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Chrysene/Triphenylene	670 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Benzo[j]fluoranthene/Benzo[k]fluoranthene	480 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Benzo[e]pyrene	485 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	1-Methyldibenzothiophene	12.1		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Benzo[a]fluoranthene	124 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Anthracene	185 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Acenaphthene	373 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Benz[a]anthracene	543 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Benzo[g,h,i]perylene	650 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	9/4-Methylphenanthrene	101		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C1-Naphthalenes	6.55		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C1-Fluorenes	88.5		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C1-Fluoranthenes/Pyrenes	448		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C1-Dibenzothiophenes	111		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C1-Decalins	4.34		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C1-Chrysenes	214		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C1-Benzo(b)thiophenes	5.01		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Biphenyl	3.43		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Benzo(b)fluorene	2.23		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C1-Naphthobenzothiophenes	67.3		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Acenaphthylene	86		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	2-Methylphenanthrene	158		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	4-Methyldibenzothiophene	37.3		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	3-Methylphenanthrene	121		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	2-Methylnaphthalene	5.78		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	2/3-Methyldibenzothiophene	42.2		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	2,6-Dimethylnaphthalene	48.8		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	2,3,5-Trimethylnaphthalene	26.2		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	1-Methylphenanthrene	83.4		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	1-Methylnaphthalene	4.46		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C4-Fluoranthenes/Pyrenes	37		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Benzo[a]pyrene	739 D		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	Benzo(b)fluorene	106		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C3-Naphthalenes	190		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C4-Dibenzothiophenes	22		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C4-Decalins	15.3		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	2-Methylanthracene	42.2		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C1-Phenanthrenes/Anthracenes	509		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C4-Chrysenes	33.4		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C4-Benzo(b)thiophenes	27.1		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C3-Naphthobenzothiophenes	26.7		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C3-Fluorenes	55.6		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C3-Fluoranthenes/Pyrenes	58.2		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C3-Dibenzothiophenes	49.4		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C3-Decalins	12.2		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C2-Naphthalenes	138		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C2-Dibenzothiophenes	81.4		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C3-Phenanthrenes/Anthracenes	98.6		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C2-Chrysenes	100		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C3-Chrysenes	54.8		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C2-Fluoranthenes/Pyrenes	127		µg/Kg	J		Id
1510017	PH15-01-A	1510017-01	EPA 8270D	C2-Decalins	12.9		µg/Kg	J		Id

Sdg	SoilSampID	Lab_ID	AnalMeth	Analyte	Result	Lab_Flag	Units	NFG Result	NFG Qualifier	validator_reason_code
1510017	PH15-01-A	1510017-01	EPA 8270D	C2-Benzo(b)thiophenes	29.3		µg/Kg	J		ld
1510017	PH15-01-A	1510017-01	EPA 8270D	C2-Naphthobenzothiophenes	38.7		µg/Kg	J		ld
1510017	PH15-01-A	1510017-01	EPA 8270D	C2-Phenanthrenes/Anthracenes	246		µg/Kg	J		ld
1510017	PH15-01-A	1510017-01	EPA 8270D	C3-Benzo(b)thiophenes	39		µg/Kg	J		ld
1510017	PH15-01-A	1510017-01	EPA 8270D	C2-Fluorenes	86.8		µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C3-Fluorenes	662	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C4-Dibenzothiophenes	259	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C4-Fluoranthenes/Pyrenes	443	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C4-Decalins	101	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C4-Naphthalenes	955	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C4-Naphthobenzothiophenes	132	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C4-Chrysenes	422	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C4-Benzo(b)thiophenes	272	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C3-Phenanthrenes/Anthracenes	1190	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C3-Naphthalenes	1820	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C3-Fluoranthenes/Pyrenes	765	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C4-Phenanthrenes/Anthracenes	524	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C3-Dibenzothiophenes	592	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C3-Decalins	92.2	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C3-Chrysenes	848	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C3-Naphthobenzothiophenes	297	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Acenaphthene	3480	D⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	3-Methylphenanthrene	1160	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C3-Benzo(b)thiophenes	350	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Carbazole	32.1	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Retene	652	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Naphthobenzothiophenes	2250	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Naphthalene	219	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Dibenzofuran	104	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Dibenz[ah]anthracene/Dibenz[ac]anthracene	1180	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	cis/trans-Decalin	14.2	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	2/3-Methyldibenzothiophene	411	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	9/4-Methylphenanthrene	1110	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Benzo(b)fluorene	21	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Benzo(b)fluorene	1280	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Acenaphthylene	923	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	4-Methyldibenzothiophene	395	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	2-Methylphenanthrene	1470	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C1-Benzo(b)thiophenes	33.9	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	2-Methylanthracene	580	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C1-Chrysenes	3090	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	2,6-Dimethylnaphthalene	566	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	2,3,5-Trimethylnaphthalene	274	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	1-Methylphenanthrene	793	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	1-Methylnaphthalene	28.2	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	1-Methyldibenzothiophene	119	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Benzo[a]fluoranthene	1510	D⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	2-Methylnaphthalene	52.2	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C1-Phenanthrenes/Anthracenes	5130	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C2-Naphthobenzothiophenes	448	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C2-Naphthalenes	1370	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C2-Fluorenes	1030	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C2-Fluoranthenes/Pyrenes	1520	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C2-Dibenzothiophenes	923	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C2-Decalins	102	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Biphenyl	29.1	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C2-Benzo(b)thiophenes	241	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C2-Phenanthrenes/Anthracenes	2760	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C1-Naphthobenzothiophenes	790	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C1-Naphthalenes	52.3	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C1-Fluorenes	837	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C1-Fluoranthenes/Pyrenes	5060	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C1-Dibenzothiophenes	1130	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C1-Decalins	43.1	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	C2-Chrysenes	1530	⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Fluoranthene	20600	D⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Benz[a]anthracene	6940	D⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Pyrene	23900	D⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Phenanthrene	17400	D⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Perylene	2310	D⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Fluorene	2100	D⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Dibenzothiophene	2340	D⌘	µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Chrysene/Triphenylene	9010	D⌘	µg/Kg	J		ld

Sdg	SoilSampID	Lab_ID	AnalMeth	Analyte	Result	Lab_Flag	Units	NFG NFG		validator_ reason_code
								Result	Qualifier	
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Benzo[j]fluoranthene/Benzo[k]fluoranthene	5950 Dα		µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Benzo[g,h,i]perylene	7660 Dα		µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Benzo[e]pyrene	5920 Dα		µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Benzo[b]fluoranthene	5850 Dα		µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Benzo[a]pyrene	8910 Dα		µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Anthracene	2130 Dα		µg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8270D	Indeno[1,2,3-cd]pyrene	6260 Dα		µg/Kg	J		ld
1510017	PH15-01-A	1510017-01	EPA 8015M	n-Decane (C10)	0.00801 JB		mg/Kg	0.0825 U		bl
1510017	PH15-01-A	1510017-01	EPA 8015M	n-Octadecane (C18)	0.0346 JB		mg/Kg	0.0825 U		bl
1510017	PH15-03-A	1510017-02	EPA 8015M	n-Octadecane (C18)	0.0315 JB		mg/Kg	0.089 U		bl
1510017	PH15-03-A	1510017-02	EPA 8015M	n-Decane (C10)	0.0108 JB		mg/Kg	0.089 U		bl
1510017	PH15-06-B	1510017-04	EPA 8015M	n-Decane (C10)	0.017 JB		mg/Kg	0.1715 U		bl
1510017	PH15-07-B	1510017-06	EPA 8015M	n-Octacosane (C28)	0.0191 JB		mg/Kg	0.0871 U		bl
1510017	PH15-07-B	1510017-06	EPA 8015M	n-Octadecane (C18)	0.0261 JB		mg/Kg	0.0871 U		bl
1510017	PH15-07-B	1510017-06	EPA 8015M	n-Decane (C10)	0.00523 JB		mg/Kg	0.0871 U		bl
1510017	PH15-07-C	1510017-07	EPA 8015M	n-Octacosane (C28)	0.0068 JB		mg/Kg	0.0739 U		bl
1510017	PH15-07-C	1510017-07	EPA 8015M	n-Octadecane (C18)	0.0248 JB		mg/Kg	0.0739 U		bl
1510017	PH15-07-C	1510017-07	EPA 8015M	n-Hexacosane (C26)	0.00399 JB		mg/Kg	0.0739 U		bl
1510017	PH15-07-C	1510017-07	EPA 8015M	n-Decane (C10)	0.00421 JB		mg/Kg	0.0739 U		bl
1510017	PH15-07-C	1510017-07	EPA 8015M	n-Pentacosane (C25)	0.0511 CJB		mg/Kg	0.0739 U		bl
1510017	PH15-08-A	1510017-08	EPA 8015M	n-Decane (C10)	0.0185 JB		mg/Kg	0.2758 U		bl
1510017	PH15-08-A	1510017-08	EPA 8015M	n-Octadecane (C18)	0.13 JBD		mg/Kg	1.38 U		bl
1510017	PH15-08-B	1510017-09	EPA 8015M	n-Octadecane (C18)	0.0136 GJB		mg/Kg	0.0736 U		bl
1510017	PH15-08-B	1510017-09	EPA 8015M	n-Decane (C10)	0.0126 JB		mg/Kg	0.0736 U		bl
1510017	PH15-13-A	1510017-10	EPA 8015M	n-Octadecane (C18)	0.0973 JBD		mg/Kg	0.62 U		bl
1510017	PH15-13-A	1510017-10	EPA 8015M	n-Decane (C10)	0.00992 JB		mg/Kg	0.124 U		bl
1510017	PH15-13-D	1510017-11	EPA 8015M	n-Decane (C10)	0.00376 JB		mg/Kg	0.0874 U		bl
1510017	PH15-13-D	1510017-11	EPA 8015M	n-Octadecane (C18)	0.0185 JBD		mg/Kg	0.18 U		bl
1510017	PH15-14-A	1510017-12	EPA 8015M	n-Octadecane (C18)	0.0302 JB		mg/Kg	0.0782 U		bl
1510017	PH15-14-A	1510017-12	EPA 8015M	n-Decane (C10)	0.00712 JB		mg/Kg	0.0782 U		bl
1510017	PH15-14-A-FD	1510017-13	EPA 8015M	n-Octadecane (C18)	0.03 JB		mg/Kg	0.0785 U		bl
1510017	PH15-14-A-FD	1510017-13	EPA 8015M	n-Decane (C10)	0.0073 JB		mg/Kg	0.0785 U		bl
1510017	PH15-15-A	1510017-14X	EPA 8015M	n-Decane (C10)	0.0144 JB		mg/Kg	0.4236 U		bl
1510017	PH15-17-A	1510017-15	EPA 8015M	n-Octadecane (C18)	0.0962 JB		mg/Kg	0.1791 U		bl
1510017	PH15-17-A	1510017-15	EPA 8015M	n-Decane (C10)	0.0188 JB		mg/Kg	0.1791 U		bl
1510017	PH15-18-A	1510017-16X	EPA 8015M	n-Decane (C10)	0.0429 JB		mg/Kg	0.4464 U		bl
1510017	PH15-20-A	1510017-17	EPA 8015M	n-Octadecane (C18)	0.0204 JB		mg/Kg	0.0752 U		bl
1510017	PH15-20-A	1510017-17	EPA 8015M	n-Decane (C10)	0.00549 JB		mg/Kg	0.0752 U		bl
1510017	PH15-21-A	1510017-18	EPA 8015M	n-Decane (C10)	0.0214 JB		mg/Kg	0.1672 U		bl
1510017	PH15-23-A	1510017-19	EPA 8015M	n-Decane (C10)	0.0148 JB		mg/Kg	0.1359 U		bl
1510017	PH15-23-A	1510017-19	EPA 8015M	n-Octadecane (C18)	0.135 JB		mg/Kg	0.1359 U		bl
1510017	PH15-25-A	1510017-20	EPA 8015M	n-Decane (C10)	0.00378 JB		mg/Kg	0.0713 U		bl
1510017	PH15-25-A	1510017-20	EPA 8015M	n-Octadecane (C18)	0.0187 JB		mg/Kg	0.0713 U		bl
1510017	PH15-06-A	1510017-03	EPA 8015M	n-Hexacosane (C26)	0.141 J		mg/Kg	J		m
1510017	PH15-01-A	1510017-01	EPA 8015M	n-Pentadecane (C15)	0.38 G		mg/Kg	J		ld
1510017	PH15-01-A	1510017-01	EPA 8015M	n-Hexadecane (C16)	0.204 G		mg/Kg	J		ld
1510017	PH15-01-A	1510017-01	EPA 8015M	n-Heptacosane (C27)	0.173		mg/Kg	J		ld
1510017	PH15-01-A	1510017-01	EPA 8015M	n-Eicosane (C20)	0.162		mg/Kg	J		ld
1510017	PH15-01-A	1510017-01	EPA 8015M	Total Saturated Hydrocarbons	2.72		mg/Kg	J		ld
1510017	PH15-01-A	1510017-01	EPA 8015M	Total Petroleum Hydrocarbons (C9-C44)	57.2		mg/Kg	J		ld
1510017	PH15-01-A	1510017-01	EPA 8015M	Pristane	0.106		mg/Kg	J		ld
1510017	PH15-01-A	1510017-01	EPA 8015M	n-Tritriacontane (C33)	0.118		mg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8015M	n-Pentadecane (C15)	3.49 Gα		mg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8015M	n-Eicosane (C20)	2.03 Gα		mg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8015M	Total Saturated Hydrocarbons	43.7 α		mg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8015M	Total Petroleum Hydrocarbons (C9-C44)	487 α		mg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8015M	Pristane	0.892 α		mg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8015M	n-Heptacosane (C27)	1.77 Gα		mg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8015M	n-Hexadecane (C16)	2.19 Gα		mg/Kg	J		ld
1510017	PH15-01-A-DUP	1510017-01D	EPA 8015M	n-Tritriacontane (C33)	0.819 α		mg/Kg	J		ld
1510017	PH15-06-A	1510017-03	EPA 8015M	n-Nonadecane (C19)	2.71		mg/Kg	J		m
1510017	PH15-06-A	1510017-03	EPA 8015M	n-Triacontane (C30)	1.89		mg/Kg	J		m
1510017	PH15-06-A	1510017-03	EPA 8015M	n-Octacosane (C28)	1.51		mg/Kg	J		m
1510017	PH15-06-A	1510017-03	EPA 8015M	n-Eicosane (C20)	16.1 G		mg/Kg	J		m, md

Table 2. Reason Codes and Explanations

Reason Code	Explanation
bf	Field blank contamination
bl	Laboratory blank contamination
C	Calibration issue
el	Clean-up standard recovery
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate RPDs
h	Holding Times
i	Internal standard areas
k	Estimated Maximum Possible Concentration (EMPC)
l	LCS or OPR recoveries
le	Labeled compound recovery
ld	Laboratory duplicate RPDs
lp	Laboratory control sample laboratory control sample duplicate RPDs
m	Matrix spike recovery
md	Matrix spike/matrix spike duplicate RPDs
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column RPD
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	ICS results