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Data Validation Report

Project:	Portland Harbor
Laboratory:	Alpha Analytical Laboratory
Environmental Test Record (ETR):	1409029
Analyses/Method:	Polycyclic Aromatic Hydrocarbons (PAH), Petroleum Biomarkers, n-Alkanes and Total Petroleum Hydrocarbons (TPH), and Total Organic Carbon (TOC)

Summary

Twelve sediment samples were collected in Portland Harbor, Oregon on August 20, 2014, August 21, 2014, and August 22, 2014. Samples were analyzed for polycyclic aromatic hydrocarbons (PAH) and petroleum biomarkers 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 1409029.

Sample ID	Lab ID	Matrix
PH14-S02-S	1409029-01	Sediment
PH14-S07-S	1409029-02	Sediment
PH14-T05-S	1409029-03	Sediment
PH14-T06-S	1409029-04	Sediment
PH14-T07-S	1409029-05	Sediment
PH14-T10-S	1409029-06	Sediment
PH14-S11-S	1409029-07	Sediment
PH14-S14-S	1409029-08	Sediment
PH14-S16-S	1409029-09	Sediment
PH14-S18-S	1409029-10	Sediment
PH14-S21-S	1409029-11	Sediment
PH14-S23-S	1409029-12	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 Sediment Forensic Chemistry Study, Portland Harbor Oregon Quality Assurance Project Plan (QAPP),*[1] dated July 29, 2014, 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 ± 2°C.

ORGANIC ANALYSES

Holding Time and Sample Preservation

All samples were extracted and analyzed within holding times.

GC/MS Instrument Performance Check – Acceptable

Initial Calibration and Continuing Calibration Verifications – Acceptable

Blanks– Acceptable except as noted below:

Method Blank: The method blank met the QC acceptance criteria for PAH and biomarkers. Cis/trans-Decalin was detected in the method blank below the reporting limit. However, with the exception of the cis/trans-decalin, the associated sample results were either non-detect or were greater than ten times the blank concentration. Samples containing cis/trans-decalin at concentrations below the reporting limit and less than ten time the blank result were qualified as not detected, and were flagged "U" at the reporting limit based on the method blank result.

[1] NewFields. (2014). Portland Harbor Sediment Forensic Chemistry Study, Portland Harbor Oregon Quality Assurance Project Plan (QAPP). July 29, 2014.
[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,

The method blank 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 ten times the blank concentration. Samples containing the below listed analytes at concentrations below the reporting limit and less than ten times the blank result were qualified as not detected, and were flagged "U" at the reporting limit based on the method blank result.

n-Alkanes and TPH Compound	Result	Unit	Lab Qualifier
n-Octadecane (C18)	0.0214	mg/Kg	CJ
n-Heneicosane (C21)	0.00100	mg/Kg	J
n-Docosane (C22)	0.00160	mg/Kg	J
n-Hexacosane (C26)	0.00250	mg/Kg	J
n-Octacosane (C28)	0.0107	mg/Kg	J

Rinsate Blank: Two rinsate blanks were collected on August 20, 2014 and August 21, 2014 (PH14-RB3 and PH14-RB4, respectively [ETR 1408040]) and are associated with the samples in this ETR.

- PH14-RB3 is associated with: PH14-S02-S and PH14-S07-S.
- PH14-RB4 is associated with: PH14-T05-S, PH14-T05-S, PH14-T06-S, PH14-T06-S, PH14-T07-S, PH14-T10-S, PH14-T10-S, PH14-S11-S, PH14-S14-S, PH14-S16-S, PH14-S18-S, PH14-S18-S, PH14-S21-S, PH14-S23-S, and PH14-S23-S.

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 except as noted below:

The surrogate recovery for 5B(H)Cholane in field sample PH14-S16-S was above the acceptance criteria of 40-120%. The results of all biomarkers were "J" qualified.

Internal Standard Areas – Acceptable.

Laboratory Control Samples – Acceptable.

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 (%)
PH14-S07-S	Naphthalene	1100	421	50 - 125	75	30
	7H-Benzo(c)fluorene	219	285	50 - 125	ok	30
	Dibenzo(a,i)pyrene	283	262	50 - 125	ok	30
	Dibenzo(a,h)pyrene	218	183	50 - 125	ok	30

The results for naphthalene, 7H-Benzo(c)fluorene, dibenzo(a,i)pyrene, and dibenzo(a,h)pyrene in the native sample were qualified as estimated and flagged "J" based on these MS/MSD results.

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 – There were no field duplicates associated with this ETR. The precision of the method was demonstrated by the results of the LCS/LCSD.

Laboratory Duplicate– Acceptable except as noted below:

A laboratory duplicate was submitted for PH14-T07-S. Seventy-seven (77%) of the results for the field duplicates exceeded the QC limit of 30%.

The samples contained highly elevated PAHs indicative tar-derived residues. Heterogeneity of sample matrix expected and reconciles with QC exceedance. The results for the analytes listed above 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.

Note: There were no MSDs analyzed for TOC in this ETR. The precision of the method was demonstrated by the results of the laboratory duplicate. The accuracy of the method was demonstrated by the results of the standard reference material (SRM 1941b and SRM 1944) that was reported with this ETR and met QC acceptance criteria.

Standard Reference Material – Acceptable.

Field Duplicate– There were no field duplicates associated with this ETR. The precision of the method was demonstrated by the results of the laboratory duplicate.

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
1409029	PH14-S11-S	1409029-07X	EPA 8270D	cis/trans-Decalin	0.268	JB	µg/Kg	0.827	U	bl
1409029	PH14-S21-S	1409029-11X	EPA 8270D	cis/trans-Decalin	0.476	JB	µg/Kg	0.861	U	bl
1409029	PH14-T07-S	1409029-05	EPA 8270D	Coronene	1760	D	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05	EPA 8270D	Retene	178	D	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05	EPA 8270D	Acenaphthene	1290	D	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05	EPA 8270D	Anthanthrene	2040	D	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05	EPA 8270D	Anthracene	2940	D	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05	EPA 8270D	Benz[a]anthracene	5390	D	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05	EPA 8270D	Benzo[j]fluoranthene/Benzo[k]fluoranthene	4580	D	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05	EPA 8270D	C4-Phenanthrenes/Anthracenes	205	D	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05	EPA 8270D	Phenanthrene	5370	D	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05	EPA 8270D	Pyrene	16600	D	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05	EPA 8270D	Fluoranthene	13700	D	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C2-Chrysenes	649		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C3-Decalins	47.9		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C3-Chrysenes	318		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C3-Benzo(b)thiophenes	105		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C30 Tricyclic Terpane-22S	7.73		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C30 Tricyclic Terpane-22R	4.1		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C2-Phenanthrenes/Anthracenes	1260		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C2-Naphthobenzothiophenes	233		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C2-Naphthalenes	322		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C2-Fluorenes	383		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C2-Fluoranthenes/Pyrenes	891		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C24 Tetracyclic Terpane	1.72		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C2-Decalins	47.3		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C3-Fluorenes	262		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C2-Benzo(b)thiophenes	59.9		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C29 Tricyclic Terpane-22R	3.32		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C28,20S-triaromatic steroid	16.4		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C28,20R-triaromatic steroid	13.3		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C28 Tricyclic Terpane-22S	3.49		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C27,20R-triaromatic steroid	24.5		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C26,20R- +C27,20S- triaromatic steroid	37.5		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C26 Tricyclic Terpane-22R	2.78		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C25 Tricyclic Terpane	7.3		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C24 Tricyclic Terpane	9.52	G	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C2-Dibenzothiophenes	414		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Dibenz[ah]anthracene/Dibenz[ac]anthracene	890		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Naphthobenzothiophenes	1340		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Naphtho(2,3-e)pyrene	416		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Naphtho(2,3-a)pyrene	1080		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Hopane	27.3		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Fluorene	614		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Dibenzothiophene	792		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Dibenzofuran	51.4		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Dibenzo(a,i)pyrene	352		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Dibenzo(a,h)pyrene	168		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C3-Dibenzothiophenes	277		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Dibenzo(a,e)fluoranthene	765		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C3-Fluoranthenes/Pyrenes	408		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	cis/trans-Decalin	4.05		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Carbazole	43.8		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C4-Naphthobenzothiophenes	83		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C4-Naphthalenes	295		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C4-Fluoranthenes/Pyrenes	229		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C4-Dibenzothiophenes	109		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C4-Chrysenes	199		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C3-Phenanthrenes/Anthracenes	535		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C3-Naphthobenzothiophenes	183		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C3-Naphthalenes	473		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C4-Benzo(b)thiophenes	83.8		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Dibenzo(a,e)pyrene	693		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	14a(H),17a(H)-20S-Ethylcholestane	10.5		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	1-Methyldibenzothiophene	48.4		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	18a-22,29,30-Trisnorneohopane-TS	12.2	G	µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	18a(H)-30-Norneohopane-C29Ts	7.14		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	18a(H)&18b(H)-Oleananes	4.55		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	17a/b,21b/a 28,30-Bisnorhopane	5.29		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	17a(H)-22,29,30-Trisnorhopane-TM	5.71		µg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8270D	17a(H),21b(H)-25-Norhopane	5.35		µg/Kg		J	ld

1409029	PH14-T07-S	1409029-05X	EPA 8270D	14b,17b-20S-Methylcholestane	15.7		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	14b,17b-20R-Methylcholestane	17.1		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	14b(H),17b(H)-20S-Cholestane	8.48		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	1-Methylnaphthalene	60.1		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	14a,17a-20S-Methylcholestane	13.5		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	14b(H),17b(H)-20R-Cholestane	11.7		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-I	29.9		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	14a(H),17a(H)-20R-Ethylcholestane	25.8	G	µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-	23.1		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	13b,17a-20S-Methyldiacholestane	12.8		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	13b(H),17a(H)-20S-Diacholestane	12.4		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	13b(H),17a(H)-20R-Diacholestane	6.29		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C23 Tricyclic Terpane	10.2		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C4-Decalins	48.7		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	14b(H),17b(H)-20R-Ethylcholestane	10.5		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Benzothiophene	9.95		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C1-Phenanthrenes/Anthracenes	1970		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C1-Naphthobenzothiophenes	465		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C1-Naphthalenes	56.4		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	14a,17a-20R-Methylcholestane	16.7		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	1-Methylphenanthrene	299		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C1-Fluorenes	330		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C1-Fluoranthenes/Pyrenes	3300		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C1-Dibenzothiophenes	433		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C1-Decalins	17		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Biphenyl	19.4		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Benzo[a]fluoranthene	1020		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	Benzo(b)fluorene	660		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	9/4-Methylphenanthrene	499		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	30,31-Trishomohopane-22R	5.91		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	2/3-Methyldibenzothiophene	154		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	2-Methylanthracene	268		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	C1-Chrysenes	1380		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	7H-Benzo(c)fluorene	200		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	2-Methylnaphthalene	33.2		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	2,6-Dimethylnaphthalene	166		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	2-Methylphenanthrene	501		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	30-Homohopane-22S	9.84		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	3-Methylphenanthrene	391		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	2,3,5-Trimethylnaphthalene	76.8		µg/Kg	J	Id
1409029	PH14-T07-S	1409029-05X	EPA 8270D	4-Methyldibenzothiophene	153		µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C2-Fluorenes	641	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C29 Tricyclic Terpane-22R	5.13	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C28,20S-triaromatic steroid	25.8	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C2-Chrysenes	1200	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C28,20R-triaromatic steroid	21.8	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C2-Decalins	75.4	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C2-Benzo(b)thiophenes	131	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C2-Dibenzothiophenes	649	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C30 Tricyclic Terpane-22R	6.77	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C2-Phenanthrenes/Anthracenes	2090	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C28 Tricyclic Terpane-22S	5.02	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C1-Fluoranthenes/Pyrenes	5280	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C2-Naphthalenes	990	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C2-Naphthobenzothiophenes	351	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C2-Fluoranthenes/Pyrenes	1340	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C1-Phenanthrenes/Anthracenes	3960	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C1-Chrysenes	2520	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C1-Decalins	28	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Fluorene	1580	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C30 Tricyclic Terpane-22S	5.17	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C1-Dibenzothiophenes	766	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C1-Naphthalenes	154	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C1-Naphthobenzothiophenes	679	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C27,20R-triaromatic steroid	40.6	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C23 Tricyclic Terpane	15.4	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C24 Tetracyclic Terpane	3.19	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C24 Tricyclic Terpane	19.6	G¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C25 Tricyclic Terpane	12.4	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C26 Tricyclic Terpane-22R	4.11	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C26,20R- +C27,20S- triaromatic steroid	69.7	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C1-Fluorenes	655	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C4-Naphthalenes	534	¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Biphenyl	43.8	¤	µg/Kg	J	Id

1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Naphthobenzothiophenes	2020 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Naphtho(2,3-e)pyrene	670 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Naphtho(2,3-a)pyrene	1820 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Hopane	40.1 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Dibenzothiophene	1590 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Dibenzo(a,i)pyrene	584 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Dibenzo(a,h)pyrene	279 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Dibenzo(a,e)pyrene	1220 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Dibenzo(a,e)fluoranthene	1370 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Dibenz[ah]anthracene/Dibenz[ac]anthracene	1630 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	cis/trans-Decalin	7.15 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Dibenzofuran	181 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C3-Phenanthrenes/Anthracenes	1060 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C3-Chrysenes	615 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C3-Decalins	69.3 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C3-Dibenzothiophenes	455 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C3-Fluoranthenes/Pyrenes	696 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C3-Fluorenes	439 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Carbazole	92.5 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C3-Naphthobenzothiophenes	281 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C4-Naphthobenzothiophenes	128 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C4-Benzo(b)thiophenes	153 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C4-Chrysenes	364 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C4-Decalins	68.4 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C4-Dibenzothiophenes	170 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C4-Fluoranthenes/Pyrenes	368 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C3-Benzo(b)thiophenes	211 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	C3-Naphthalenes	1070 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-I	60.1 G¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	14a(H),17a(H)-20R-Ethylcholestane	35.2 G¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-	41.5 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Benzothiophene	14.6 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	13b(H),17a(H)-20S-Diacholestane	20.6 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	14a(H),17a(H)-20S-Ethylcholestane	16.6 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	13b,17a-20S-Methyldiacholestane	19.7 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05D	EPA 8270D	Retene	3490 D¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05D	EPA 8270D	Pyrene	25100 D¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05D	EPA 8270D	Phenanthrene	12900 D¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05D	EPA 8270D	Fluoranthene	21500 D¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05D	EPA 8270D	Coronene	2400 D¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05D	EPA 8270D	C4-Phenanthrenes/Anthracenes	949 D¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05D	EPA 8270D	Benzo[j]fluoranthene/Benzo[k]fluoranthene	6350 D¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05D	EPA 8270D	Benz[a]anthracene	7800 D¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05D	EPA 8270D	Anthracene	5120 D¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05D	EPA 8270D	Anthanthrene	2880 D¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05D	EPA 8270D	Acenaphthene	2670 D¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	30-Homohopane-22S	15.5 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	2,3,5-Trimethylnaphthalene	141 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	2,6-Dimethylnaphthalene	538 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	2/3-Methyldibenzothiophene	278 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	14a,17a-20R-Methylcholestane	27.5 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	2-Methylnaphthalene	101 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	1-Methylphenanthrene	543 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	30,31-Trishomohopane-22R	8.51 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	2-Methylanthracene	488 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	3-Methylphenanthrene	829 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	4-Methyldibenzothiophene	267 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	7H-Benzo(c)fluorene	286 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	9/4-Methylphenanthrene	970 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Benzo(b)fluorene	1280 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	Benzo[a]fluoranthene	1790 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	13b(H),17a(H)-20R-Diacholestane	8.6 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	14b(H),17b(H)-20R-Ethylcholestane	16 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	2-Methylphenanthrene	1100 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	14b(H),17b(H)-20R-Cholestane	17.5 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	14b(H),17b(H)-20S-Cholestane	12.7 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	14b,17b-20R-Methylcholestane	23.7 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	14b,17b-20S-Methylcholestane	27.8 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	17a(H),21b(H)-25-Norhopane	7.65 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	17a/b,21b/a 28,30-Bisnorhopane	11.8 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	18a(H)&18b(H)-Oleananes	7.29 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	18a(H)-30-Norneohopane-C29Ts	11.1 ¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	18a-22,29,30-Trisnorneohopane-TS	20.2 G¤	µg/Kg	J	Id
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	1-Methyldibenzothiophene	85.1 ¤	µg/Kg	J	Id

1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	1-Methylnaphthalene	148	¤	µg/Kg		J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	17a(H)-22,29,30-Trisnorhopane-TM	9.57	¤	µg/Kg		J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8270D	14a,17a-20S-Methylcholestane	29.7	G¤	µg/Kg		J	ld
1409029	PH14-S07-S	1409029-02X	EPA 8270D	Dibenzo(a,i)pyrene	1010		µg/Kg		J	m
1409029	PH14-S07-S	1409029-02X	EPA 8270D	Dibenzo(a,h)pyrene	435		µg/Kg		J	m
1409029	PH14-S07-S	1409029-02X	EPA 8270D	7H-Benzo(c)fluorene	726		µg/Kg		J	m
1409029	PH14-S07-S	1409029-02X	EPA 8270D	Naphthalene	494		µg/Kg		J	m, md
1409029	PH14-S16-S	1409029-09X	EPA 8270D	30,31-Trishomohopane-22R	5.38		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C26,20R- +C27,20S- triaromatic steroid	65.8		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C26 Tricyclic Terpane-22S	9.42		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C26 Tricyclic Terpane-22R	5.71		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C24 Tricyclic Terpane	10.7		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C23 Tricyclic Terpane	17.8		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	30-Normoretane	5.61		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	30-Norhopane	24.7		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	30-Homohopane-22S	12.8		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	30-Homohopane-22R	13.7	G	µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	18a-22,29,30-Trisnorneohopane-TS	4.99		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	30,31-Bishomohopane-22R	6.9		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	30,31-Bishomohopane-22S	19.2	G	µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C27,20R-triaromatic steroid	44		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	Tetrakishomohopane-22S	17.2	G	µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	30,31-Trishomohopane-22S	8.77		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C30 Tricyclic Terpane-22S	4.58		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C24 Tetracyclic Terpane	2.55		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	18a(H)-30-Norneohopane-C29Ts	9.06		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	Unknown Sterane (S18)	3.34		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	Tetrakishomohopane-22R	3.58		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	Pentakishomohopane-22S	4.04		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	Pentakishomohopane-22R	4.54		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	T22a-Gammacerane/C32-diahopane	4.72		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	Hopane	48.6		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C28 Tricyclic Terpane-22R	8.37		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C30 Tricyclic Terpane-22R	4.34		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C29 Tricyclic Terpane-22S	4.61		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C29 Tricyclic Terpane-22R	4.97		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C28,20S-triaromatic steroid	24.8		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C28,20R-triaromatic steroid	28.5		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C28 Tricyclic Terpane-22S	5.41		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	Moretane	13.4	G	µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-	55.8		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	13b(H),17a(H)-20S-Diacholestane	26.1		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	13a,17b-20S-Ethyldiacholestane	2.02		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	14a(H),17a(H)-20R-Ethylcholestane	29.3		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	13b,17a-20S-Methyldiacholestane	26.4	G	µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	18a(H)&18b(H)-Oleananes	13.3		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	14b(H),17b(H)-20S-Ethylcholestane	8.31		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	17a/b,21b/a 28,30-Bisnorhopane	15.2		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	17a(H)-Diahopane	1.72		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	17a(H)-22,29,30-Trisnorhopane-TM	9.01		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	17a(H),21b(H)-25-Norhopane	3.32		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	13b(H),17a(H)-20R-Diacholestane	9.08		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	14b,17b-20R-Methylcholestane	23.2		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-I	28.3		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	14b(H),17b(H)-20S-Cholestane	17.1		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	14b(H),17b(H)-20R-Ethylcholestane	23.3		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	14b(H),17b(H)-20R-Cholestane	19.3		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	14a,17a-20S-Methylcholestane	27.1		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	C25 Tricyclic Terpane	12.4		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	14a,17a-20R-Methylcholestane	42.4		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	14a(H),17a(H)-20S-Ethylcholestane	17.7		µg/Kg		J	S
1409029	PH14-S16-S	1409029-09X	EPA 8270D	14b,17b-20S-Methylcholestane	24.8		µg/Kg		J	S
1409029	PH14-S11-S	1409029-07X	EPA 8015M	n-Hexacosane (C26)	0.0184	JB	mg/Kg	0.0827	U	bl
1409029	PH14-S11-S	1409029-07X	EPA 8015M	n-Docosane (C22)	0.00744	JB	mg/Kg	0.0827	U	bl
1409029	PH14-S11-S	1409029-07X	EPA 8015M	n-Octacosane (C28)	0.0237	JB	mg/Kg	0.0827	U	bl
1409029	PH14-S11-S	1409029-07X	EPA 8015M	n-Octadecane (C18)	0.0143	JB	mg/Kg	0.0827	U	bl
1409029	PH14-S11-S	1409029-07X	EPA 8015M	n-Heneicosane (C21)	0.00571	JB	mg/Kg	0.0827	U	bl
1409029	PH14-S21-S	1409029-11X	EPA 8015M	n-Octacosane (C28)	0.0768	JB	mg/Kg	0.0861	U	bl
1409029	PH14-S21-S	1409029-11X	EPA 8015M	n-Docosane (C22)	0.00955	JB	mg/Kg	0.0861	U	bl
1409029	PH14-T07-S	1409029-05X	EPA 8015M	n-Hexacosane (C26)	0.164		mg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8015M	n-Hexadecane (C16)	0.149		mg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8015M	n-Nonacosane (C29)	3.88	G	mg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8015M	n-Octadecane (C18)	4.44	G	mg/Kg		J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8015M	Norpristane (1650)	0.242		mg/Kg		J	ld

1409029	PH14-T07-S	1409029-05X	EPA 8015M	Pristane	0.309		mg/Kg	J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8015M	n-Tricosane (C23)	0.734		mg/Kg	J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8015M	n-Pentacosane (C25)	5.53	G	mg/Kg	J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8015M	Phytane	2.41	G	mg/Kg	J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8015M	2,6,10 Trimethyldodecane (1380)	0.217		mg/Kg	J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8015M	2,6,10 Trimethyltridecane (1470)	1.19		mg/Kg	J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8015M	Total Saturated Hydrocarbons	22.1		mg/Kg	J	ld
1409029	PH14-T07-S	1409029-05X	EPA 8015M	Total Petroleum Hydrocarbons (C9-C44)	309		mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	n-Nonacosane (C29)	6.08	G¤	mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	n-Hexacosane (C26)	0.273	¤	mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	Norpristane (1650)	0.481	¤	mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	Total Saturated Hydrocarbons	39.7	¤	mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	Total Petroleum Hydrocarbons (C9-C44)	497	¤	mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	Pristane	0.524	¤	mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	Phytane	4.72	¤	mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	n-Tricosane (C23)	1.14	¤	mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	n-Pentacosane (C25)	7.88	G¤	mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	n-Hexadecane (C16)	0.291	¤	mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	2,6,10 Trimethyltridecane (1470)	1.75	¤	mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	2,6,10 Trimethyldodecane (1380)	0.336	¤	mg/Kg	J	ld
1409029	PH14-T07-S-DUP	1409029-05XD	EPA 8015M	n-Octadecane (C18)	12	¤	mg/Kg	J	ld

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