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Interlaboratory Analytical Comparison Study to Support Deepwater Horizon Natural Resource Damage Assessment: Description and Results for Crude Oil QA10OIL01

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ABSTRACT

To support natural resource damage assessment (NRDA) in response to the Deepwater Horizon (DWH) oil spill in the Gulf of Mexico, a large number of coastal sediment and tissue (i.e., oysters) samples have been collected outside of the spill zone to define baseline environmental conditions prior to being exposed to oil. Analysis of oiled sediments and oil-exposed oysters will continue for the foreseeable future. To support these efforts, NOAA will require additional analytical laboratories to perform NRDA sample analyses. To compare the data among these laboratories, inter-laboratory comparison studies have been initiated with the results from the second exercise, crude oil QA10OIL01 reported here. In this exercise, selected polycyclic aromatic hydrocarbons (PAHs), alkylated PAHs, hopanes, and steranes were determined in the exercise material, which consisted of a crude oil, and in SRM 1582 Petroleum Crude Oil. The results from this second exercise are reported along with a summary of the analytical methods used.

INTRODUCTION

On April 20, 2010, a fatal explosion, fire, and sinking of BP's Deepwater Horizon drilling rig occurred approximately 40 miles off the Louisiana coast. The disaster resulted in the discharge of tens of thousands of barrels of oil per day from the seafloor into the Gulf of Mexico. In what has become the worst offshore oil spill in U.S. history, a wide expanse and variety of natural resources have become exposed and potentially impacted by oil and other consequences of the spill. Under the Oil Pollution Act, those responsible for an oil spill are liable for clean-up and for natural resource damages. Several federal and state agencies are conducting a natural resource damage assessment (NRDA) to determine what resources have been injured and what uses of the resources have been lost due to the spill.

To support this NRDA, the trustees and BP's representatives have been collecting and analyzing tens of thousands of environmental samples to characterize both pre-spill and post-spill environmental conditions. A broad range of sample types have been collected including oil in various forms, water, sediment, and biota. For the foreseeable future, subsequent sampling and analysis will be required. In addition, numerous other entities have collected environmental samples for hydrocarbon analysis and submitted them to different laboratories throughout the country.

In the past the National Institute of Standards and Technology (NIST) has helped benchmark and improve the quality of analytical data gathered on the marine environment by administering interlaboratory comparison exercises. To compare the data among the many laboratories analyzing samples from this spill, the National Oceanic and Atmospheric Administration (NOAA) has requested that NIST coordinate interlaboratory comparison studies with sediment, crude oil, and bivalve tissue being the three matrices of interest. These studies are performance-based with each laboratory using its current methods for analysis of similar matrices that it would use for its program customers. The target analytes for each study are selected polycyclic aromatic hydrocarbons (PAHs), alkylated PAHs, hopanes, and steranes. More than three dozen laboratory facilities were contacted by NOAA and invited to participate in the studies; for all three matrix studies a large number of laboratories agreed to receive samples and report their analytical results to NIST.

The data received from 26 laboratories for the crude oil QA10OIL01 are summarized in this report along with summaries of the analytical methods used by each laboratory. Numerical indices, z- and p-scores, are used to assess and track laboratory performances for accuracy and precision, respectively, and to provide a mechanism for assessing the comparability of data produced by the participating laboratories for the target analytes.

SOURCE OF MATERIAL

The crude oil used for the exercise source oil was collected under NOAA's direction from the site of the Deepwater Horizon oil rig on May 21, 2010 (one month after the incident), stored at another laboratory, and then shipped to NIST (Gaithersburg, MD) on September 22, 2010. On October 18, 2010, the contents of six of the containers received were divided among five separatory funnels and allowed to sit for at least one hour until the water and oil separated. The water was then removed and discarded while the oil was allowed to sit for another hour. In all cases, no additional water separated from the oil. The oil was then combined in a 20-L glass carboy containing a large stir bar. The glass carboy was covered with a black trash bag and stirred overnight. The following day the crude oil was ampouled. Aliquots of approximately 1.3 mL of oil were placed in 2 mL amber ampoules. The ampoules were filled with argon just prior to filling with the solution. A total of 66 gross were produced with ampoules taken from boxes 64 and 65 for distribution in this study. The remainder of the ampoules will be used for SRM 2779 Gulf of Mexico Crude Oil following the certification process.

SAMPLE DISTRIBUTION

Five ampules were distributed to each of 37 laboratories during the week of November 29, 2010. Each laboratory was requested to analyze three samples of Crude Oil QA10OIL01 and at least one or more samples of SRM 1582 Petroleum Crude Oil [2] using their laboratory's and/or program's analytical protocols, for determination of the concentrations (mass/mass) of the parent polycyclic aromatic hydrocarbon (PAH) compounds, alkylated PAH compounds, hopanes, and steranes currently being determined in their laboratory. Note that SRM 1582 was not provided to the laboratories.

The instructions including the list of target analytes sent to participants are attached in Appendix A.

EVALUATION OF EXERCISE RESULTS

Establishment of the Assigned Values

Laboratory data submission: Each participating laboratory was asked to submit data from three replicate determinations of the "unknown" material QA10OIL01 and was requested to report results of concurrent analyses of NIST SRM 1582 Petroleum Crude Oil. Laboratories were requested to report these results to three significant figures and to provide brief descriptions of their cleanup and analytical procedures.

Determination of laboratory analyte means: For each laboratory, the laboratory analyte mean of the three sample results (S1, S2, and S3) was calculated for each analyte. Non-numerical data were treated

as follows: A mean "<value" was used when three "<values" were reported; NA (not analyzed/determined) was used for three reported NAs; and, if the reported results were of mixed type, e.g., S1 and S2 were numerical values and S3 was reported as "<value", the two similar "types" were used to either determine the mean or to set a non-numerical descriptor.

Determination of assigned values: The assigned values are the means of the acceptable data as defined here. For a particular analyte, the performance on the reference material, SRM 1582, was initially deemed acceptable for the purpose of this exercise if the laboratory result was within 30 % of the upper and lower limits of the confidence interval for analytes listed in the Certificate of Analysis for SRM 1582 [2]. The criterion of 30 % is the same as the one that was used for the National Oceanic and Atmospheric Administration (NOAA) Mussel Watch and National Status and Trends Quality Assurance Programs [3]. If a laboratory demonstrated acceptable performance on a particular analyte in the reference material, that laboratory's results for that analyte in the corresponding "unknown" exercise material was then used in the calculation of the analyte's exercise assigned value, unless it was deemed an outlier. For evaluation of potential outliers, statistical tests and expert analyst judgment were used after viewing both normal and log-normal plots of the data. This judgment utilized knowledge of potential coeluters based on the laboratory's reported methods. In instances for which the analyte concentration was below the detection limit of most participating laboratories, no exercise assigned value was calculated. In data sets where a number of laboratories report results as "not detected" at various detection limits, there is no consensus as to what numerical value should be assigned to these results in the computation of consensus means and other values.

REPORTED RESULTS

Laboratories were assigned numerical identification codes in order of receipt of data with the exception of the two NIST laboratories which are Lab 1 and 25 in this exercise. The laboratory mean replicate data are shown in Tables 1 to 3 for QA10OIL01. Included in these tables are the exercise assigned mean values and the standard deviation of the assigned mean values along with the exercise assigned median values. Summaries of the methods used by each laboratory are in Appendix B, and notes included by a laboratory with its data are listed in Appendix C. In Appendix D, charts of the mean numerical results reported by each laboratory for each analyte are shown for the exercise material and the corresponding reference material, SRM 1582.

Performance Scores

The exercise coordinators recognize that different environmental monitoring programs have different data quality objectives and needs. The acceptability of the results submitted by a particular laboratory will be decided by the individual program(s) for which the laboratory provides data. Typically, each program will use these exercise results in conjunction with the laboratory's performance in the analysis of certified reference materials and/or control materials, and of other quality assurance samples. These exercise results are exhibited in a number of ways in this report to facilitate their use by most environmental monitoring programs in their acceptability assessments.

IUPAC guidelines describe the use of z-scores and p-scores for assessment of accuracy and precision in intercomparison exercises such as those described in this report. These indices assess the difference between the result of the laboratory and the exercise assigned value and can be used to compare the

performance of different laboratories among the participants on different analytes and on different materials.

Accuracy Assessment (z-score)

$$\text{z-score} = (\text{bias estimate})/(\text{performance criterion}) = (x - X)/\sigma$$

where x is the individual laboratory result, X is the "Exercise Assigned Value," and σ is the target value for standard deviation.

The choice of σ is dependent upon data quality objectives of a particular program, or as ISO 17043 suggests "a fitness for purpose goal for performance as determined by expert judgement" [4]. It can be "fixed" and arrived at by perception, prescription, or referenced to validated methodology (e.g., σ = 0.025 X; X is the exercise assigned value,), or it can be an estimate of the actual variation (e.g., the calculated sample standard deviation, *s*, from the exercise data). The "fixed" performance criterion is more useful in the comparison of a laboratory's performance on different materials while the use of the actual variation may be more useful within a given exercise, for example, if the determination of a particular analyte is exceptionally problematic. The measurement of analytes targeted in this study is not particularly problematic.

We have calculated and reported z-scores using the fixed performance criterion for each analyte for each laboratory using "25 % of the exercise assigned value" as the fixed target value for standard deviation for this program. The use of z-score (25 % X) is also taken from the NOAA Mussel Watch and National Status and Trends Quality Assurance Programs [3]. The z-scores calculated for these exercises can thus be interpreted as shown in the following examples:

z-score (25 % X):

+1 ⇒ laboratory result is 25 % higher than the assigned value
-2 ⇒ laboratory result is 50 % lower than the assigned value.

A common classification of z-scores is [4]:

$\lvert z \rvert \leq 2$	Satisfactory
$2 < \lvert z \rvert < 3$	Questionable
$\lvert z \rvert \geq 3$	Unsatisfactory.

This classification has been deemed acceptable within the measurement community.

Tables 4 through 6 summarize the z-scores (25 %) for each laboratory for each reported analyte in QA10OIL01.

Precision Assessment (p-score)

$$\text{p-score} = \sigma_{lab} / \sigma_{target}$$

For the calculation of p-scores for this program, the σ values used are coefficients of variation (CV calculated as relative standard deviations) with the current target σ (CV) for the three replicates being

15 %. Tables 7 through 9 summarize the relative standard deviations (RSDs) calculated from the three concentrations reported by the laboratory for each analyte quantified while Tables 10 through 12 summarize the p-scores (15%). A p-score of 1 indicates that the laboratory's CV was 15%, and a p-score of 2 indicates that the laboratory's CV was 30%.

DISCUSSION

NOAA's NRDA office solicited laboratories involved in the analysis of samples shortly after the DWH disaster for their interest in participating in this interlaboratory study for analytes of interest in crude oil. The participation by the laboratories was voluntary, and samples of QA10OIL01 were provided free of charge. Laboratories were provided with information for ordering SRM 1582 (See Appendix A). Interested laboratories were requested to quantify selected PAHs, alkylated PAHs (some individual and some as groups), and biomarkers (hopanes and steranes) in three aliquots of QA10OIL01 and SRM 1582 using their laboratories' analytical protocols for these analyses. A total of 37 laboratories received samples of which 26 laboratories submitted data. The 26 participating laboratories are listed in alphabetical order in Appendix E.

Tables 1 through 3 summarize the laboratory means and exercise assigned values for the PAHs, alkylated PAHs, and hopanes and steranes, respectively. The consensus value for a given compound in QA10OIL01 was derived by combining data where corresponding values in SRM 1582 were within 30 % of the expanded uncertainty of the SRM value. In the absence of a corresponding SRM value, individual results were screened using outlier tests and included in the consensus value if values were shown not to be statistical outliers. Appendix D contains the charts of the QA10OIL01 and SRM 1582 data by analyte. In these charts, the analytes that are not included on the Certificate of Analysis for SRM 1582 are shown with no target value.

No assigned values were calculated for chrysene, triphenylene, benzo[*j*]fluoranthene, or benzo[*k*]fluoranthene in QA10OIL01. All of the data sets, except the two from NIST, were determined from gas chromatographic analyses on a 5% phenyl phase from different manufacturers. Chrysene and triphenylene coelute when using this phase as do several of the benzofluoranthene isomers. Although several laboratories recognized and reported coelutions for chrysene with triphenylene and among the benzofluoranthenes using this phase, several did not, thus reporting the combined value for chrysene and triphenylene as only the chrysene peak and in a similar fashion for the benzofluoranthenes. Lab 25 (NIST) reported values for chrysene (mean 20.7 ng/g, std dev 0.4 ng/g, n=3) and triphenylene (mean 14.4 ng/g, std dev 0.9 ng/g, n=3) in QA10OIL01 partially separated using a 50% phenyl phase while both Lab 1 (NIST) and Lab 25 (NIST) reported individual values for benzo[*b*], benzo[*j*], and benzo[*k*]fluroanthene separated on the 50% phenyl phase. Lab 1 (NIST) did not get enough separation of chrysene from triphenylene to report separate values for those compounds.

The spread in the PAH data for QA10OIL01 among the laboratories is highest for anthracene, perylene, benzothiophene, and naphthobenzothiophene, analytes at relatively low mass fractions and determined by fewer laboratories. The range in mass fractions for the PAHs in the crude oil QA10OIL01 is wide ranging from < 1 ng/g for perylene to > 800 ng/g for naphthalene. The agreement among the data for the more volatile PAHs, naphthalene and biphenyl, was better in the crude oil than in the previous sediment study [2] suggesting that extraction and sample concentration may be issues for the more

volatile species. This will be further tested in the next study using a mussel tissue as the matrix of interest.

The alkylated PAH data for QA10OIL01 do not show as much spread among the laboratories as for the sediment material QA10SED01 [1]. However, similar to the sediment study, the laboratories reporting 1-methylnaphthalene and 2- methylnaphthalene as well as C1-naphthalenes, generally reported values for C1-naphthalenes lower than the sum of the 1-methyl- and 2-methylnaphthalene (see Figure 1). Labs 1, 9, 13, 20, and 23 reported very similar values for C1-naphthalenes and 1-methyl plus 2-methylnapthalene. These labs, except for Lab 20, reported using the methylnaphthalenes to quantify the C-1 naphthalenes. Lab 23 also reported using the methylnaphthalenes to quantify the C1-naphthalenes but their reported mass fraction for the C1-naphthalenes was 17% lower than the sum of the methylnaphthalenes. Lab 20, as well as most of the other laboratories, reported using naphthalene to quantify the C1-napthalenes. There are obviously issues with the choice of the representative compound used for quantification of the alkylated PAHs, as well as the interpretation of the chromatograms as to what peaks should and should not be included in the summation for the alkylated groups. For an alkylated group of PAHs, the mass spectra are different based on where the PAH is alkylated (or if it is alkylated) thus resulting in different response factors for isomers in a homolog group. These issues need to be explored in more detail in future studies and discussions.

Fewer laboratories reported data for the selected biomarkers with the largest spread in the data seen for 5α(H),14α(H),17α(H)-Cholestane 20S and 5α(H),14α(H),17α(H)-Cholestane 20R.

Laboratories 1, 4, 9, 11, 16, 18, 23, 24, 25, and 26 performed some clean-up/isolation step for the oil samples (Appendix B) while the remaining laboratories diluted the oil samples and ran them on the GC/MS (without a clean-up/isolation step). Comparison of the means and standard deviations for selected PAHs (Figure 2) and selected steranes (Figure 3) for the laboratories performing a clean-up step to those for laboratories not performing a clean-up step shows that the means for the laboratories not performing a clean-up step are consistently higher than those for laboratories performing a clean-up step. The differences between the two groups of laboratories, however, are not greater than the spread of the data (as indicated by the standard deviations of the means). The consistently higher means may indicate that the laboratories not performing a clean-up step had a higher background interference not seen in the calibration solutions.

The two crude oil samples, QA10OIL01 and SRM 1582, have different patterns of the PAHs and biomarkers. Using the data from Lab 1 (NIST) for illustration, Figure 4 shows that the mass fractions of the more volatile PAHs (molecular mass 128 through 192) are higher in QA10OIL01 as are the majority of the less volatile PAHs (molecular mass 202 through 276) in Figure 5. The notable exception is perylene which is almost 30 times higher in SRM 1582 compared to QA10OIL01. The hopanes and steranes (Figure 6) are higher in SRM 1582 compared to QA10OIL01.

The majority of the z-scores based on 25% (Tables 4 through 6) are within ± 2 while the majority of the p-scores based on 15% (Tables 10 through 12) are within ± 1. This indicates that the laboratories are internally consistent, but there is still a fair amount of spread in the data among the laboratories.

It is important to evaluate the non-quantitative results reported by each laboratory as well. Although these results are not easily presented or numerically evaluated, they are included in Tables 1 through 3 of this report. The laboratory and its data users should closely examine these non-quantitative results.

Decisions based on false negative or false positive results from a laboratory can lead to significant environmental and/or economic consequences. Some laboratories reported detection limits in the exercise material that may be too high for the data quality objectives and needs of their program(s), and these issues should be assessed as well.

Intercomparison exercises provide an important mechanism for assessing the comparability, repeatability, and trueness of data being produced by the participating laboratories. Exercise materials similar in matrix, form, and analyte concentration to typical samples routinely analyzed by the laboratories are most useful for demonstrating the level of comparability and for revealing potential problem areas.
Minimizing the among-laboratory biases so that the analytical variability is significantly less than the field sampling variability should be an achievable goal in environmental monitoring.

Acknowledgments

The time and effort of the analysts and management of the participating laboratories and the assistance of NOAA with obtaining the crude oil and the NIST Standard Reference Materials Program with the preparation of the exercise material are gratefully acknowledged.

Disclaimer

Certain commercial equipment, instruments, or materials are identified in this report to specify adequately the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are the best available for the purpose.

References

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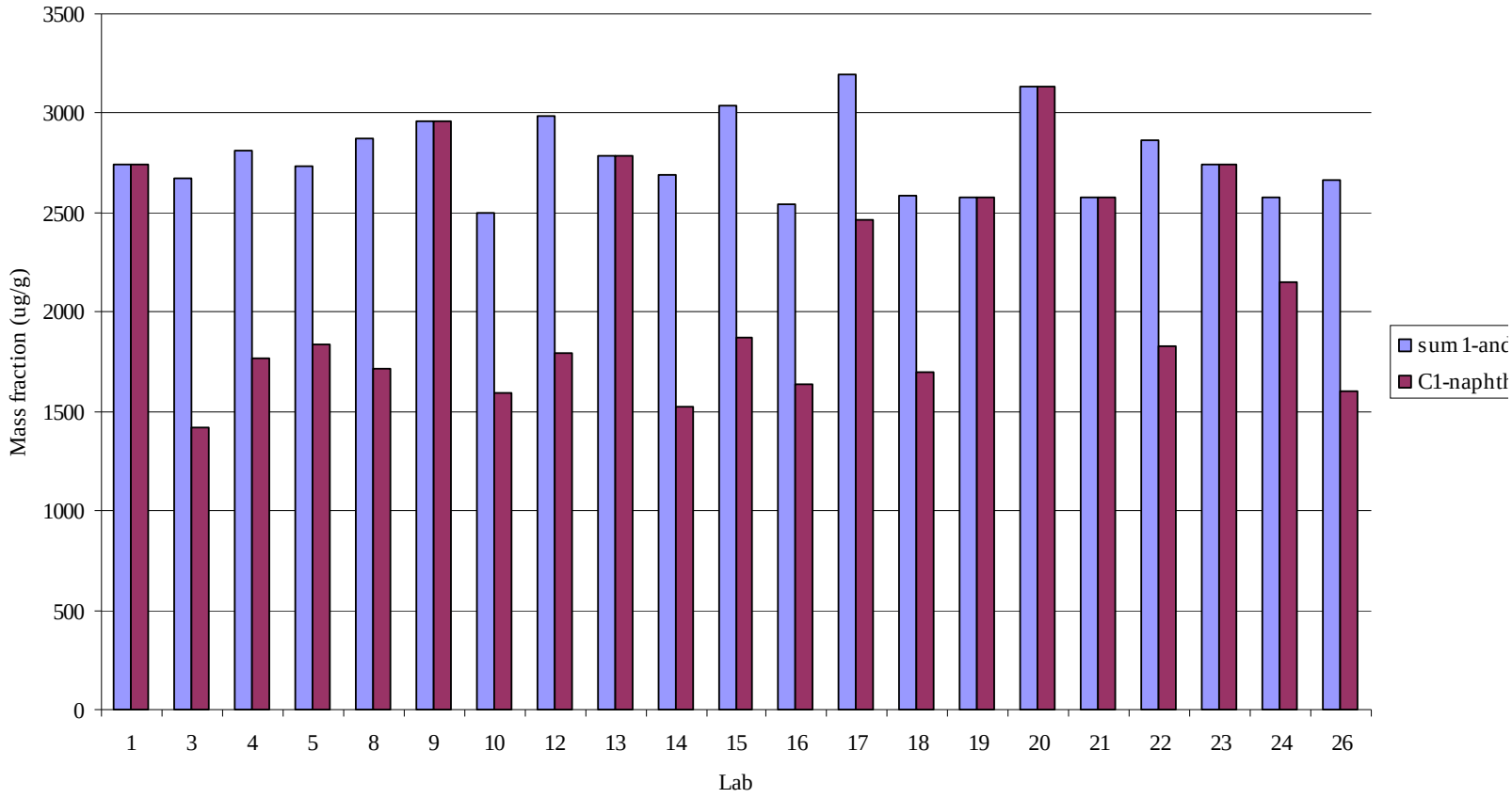


Figure 1. Comparison of data submitted by laboratory for the sum of individual values for 1-methyl naphthalene and 2-methylnaphthalene and for the C1-naphthalenes.

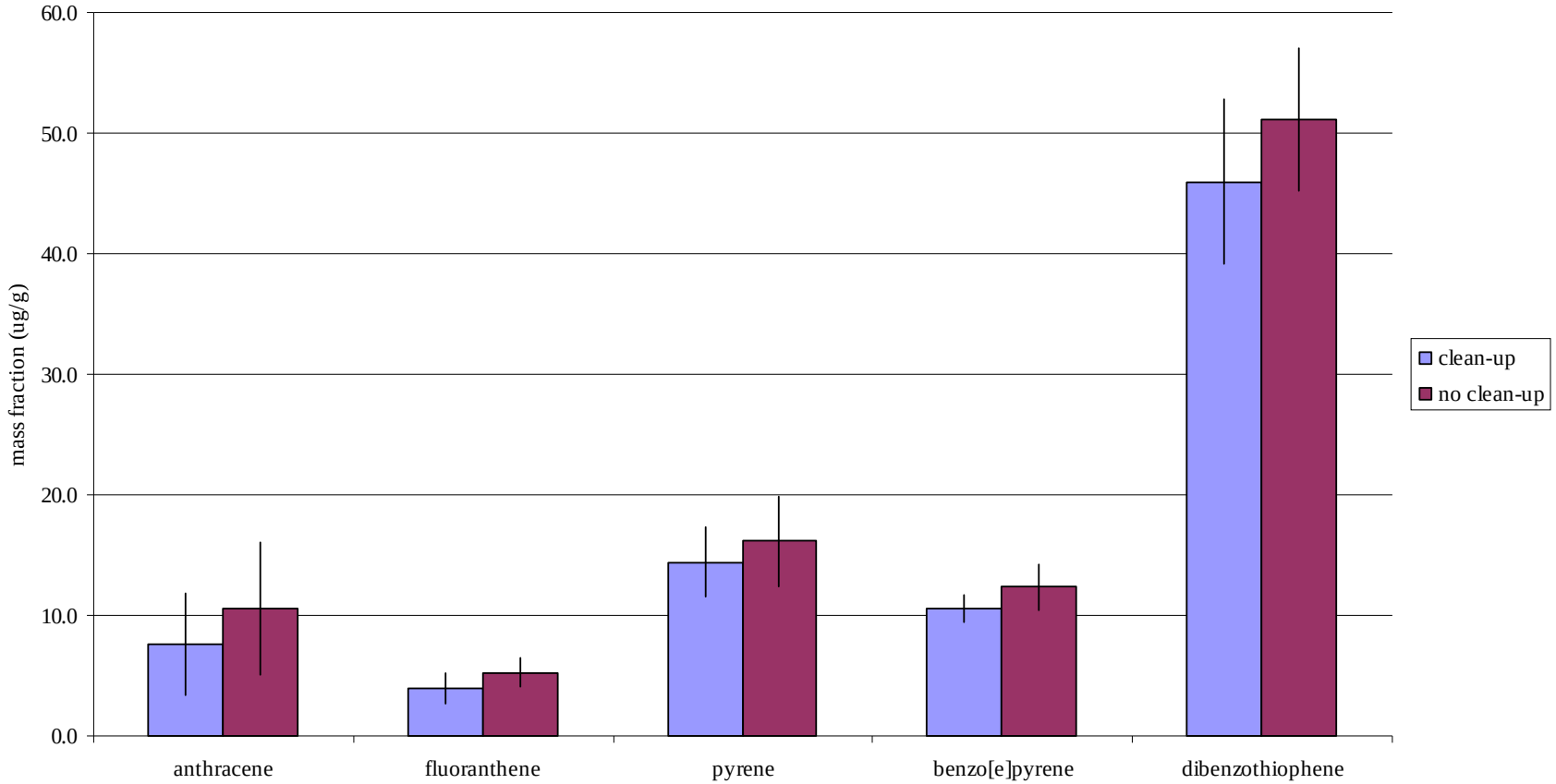


Figure 2. Comparison of mean mass fractions (and standard deviations) for selected PAHs determined by laboratories performing clean-up step (n=10) and laboratories not performing clean-up step (n=16) for QA10OIL01

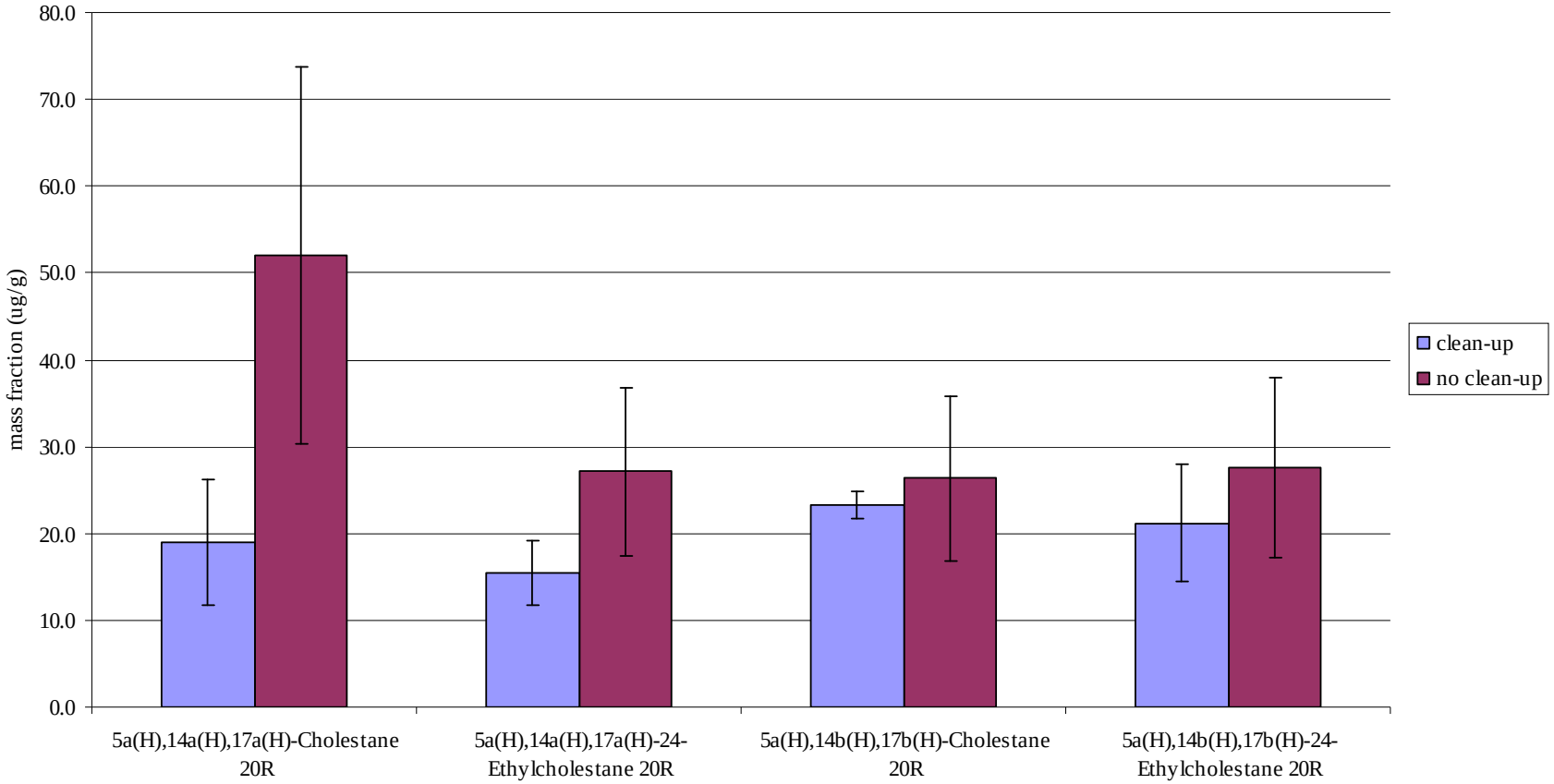


Figure 3. Comparison of mean mass fractions (and standard deviations) for selected steranes determined by laboratories performing clean-up step (n=10) and laboratories not performing clean-up step (n=16) for QA10OIL01

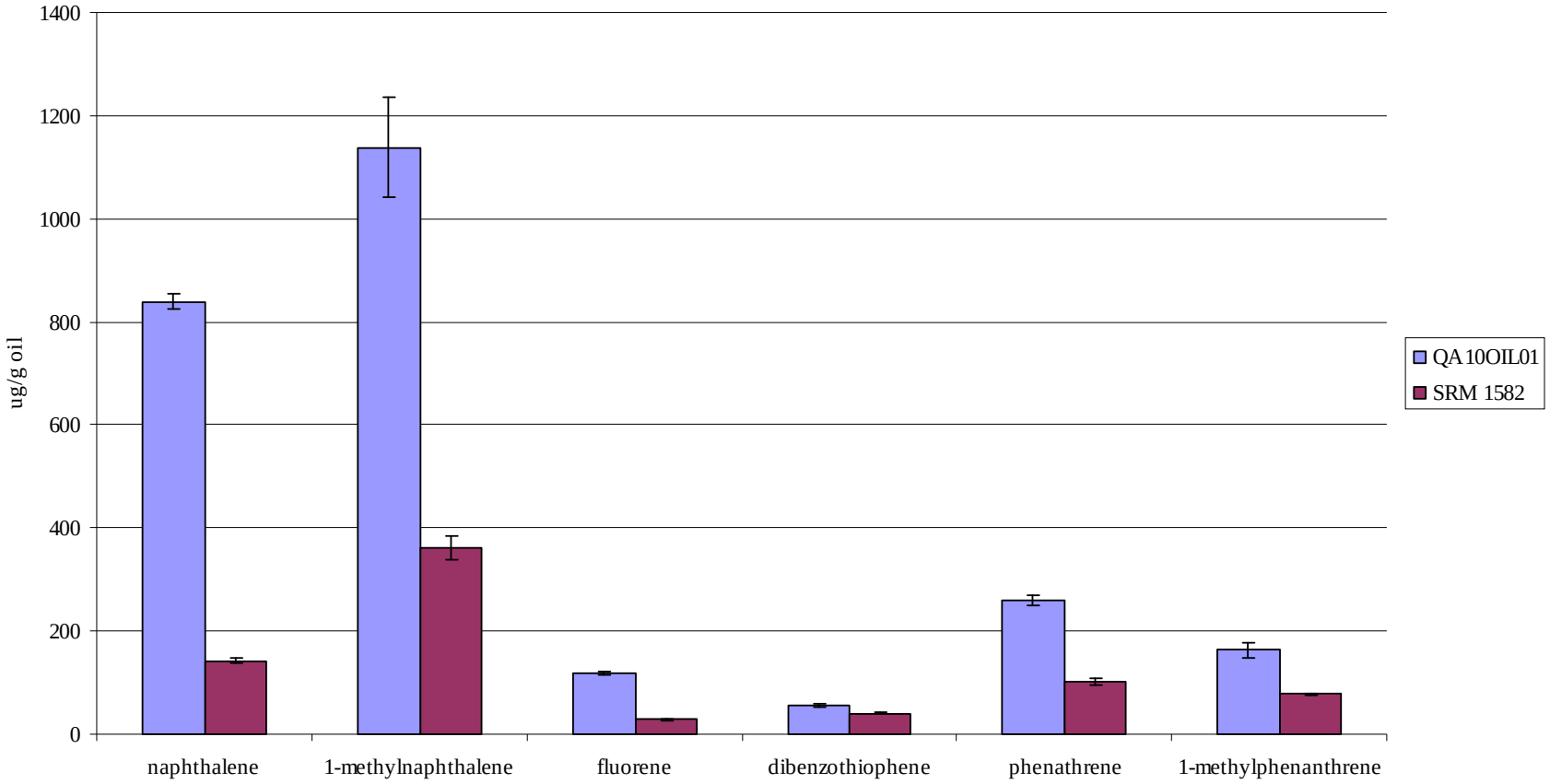


Figure 4. Comparison of mass fractions (and standard deviations) for selected PAHs (molecular mass 128 to 192) determined by Lab 1 (NIST) in QA10OIL01 and SRM 1582

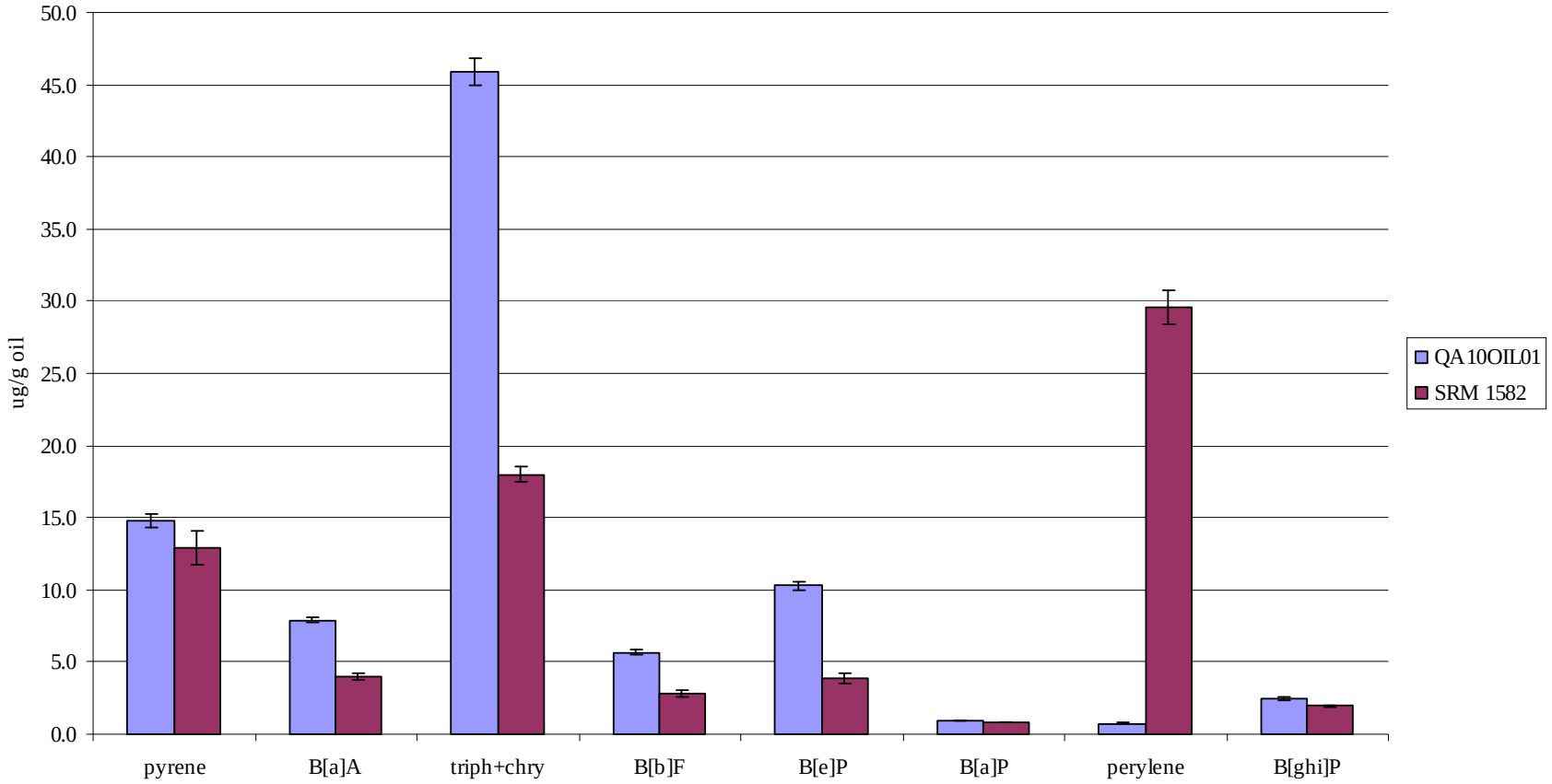


Figure 5. Comparison of mass fractions (and standard deviations) for selected PAHs (molecular mass 202 to 276) determined by Lab 1 (NIST) in QA10OIL01 and SRM 1582

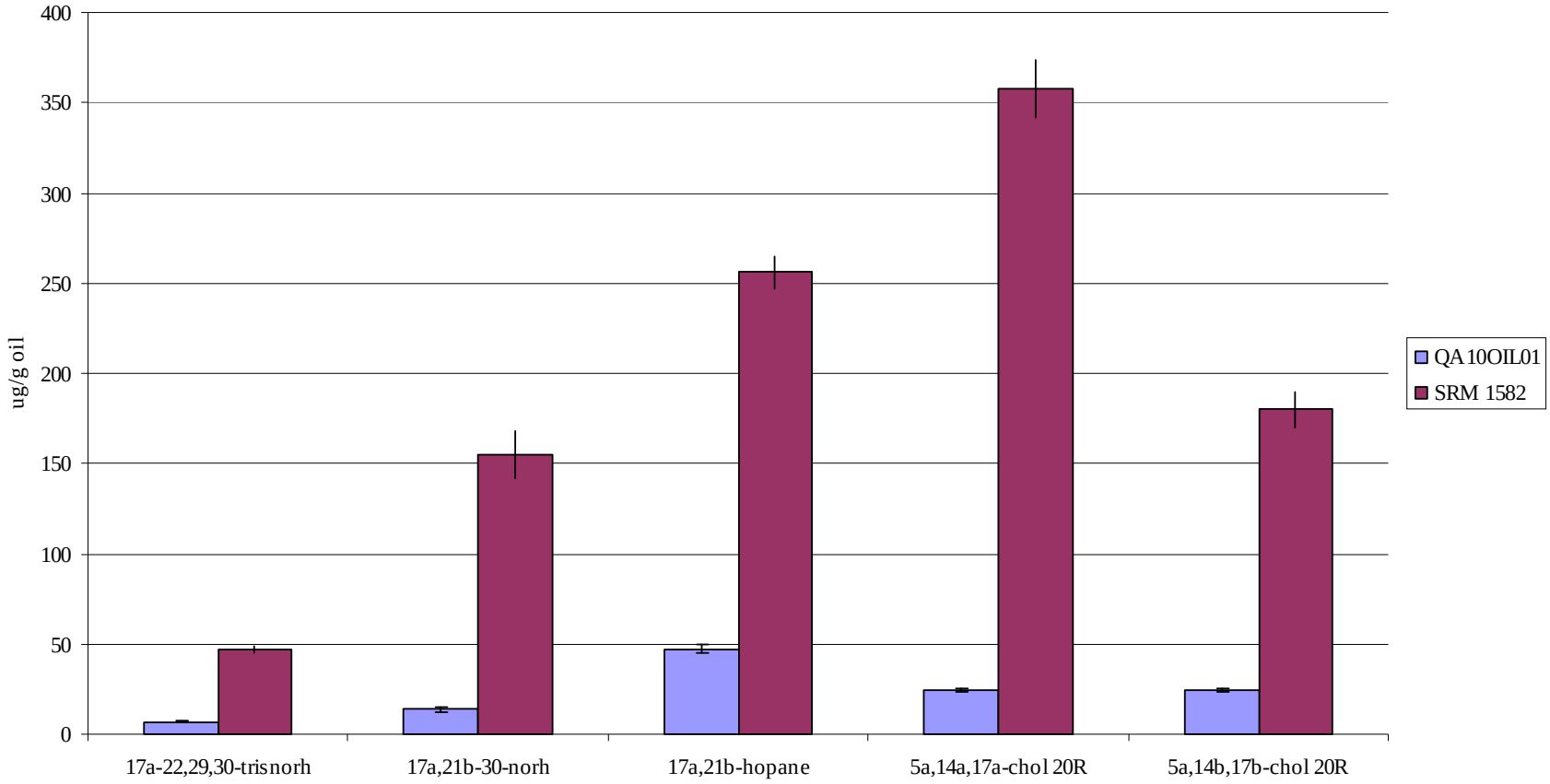


Figure 6. Comparison of mass fractions (and standard deviations) for selected hopanes and steranes determined by Lab 1 (NIST) in QA10OIL01 and SRM 1582

Table 1. Crude Oil (QA10OIL01): Laboratory means of three replicates and exercise assigned values - PAHs (µg/g)
(reported as if three figures were significant)

Laboratory No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
naphthalene	839	979	756	869	790	1260	746	851	855	749	653	778	1057	874	792
biphenyl	203		178	172	217	226	165	181	181	152	158	199	220	204	184
acenaphthene	<5	<500	9.69	<4	DL	10.3	10.4	12.0	12.4	16.9	13.6	13.9	**85.6**	19.6	<9.35
acenaphthylene	<5	<500	6.85	<4	DL	13.7	16.5	6.44	14.3	<10	8.50	7.47	13.8	7.47	5.44
fluorene	119	168	124	162	143	189	91.2	130	149	139	116	149	169	113	150
phenanthrene	259	311	277	304	273	363	271.3	262	284	263	247	320	378	286	301
anthracene	3.97	<500	13.0	7.52	DL	DL	5.14	2.41	16.7	<10	10.7	15.0	**22.8**	11.9	15.7
fluoranthene	4.23	<500	4.44	<4	DL	4.95	6.05	4.96	6.24	<10	3.43	3.49	7.73	4.63	<9.35
pyrene	14.8	<500	14.7	9.33	DL	17.7	24.0	15.3	19.3	11.4	15.9	17.7	16.3	17.2	13.7
benzo[b]fluorene	NA		10.9	22.6	NA	NA		NA	NA	11.6	NA	NA	11.5	NA	NA
benz[a]anthracene	7.87	<500	4.20	15.3	DL	9.20	5.25	5.46	13.5	<10	6.73	5.94	6.14	9.06	<9.35
chrysene	below	<500	36.4	49.5	51.0	27.7		47.5		coelute	27.5	62.0	64.4	50.4	51.8
triphenylene	below		NA	49.5	NA	NA		NA		NA	NA	OTHER	36	NA	NA
chrysene / triphenylene	45.9						48.4		53.9	42.7					
benzo[*b*]fluoranthene	5.69	<500	7.59	5.36	7.83	6.52	8.08	5.26	5.71	<10	Other	5.89	6.82	5.83	<9.35
benzo[*j*]fluoranthene	0.602		NA	<4	NA	NA		NA		coelute	Other	OTHER	2.92	NA	NA
benzo[*k*]fluoranthene	0.503	<500	DL	<4	DL	DL	ND	<5.00		NA	<1.2	< 3.89	3	<3.92	<9.35
Benzo[b+j]fluoranthene											3.63				
benzo[j+k]fluoranthene									1.27	<10					
benzo[a]fluoranthene	<1		NA	<4	NA	NA		NA	NA	<10	NA	NA	N/A	NA	NA
benzo[e]pyrene	10.3		10.6	10.1	13.0	15.1	12.2	11.2	12.3	<10	8.67	11.1	**6.34**	11.5	<9.35
benzo[a]pyrene	0.951	<500	DL	<4	DL	**3.04**	ND	2.12	1.86	<10	<1.2	2.16	2.10	2.65	<9.35
perylene	0.751		DL	<4	DL	1.88	ND	<5.00	0.518	<10	1.27	0.67	0.69	<3.92	<9.35
indeno[1,2,3-cd]pyrene	0.419	<500	DL	<4	DL	DL	ND	<5.00	<0.478	<10	<1.2	< 1.94	215	<3.92	<9.35
benzo[ghi]perylene	2.45	<500	DL	<4	DL	3.39	ND	<5.00	2.04	<10	1.57	1.84	**4.98**	<3.92	<9.35
dibenz[a,h]anthracene	0.492	<500	3.30	<4	DL	2.76	ND	1.50		<10	2.17	1.73	N/A	2.17	<9.35
dibenz[a,c]anthracene	1.99														
dibenz[a,h+ a,c]anthracene									2.26						
cis/trans-decalin	NA		790	814	NA	NA		NA	NA	699	NA	704	1317	NA	NA
cis-decalin															
trans-decalin															
dibenzofuran	NA	<500	27.5	24.7	NA	18.3		25.3	NA	35.4	NA	31.6	36.9	19.9	18.0
retene	NA		NA	19.8	NA	NA		NA	10.6	<10	20.9	**68.5**	13.4	NA	NA
benzothiophene	NA		6.88	9.03	NA	NA		NA	NA	<10	NA	8.3	22.2	NA	NA
dibenzothiophene	54.8		52.8	41.2	58.3	42.4	44.9	51.5	55.1	49.7	42.2	59.7	51.3	44.4	54.3
naphthobenzothiophene	NA		15.9	13.3	NA	NA		NA		**32.5**	NA	8.44	2.25	NA	NA
benzo[b]naphtho[2,1-d]thiophene									19.5						
benzo[b]naphtho[1,2-d]thiophene									3.51						
benzo[b]naphtho[2,3-d]thiophene									2.65						

NA=Not analyzed; DL=Detection limit; No value in space=nothing reported by lab: Bolded values were not used in the calculation of the consensus statistics

Table 1 (cont.). Crude Oil (QA10OIL01): Laboratory means of three replicates and exercise assigned values - PAHs (µg/g)
(reported as if three figures were significant)

Laboratory No.	16	17	18	19	20	21	22	23	24	25	26	mean	s	%RSD	median
naphthalene	767	751	801	743	866	657	769	843	953	919	843	837	126	15.0	820
biphenyl	176	279	202	164	204	168	161	168	284	223	177	194	34	17.5	181
acenaphthene	<conc	32.9	12.1	33.1	16.4	17.0	22.2	**14.0**	DL	21.2	8.03	16.4	7.2	43.8	14.0
acenaphthylene	<conc	**34.1**	<15	15.7	10.0	ND	6.86	<5.8	DL	8.08	DL	10.1	3.8	38.2	8.29
fluorene	112	**267**	117	141	153	119	132	164	106	217	120	140	28	20.3	139
phenanthrene	231	**45.7**	211	232	304	244	285	279	340	218	273	281	42	14.8	277
anthracene	<conc	<10	6.55	<0.02	<10	ND	<1.99	7.34	8.66	2.85	4.33	8.79	4.79	54.5	7.52
fluoranthene	<conc	5.33	4.29	**11.0**	6.50	ND	4.41	3.40	DL	4.10	2.13	4.72	1.36	28.7	4.44
pyrene	<conc	17.0	11.7	11.4	20.8	10.6	18.3	12.7	14.6	14.4	17.0	15.5	3.5	22.4	15.3
benzo[b]fluorene	<conc	<10	14.4	13.8	NA	NA	12.1	NA	DL	NA	22.0	14.9	4.7	31.8	13.0
benz[a]anthracene	<conc	15.85	7.48	<0.02	8.60	10.5	6.27	5.06	DL	5.85	11.3	8.40	3.47	41.3	7.48
chrysene	63.1	22.3		ceolute	58.2	46.9		37.3		20.7	45.3	No assigned value			
triphenylene	NA	<10		ceolute	NA	NA	NA	NA		14.4	NA	No assigned value			
chrysene / triphenylene			45.1	41.7			49.9		54.3			47.7	4.7	9.9	47.2
benzo[*b*]fluoranthene	<conc	5.78	4.44	ceolute	8.17	6.57	5.16	4.86	NA	6.15	4.83	6.13	1.13	18.4	5.83
benzo[*j*]fluoranthene	NA	2.04		<0.02	NA	NA	NA	NA		1.11	NA	No assigned value			
benzo[*k*]fluoranthene	<conc	2.57		<0.02	<10	NA		<0.8		1.06	DL	No assigned value			
Benzo[b+j]fluoranthene												No assigned value			
benzo[j+k]fluoranthene			0.520				<1.99		NA			No assigned value			
benzo[a]fluoranthene	NA	<10	<0.50	ceolute	NA	NA	<1.99	NA	DL	1.96	DL	No assigned value			
benzo[e]pyrene	<conc	16.5	10.4	12.0	13.7	11.4	10.2	10.6	DL	11.8	10.7	11.7	1.8	15.6	11.3
benzo[a]pyrene	<conc	<10	1.97	<0.02	<10	ND	2.24	<0.6	DL	1.42	DL	1.94	0.50	25.5	2.10
perylene	<conc	<10	<0.50	<0.02	<10	ND	1.03	0.697	DL	0.543	0.333	0.838	0.450	53.8	0.694
indeno[1,2,3-cd]pyrene	<conc	<10	<0.50	<0.02	<10	ND	<1.99	<0.2	DL	0.617	DL	No assigned value			
benzo[ghi]perylene	<conc	<10	1.84	2.01	<10	ND	1.97	1.68	DL	2.10	2.20	2.10	0.49	23.4	2.01
dibenz[a,h]anthracene	<conc	<10	3.09	<0.02	<10	ND	2.50	1.48	DL	0.67	2.03	No assigned value			2.10
dibenz[a,c]anthracene												No assigned value			1.99
dibenz[a,h+ a,c]anthracene												No assigned value			2.26
cis/trans-decalin	NA	614	632		NA	NA	703	NA	Other	NA	1433	856	302	35.3	704
cis-decalin				<0.02								No assigned value			
trans-decalin				1270								No assigned value			1270
dibenzofuran	<conc	<10	<30	<0.02	29.4	NA	25.7	NA	28.3	NA	25.7	26.7	5.9	22.0	25.7
retene	NA	NA	7.37	<0.02	NA	NA	<1.99	NA	20.5	24.5	DL	16.7	6.3	37.6	19.8
benzothiophene	NA	<10	10.3	<0.02	NA	NA	7.29	NA	23.0	NA	21.7	13.6	7.3	53.6	9.68
dibenzothiophene	41.7	<10	34.4	54.0	59.6	42.9	49.3	46.6	48.4	**106**	49.3	49.1	6.6	13.5	49.3
naphthobenzothiophene	NA	<10	16.7	3.09	NA	NA	21.6	NA	NA	NA	17.0	12.3	7.0	56.9	14.6
benzo[b]naphtho[2,1-d]thiophene												No assigned value			
benzo[b]naphtho[1,2-d]thiophene												No assigned value			
benzo[b]naphtho[2,3-d]thiophene												No assigned value			

NA=Not analyzed; DL=Detection limit; No value in space=nothing reported by lab: Bolded values were not used in the calculation of the consensus statistics

Table 2. Crude Oil (QA10OIL01): Laboratory means of three replicates and exercise assigned values - alkylated PAHs (µg/g)
(reported as if three figures were significant)

Laboratory No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1-methylnaphthalene	1138		1017	991	1100	1410	772	1103	1070	1025	1093	1177	1060	1177	1133
2-methylnaphthalene	1607	1877	1653	1820	1633	2107	1080	1767	1890	1477	1440	1813	1723	1513	1907
2,6-dimethylnaphthalene	1125		1017	1033	NA	1303	420	1042	1028	971	NA	1163	221	1160	993
1,6,7-trimethylnaphthalene	NA		251	NA	NA	471	111	306	212	174	NA	302	NA	334	487
1-methylphenanthrene	164		201	96.7	NA	218	180	180	195	106	NA	224	129	206	173
C1-decalins	NA		NA	1293	NA	NA		NA	NA	1013	NA	1050	NA	NA	NA
C2-decalins	NA		NA	1743	NA	NA		NA	NA	838	NA	928	NA	NA	NA
C3-decalins	NA		NA	1230	NA	NA		NA	NA	513	NA	435	NA	NA	NA
C4-decalins	NA		NA	793	NA	NA		NA	NA	481	NA	563	NA	NA	NA
C1-naphthalenes	2745		1417	1763	1833	NA		1717	2960	1597	NA	1793	2783	1520	1870
C2-naphthalenes	2250		2080	1917	2367	NA	1380	2047	3687	2000	4183	2237	3143	1823	2173
C3-naphthalenes	1503		1177	1130	1733	NA	787	1370	2990	1327	2460	1563	2200	1177	1397
C4-naphthalenes	776		515	489	840	NA	403	729	1360	698	1197	769	318	543	670
C1-benzothiophenes	NA		NA	53.9	NA	NA		NA	NA	28.4	NA	33.7	**212**	NA	NA
C2-benzothiophenes	NA		NA	35.6	NA	NA		NA	NA	27.3	NA	40.8	**4593**	NA	NA
C3-benzothiophenes	NA		NA	47.4	NA	NA		NA	NA	36.6	NA	51.5	380	NA	NA
C4-benzothiophenes	NA		NA	31.8	NA	NA		NA	NA	25.0	NA	30.6	NA	NA	NA
C1-fluorenes	317		234	299	377	NA	174	298	320	300	252	327	704	242	286
C2-fluorenes	400		348	311	507	NA	**180**	396	408	409	341	444	NA	323	364
C3-fluorenes	266		244	256	413	NA	**123**	285	336	340	269	333	545	249	260
C1-phenanthrenes/anthracenes	971		630	638	700	NA	616	599	927	514	769	758	917	550	667
C2-phenanthrenes/anthracenes	789		603	632	807	NA	573	624	950	573	826	799	839	567	640
C3-phenanthrenes/anthracenes	488		309	355	497	NA	387	416	670	368	543	487	196	371	430
C4-phenanthrenes/anthracenes	286		171	184	197	NA	138	230	327	203	**807**	198	87.9	205	212
C1-dibenzothiophenes	135		152	132	97.3	NA	145	85.7	162	132	133	178	**7.07**	88.4	97.8
C2-dibenzothiophenes	120		189	153	143	NA	187	116	241	199	186	253	107	118	142
C3-dibenzothiophenes	102		139	115	123	NA	118	89.0	162	147	NA	181	87.9	85.9	102
C4-dibenzothiophenes	46.8		55.4	54.5	72.3	NA		46.6	83.8	65.7	NA	82.9	46.6	41.3	58.0
C1-fluoranthenes/pyrenes	60.6		65.4	67.8	99.0	NA	65.0	84.9	83.0	86.8	66.7	89.6	52.8	68.8	55.3
C2-fluoranthenes/pyrenes	125		117	90.4	167	NA	98.4	138	138	140	116	148	NA	125	121
C3-fluoranthenes/pyrenes	148		105	75.8	157	NA	82.6	135	159	137	124	165	65.9	113	111
C4-fluoranthenes/pyrenes	103		NA	60.5	NA	NA		NA	109	110	90.7	NA	**7.63**	NA	NA
C1-naphthobenzothiophenes	NA		NA	54.5	NA	NA		NA	71.0	82.3	NA	30.4	NA	NA	NA
C2-naphthobenzothiophenes	NA		NA	57.2	NA	NA		NA	82.8	103	NA	37.0	NA	NA	NA
C3-naphthobenzothiophenes	NA		NA	41.5	NA	NA		NA	60.1	59.3	NA	25.2	NA	NA	NA
C4-naphthobenzothiophenes	NA		NA	21.2	NA	NA		NA	32.1	28.1	NA	11.3	NA	NA	NA
C1-chrysenes	107		85.9	108	113	NA	96.4	108	118	94.2	NA	134	**179**	95.9	110
C2-chrysenes	127		92.5	128	123	NA	115	117	143	114	NA	155	**17.1**	109	134
C3-chrysenes	85.5		63.9	94.8	103	NA	55.4	84.1	98.5	91.1	NA	114	NA	84.4	74.6
C4-chrysenes	70.9		39.3	39.1	NA	NA	ND	71.2	72.1	49.6	NA	75.2	**3.98**	48.3	<8.22

NA=Not analyzed; DL=Detection limit; No value in space=nothing reported by lab: Bolded values were not used in the calculation of the consensus statistics

Table 2 (cont.). Crude Oil (QA10OIL01): Laboratory means of three replicates and exercise assigned values - alkylated PAHs (µg/g)
(reported as if three figures were significant)

Laboratory No.	16	17	18	19	20	21	22	23	24	25	26	mean	s	%RSD	median
1-methylnaphthalene	992	**2115**	1063	1013	1183	989	1153	1124	1457	NA	1100	1102	137	12.5	1100
2-methylnaphthalene	1547	1078	1527	1563	1950	1585	1710	1621	1123	NA	1567	1623	259	15.9	1621
2,6-dimethylnaphthalene	<conc	276	961	1016	1297	788	958	979	779	625	1000	916	293	32.0	997
1,6,7-trimethylnaphthalene	NA	N/A	389	306	370	286	193	NA	547	NA	377	320	119	37.2	306
1-methylphenanthrene	138	197	92.7	170	253	158	118	178	174	163	103	166	43	26.1	173
C1-decalins	NA	<10	1033	<0.02	NA	NA	1018	NA	Other	NA	2000	1235	390	31.6	1042
C2-decalins	NA	<10	1200	<0.02	NA	NA	817	NA	DL	NA	1800	1221	448	36.7	1064
C3-decalins	NA	<10	1000	<0.02	NA	NA	384	NA	DL	NA	1433	833	449	53.9	757
C4-decalins	NA	<10	807	<0.02	NA	NA	365	NA	DL	NA	1167	696	289	41.5	678
C1-naphthalenes	1640	2461	1700	2580	3137	2573	1827	2745	2150	NA	1600	2115	544	25.7	1833
C2-naphthalenes	2043	3800	2200	3687	2273	1044	1777	3476	1943	NA	1867	2409	830	34.5	2173
C3-naphthalenes	1297	**8228**	1300	2557	1447	615	1143	2482	1677	NA	1233	1571	604	38.5	1383
C4-naphthalenes	537	740	710	564	702	332	528	811	1593	NA	550	712	308	43.3	698
C1-benzothiophenes	NA	74.9	32.3	<0.02	NA	NA	29.0	NA	NA	NA	28.7	40.1	17.8	44.3	32.3
C2-benzothiophenes	NA	66.6	29.3	<0.02	NA	NA	26.9	NA	NA	NA	36.0	37.5	13.8	36.8	35.6
C3-benzothiophenes	NA	368	30.7	<0.02	NA	NA	42.5	NA	NA	NA	23.0	No assigned value			
C4-benzothiophenes	NA	<10	30.0	<0.02	NA	NA	31.4	NA	NA	NA	23.7	28.8	3.5	12.2	30.3
C1-fluorenes	244	763	247	554	308	260	276	320	326	NA	217	332	146	43.9	299
C2-fluorenes	297	**57.1**	360	503	476	353	347	399	419	NA	277	384	64	16.8	380
C3-fluorenes	218	130	283	167	364	276	251	185	280	NA	220	280	87	31.2	267
C1-phenanthrenes/anthracenes	506	1167	480	1257	710	613	614	872	750	NA	587	731	204	27.9	667
C2-phenanthrenes/anthracenes	509	**9719**	497	492	742	427	588	919	726	NA	617	670	146	21.7	628
C3-phenanthrenes/anthracenes	<conc	**1069**	307	398	472	278	321	431	568	NA	347	411	109	26.5	398
C4-phenanthrenes/anthracenes	<conc	**49.1**	207	51.2	256	166	139	142	322	NA	177	195	69	35.4	197
C1-dibenzothiophenes	70.7	219	103	75.7	101	153	138	130	93.7	NA	137	125	36	28.7	132
C2-dibenzothiophenes	75.0	**12.8**	160	91.6	139	208	167	174	122	NA	203	159	47	29.5	156
C3-dibenzothiophenes	<conc	108	120	<0.02	114	83.2	121	102	89.7	NA	140	117	26	22.7	114
C4-dibenzothiophenes	<conc	21.6	60.3	<0.02	106	NA	60.6	27.9	45.4	NA	56.7	57.4	20.2	35.3	56.0
C1-fluoranthenes/pyrenes	<conc	**343**	52.7	**195**	97.1	98.3	81.7	62.5	51.3	NA	66.7	72.8	15.9	21.8	67.2
C2-fluoranthenes/pyrenes	<conc	<10	100	195	211	NA	138	115	87.0	NA	110	130	33	25.0	125
C3-fluoranthenes/pyrenes	<conc	**369**	120	168	183	NA	156	101	102	NA	120	126	33	25.9	122
C4-fluoranthenes/pyrenes	NA	72.7	82.7	175	NA	NA	122	53.9	83.3	NA	77.3	95.0	32.5	34.2	87.0
C1-naphthobenzothiophenes	NA	**12.3**	47.7	30.0	NA	NA	62.5	NA	NA	NA	59.7	54.8	18.4	33.6	57.1
C2-naphthobenzothiophenes	NA	<10	67.3	41.3	NA	NA	86.4	NA	NA	NA	72.0	68.4	22.7	33.2	69.7
C3-naphthobenzothiophenes	NA	30.9	49.0	<0.02	NA	NA	63.5	NA	NA	NA	46.7	47.0	14.0	29.7	47.8
C4-naphthobenzothiophenes	NA	<10	30.7	<0.02	NA	NA	43.3	NA	NA	NA	35.7	28.9	10.3	35.6	30.7
C1-chrysenes	72.4	**244**	96.7	133	130	130	116	106	112	NA	94.7	108	16	15.1	108
C2-chrysenes	<conc	**364**	130	150	163	162	144	115	140	NA	113	130	19	14.7	128
C3-chrysenes	<conc	<10	94.3	127	118	**11.2**	140	39.4	96.7	NA	79.0	91.3	24.7	27.1	92.7
C4-chrysenes	<conc	<10	77.0	<0.02	87.8	ND	79.6	**7.56**	70.7	NA	69.7	65.4	15.8	24.2	70.9

NA=Not analyzed; DL=Detection limit; No value in space=nothing reported by lab: Bolded values were not used in the calculation of the consensus statistics

Table 3. Crude Oil (QA10OIL01): Laboratory means of three replicates and exercise assigned values - biomarkers (µg/g)
(reported as if three figures were significant)

Laboratory No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Carbazole	NA	<500	NA	6.48	NA	NA		NA	NA	NA	Other	NA	8.88	NA	NA
18a(H)-22,29,30-Trisnorhopane	NA		5.17	NA	6.27	NA		5.30	NA	NA	Other	8.10	N/A	7.08	8.55
17a(H)-22,29,30-Trisnorhopane	6.88		4.87	NA	11.8	NA		5.03	NA	NA	Other	5.61	**26.8**	5.10	8.96
17α(H),21β(H)-30-Norhopane	13.9		13.0	NA	15.9	NA		12.7	NA	NA	Other	< 5.82	N/A	15.3	**1.69**
18a(H)-30-Norneohopane	NA		4.54	NA	10.4	NA		4.66	NA	NA	Other	**17.0**	N/A	4.93	5.58
17a(H)-Diahopane	NA		3.28	NA	4.90	NA		4.26	NA	NA	Other	5.38	N/A	4.47	1.67
17α(H),21β(H)-Hopane	47.4		32.2	49.2	53.3	NA		29.0	NA	NA	Other	38.7	44.6	36.9	42.6
17α(H),21β(H)-22R-Homohopane	11.5		8.64	NA	17.0	NA		12.6	NA	NA	Other	10.3	N/A	10.7	11.1
17α(H),21β(H)-22S-Homohopane	15.3		14.0	NA	17.3	NA		8.89	NA	NA	Other	15.5	N/A	15.4	12.6
13b(H)17a(H)-Diacholestane 20S	NA		50.1	NA	52.7	NA		35.4	NA	NA	Other	44.5	N/A	41.2	33.6
5a(H),14a(H),17a(H)-Cholestane 20S	NA		56.5	NA	NA	NA		43.0	NA	NA	Other	52.7	N/A	47.3	19.2
5a(H),14a(H),17a(H)-Cholestane 20R	24.5		62.7	NA	75.7	NA		20.9	NA	NA	Other	54.3	34.9	55.3	20.0
5a(H),14a(H),17a(H)-24-Ethylcholestane 20S	NA		27.5	NA	28.0	NA		19.5	NA	NA	Other	19.8	N/A	30.0	<9.35
5a(H),14a(H),17a(H)-24-Ethylcholestane 20R	19.6		22.6	NA	34.3	NA		41.5	NA	NA	Other	18.1	**14.1**	20.1	<9.35
5a(H),14b(H),17b(H)-Cholestane 20R	24.7		24.6	NA	32.3	NA		15.4	NA	NA	Other	25.3	N/A	17.3	28.0
5a(H),14b(H),17b(H)-Cholestane 20S	NA		24.2	NA	36.7	NA		16.1	NA	NA	Other	24.6	N/A	18.4	18.5
5a(H),14b(H),17b(H)-24-Ethylcholestane 20R	25.5		24.1	NA	34.0	NA		18.8	NA	NA	Other	30.7	N/A	24.9	16.8
5a(H),14b(H),17b(H)-24-Ethylcholestane 20S	NA		23.6	NA	33.0	NA		15.1	NA	NA	Other	23.1	N/A	19.8	31.1

NA=Not analyzed; DL=Detection limit; No value in space=nothing reported by lab: Bolded values were not used in the calculation of the consensus statistics

Table 3 (cont). Crude Oil (QA10OIL01): Laboratory means of three replicates and exercise assigned values - biomarkers (µg/g)
(reported as if three figures were significant)

Laboratory No.	16	17	18	19	20	21	22	23	24	25	26	mean	s	%RSD	median
Carbazole	NA	11.4	<3.5	<0.02	NA	ND	6.02	NA		NA	NA	8.19	2.48	30.2	7.68
18a(H)-22,29,30-Trisnorhopane	<conc	NA		NA	<10	NA	8.54	6.78		NA	NA	6.97	1.35	19.4	6.93
17a(H)-22,29,30-Trisnorhopane	<conc	**22.0**		NA	<10	NA	7.08	7.39		7.93	NA	7.07	2.16	30.5	6.98
17α(H),21β(H)-30-Norhopane	<conc	NA		**64.2**	25.6	NA	18.4	17.9		21.6	NA	17.1	4.3	24.9	15.9
18a(H)-30-Norneohopane	<conc	NA		NA	<10	NA	7.47	7.59		NA	NA	6.46	2.17	33.5	5.58
17a(H)-Diahopane	<conc	NA		NA	<10	NA	5.37	NA		NA	NA	4.19	1.33	31.6	4.47
17α(H),21β(H)-Hopane	<conc	NA	59.2	NA	57.9	NA	45.8	42.7		33.8	NA	43.8	9.2	21.0	43.6
17α(H),21β(H)-22R-Homohopane	<conc	NA		NA	14.4	NA	14.9	12.1		17.6	NA	12.8	2.8	22.2	12.1
17α(H),21β(H)-22S-Homohopane	<conc	NA		NA	18.8	NA	18.0	14.8		22.0	NA	15.7	3.4	21.9	15.4
13b(H)17a(H)-Diacholestane 20S	<conc	NA		NA	**78.8**	NA	38.4	NA		NA	NA	42.3	7.2	17.1	41.2
5a(H),14a(H),17a(H)-Cholestane 20S	<conc	NA		NA	94.9	NA	46.5	11.9		NA	NA	46.5	25.2	54.1	46.9
5a(H),14a(H),17a(H)-Cholestane 20R	<conc	59.9		NA	86.2	NA	50.5	21.5		10.7	NA	44.4	23.9	53.8	50.5
5a(H),14a(H),17a(H)-24-Ethylcholestane 20S	<conc	NA		NA	48.9	NA	24.9	10.3		NA	NA	26.1	11.2	42.8	26.2
5a(H),14a(H),17a(H)-24-Ethylcholestane 20R	<conc	NA		NA	35.3	NA	18.0	14.0		12.5	NA	23.6	9.9	41.9	19.9
5a(H),14b(H),17b(H)-Cholestane 20R	<conc	NA		NA	45.5	NA	22.3	23.5		21.6	NA	25.5	8.1	31.7	24.6
5a(H),14b(H),17b(H)-Cholestane 20S	<conc	NA		NA	45.0	NA	22.3	17.9		NA	NA	24.9	9.7	39.2	22.3
5a(H),14b(H),17b(H)-24-Ethylcholestane 20R	<conc	18.8		NA	49.9	NA	30.3	24.6		13.5	NA	26.0	9.7	37.2	24.8
5a(H),14b(H),17b(H)-24-Ethylcholestane 20S	<conc	<10		NA	41.9	NA	20.6	20.3		NA	NA	25.4	8.4	32.9	23.1

NA=Not analyzed; DL=Detection limit; No value in space=nothing reported by lab: Bolded values were not used in the calculation of the consensus statistics

Table 4. Crude Oil (QA10OIL01): z scores (25% by laboratory)- PAHs

(z=+1 is 25% higher than the exercise assigned value; z=-1 is 25% lower than the exercise assigned value.)

Laboratory No.	1	2	3	4	5	6	7	8	9	10	11	12	13
naphthalene	0.0	0.7	-0.4	0.2	-0.2	2.0	-0.4	0.1	0.1	-0.4	-0.9	-0.3	1.1
biphenyl	0.2		-0.3	-0.5	0.5	0.7	-0.6	-0.3	-0.3	-0.9	-0.7	0.1	0.6
acenaphthene			-1.6			-1.5	-1.5	-1.1	-1.0	0.1	-0.7	-0.6	16.8
acenaphthylene			-1.3			1.4	2.6	-1.4	1.7		-0.6	-1.0	1.5
fluorene	-0.6	0.8	-0.4	0.7	0.1	1.4	-1.4	-0.3	0.3	0.0	-0.7	0.3	0.8
phenanthrene	-0.3	0.4	-0.1	0.3	-0.1	1.2	-0.1	-0.3	0.0	-0.2	-0.5	0.6	1.4
anthracene	-2.2		1.9	-0.6			-1.7	-2.9	3.6		0.9	2.8	6.4
fluoranthene	-0.4		-0.2			0.2	1.1	0.2	1.3		-1.1	-1.0	2.5
pyrene	-0.2		-0.2	-1.6		0.6	2.2	-0.1	1.0	-1.1	0.1	0.6	0.2
benzo[b]fluorene			-1.1	2.1						-0.9			-0.9
benz[a]anthracene	-0.3		-2.0	3.3		0.4	-1.5	-1.4	2.4		-0.8	-1.2	-1.1
chrysene													
triphenylene													
benzo[*b*]fluoranthene	-0.3		1.0	-0.5	1.1	0.3	1.3	-0.6	-0.3			-0.2	0.4
benzo[*j*]fluoranthene													
benzo[*k*]fluoranthene													
benzo[a]fluoranthene													
benzo[e]pyrene	-0.5		-0.4	-0.5	0.5	1.2	0.2	-0.2	0.2		-1.0	-0.2	-1.8
benzo[a]pyrene	-2.0					2.3		0.4	-0.2			0.5	0.3
perylene	-0.4					5.0			-1.5		2.0	-0.8	-0.7
indeno[1,2,3-cd]pyrene													
benzo[ghi]perylene	0.7					2.5			-0.1		-1.0	-0.5	5.5
dibenz[a,h]anthracene													
cis/trans-decalin			-0.3	-0.2						-0.7		-0.7	2.2
dibenzofuran			0.1	-0.3		-1.3		-0.2		1.3		0.7	1.5
retene				0.7					-1.5		1.0	12.4	-0.8
benzothiophene			-2.0	-1.3								-1.6	2.5
dibenzothiophene	0.5		0.3	-0.6	0.8	-0.5	-0.3	0.2	0.5	0.1	-0.6	0.9	0.2
naphthobenzothiophene			1.2	0.3						6.6		-1.3	-3.3
chrysene + triphenylene	-0.2								0.5	-0.4			

Table 4 (cont). Crude Oil (QA10OIL01): z scores (25% by laboratory)- PAHs

(z=+1 is 25% higher than the exercise assigned value; z=-1 is 25% lower than the exercise assigned value.)

Laboratory No.	14	15	16	17	18	19	20	21	22	23	24	25	26
naphthalene	0.2	-0.2	-0.3	-0.4	-0.2	-0.4	0.1	-0.9	-0.3	0.0	0.6	0.4	0.0
biphenyl	0.2	-0.2	-0.4	1.8	0.2	-0.6	0.2	-0.5	-0.7	-0.5	1.9	0.6	-0.4
acenaphthene	0.8			4.0	-1.0	4.1	0.0	0.1	1.4	-0.6		1.2	-2.0
acenaphthylene	-1.0	-1.8		9.5		2.2	0.0		-1.3			-0.8	
fluorene	-0.8	0.3	-0.8	3.6	-0.7	0.0	0.4	-0.6	-0.2	0.7	-1.0	2.2	-0.6
phenanthrene	0.1	0.3	-0.7	-3.3	-1.0	-0.7	0.3	-0.5	0.1	0.0	0.8	-0.9	-0.1
anthracene	1.4	3.2			-1.0					-0.7	-0.1	-2.7	-2.0
fluoranthene	-0.1			0.5	-0.4	5.3	1.5		-0.3	-1.1		-0.5	-2.2
pyrene	0.4	-0.5		0.4	-1.0	-1.1	1.4	-1.3	0.7	-0.7	-0.2	-0.3	0.4
benzo[b]fluorene					-0.1	-0.3			-0.8				1.9
benz[a]anthracene	0.3			3.5	-0.4		0.1	1.0	-1.0	-1.6		-1.2	1.4
chrysene													
triphenylene													
benzo[*b*]fluoranthene	-0.2			-0.2	-1.1		1.3	0.3	-0.6	-0.8		0.0	-0.8
benzo[*j*]fluoranthene													
benzo[*k*]fluoranthene													
benzo[a]fluoranthene													
benzo[e]pyrene	-0.1			1.7	-0.4	0.1	0.7	-0.1	-0.5	-0.4		0.0	-0.3
benzo[a]pyrene	1.5				0.1				0.6			-1.1	
perylene									0.9	-0.7		-1.4	-2.4
indeno[1,2,3-cd]pyrene													
benzo[ghi]perylene					-0.5	-0.2			-0.2	-0.8		0.0	0.2
dibenz[a,h]anthracene													
cis/trans-decalin				-1.1	-1.0				-0.7				2.7
dibenzofuran	-1.0	-1.3					0.4		-0.2		0.2		-0.2
retene					-2.2						0.9	1.9	
benzothiophene					-1.0				-1.9		2.8		2.4
dibenzothiophene	-0.4	0.4	-0.6		-1.2	0.4	0.9	-0.5	0.0	-0.2	-0.1	4.7	0.0
naphthobenzothiophene					1.4	-3.0			3.0				1.5
chrysene + triphenylene					-0.2	-0.5			0.2		0.5		

Table 5. Crude Oil (QA10OIL01): z scores (25% by laboratory) - Alkylated PAHs

(z=+1 is 25% higher than the exercise assigned value; z=-1 is 25% lower than the exercise assigned value.)

Laboratory No.	1	2	3	4	5	6	7	8	9	10	11	12	13
1-methylnaphthalene	0.1		-0.3	-0.4	0.0	1.1	-1.2	0.0	-0.1	-0.3	0.0	0.3	-0.2
2-methylnaphthalene	0.0	0.6	0.1	0.5	0.0	1.2	-1.3	0.4	0.7	-0.4	-0.5	0.5	0.2
2,6-dimethylnaphthalene	0.9		0.4	0.5		1.7	-2.2	0.5	0.5	0.2		1.1	-3.0
1,6,7-trimethylnaphthalene			-0.9			1.9	-2.6	-0.2	-1.3	-1.8		-0.2	
1-methylphenanthrene	-0.1		0.8	-1.7		1.3	0.3	0.3	0.7	-1.5		1.4	-0.9
C1-decalins				0.2						-0.7		-0.6	
C2-decalins				1.7						-1.3		-1.0	
C3-decalins				1.9						-1.5		-1.9	
C4-decalins				0.6						-1.2		-0.8	
C1-naphthalenes	1.2		-1.3	-0.7	-0.5			-0.8	1.6	-1.0		-0.6	1.3
C2-naphthalenes	-0.3		-0.5	-0.8	-0.1		-1.7	-0.6	2.1	-0.7	2.9	-0.3	1.2
C3-naphthalenes	-0.2		-1.0	-1.1	0.4		-2.0	-0.5	3.6	-0.6	2.3	0.0	1.6
C4-naphthalenes	0.4		-1.1	-1.3	0.7		-1.7	0.1	3.6	-0.1	2.7	0.3	-2.2
C1-benzothiophenes				1.4						-1.2		-0.6	17.2
C2-benzothiophenes				-0.2						-1.1		0.4	485.9
C3-benzothiophenes													
C4-benzothiophenes				0.4						-0.5		0.3	
C1-fluorenes	-0.2		-1.2	-0.4	0.5		-1.9	-0.4	-0.1	-0.4	-1.0	-0.1	4.5
C2-fluorenes	0.2		-0.4	-0.8	1.3		-2.1	0.1	0.2	0.3	-0.4	0.6	
C3-fluorenes	-0.2		-0.5	-0.3	1.9		-2.2	0.1	0.8	0.8	-0.2	0.7	3.8
C1-phenanthrenes/anthracenes	1.3		-0.6	-0.5	-0.2		-0.6	-0.7	1.1	-1.2	0.2	0.1	1.0
C2-phenanthrenes/anthracenes	0.7		-0.4	-0.2	0.8		-0.6	-0.3	1.7	-0.6	0.9	0.8	1.0
C3-phenanthrenes/anthracenes	0.7		-1.0	-0.5	0.8		-0.2	0.0	2.5	-0.4	1.3	0.7	-2.1
C4-phenanthrenes/anthracenes	1.9		-0.5	-0.2	0.0		-1.2	0.7	2.7	0.2	12.6	0.1	-2.2
C1-dibenzothiophenes	0.3		0.8	0.2	-0.9		0.6	-1.3	1.2	0.2	0.3	1.7	-3.8
C2-dibenzothiophenes	-1.0		0.8	-0.2	-0.4		0.7	-1.1	2.1	1.0	0.7	2.4	-1.3
C3-dibenzothiophenes	-0.5		0.8	-0.1	0.2		0.1	-0.9	1.5	1.0		2.2	-1.0
C4-dibenzothiophenes	-0.7		-0.1	-0.2	1.0			-0.8	1.8	0.6		1.8	-0.8
C1-fluoranthenes/pyrenes	-0.7		-0.4	-0.3	1.4		-0.4	0.7	0.6	0.8	-0.3	0.9	-1.1
C2-fluoranthenes/pyrenes	-0.2		-0.4	-1.2	1.1		-1.0	0.2	0.2	0.3	-0.4	0.5	
C3-fluoranthenes/pyrenes	0.7		-0.7	-1.6	1.0		-1.4	0.3	1.0	0.3	-0.1	1.2	-1.9
C4-fluoranthenes/pyrenes	0.3			-1.5					0.6	0.6	-0.2		-3.7
C1-naphthobenzothiophenes				0.0					1.2	2.0		-1.8	
C2-naphthobenzothiophenes				-0.7					0.8	2.0		-1.8	
C3-naphthobenzothiophenes				-0.5					1.1	1.0		-1.9	
C4-naphthobenzothiophenes				-1.1					0.4	-0.1		-2.4	
C1-chrysenes	0.0		-0.8	0.0	0.2		-0.4	0.0	0.4	-0.5		1.0	2.6
C2-chrysenes	-0.1		-1.2	-0.1	-0.2		-0.5	-0.4	0.4	-0.5		0.8	-3.5
C3-chrysenes	-0.3		-1.2	0.2	0.5		-1.6	-0.3	0.3	0.0		1.0	
C4-chrysenes	0.3		-1.6	-1.6				0.4	0.4	-1.0		0.6	-3.8

Table 5 (cont). Crude Oil (QA10OIL01): z scores (25% by laboratory) - Alkylated PAHs

(z=+1 is 25% higher than the exercise assigned value; z=-1 is 25% lower than the exercise assigned value.)

Laboratory No.	14	15	16	17	18	19	20	21	22	23	24	25	26
1-methylnaphthalene	0.3	0.1	-0.4	3.7	-0.1	-0.3	0.3	-0.4	0.2	0.1	1.3		0.0
2-methylnaphthalene	-0.3	0.7	-0.2	-1.3	-0.2	-0.1	0.8	-0.1	0.2	0.0	-1.2		-0.1
2,6-dimethylnaphthalene	1.1	0.3		-2.8	0.2	0.4	1.7	-0.6	0.2	0.3	-0.6	-1.3	0.4
1,6,7-trimethylnaphthalene	0.2	2.1			0.9	-0.2	0.6	-0.4	-1.6		2.8		0.7
1-methylphenanthrene	1.0	0.2	-0.7	0.7	-1.8	0.1	2.1	-0.2	-1.2	0.3	0.2	-0.1	-1.5
C1-decalins					-0.7				-0.7				2.5
C2-decalins					-0.1				-1.3				1.9
C3-decalins					0.8				-2.2				2.9
C4-decalins					0.6				-1.9				2.7
C1-naphthalenes	-1.1	-0.5	-0.9	0.7	-0.8	0.9	1.9	0.9	-0.5	1.2	0.1		-1.0
C2-naphthalenes	-1.0	-0.4	-0.6	2.3	-0.3	2.1	-0.2	-2.3	-1.0	1.8	-0.8		-0.9
C3-naphthalenes	-1.0	-0.4	-0.7	16.9	-0.7	2.5	-0.3	-2.4	-1.1	2.3	0.3		-0.9
C4-naphthalenes	-1.0	-0.2	-1.0	0.2	0.0	-0.8	-0.1	-2.1	-1.0	0.6	5.0		-0.9
C1-benzothiophenes				3.5	-0.8				-1.1				-1.1
C2-benzothiophenes				3.1	-0.9				-1.1				-0.2
C3-benzothiophenes													
C4-benzothiophenes					0.2				0.4				-0.7
C1-fluorenes	-1.1	-0.6	-1.1	5.2	-1.0	2.7	-0.3	-0.9	-0.7	-0.1	-0.1		-1.4
C2-fluorenes	-0.6	-0.2	-0.9	-3.4	-0.3	1.2	1.0	-0.3	-0.4	0.2	0.4		-1.1
C3-fluorenes	-0.4	-0.3	-0.9	-2.2	0.0	-1.6	1.2	-0.1	-0.4	-1.4	0.0		-0.9
C1-phenanthrenes/anthracenes	-1.0	-0.3	-1.2	2.4	-1.4	2.9	-0.1	-0.6	-0.6	0.8	0.1		-0.8
C2-phenanthrenes/anthracenes	-0.6	-0.2	-1.0	54.0	-1.0	-1.1	0.4	-1.5	-0.5	1.5	0.3		-0.3
C3-phenanthrenes/anthracenes	-0.4	0.2		6.4	-1.0	-0.1	0.6	-1.3	-0.9	0.2	1.5		-0.6
C4-phenanthrenes/anthracenes	0.2	0.3		-3.0	0.2	-2.9	1.2	-0.6	-1.1	-1.1	2.6		-0.4
C1-dibenzothiophenes	-1.2	-0.9	-1.7	3.0	-0.7	-1.6	-0.8	0.9	0.4	0.2	-1.0		0.4
C2-dibenzothiophenes	-1.0	-0.4	-2.1	-3.7	0.0	-1.7	-0.5	1.2	0.2	0.4	-0.9		1.1
C3-dibenzothiophenes	-1.1	-0.5		-0.3	0.1		-0.1	-1.1	0.2	-0.5	-0.9		0.8
C4-dibenzothiophenes	-1.1	0.0		-2.5	0.2		3.4		0.2	-2.1	-0.8		0.0
C1-fluoranthenes/pyrenes	-0.2	-1.0		14.9	-1.1	6.7	1.3	1.4	0.5	-0.6	-1.2		-0.3
C2-fluoranthenes/pyrenes	-0.2	-0.3			-0.9	2.0	2.5		0.2	-0.5	-1.3		-0.6
C3-fluoranthenes/pyrenes	-0.4	-0.5		7.7	-0.2	1.3	1.8		0.9	-0.8	-0.8		-0.2
C4-fluoranthenes/pyrenes				-0.9	-0.5	3.4			1.1	-1.7	-0.5		-0.7
C1-naphthobenzothiophenes				-3.1	-0.5	-1.8			0.6				0.4
C2-naphthobenzothiophenes					-0.1	-1.6			1.1				0.2
C3-naphthobenzothiophenes				-1.4	0.2				1.4				0.0
C4-naphthobenzothiophenes					0.2				2.0				0.9
C1-chrysenes	-0.5	0.1	-1.3	5.0	-0.4	0.9	0.8	0.8	0.3	-0.1	0.2		-0.5
C2-chrysenes	-0.6	0.1		7.2	0.0	0.6	1.0	1.0	0.4	-0.5	0.3		-0.5
C3-chrysenes	-0.3	-0.7			0.1	1.6	1.2	-3.5	2.1	-2.3	0.2		-0.5
C4-chrysenes	-1.0				0.7		1.4		0.9	-3.5	0.3		0.3

Table 6. Crude Oil (QA10OIL01): z scores (25% by laboratory) - Biomarkers

(z=+1 is 25% higher than the exercise assigned value; z=-1 is 25% lower than the exercise assigned value.)

Laboratory No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Carbazole				-0.8									0.3
18a(H)-22,29,30-Trisnorhopane			-1.0		-0.4			-1.0				0.6	
17a(H)-22,29,30-Trisnorhopane	-0.1		-1.2		2.7			-1.2				-0.8	11.2
17α(H),21β(H)-30-Norhopane	-0.8		-1.0		-0.3			-1.0					
18a(H)-30-Norneohopane			-1.2		2.5			-1.1				6.5	
17a(H)-Diahopane			-0.9		0.7			0.1				1.1	
17α(H),21β(H)-Hopane	0.3		-1.1	0.5	0.9			-1.4				-0.5	0.1
17α(H),21β(H)-22R-Homohopane	-0.4		-1.3		1.3			-0.1				-0.8	
17α(H),21β(H)-22S-Homohopane	-0.1		-0.4		0.4			-1.7				0.0	
13b(H)17a(H)-Diacholestane 20S			0.7		1.0			-0.6				0.2	
5a(H),14a(H),17a(H)-Cholestane 20S			0.9					-0.3				0.5	
5a(H),14a(H),17a(H)-Cholestane 20R	-1.8		1.6		2.8			-2.1				0.9	-0.9
5a(H),14a(H),17a(H)-24-Ethylcholestane 20S			0.2		0.3			-1.0				-1.0	
5a(H),14a(H),17a(H)-24-Ethylcholestane 20R	-0.7		-0.2		1.8			3.0				-0.9	-1.6
5a(H),14b(H),17b(H)-Cholestane 20R	-0.1		-0.1		1.1			-1.6				0.0	
5a(H),14b(H),17b(H)-Cholestane 20S			-0.1		1.9			-1.4				0.0	
5a(H),14b(H),17b(H)-24-Ethylcholestane 20R	-0.1		-0.3		1.2			-1.1				0.7	
5a(H),14b(H),17b(H)-24-Ethylcholestane 20S			-0.3		1.2			-1.6				-0.4	

Table 6 (cont). Crude Oil (QA10OIL01): z scores (25% by laboratory) - Biomarkers

(z=+1 is 25% higher than the exercise assigned value; z=-1 is 25% lower than the exercise assigned value.)

Laboratory No.	14	15	16	17	18	19	20	21	22	23	24	25	26
Carbazole				1.6					-1.1				
18a(H)-22,29,30-Trisnorhopane	0.1	0.9							0.9	-0.1			
17a(H)-22,29,30-Trisnorhopane	-1.1	1.1		8.5					0.0	0.2		0.5	
17α(H),21β(H)-30-Norhopane	-0.4	-3.6				11.0	2.0		0.3	0.2		1.0	
18a(H)-30-Norneohopane	-0.9	-0.5							0.6	0.7			
17a(H)-Diahopane	0.3	-2.4							1.1				
17α(H),21β(H)-Hopane	-0.6	-0.1			1.4		1.3		0.2	-0.1		-0.9	
17α(H),21β(H)-22R-Homohopane	-0.7	-0.5					0.5		0.7	-0.2		1.5	
17α(H),21β(H)-22S-Homohopane	-0.1	-0.8					0.8		0.6	-0.2		1.6	
13b(H)17a(H)-Diacholestane 20S	-0.1	-0.8					3.5		-0.4				
5a(H),14a(H),17a(H)-Cholestane 20S	0.1	-2.3					4.2		0.0	-3.0			
5a(H),14a(H),17a(H)-Cholestane 20R	1.0	-2.2		1.4			3.8		0.6	-2.1		-3.0	
5a(H),14a(H),17a(H)-24-Ethylcholestane 20S	0.6						3.5		-0.2	-2.4			
5a(H),14a(H),17a(H)-24-Ethylcholestane 20R	-0.6						2.0		-0.9	-1.6		-1.9	
5a(H),14b(H),17b(H)-Cholestane 20R	-1.3	0.4					3.1		-0.5	-0.3		-0.6	
5a(H),14b(H),17b(H)-Cholestane 20S	-1.0	-1.0					3.2		-0.4	-1.1			
5a(H),14b(H),17b(H)-24-Ethylcholestane 20R	-0.2	-1.4		-1.1			3.7		0.7	-0.2		-1.9	
5a(H),14b(H),17b(H)-24-Ethylcholestane 20S	-0.9	0.9					2.6		-0.8	-0.8			

Table 7. Crude Oil (QA10OIL01): Laboratory relative standard deviatins of three replicates - PAHs

Laboratory No.	1	2	3	4	5	6	7	8	9	10	11	12	13
naphthalene	1.9%	38.3%	2.9%	1.7%	4.4%	2.1%	7.3%	5.9%	6.0%	5.1%	8.3%	17.0%	0.5%
biphenyl	2.3%		2.8%	2.0%	7.1%	7.8%	5.3%	2.3%	6.7%	3.5%	4.8%	3.9%	7.7%
acenaphthene			7.3%			13.9%	2.8%	6.7%	6.1%	3.3%	1.1%	4.4%	2.9%
acenaphthylene			13.1%			5.1%	3.1%	12.7%	6.1%		5.1%	6.1%	25.4%
fluorene	2.5%	33.4%	4.0%	3.7%	4.0%	4.9%	6.7%	3.8%	6.7%	5.8%	5.5%	3.4%	1.8%
phenanthrene	3.4%	33.7%	2.9%	0.6%	2.1%	4.8%	9.6%	5.1%	6.0%	2.4%	4.9%	1.7%	2.1%
anthracene	5.7%		5.8%	1.8%			18.4%	19.1%	9.8%		5.4%	7.3%	28.1%
fluoranthene	6.3%		2.8%			11.1%	9.0%	8.6%	8.3%		1.7%	27.2%	17.8%
pyrene	3.0%		8.8%	3.1%		4.6%	8.0%	8.3%	7.0%	7.8%	1.1%	5.6%	4.4%
benzo[b]fluorene			3.7%	5.9%						26.4%			36.7%
benz[a]anthracene	2.3%		3.3%	2.9%		5.4%	2.3%	10.6%	9.1%		3.1%	11.0%	8.7%
chrysene			3.8%	3.7%	5.9%	19.2%		1.7%		9.4%	3.7%	6.8%	3.5%
triphenylene				3.7%									4.1%
benzo[*b*]fluoranthene	3.4%		10.8%	7.2%	25.4%	2.7%	6.2%	12.8%	6.4%			3.0%	6.3%
benzo[*j*]fluoranthene	5.5%												57.3%
benzo[*k*]fluoranthene	5.9%												9.7%
benzo[a]fluoranthene													
benzo[e]pyrene	2.6%		2.4%	5.4%	7.7%	5.0%	6.2%	12.2%	5.9%		5.9%	5.8%	83.8%
benzo[a]pyrene	2.7%					7.0%		6.3%	6.8%			6.7%	2.6%
perylene	3.1%					3.5%			9.3%		4.6%	2.8%	93.0%
indeno[1,2,3-cd]pyrene	6.5%												0.3%
benzo[ghi]perylene	5.5%					7.7%			8.3%		3.7%	14.3%	36.6%
dibenz[a,h]anthracene	6.2%		6.4%			2.9%		8.2%			2.7%	13.9%	
cis/trans-decalin			3.2%	0.7%						1.8%		3.1%	1.9%
dibenzofuran			2.1%	2.5%		6.2%		6.9%		2.7%		3.3%	2.0%
retene				3.0%					10.4%		3.3%	18.9%	4.8%
benzothiophene			3.1%	8.2%								12.3%	5.2%
dibenzothiophene	6.2%		2.9%	1.4%	8.5%	2.9%	8.5%	2.9%	5.9%	13.1%	1.5%	2.8%	3.4%
naphthobenzothiophene			3.9%	3.9%						11.4%		10.2%	12.9%

Table 7 (cont). Crude Oil (QA10OIL01): Laboratory relative standard deviatins of three replicates - PAHs

Laboratory No.	14	15	16	17	18	19	20	21	22	23	24	25	26
naphthalene	2.6%	1.9%	6.4%	4.5%	1.0%	12.5%	1.0%	4.1%	3.3%	0.3%	2.8%	2.0%	4.9%
biphenyl	3.9%	39.6%	8.4%	3.9%	12.3%	7.0%	5.6%	0.7%	4.4%	2.0%	2.6%	5.1%	3.3%
acenaphthene	2.8%			7.9%	2.5%	11.0%	33.4%	6.5%	9.2%	1.1%		10.1%	23.7%
acenaphthylene	3.3%	71.3%		7.0%		7.3%	7.0%		7.2%			5.9%	
fluorene	3.1%	2.8%	4.9%	4.3%	1.3%	5.7%	8.5%	7.3%	5.1%	0.9%	2.2%	7.5%	0.0%
phenanthrene	0.7%	3.3%	7.2%	20.3%	0.3%	7.7%	1.8%	1.1%	4.2%	1.0%	19.6%	2.0%	4.2%
anthracene	2.9%	5.8%			2.7%					1.6%	5.8%	3.9%	1.3%
fluoranthene	2.8%			3.6%	2.6%	8.9%	10.8%		5.2%	4.1%		8.6%	5.4%
pyrene	5.5%	6.7%		6.2%	3.4%	5.3%	12.7%	4.4%	3.3%	8.6%	2.9%	2.8%	5.9%
benzo[b]fluorene					2.6%	9.0%			4.8%				4.5%
benz[a]anthracene	10.7%			39.7%	2.6%		39.4%	1.6%	4.4%	10.2%		3.9%	5.1%
chrysene	4.2%	2.5%	8.7%	5.4%	0.6%		0.9%	6.0%	7.2%	8.0%	1.4%	2.0%	2.5%
triphenylene											1.4%	5.9%	
benzo[*b*]fluoranthene	3.0%			21.4%	2.0%		42.8%	3.5%	7.2%	2.7%		3.1%	1.2%
benzo[*j*]fluoranthene				20.7%								7.5%	
benzo[*k*]fluoranthene				18.4%	6.8%							9.2%	
benzo[a]fluoranthene												5.4%	
benzo[e]pyrene	2.8%			2.8%	1.7%	9.3%	11.5%	0.5%	2.6%	5.7%		3.0%	5.4%
benzo[a]pyrene	1.9%				4.4%				4.9%			2.7%	
perylene									6.7%	32.4%		2.8%	n=1
indeno[1,2,3-cd]pyrene												2.6%	
benzo[ghi]perylene					0.8%	9.0%			4.9%	10.3%		4.7%	4.5%
dibenz[a,h]anthracene	3.7%				2.6%				7.4%	20.5%		4.2%	2.8%
cis/trans-decalin				2.1%	1.7%				4.5%				4.0%
dibenzofuran	2.5%	79.2%					4.6%		2.7%		3.1%		2.2%
retene					5.0%						5.2%	2.0%	
benzothiophene					1.5%				9.0%		6.1%		2.7%
dibenzothiophene	2.9%	1.9%	15.0%		1.2%	8.9%	9.9%	1.3%	4.5%	1.9%	1.5%	1.9%	4.2%
naphthobenzothiophene					2.2%	11.6%			4.8%				5.9%

Table 8. Crude Oil (QA10OIL01): Laboratory relative standard deviatins of three replicates - Alkylated PAHs

Laboratory No.	1	2	3	4	5	6	7	8	9	10	11	12	13
1-methylnaphthalene	8.6%		4.0%	1.5%	9.1%	10.6%	4.1%	6.6%	5.8%	4.8%	8.8%	5.2%	2.5%
2-methylnaphthalene	5.7%	39.9%	4.4%	1.1%	7.1%	8.6%	5.8%	6.7%	7.1%	5.0%	9.1%	7.7%	1.3%
2,6-dimethylnaphthalene	3.9%		3.0%	0.5%		8.7%	9.3%	6.4%	6.5%	1.1%		6.1%	5.7%
1,6,7-trimethylnaphthalene			2.5%			6.0%	5.3%	5.8%	5.0%	4.3%		18.9%	
1-methylphenanthrene	8.9%		3.2%	1.4%		3.4%	6.7%	0.6%	6.5%	14.0%		4.0%	8.9%
C1-decalins				1.6%						3.2%		3.4%	
C2-decalins				4.4%						8.3%		2.4%	
C3-decalins				4.9%						10.8%		4.0%	
C4-decalins				3.0%						16.8%		6.1%	
C1-naphthalenes	0.6%		4.1%	1.7%	6.3%			2.4%	6.7%	5.7%		10.9%	1.8%
C2-naphthalenes	6.7%		4.2%	4.1%	6.5%		5.0%	3.0%	6.9%	7.4%	9.1%	6.4%	2.1%
C3-naphthalenes	5.5%		3.4%	0.9%	6.7%		5.7%	3.3%	7.1%	10.0%	10.5%	3.0%	11.8%
C4-naphthalenes	4.0%		3.4%	3.5%	7.4%		6.5%	3.7%	6.5%	9.3%	4.1%	8.0%	6.2%
C1-benzothiophenes				6.6%						2.1%		6.1%	12.5%
C2-benzothiophenes				3.2%						7.4%		3.6%	29.4%
C3-benzothiophenes				0.1%						6.3%		3.6%	4.5%
C4-benzothiophenes				6.6%						14.4%		1.7%	
C1-fluorenes	4.8%		2.6%	4.8%	6.1%		5.7%	2.9%	7.1%	3.4%	3.8%	6.9%	6.0%
C2-fluorenes	3.5%		3.0%	1.8%	9.7%		3.5%	3.5%	6.7%	8.8%	2.1%	8.5%	
C3-fluorenes	4.0%		4.7%	11.1%	9.2%		3.7%	3.3%	7.7%	7.8%	8.3%	11.0%	44.4%
C1-phenanthrenes/anthracenes	1.8%		3.3%	2.6%	3.8%		4.1%	2.6%	6.7%	8.2%	1.0%	2.4%	5.0%
C2-phenanthrenes/anthracenes	2.7%		2.9%	4.1%	4.4%		6.3%	2.6%	6.8%	9.2%	2.8%	2.9%	10.6%
C3-phenanthrenes/anthracenes	3.7%		2.6%	8.0%	4.6%		4.9%	1.9%	6.2%	11.1%	3.9%	3.0%	8.3%
C4-phenanthrenes/anthracenes	6.8%		5.1%	5.8%	7.8%		5.2%	3.5%	7.3%	15.6%	2.4%	2.3%	16.1%
C1-dibenzothiophenes	6.3%		3.0%	3.6%	4.7%		8.1%	2.8%	6.7%	12.7%	0.4%	6.5%	3.5%
C2-dibenzothiophenes	11.3%		4.0%	4.1%	4.0%		6.0%	3.0%	8.3%	18.4%	0.3%	2.0%	8.1%
C3-dibenzothiophenes	3.2%		3.6%	6.5%	9.4%		2.5%	2.2%	7.0%	14.7%		6.1%	8.9%
C4-dibenzothiophenes	6.1%		2.4%	5.4%	2.9%			2.5%	6.4%	10.7%		7.4%	19.7%
C1-fluoranthenes/pyrenes	9.7%		2.9%	2.5%	10.6%		8.1%	1.0%	6.8%	15.9%	7.3%	2.4%	9.4%
C2-fluoranthenes/pyrenes	9.4%		6.6%	2.3%	6.9%		8.4%	1.5%	6.3%	15.3%	5.2%	5.6%	
C3-fluoranthenes/pyrenes	2.4%		4.0%	7.7%	7.4%		8.4%	3.0%	6.2%	21.1%	6.1%	4.6%	5.9%
C4-fluoranthenes/pyrenes	6.3%			6.9%					8.4%	12.3%	5.8%		17.3%
C1-naphthobenzothiophenes				5.2%					6.9%	2.0%		8.9%	
C2-naphthobenzothiophenes				0.9%					7.5%	4.0%		8.2%	
C3-naphthobenzothiophenes				5.6%					7.8%	3.9%		11.7%	
C4-naphthobenzothiophenes				4.5%					8.0%	19.1%		15.7%	
C1-chrysenes	4.1%		3.6%	2.1%	5.1%		8.1%	3.2%	6.6%	7.2%		8.0%	4.5%
C2-chrysenes	5.3%		1.5%	3.1%	4.7%		9.2%	5.5%	5.6%	9.6%		8.1%	19.6%
C3-chrysenes	5.5%		10.4%	1.4%	6.3%		7.1%	8.5%	6.3%	9.4%		9.4%	
C4-chrysenes	6.2%		4.6%	6.6%				2.1%	5.5%	19.6%		8.6%	18.4%

Table 8 (cont). Crude Oil (QA10OIL01): Laboratory relative standard deviatins of three replicates - Alkylated PAHs

Laboratory No.	14	15	16	17	18	19	20	21	22	23	24	25	26
1-methylnaphthalene	2.0%	1.3%	5.7%	24.3%	0.5%	9.7%	9.8%	5.1%	2.8%	0.7%	4.0%		9.1%
2-methylnaphthalene	2.7%	1.3%	6.0%	1.6%	0.8%	10.7%	10.8%	4.1%	3.3%	0.4%	1.4%		3.7%
2,6-dimethylnaphthalene	2.3%	1.2%		3.1%	0.4%	10.1%	7.7%	3.5%	4.4%	0.7%	1.5%	5.8%	0.0%
1,6,7-trimethylnaphthalene	2.4%	1.2%			0.5%	5.8%	13.2%	5.0%	3.0%		10.7%		14.6%
1-methylphenanthrene	7.3%	6.7%	6.1%	2.8%	0.6%	9.3%	2.8%	6.0%	3.7%	1.6%	3.7%	3.1%	5.6%
C1-decalins					5.6%				7.1%				0.0%
C2-decalins					0.0%				6.7%				5.6%
C3-decalins					0.0%				8.4%				4.0%
C4-decalins					1.4%				6.9%				4.9%
C1-naphthalenes	3.7%	1.1%	7.0%	3.7%	0.0%	10.8%	10.5%	4.5%	3.1%	0.4%	1.2%		6.3%
C2-naphthalenes	5.2%	1.6%	9.9%	6.5%	0.0%	11.3%	7.2%	3.5%	4.2%	0.8%	7.5%		3.1%
C3-naphthalenes	2.1%	1.5%	8.5%	3.0%	0.0%	11.2%	17.0%	5.7%	4.5%	0.4%	3.3%		4.7%
C4-naphthalenes	1.7%	0.7%	8.4%	38.5%	1.4%	13.8%	17.2%	6.6%	4.8%	0.8%	13.6%		14.2%
C1-benzothiophenes				17.7%	1.8%				4.1%				2.0%
C2-benzothiophenes				26.2%	5.2%				3.9%				2.8%
C3-benzothiophenes				11.8%	1.9%				4.0%				4.3%
C4-benzothiophenes					3.3%				5.3%				6.5%
C1-fluorenes	1.9%	1.0%	7.3%	10.4%	2.3%	7.6%	12.7%	2.0%	4.6%	0.5%	3.0%		2.7%
C2-fluorenes	3.0%	1.6%	15.2%	27.1%	0.0%	15.2%	5.9%	8.3%	3.9%	1.6%	8.9%		2.1%
C3-fluorenes	4.6%	4.0%	12.2%	12.0%	2.0%	10.5%	8.8%	2.7%	5.1%	2.9%	15.0%		4.5%
C1-phenanthrenes/anthracenes	3.1%	2.6%	6.6%	5.2%	0.0%	11.5%	2.2%	1.7%	4.6%	1.2%	2.9%		4.3%
C2-phenanthrenes/anthracenes	2.1%	2.3%	6.5%	6.4%	1.2%	9.8%	7.2%	1.2%	5.0%	2.2%	2.6%		3.7%
C3-phenanthrenes/anthracenes	4.5%	2.8%		3.5%	1.9%	10.0%	16.3%	3.3%	5.8%	3.2%	5.9%		3.3%
C4-phenanthrenes/anthracenes	2.5%	5.0%		27.9%	2.8%	9.0%	10.3%	1.9%	6.8%	4.7%	6.2%		3.3%
C1-dibenzothiophenes	4.5%	10.0%	9.2%	3.5%	5.9%	13.1%	1.8%	0.4%	5.5%	0.7%	7.9%		4.2%
C2-dibenzothiophenes	2.2%	0.4%	8.1%	14.9%	0.0%	10.2%	3.6%	0.7%	4.0%	1.2%	7.8%		10.2%
C3-dibenzothiophenes	3.3%	5.0%		20.2%	0.0%		13.2%	5.5%	6.2%	1.8%	11.8%		12.4%
C4-dibenzothiophenes	8.2%	5.0%		31.3%	1.9%		24.0%		6.3%	4.1%	10.3%		7.1%
C1-fluoranthenes/pyrenes	3.6%	2.5%		39.7%	2.9%	19.4%	1.2%	9.7%	5.4%	3.5%	8.1%		8.3%
C2-fluoranthenes/pyrenes	2.6%	2.2%			0.6%	12.4%	15.3%		5.6%	5.7%	9.1%		9.1%
C3-fluoranthenes/pyrenes	2.5%	6.5%		6.1%	0.0%	17.5%	4.2%		7.7%	5.2%	10.1%		8.3%
C4-fluoranthenes/pyrenes				53.6%	1.4%	12.2%			6.2%	7.1%	10.9%		7.5%
C1-naphthobenzothiophenes				17.2%	1.2%	6.7%			6.5%				3.9%
C2-naphthobenzothiophenes					0.9%	12.9%			6.3%				3.7%
C3-naphthobenzothiophenes				6.3%	2.0%				7.0%				3.3%
C4-naphthobenzothiophenes					3.8%				6.3%				13.2%
C1-chrysenes	2.7%	1.4%	3.8%	2.4%	2.2%	11.5%	6.7%	12.5%	4.6%	2.3%	0.5%		1.6%
C2-chrysenes	3.5%	5.1%		20.6%	0.0%	13.4%	14.3%	5.0%	4.2%	4.1%	5.4%		5.1%
C3-chrysenes	3.2%	22.7%			0.6%	11.1%	18.2%	8.5%	3.1%	11.2%	7.8%		2.2%
C4-chrysenes	2.9%				3.4%		14.5%		4.0%	24.0%	1.6%		4.1%

Table 9. Crude Oil (QA10OIL01): Laboratory relative standard deviatins of three replicates - Biomarkers

Laboratory No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Carbazole			17.3%	13.6%									7.2%
18a(H)-22,29,30-Trisnorneohopane			6.2%		16.6%			4.0%				1.4%	
17a(H)-22,29,30-Trisnorhopane	3.5%		6.2%		39.9%			6.4%				2.9%	6.1%
17α(H),21β(H)-30-Norhopane	9.3%		7.8%		71.5%			6.7%					
18a(H)-30-Norneohopane			4.9%		79.7%			4.8%				6.8%	
17a(H)-Diahopane			3.4%		39.1%			18.8%				15.8%	
17α(H),21β(H)-Hopane	5.0%		7.6%	6.7%	12.1%			8.9%				3.1%	8.2%
17α(H),21β(H)-22R-Homohopane	7.8%		9.1%		30.6%			11.2%				5.0%	
17α(H),21β(H)-22S-Homohopane	3.5%		5.8%		40.9%			7.7%				3.9%	
13b(H)17a(H)-Diacholestane 20S			3.2%		5.5%			6.5%				3.7%	
5a(H),14a(H),17a(H)-Cholestane 20S			7.6%					12.0%				1.6%	
5a(H),14a(H),17a(H)-Cholestane 20R	3.3%		26.4%		16.7%			4.5%				2.0%	30.4%
5a(H),14a(H),17a(H)-24-Ethylcholestane 20S			4.1%		50.4%			6.2%				6.6%	
5a(H),14a(H),17a(H)-24-Ethylcholestane 20R	4.4%		5.9%		19.0%			13.7%				2.8%	9.7%
5a(H),14b(H),17b(H)-Cholestane 20R	4.5%		5.9%		9.4%			6.3%				3.4%	
5a(H),14b(H),17b(H)-Cholestane 20S			5.7%		20.8%			13.8%				3.5%	
5a(H),14b(H),17b(H)-24-Ethylcholestane 20R	4.1%		8.1%		31.0%			5.6%				4.9%	
5a(H),14b(H),17b(H)-24-Ethylcholestane 20S					24.8%			20.1%				12.1%	

Table 9 (cont). Crude Oil (QA10OIL01): Laboratory relative standard deviatins of three replicates - Biomarkers

Laboratory No.	14	15	16	17	18	19	20	21	22	23	24	25	26
Carbazole				11.0%					6.3%				
18a(H)-22,29,30-Trisnorneohopane	1.5%	26.5%							5.3%	7.4%			
17a(H)-22,29,30-Trisnorhopane	5.1%	34.1%		9.1%					5.8%	4.8%		5.1%	
17α(H),21β(H)-30-Norhopane	5.6%	20.4%				11.4%	19.2%		5.7%	5.2%		10.3%	
18a(H)-30-Norneohopane	4.4%	22.7%							7.5%	4.1%			
17a(H)-Diahopane	2.7%	23.0%							9.5%				
17α(H),21β(H)-Hopane	3.4%	9.2%			3.1%		21.4%		8.3%	5.3%		7.3%	
17α(H),21β(H)-22R-Homohopane	4.1%	0.5%					20.3%		4.4%	4.6%		9.2%	
17α(H),21β(H)-22S-Homohopane	3.7%	19.1%					23.1%		7.2%	5.4%		10.1%	
13b(H)17a(H)-Diacholestane 20S	1.1%	4.2%					22.9%		6.6%				
5a(H),14a(H),17a(H)-Cholestane 20S	4.4%	4.7%					24.0%		5.7%	6.0%			
5a(H),14a(H),17a(H)-Cholestane 20R	2.9%	12.5%		8.5%			21.1%		6.4%	6.4%		3.8%	
5a(H),14a(H),17a(H)-24-Ethylcholestane 20S	7.4%						11.7%		1.4%	5.9%			
5a(H),14a(H),17a(H)-24-Ethylcholestane 20R	4.0%						18.3%		12.6%	6.3%		3.0%	
5a(H),14b(H),17b(H)-Cholestane 20R	5.2%	14.7%					27.1%		7.8%	6.7%		6.4%	
5a(H),14b(H),17b(H)-Cholestane 20S	9.3%	25.5%					30.3%		7.6%	5.8%			
5a(H),14b(H),17b(H)-24-Ethylcholestane 20R	3.8%	7.1%		11.7%			11.0%		7.7%	4.4%		4.6%	
5a(H),14b(H),17b(H)-24-Ethylcholestane 20S	9.6%	n=1					19.9%		18.5%	7.7%			

Table 10. Crude Oil (QA10OIL01): p-scores (15%) - PAHs
(p=1 reported rsd is 15%; p=2 reported rsd is 30%)

Laboratory No.	1	2	3	4	5	6	7	8	9	10	11	12	13
naphthalene	0.12	2.56	0.20	0.12	0.29	0.14	0.49	0.39	0.40	0.34	0.56	1.14	0.04
biphenyl	0.16		0.19	0.14	0.47	0.52	0.35	0.15	0.45	0.23	0.32	0.26	0.52
acenaphthene			0.48			0.92	0.19	0.44	0.41	0.22	0.08	0.29	0.19
acenaphthylene			0.88			0.34	0.21	0.85	0.41		0.34	0.41	1.69
fluorene	0.17	2.22	0.27	0.25	0.27	0.33	0.45	0.26	0.45	0.39	0.36	0.23	0.12
phenanthrene	0.23	2.25	0.19	0.04	0.14	0.32	0.64	0.34	0.40	0.16	0.32	0.11	0.14
anthracene	0.38		0.38	0.12			1.23	1.27	0.65		0.36	0.49	1.88
fluoranthene	0.42		0.19	0.00		0.74	0.60	0.57	0.55		0.11	1.81	1.18
pyrene	0.20		0.58	0.21		0.30	0.53	0.55	0.47	0.52	0.07	0.38	0.30
benzo[b]fluorene			0.24	0.39						1.76			2.44
benz[a]anthracene	0.15		0.22	0.19		0.36	0.16	0.70	0.61		0.21	0.74	0.58
chrysene			0.26	0.25	0.39	1.28		0.11		0.63	0.24	0.45	0.23
triphenylene				0.25									0.27
benzo[*b*]fluoranthene	0.22		0.72	0.48	1.69	0.18	0.41	0.85	0.43			0.20	0.42
benzo[*j*]fluoranthene	0.37												3.82
benzo[*k*]fluoranthene	0.40												0.64
benzo[a]fluoranthene													
benzo[e]pyrene	0.17		0.16	0.36	0.51	0.34	0.41	0.81	0.39		0.39	0.38	5.59
benzo[a]pyrene	0.18					0.46		0.42	0.45			0.45	0.17
perylene	0.21					0.23			0.62		0.30	0.19	6.20
indeno[1,2,3-cd]pyrene	0.44												0.02
benzo[ghi]perylene	0.37					0.51			0.56		0.25	0.95	2.44
dibenz[a,h]anthracene	0.42		0.42			0.20		0.55			0.18	0.93	
cis/trans-decalin			0.21	0.05						0.12		0.20	0.13
dibenzofuran			0.14	0.16		0.41		0.46		0.18		0.22	0.13
retene				0.20					0.69		0.22	1.26	0.32
benzothiophene			0.21	0.55					0.00			0.82	0.34
dibenzothiophene	0.41		0.20	0.09	0.56	0.20	0.57	0.19	0.39	0.87	0.10	0.18	0.23
naphthobenzothiophene			0.26	0.26						0.76		0.68	0.86

Table 10 (cont). Crude Oil (QA10OIL01): p-scores (15%) - PAHs
(p=1 reported rsd is 15%; p=2 reported rsd is 30%)

Laboratory No.	14	15	16	17	18	19	20	21	22	23	24	25	26
naphthalene	0.17	0.13	0.43	0.30	0.07	0.83	0.07	0.27	0.22	0.02	0.19	0.13	0.33
biphenyl	0.26	2.64	0.56	0.26	0.82	0.47	0.37	0.05	0.29	0.13	0.17	0.34	0.22
acenaphthene	0.19			0.53	0.17	0.73	2.23	0.43	0.61	0.08		0.67	1.58
acenaphthylene	0.22	4.75		0.46		0.48	0.47	0.00	0.48			0.39	
fluorene	0.21	0.18	0.33	0.29	0.09	0.38	0.57	0.49	0.34	0.06	0.15	0.50	
phenanthrene	0.05	0.22	0.48	1.35	0.02	0.52	0.12	0.07	0.28	0.06	1.31	0.13	0.28
anthracene	0.19	0.38		0.00	0.18					0.11	0.38	0.26	0.09
fluoranthene	0.19			0.24	0.17	0.59	0.72	0.00	0.35	0.28		0.57	0.36
pyrene	0.37	0.45		0.41	0.23	0.35	0.85	0.29	0.22	0.58	0.19	0.19	0.39
benzo[b]fluorene					0.18	0.60			0.32				0.30
benz[a]anthracene	0.71	0.00		2.65	0.17		2.63	0.11	0.29	0.68		0.26	0.34
chrysene	0.28	0.16	0.58	0.36	0.04		0.06	0.40	0.48	0.53	0.09	0.13	0.17
triphenylene											0.09	0.40	
benzo[*b*]fluoranthene	0.20			1.43	0.13		2.85	0.23	0.48	0.18		0.21	0.08
benzo[*j*]fluoranthene				1.38								0.50	
benzo[*k*]fluoranthene				1.23	0.45							0.61	
benzo[a]fluoranthene												0.36	
benzo[e]pyrene	0.19			0.19	0.11	0.62	0.76	0.03	0.17	0.38		0.20	0.36
benzo[a]pyrene	0.13				0.29				0.33			0.18	
perylene									0.45	2.16		0.19	n=1
indeno[1,2,3-cd]pyrene												0.17	
benzo[ghi]perylene					0.06	0.60			0.33	0.69		0.32	0.30
dibenz[a,h]anthracene	0.25				0.18				0.50	1.37		0.28	0.19
cis/trans-decalin				0.14	0.12				0.30				0.27
dibenzofuran	0.17	5.28					0.31		0.18		0.21		0.15
retene					0.33						0.35	0.14	
benzothiophene					0.10				0.60		0.41		0.18
dibenzothiophene	0.20	0.13	1.00		0.08	0.59	0.66	0.09	0.30	0.13	0.10	0.13	0.28
naphthobenzothiophene					0.14	0.77			0.32				0.39

Table 11. Crude Oil (QA10OIL01): p-scores (15%) - Alkylated PAHs
(p=1 reported rsd is 15%; p=2 reported rsd is 30%)

Laboratory No.	1	2	3	4	5	6	7	8	9	10	11	12	13
1-methylnaphthalene	0.57		0.27	0.10	0.61	0.71	0.27	0.44	0.39	0.32	0.59	0.35	0.17
2-methylnaphthalene	0.38	2.66	0.29	0.07	0.47	0.58	0.39	0.45	0.47	0.33	0.61	0.52	0.09
2,6-dimethylnaphthalene	0.26		0.20	0.04		0.58	0.62	0.43	0.43	0.07		0.41	0.38
1,6,7-trimethylnaphthalene			0.17			0.40	0.35	0.39	0.34	0.29		1.26	
1-methylphenanthrene	0.60		0.22	0.09		0.23	0.45	0.04	0.43	0.93		0.27	0.60
C1-decalins				0.11						0.21		0.23	
C2-decalins				0.29						0.55		0.16	
C3-decalins				0.33						0.72		0.26	
C4-decalins				0.20						1.12		0.41	
C1-naphthalenes	0.04		0.27	0.11	0.42			0.16	0.44	0.38		0.72	0.12
C2-naphthalenes	0.45		0.28	0.27	0.43		0.33	0.20	0.46	0.49	0.61	0.43	0.14
C3-naphthalenes	0.37		0.23	0.06	0.44		0.38	0.22	0.48	0.67	0.70	0.20	0.79
C4-naphthalenes	0.27		0.22	0.23	0.50		0.43	0.25	0.44	0.62	0.27	0.53	0.41
C1-benzothiophenes				0.44						0.14		0.41	0.84
C2-benzothiophenes				0.22						0.49		0.24	1.96
C3-benzothiophenes				0.01						0.42		0.24	0.30
C4-benzothiophenes				0.44						0.96		0.12	
C1-fluorenes	0.32		0.17	0.32	0.41		0.38	0.19	0.48	0.23	0.25	0.46	0.40
C2-fluorenes	0.23		0.20	0.12	0.65		0.23	0.23	0.45	0.59	0.14	0.57	
C3-fluorenes	0.26		0.32	0.74	0.61		0.25	0.22	0.51	0.52	0.55	0.74	2.96
C1-phenanthrenes/anthracenes	0.12		0.22	0.17	0.25		0.27	0.17	0.45	0.55	0.07	0.16	0.34
C2-phenanthrenes/anthracenes	0.18		0.20	0.28	0.29		0.42	0.17	0.45	0.61	0.19	0.20	0.70
C3-phenanthrenes/anthracenes	0.25		0.18	0.53	0.31		0.33	0.13	0.41	0.74	0.26	0.20	0.55
C4-phenanthrenes/anthracenes	0.45		0.34	0.39	0.52		0.35	0.23	0.49	1.04	0.16	0.15	1.07
C1-dibenzothiophenes	0.42		0.20	0.24	0.32		0.54	0.19	0.45	0.85	0.03	0.43	0.23
C2-dibenzothiophenes	0.75		0.27	0.28	0.27		0.40	0.20	0.56	1.23	0.02	0.14	0.54
C3-dibenzothiophenes	0.22		0.24	0.44	0.62		0.17	0.15	0.47	0.98		0.41	0.59
C4-dibenzothiophenes	0.41		0.16	0.36	0.19		0.00	0.17	0.43	0.71		0.49	1.31
C1-fluoranthenes/pyrenes	0.64		0.19	0.17	0.71		0.54	0.07	0.45	1.06	0.48	0.16	0.63
C2-fluoranthenes/pyrenes	0.63		0.44	0.15	0.46		0.56	0.10	0.42	1.02	0.34	0.38	
C3-fluoranthenes/pyrenes	0.16		0.27	0.51	0.49		0.56	0.20	0.41	1.40	0.40	0.31	0.39
C4-fluoranthenes/pyrenes	0.42			0.46					0.56	0.82	0.39		1.15
C1-naphthobenzothiophenes				0.35					0.46	0.14	0.00	0.59	
C2-naphthobenzothiophenes				0.06					0.50	0.27		0.55	
C3-naphthobenzothiophenes				0.38					0.52	0.26		0.78	
C4-naphthobenzothiophenes				0.30					0.53	1.27		1.05	
C1-chrysenes	0.27		0.24	0.14	0.34		0.54	0.21	0.44	0.48		0.54	0.30
C2-chrysenes	0.35		0.10	0.21	0.31		0.62	0.37	0.37	0.64		0.54	1.31
C3-chrysenes	0.37		0.69	0.10	0.42		0.47	0.57	0.42	0.63		0.63	
C4-chrysenes	0.41		0.31	0.44				0.14	0.37	1.31		0.57	1.23

Table 11 (cont.). Crude Oil (QA10OIL01): p-scores (15%) - Alkylated PAHs
(p=1 reported rsd is 15%; p=2 reported rsd is 30%)

Laboratory No.	14	15	16	17	18	19	20	21	22	23	24	25	26
1-methylnaphthalene	0.13	0.09	0.38	1.62	0.04	0.65	0.65	0.34	0.19	0.04	0.27		0.61
2-methylnaphthalene	0.18	0.09	0.40	0.11	0.05	0.72	0.72	0.27	0.22	0.02	0.09		0.25
2,6-dimethylnaphthalene	0.15	0.08		0.21	0.03	0.67	0.51	0.23	0.29	0.05	0.10	0.39	0.00
1,6,7-trimethylnaphthalene	0.16	0.08			0.04	0.39	0.88	0.33	0.20		0.72		0.97
1-methylphenanthrene	0.49	0.44	0.40	0.19	0.04	0.62	0.18	0.40	0.25	0.11	0.25	0.21	0.37
C1-decalins					0.37				0.47				
C2-decalins									0.45				0.37
C3-decalins									0.56				0.27
C4-decalins					0.10				0.46				0.33
C1-naphthalenes	0.24	0.07	0.47	0.24		0.72	0.70	0.30	0.21	0.03	0.08		0.42
C2-naphthalenes	0.35	0.11	0.66	0.43		0.75	0.48	0.24	0.28	0.05	0.50		0.21
C3-naphthalenes	0.14	0.10	0.56	0.20		0.75	1.13	0.38	0.30	0.02	0.22		0.31
C4-naphthalenes	0.11	0.05	0.56	2.56	0.09	0.92	1.15	0.44	0.32	0.05	0.90		0.95
C1-benzothiophenes				1.18	0.12				0.27				0.13
C2-benzothiophenes				1.74	0.35				0.26				0.19
C3-benzothiophenes				0.79	0.13				0.27				0.29
C4-benzothiophenes					0.22				0.35				0.43
C1-fluorenes	0.12	0.07	0.49	0.69	0.16	0.50	0.84	0.13	0.30	0.03	0.20		0.18
C2-fluorenes	0.20	0.10	1.01	1.81		1.02	0.40	0.55	0.26	0.11	0.59		0.14
C3-fluorenes	0.31	0.26	0.81	0.80	0.14	0.70	0.59	0.18	0.34	0.20	1.00		0.30
C1-phenanthrenes/anthracenes	0.21	0.17	0.44	0.35		0.77	0.15	0.11	0.31	0.08	0.19		0.29
C2-phenanthrenes/anthracenes	0.14	0.16	0.44	0.43	0.08	0.65	0.48	0.08	0.33	0.15	0.17		0.25
C3-phenanthrenes/anthracenes	0.30	0.19	0.00	0.23	0.13	0.66	1.09	0.22	0.38	0.22	0.39		0.22
C4-phenanthrenes/anthracenes	0.17	0.33	0.00	1.86	0.19	0.60	0.69	0.13	0.45	0.32	0.42		0.22
C1-dibenzothiophenes	0.30	0.67	0.61	0.24	0.39	0.87	0.12	0.03	0.37	0.05	0.52		0.28
C2-dibenzothiophenes	0.15	0.03	0.54	0.99		0.68	0.24	0.05	0.27	0.08	0.52		0.68
C3-dibenzothiophenes	0.22	0.33		1.34			0.88	0.37	0.42	0.12	0.79		0.82
C4-dibenzothiophenes	0.55	0.34		2.09	0.13		1.60		0.42	0.27	0.69		0.48
C1-fluoranthenes/pyrenes	0.24	0.17		2.64	0.19	1.29	0.08	0.64	0.36	0.23	0.54		0.55
C2-fluoranthenes/pyrenes	0.17	0.15			0.04	0.83	1.02		0.37	0.38	0.61		0.61
C3-fluoranthenes/pyrenes	0.17	0.43		0.41		1.17	0.28		0.51	0.35	0.67		0.56
C4-fluoranthenes/pyrenes				3.57	0.09	0.81			0.41	0.47	0.73		0.50
C1-naphthobenzothiophenes				1.15	0.08	0.45			0.43				0.26
C2-naphthobenzothiophenes					0.06	0.86			0.42				0.24
C3-naphthobenzothiophenes				0.42	0.14				0.46				0.22
C4-naphthobenzothiophenes					0.25				0.42				0.88
C1-chrysenes	0.18	0.09	0.25	0.16	0.14	0.77	0.45	0.83	0.30	0.15	0.03		0.11
C2-chrysenes	0.23	0.34		1.38		0.89	0.95	0.33	0.28	0.27	0.36		0.34
C3-chrysenes	0.22	1.51			0.04	0.74	1.21	0.57	0.21	0.75	0.52		0.15
C4-chrysenes	0.19				0.23		0.97		0.27	1.60	0.11		0.28

Table 12. Crude Oil (QA10OIL01): p-scores (15%) - Biomarkers
(p=1 reported rsd is 15%; p=2 reported rsd is 30%)

Laboratory No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Carbazole			1.15	0.91									0.48
18a(H)-22,29,30-Trisnorneohopane			0.41		1.11			0.27				0.10	
17a(H)-22,29,30-Trisnorhopane	0.23		0.42		2.66			0.42				0.19	0.41
17α(H),21β(H)-30-Norhopane	0.62		0.52		4.76			0.45				0.00	
18a(H)-30-Norneohopane			0.33		5.31			0.32				0.45	
17a(H)-Diahopane			0.23		2.61			1.25				1.05	
17α(H),21β(H)-Hopane	0.34		0.51	0.45	0.80			0.59				0.21	0.55
17α(H),21β(H)-22R-Homohopane	0.52		0.61		2.04			0.75				0.34	
17α(H),21β(H)-22S-Homohopane	0.23		0.39		2.73			0.51				0.26	
13b(H)17a(H)-Diacholestane 20S			0.21		0.37			0.43				0.25	
5a(H),14a(H),17a(H)-Cholestane 20S			0.51					0.80				0.10	
5a(H),14a(H),17a(H)-Cholestane 20R	0.22		1.76		1.12			0.30				0.13	2.02
5a(H),14a(H),17a(H)-24-Ethylcholestane 20S			0.27		3.36			0.41				0.44	
5a(H),14a(H),17a(H)-24-Ethylcholestane 20R	0.29		0.39		1.26			0.92				0.19	
5a(H),14b(H),17b(H)-Cholestane 20R	0.30		0.39		0.63			0.42				0.22	
5a(H),14b(H),17b(H)-Cholestane 20S			0.38		1.39			0.92				0.23	
5a(H),14b(H),17b(H)-24-Ethylcholestane 20R	0.28		0.54		2.07			0.38				0.33	
5a(H),14b(H),17b(H)-24-Ethylcholestane 20S					1.65			1.34				0.81	

Table 12 (cont). Crude Oil (QA10OIL01): p-scores (15%) - Biomarkers
(p=1 reported rsd is 15%; p=2 reported rsd is 30%)

Laboratory No.	14	15	16	17	18	19	20	21	22	23	24	25	26
Carbazole				0.73					0.42				
18a(H)-22,29,30-Trisnorneohopane	0.10	1.76							0.35	0.50			
17a(H)-22,29,30-Trisnorhopane	0.34	2.27		0.61					0.39	0.32		0.34	
17α(H),21β(H)-30-Norhopane	0.37	1.36				0.76	1.28		0.38	0.34		0.69	
18a(H)-30-Norneohopane	0.30	1.51					0.00		0.50	0.27			
17a(H)-Diahopane	0.18	1.54							0.64	0.00		0.00	
17α(H),21β(H)-Hopane	0.23	0.61					1.43		0.55	0.35		0.49	
17α(H),21β(H)-22R-Homohopane	0.27	0.03					1.35		0.29	0.31		0.61	
17α(H),21β(H)-22S-Homohopane	0.25	1.27					1.54		0.48	0.36		0.67	
13b(H)17a(H)-Diacholestane 20S	0.07	0.28					1.53		0.44	0.00			
5a(H),14a(H),17a(H)-Cholestane 20S	0.29	0.31					1.60		0.38	0.40			
5a(H),14a(H),17a(H)-Cholestane 20R	0.19	0.84		0.57			1.40		0.43	0.42		0.25	
5a(H),14a(H),17a(H)-24-Ethylcholestane 20S	0.49						0.78		0.10	0.39			
5a(H),14a(H),17a(H)-24-Ethylcholestane 20R	0.27						1.22		0.84	0.42		0.20	
5a(H),14b(H),17b(H)-Cholestane 20R	0.34	0.98					1.81		0.52	0.44		0.43	
5a(H),14b(H),17b(H)-Cholestane 20S	0.62	1.70					2.02		0.51	0.38			
5a(H),14b(H),17b(H)-24-Ethylcholestane 20R	0.26	0.47		0.78			0.73		0.52	0.29		0.31	
5a(H),14b(H),17b(H)-24-Ethylcholestane 20S	0.64	n=1					1.32		1.24	0.52			

APPENDIX A

Interlaboratory Analytical Comparison Study to Support Deepwater Horizon Natural Resource Damage Assessment

Intercomparison Exercise: Crude Oil QA10OIL01 Description of Materials and Instructions

Intercomparison Exercise Material:

Each of the five ampoules contains approximately 1.3 mL of Crude Oil QA10OIL01. This crude oil was collected from the site of the Deepwater Horizon oil rig on May 21, 2010. This material was not enriched or spiked. Each ampoule is labeled with an individual ampoule number as well as the above name.

In addition, three concurrent analyses of SRM 1582 Petroleum Crude Oil are recommended. This material can be obtained from the NIST Standard Reference Materials Program ($309/5 x 5 mL ampoules). See the following link for information on ordering on-line: https://www-s.nist.gov/srmors/view_detail.cfm?srm=1582.

Storage of Materials:
Sealed ampoules, as received, should be stored in the dark at temperatures between 10 °C and 30 °C.

Instructions for Use:
You are to analyze Crude Oil QA10OIL01 and SRM 1582 using **your** laboratory's and/or program's analytical protocols, for the concentrations (mass/mass) of the parent polycyclic aromatic hydrocarbon (PAH) compounds, alkylated PAH compounds, and biomarkers currently being determined in your laboratory. A target list of compounds are presented in Table 1; however, participants do not need to quantify all of these compounds and can add additional compounds when reporting the data.
The amount of material used for each analysis should correspond to the amount of crude that you would typically analyze as prescribed in your protocols. Prior to opening the ampoules of QA10OIL01, you should sonicate the sample in the ampoule. Samples for analysis should be withdrawn immediately after opening the ampoule and should be processed without delay. Material should not be stored in the ampoules that have been opened, even if they are resealed.

You should analyze three samples of Crude Oil QA10OIL01 and at least one or more samples of SRM 1582 using your protocol for crude oil samples. If time allows, we are asking that you analyze one sample of Crude Oil QA10OIL01 and one sample of SRM 1582 with one batch of laboratory samples; analyze a second sample of each material with another batch; and the third sample with yet another batch. This will allow a more realistic assessment of laboratory precision over a longer term than the assessment obtained when a laboratory places all three samples in the same batch and the resulting extracts are analyzed using the same calibration curve, etc.

Reporting of Results:
Please report one result, as if three figures were significant, for each of the analytes quantified in each of the three replicates of the Crude Oil QA10OIL01 and of SRM 1582. Report results in units of µg/g. Report the date of measurement of each sample in the requested m/d/y format.

If you know that a target or non-target compound is interfering (coeluting) with the determination of a target analyte, please identify this issue by qualifying the data and note the data qualifier used at the bottom of your table of results. Please note that any changes you make to the column or row headings **within** the tables will **not** be seen by the coordinators because only the table entries and comments at the bottom of the tables are automatically transferred to the exercise database.

We prefer that concentration values be reported for each analyte determined. If the measured concentration is below your typical reporting concentration for an analyte in a particular matrix, you can report the number and list the appropriate detection limit, quantification limit, etc. at the bottom of the data table. However, if you need to report non-numerical data please use the following conventions:

NA	"Not analyzed", "not determined"
<"value"	"Less than specified concentration", e.g., <8 µg/g
Other	"Other"; add note of explanation at end of data table, e.g., interference
DL	"Below detection limit" may be used, however, <"value" is preferable

Do not use negative numbers or parentheses to indicate "less than detection limits".

The attached file is an EXCEL file, QA10OIL01.xls. If you have any software/hardware conversion problems, please contact Michele Schantz. The data file templates also include places for you to list the surrogate/internal standards and type of calibration curve used, and to provide a brief description of the analyses. Please **do not** add spaces before entering numbers in the table cells and enter them as "numbers" not as "labels". Please **do not** insert any columns or rows **within** the table in the data file. If you wish to include additional data and/or other information or comments, you may add it to the bottom of the data table in the attached file.

Submit your results by **January 21, 2011** as an attached file via e-mail to:

michele.schantz@nist.gov

Further Information:

If you need further information, please contact Michele at the following address or phone numbers:

Michele M. Schantz
NIST
100 Bureau Drive Stop 8392
Gaithersburg, MD 20899-8392
Phone: (301)975-3106 FAX: (301)977-0685

Table 1: Preliminary List of Analytes of Interest in the Interlaboratory Analytical Comparison Study to Support Deepwater Horizon Natural Resource Damage Assessment

PAHs

Naphthalene
Biphenyl
Acenaphthene
Acenaphthylene
Fluorene
Phenanthrene
Anthracene
Fluoranthene
Pyrene
Benzo[*b*]fluorene
Benz[*a*]anthracene
Chrysene
Triphenylene
Benzo[*b*]fluoranthene
Benzo[*j*]fluoranthene
Benzo[*k*]fluoranthene
Benzo[*a*]fluoranthene
Benzo[*e*]pyrene
Benzo[*a*]pyrene
Perylene
Indeno[1,2,3-*cd*]pyrene
Benzo[*ghi*]perylene
Dibenz[*a,h*]anthracene

cis/trans-Decalin
Dibenzofuran
Retene
Benzothiophene
Dibenzothiophene
Naphthobenzothiophene

Alkylated PAHs

1-Methylnaphthalene
2-Methylnaphthalene
2,6-Dimethylnaphthalene
1,6.7-Trimethylnaphthalene
1-Methylphenanthrene

C1-Decalins
C2-Decalins
C3-Decalins
C4-Decalins

C1-Naphthalenes
C2-Naphthalenes
C3-Naphthalenes
C4-Naphthalenes

C1-Benzothiophenes
C2-Benzothiophenes
C3-Benzothiophenes
C4-Benzothiophenes

Table 1 (cont.)

C1-Fluorenes
C2-Fluorenes
C3-Fluorenes

C1-Phenanthrenes/anthracenes
C2- Phenanthrenes/anthracenes
C3- Phenanthrenes/anthracenes
C4- Phenanthrenes/anthracenes
C1-Dibenzothiophenes
C2-Dibenzothiophenes
C3-Dibenzothiophenes
C4-Dibenzothiophenes

C1-Fluoranthenes/pyrenes
C2-Fluoranthenes/pyrenes
C3-Fluoranthenes/pyrenes
C4-Fluoranthenes/pyrenes

C1-Naphthobenzothiophenes
C2-Naphthobenzothiophenes
C3-Naphthobenzothiophenes
C4-Naphthobenzothiophenes

C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes

<u>Biomarkers</u>

Carbazole
18α(H)-22,29,30-Trisnorneohopane
17α(H)-22,29,30-Trisnorhopane
17α(H),21β(H)-30-Norhopane
18α(H)-30-Norneohopane
17α(H)-Diahopane
17α(H),21β(H)-Hopane
17α(H),21β(H)-22R-Homohopane
17α(H),21β(H)-22S-Homohopane
13β(H) 17α(H)-Diacholestane 20S
5α(H),14α(H),17α(H)-Cholestane 20S
5α(H),14α(H),17α(H)-Cholestane 20R
5α(H),14α(H),17α(H)-24-Ethylcholestane 20S
5α(H),14α(H),17α(H)-24-Ethylcholestane 20R
5α(H),14β(H),17β(H)-Cholestane 20S
5α(H),14β(H),17β(H)-Cholestane 20R
5α(H),14β(H),17β(H)-24-Ethylcholestane 20S
5α(H),14β(H),17β(H)-24-Ethylcholestane 20R

Appendix B

Summary of Method Information Provided by the Participating Laboratories

METHOD Information as Provided by Laboratories

Lab #	Reported	g used QA10OIL01	g used SRM 1582	Sample cleanup method	Method of quantitation
1	1/31/2011	0.4	0.4	Add IS solution and dilute to approx. 2 mL; Take 0.5 mL for aminopropyl Sep Pak (SPE) - conditioning and eluting with 20 mL of 5% dichloromethane (DCM) in hexane; Concentrate to approx. 0.3 mL and inject in LC using semi-preparative scale aminopropyl silane column - collect 3 fractions - 1st with aliphatics and hopanes/steranes; 2nd with naphthalene through dimethylphenanthrenes; 3rd with remainder of PAHs through 302's - mobile phase is 2% DCM in hexane for 1st 145 mL and 20% DCM in hexane for remainder	IS
2	12/28/2010	0.1		A potion of the crude oil sample was measured, mixed into DCM, and analyzed via direct injection GC/MS.	IS
3	1/14/2011	0.40	0.04	NA	IS
4	1/19/2011	0.10	0.10	Silica gel cleanup performed.	IS
5	1/17/2011	1	1	none	IS
6	1/20/2011	1.00	1.00	EPA 3540A Waste Dilution, with no cleanup	IS
7	1/21/2011	1.000	1.000	Intercalibration Oil:1/100 dilution of the oils and direct injection after spiking with surrogate and internal standards; SRM 1582:1/1000 dilution of the SRM and direct injection after spiking with surrogate and internal standards	Surrogate Standards
8	1/21/2011	1.00	0.01	SW-846 method 3580A	IS
9	1/21/2011	0.12	0.12	Gravity flow column with silica gel and neutral alumina, followed by size-exclusion HPLC to elute fraction containing PAHs and alkyl-PAHs.	IS
10	1/20/2011	0.00300	0.00180	None	IS
11	1/14/2011	0.10	0.10	Samples are diluted with DCM, spiked with labeled surrogate, cleaned up using a 2.5 g (2% deactivated) neutral alumina/5g silica column. Fraction 1 is eluted off with pentane. Fraction 2 is eluted with 60:40 DCM:Hexane. Fraction 1 and 2 are analysed in two separate runs for biomarkers. Fraction 1 and 2 are combined to analyze for PAHs and alkylated PAHs.	IS
12	1/21/2011	0.055	0.055	none	IS
13	1/21/2011	0.0850	0.0870	Samples diluted in DCM	IS
14	1/21/2011	0.0260	0.0260	SW-846 3580A Waste Dilution	IS
15	1/21/2011	0.05	0.05		IS
16	1/21/2011	0.1	0.1	Mercury cleanup was performed to reduce sulphur interference.	IS
17	1/21/2011	1.0	0.1 &10	EPA Method 3580A- Approximately 1.0 g of each sample was weigh into 10.0 mL volumetric flask and and surrogate spiking solution was added to all samples and QC Samples before diluted to 10.0 mL final volume. Similarly, 1.0 g of the reference standard SRM 1582 was diluted with DCM into volumetric flask Again 2.0 ml of surrogate spking solution was added before the extraction process.	IS
18	1/21/2011	1	0.2	EPA 3580A; EPA 3630 Silica gel	IS
19	1/21/11	0.100	0.100	SW 3580 (Waste Dilution)	IS
20	1/21/2011	0.9	0.9	None.	IS
21	1/21/2011	0.002 to 0.005	0.002 to 0.01	Stock solutions of the oils (1 g in 50 mL) were prepared in DCM to produce concentrations around 20,000ppm. Dilutions of the stock were suplemented with the appropiate surrogate and recovery standards and analyzed by GC/MS-SIM withouth further cleanup.	IS
22	1/28/2011	~0.1	~0.1	NA	IS
23	2/2/2011	0.0046	0.0046	Dissolved sample eluted from 6 g silica gel column with 1:1 volume of pentane:DCM solution.	IS
24	1/31/2011	0.005	0.005	Samples were diluted in DCM, aliquoted, and solvent exchanged to hexane using an N-Evap nitrogen blow-down. Aliquots equivalent to approximately 0.01 g or 0.001 g oil were eluted through 2 g 6% deactivated alumina with petroleum ether and toluene. Samples were then concentrated and solvent exhanged to hexane for GCMS analysis.	IS
25	2/11/2011	0.025	0.035	Oil samples were diluted approximately 1/25 (mass:mass) with hexane. 0.5 mL of this solution was combined gravimentrically with an internal standard solution containing deuterated PAHs and deuterated aliphatic hydrocarbons. The solution was then separated using an alumina:silica column containing 2 g of alumina (6% detactivated with water) and 3 g of silica dectivated with 50 uL of water. The oil dilution was added and two fractions were collected: fraction 1 was 8 mL of hexane and fraction 2 was 20 mL 20% DCM:hexane (volume fraction).	IS
26	2/11/2011	0.1	0.1	Silica Gel Cleanup	IS

Analytical Methods used for PAHs

	PAHs				Calibration Curve	
Lab #	Instrument	Phase	Dimensions	injection mode	# points	range*
1	GC/MS	DB-17MS	60m x 0.25mm, 0.25µm film	on-column	6	varied by compound
2	GC/MS	DB-5.625	20m x 0.18mm, 0.36µm film	splitless	5	500 ug/g to 8000 ug/g
3	GC/MS	ZB-5MSi	60m x 0.25mm, 0.25µm film	splitless	6	0.008 ug/mL to 0.80 ug/mL
4	MS04	Rtx-5MS	30m x 0.32mm, 0.25µm film	split	7	4ug/g to 1000ug/g
5	MSD7	ZB-MS-5si	60m x 0.25mm, 0.25µm film	splitless	6	0.1 ug/mL to 4.0 ug/mL
6	GC/MS	DB-5	30m x 0.25mm, 0.25µm film	splitless	5	10 ng/mL to 1000 ng/mL
7	GC/MS	DB5-MS	30m x 0.25mm, 0.25µm film	split/splitless	5	20 ng/mL to 1000 ng/mL
8	GC/MS	DB - 5	60m x 0.25mm, 0.25µm film	splitless	6	0.1 ug/mL to 4.0 ug/mL
9	GC/MS	DB-5	60m x 0.25mm, 0.25µm film	on-column	9	0.001 ng/µL to 10.0 ng/µL
10	GC/MS	HP-5MS	60m x 0.25mm, 0.25µm film	splitless	5	(20, 100, 250, 500,1000) ng/mL
11	GC/MS	DB-5	30m x 0.25mm, 0.25µm film	splitless	6	0.05 mg/L to 5 mg/L
12	GC-MS	DB-5	60m x 0.25mm, 0.25µm film	splitless	7	~0.01 ng/uL to 7 ng/uL
13	GC/MS	Rtx-5MS	60m x 0.25mm, 0.25µm film	splitless	6	130 ug/L to 50,000 ug/L
14	GC/MS 7890A	ZB5MSi	60m x 0.25mm, 0.25µm film		6	0.02 ug/L to 0.8 ug/L
15	MSE	ZB-5MSI	60m x 0.25mm, 0.25µm film	split/splitless	6	0.1 ppm to 4.0ppm
16	GC/MS	ZB-MS-5Si	60m x 0.25mm, 0.25µm film	pulsed splittless	6	0.1 ug/mL to 4.0 ug/mL
17	GC/MS	5% diphenyl / 95% dimethyl polysiloxane	30m x 0.25mm, 0.25µm film		5	2ug/ml to 50ug/mL
18	GC/MS	ZB-5MS	30m x 0.25mm, 0.25µm film		10	2 ng/L to 2000 ng/L
19	GC/MS SIM	DB5MS	30m x 0.25mm, 0.5µm film	split	8	0.13 ug/kg to 23.33 ug/kg (0.04 ug/mL to 7 ug/mL)
20	GC/MS	ZB5-MSI	60m x 0.25mm, 0.25µm film	splitless	6	0.1 ug/mL to 4 ug/mL
21	THERMO DSQII	RTX5-MS	30m x 0.25mm, 0.25µm film	splitless (2 ul)	6	0.020 ng/uL to 4.000 ng/uL
22	GC/MS-SIM	ZB-5	60m x 0.25mm, 0.25µm film	splitless	7	10 ng/mL to 20,000ng/mL
23	GC/MS	5% phenylmethyl silicone	25m x 0.2mm, 0.33µm film	splitless	5	15 ng/mL to 700 ng/mL
24	GC/MS	DB5	30m x 0.25mm, 0.25µm film	PTV	6	10ng/mL to 5000ng/mL
25	GC/MS	Rxi-17 sil	60m x 0.25mm, 0.25µm film	splitless	6	2 ng/mL to 2000 ng/mL
26	GC/MS	ZB-5MS	30m x 0.25mm, 0.25µm film	split/splitless	7	2 ppb to 2000ppb

* Note that units are those provided by the participating laboratory.

Analytical Methods used for Alkylated PAHs

	Alkylated PAH				Calibration Curve	
Lab #	Instrument	Phase	Dimensions	injection mode	# points	range*
1	GC/MS	DB-17MS	60m x 0.25mm, 0.25µm film	on-column	6	varied by compound
2	GC/MS	DB-5.625	20m x 0.18mm, 0.36µm film	splitless	5	500 - 8000 ug/g
3	GC/MS	ZB-5MSi	60m x 0.25mm, 0.25µm film	splitless	6	0.008-0.80 ug/mL
4	MS04	Rtx-5MS	30m x 0.32mm, 0.25µm film	split	7	4ug/g to 1000ug/g
5	MSD7	ZB-MS-5si	60m x 0.25mm, 0.25µm film	splitless	6	0.1 ug/mL to 4.0 ug/mL
6	GC/MS	DB-5	30m x 0.25mm, 0.25µm film	splitless	5	10 ng/ml to 1000 ng/ml
7	GC/MS	DB5-MS	30m x 0.25mm, 0.25µm film	split/splitless	5	20 ng/mL to 1000 ng/mL
8	GC/MS	DB - 5	60m x 0.25mm, 0.25µm film	splitless	6	0.1 ug/mL to 4.0 ug/mL
9	GC/MS	DB-5	60m x 0.25mm, 0.25µm film	on-column	9	0.001 ng/µL to 10.0 ng/µL
10	GC/MS	HP-5MS	60m x 0.25mm, 0.25µm film	splitless	5	(20, 100, 250, 500,1000) ng/mL
11	GC/MS	DB-5	30m x 0.25mm, 0.25µm film	splitless	6	0.05 mg/L to 5 mg/L
12	GC-MS	DB-5	60m x 0.25mm, 0.25µm film	splitless	7	~0.01 ng/uL to 7 ng/uL
13	GC/MS	Rtx-5MS	60m x 0.25mm, 0.25µm film	splitless	6	130 ug/L to 50,000 ug/L
14	GC/MS 7890A	ZB5MSi	60m x 0.25mm, 0.25µm film		6	0.02 ug/L to 0.8 ug/L
15	MSE	ZB-5MSI	60m x 0.25mm, 0.25µm film	split/splitless	6	0.1 ppm to 4.0ppm
16	GC/MS	ZB-MS-5Si	60m x 0.25mm, 0.25µm film	pulsed splittless	6	0.1 ug/mL to 4.0 ug/mL
17	GC/MS	5% diphenyl / 95% dimethyl polysiloxane	30m x 0.25mm, 0.25µm film		5	2ug/ml to 50ug/mL
18	GC/MS	ZB-5MS	30m x 0.25mm, 0.25µm film		10	2 ng/L to 2000 ng/L
19	GC/MS SIM	DB5MS	30m x 0.25mm, 0.5µm film	split	8	0.13 ug/kg to 23.33 ug/kg (0.04 ug/mL to 7 ug/mL)
20	GC/MS	ZB5-MSI	60m x 0.25mm, 0.25µm film	splitless	6	0.1 ug/mL to 4 ug/mL
21	THERMO DSQII	RTX5-MS	30m x 0.25mm, 0.25µm film	splitless (2 ul)	6	0.020 ng/uL to 4.000 ng/uL
22	GC/MS-SIM	ZB-5	60m x 0.25mm, 0.25µm film	splitless	7	10 ng/mL to 20,000ng/mL
23	GC/MS	5% phenylmethyl silicone	25m x 0.2mm, 0.33µm film	splitless	5	15 ng/mL to 700 ng/mL
24	GC/MS	DB5	30m x 0.25mm, 0.25µm film	PTV	6	10ng/mL to 5000ng/mL
25	GC/MS	Rxi-17 sil	60m x 0.25mm, 0.25µm film	splitless	6	0.6 ng/mL to 600 ng/mL
26	GC/MS	ZB-5MS	30m x 0.25mm, 0.25µm film	split/splitless		

* Note that units are those provided by the participating laboratory.

Analytical Methods used for Biomarkers

	Biomarkers				Calibration Curve	
Lab #	Instrument	Phase	Dimensions	injection mode	# points	range*
1	GC/MS	DB-17MS	60m x 0.25mm, 0.25µm film	on-column	6	varied by compound
2	GC/MS	DB-5.625	20m x 0.18mm, 0.36µm film	splitless	5	500 - 8000 ug/g
3	GC/MS	ZB-5MSi	60m x 0.25mm, 0.25µm film	splitless	6	0.008-0.80 ug/mL
4	MS04	Rtx-5MS	30m x 0.32mm, 0.25µm film	split	7	4ug/g to 1000ug/g
5	MSD7	ZB-MS-5si	60m x 0.25mm, 0.25µm film	splitless	6	0.1 ug/mL to 4.0 ug/mL
6	GC/MS	DB-5	30m x 0.25mm, 0.25µm film	splitless	5	10 ng/ml to 1000 ng/ml
7	NA	NA	NA	NA	NA	NA
8	GC/MS	DB - 5	60m x 0.25mm, 0.25µm film	splitless	6	0.1 ug/mL to 4.0 ug/mL
9	NA	NA	NA	NA	NA	NA
10	NA	NA	NA	NA	NA	NA
11	GC/MS	DB-5	60m x 0.25mm, 0.25µm film	splitless	NA	NA
12	GC-MS	DB-5	60m x 0.25mm, 0.25µm film	splitless	7	~0.01 ng/uL to 7 ng/uL
13	GC/MS	Rtx-5MS	60m x 0.25mm, 0.25µm film	splitless	6	300 ug/L to 30,000 ug/L
14	GC/MS 7890A	ZB5MSi	60m x 0.25mm, 0.25µm film		6	0.02 ug/L to 0.8 ug/L
15	MSE	ZB-5MSI	60m x 0.25mm, 0.25µm film	split/splitless	6	0.1 ppm to 4.0ppm
16	GC/MS	ZB-MS-5Si	60m x 0.25mm, 0.25µm film	pulsed splittless	6	0.1 ug/mL to 4.0 ug/mL
17	GC/MS	5% diphenyl / 95% dimethyl polysiloxane	30m x 0.25mm, 0.25µm film		5	2ug/ml to 50ug/mL
18						
19	GC/MS SIM	DB5MS	30m x 0.25mm, 0.5µm film	split	8	0.13 ug/kg to 23.33 ug/kg (0.04 ug/mL to 7 ug/mL)
20	GC/MS	ZB5-MSI	60m x 0.25mm, 0.25µm film	splitless	6	0.1 ug/mL to 4 ug/mL
21	NA	NA	NA	NA	NA	NA
22	GC/MS-SIM	ZB-5	60m x 0.25mm, 0.25µm film	splitless	6	10 ng/mL to 10,000ng/mL
23	GC/MS	5% phenylmethyl silicone	25m x 0.2mm, 0.33µm film	splitless	5	10 ng/mL to 5000 ng/ml
24	NA	NA	NA	NA	NA	NA
25	GC/MS	Rxi-17 sil	60m x 0.25mm, 0.25µm film	splitless	6	0.4 ng/mL to 2400 ng/mL
26						

* Note that units are those provided by the participating laboratory.

Qunatitation of PAHs

Lab #	IS/surrogate added prior to extraction	Used?	**PAHs** added prior to analysis	Used?	corrected for recovery?	others?
1	naphthalene-d8;biphenyl-d10; acenaphthalene-d10; phenanthrene-d10; fluoranthene-d10; pyrene-d10; B[a]A-d12; B[a]P-d12; perylene-d12; B[ghi]P-d12;DB[a,h]A-d14	x				
2			naphthalene-d8, acenaphthene-d10, phenanthrene-d10, chrysene-d12, perylene-d12	x	no	
3			Fluorene-d10, Benzo(a)pyrene-d12	x	no	
4	Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, 5 alpha-Androstane, Chrysene-d12, Perylene-d12		Fluorene-d10, Pyrene-d10, Benzo(a)pyrene-d12	x	yes	
5	Nitrobenzene- d5; 2- Fluorobiphenyl; Terphenyl- d14		Naphthalene- d8; Acenapthene- d10; Chrysene- d12; Perylene- d12	x	yes	
6			Acenaphthene-d10, Acenaphthylene-d8, Anthracene-d10, Benz[a]Anthracene-d12, Benzo[b]Fluoranthene-d12, Benzo[k]Fluoranthene-d12, Benzo[g,h,i]Perylene-d12, Benzo[a]Pyrene-d12, Chrysene-d12, Dibenz[a,h]Anthracene-d14, Fluoranthene-d10, Fluorene-d10, Indeno[l,2,3-cd]Pyrene-d12, Naphthalene-d8, Phenanthrene-d10, Pyrene-d10	x	no	
7	d8-Naphthalene, d10-Acenaphthene, d10-Phenanthrene, d12-Chrysene, d12-Perylene	x	d10-Fluorene, d12-Benzo(a)pyrene			
8	Nitrobenzene-d5, 2-Fluorobiphenyl, Terphenyl-d14		Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Chrysene-d10	x	no	
9	Naphthalene-d8, Acenaphthene-d10, Benzo[a]Pyrene-d12	x	Hexamethylbenzene			Phenanthrene-d10 - prior to size-exclusion HPLC cleanup
10	SU-Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Chrysene-d12, Perylene-d12		IS-Fluorene-d10, Pyrene-d10, Benzo(a)pyrene-d12	x	yes	
11	phenanthrene d10, benzo(a)pyrene d12, benzo(ghi)perylene d12, naphthalene d8, acenaphthylene d8, pyrene d10		2-fluorobiphenyl, p-terphenyl-d14, chrysene d12, dibenzo(a,h)anthracene d14	x	no	
12	Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Benzo[a]pyrene-d12		Fluorene-d10, Chrysene-d12	x	yes	
13	Nitrobenzene d5/p Terphenyl d14/2-Fluorobiphenyl		1,4 Dichlorobenzene d4/Naphthalene d8/Acenaphthene d10/Phenanthrene d10/Chrysene d12/Perylene d12	x	no	
14	Surrogates: Nitrobenzene-d5; 2-Fluorobiphenyl; Terphenyl-d14		Naphthalene-d8; Acenaphthene-d10; Phenanthrene-d10; Chrysene-d12; Perylene-d12		no	
15	Surr		IS	x	no	
16	2-Fluorobiphenyl, Nitrobenzene-d5, Terphenyl-d14		Acenaphthene-d10, Chrysene-d12, Naphthalene-d8, Perylene-d12, Phenanthrene-d10	x	yes	
17	Nitrobenzene d5/p Terphenyl d14/2-Fluorobiphenyl		1,4 Dichlorobenzene d4/Naphthalene d8/Acenaphthene d10/Phenanthrene d10/Chrysene d12/Perylene d12	x	no	
18			Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Chrysene-d12, Pyrene-12	x	yes	
19	Nitrobenzene-d5 (S), 2-Fluorobiphenyl (S), and Terphenyl-d14 (S)		Naphthalene-d8 (IS), Acenaphthalene-d10 (IS), Phenanthrene-d10 (IS), Chrysene-d12 (IS), and Perylene-d12 (IS)	x	no	
20	PAH0235 (Surr)		SVBIOM ISTD-00001 (IS)	x	no	
21	naphthalene-d8, acenaphtene-d10, phenenthrene-d10, chrysene-d12, and perylene-d12	x	fluorene-d10, benzo(a)pyrene-d12			
22	Surrogates	x	IS	x	yes	
23	d8Naph, d10Ace, d10Phen, d12Chry, d12B-a-P, d12Pery	x	hexamethylbenzene			
24	d8-Napthalene, d8-1-Methylnapthalene, d8-Acenaphthylene, d10-Acenaphthene, d10-Fluorene, d10-Phenanthrene, d10-Anthracene, d10-Fluoranthene, d10-Pyrene, d12-Benz(a)anthracene, d12-Chrysene, d12-Benzo(b)fluoranthene, d12-Benzo(k)fluoranthene, d12-Benzo(e)pyrene, d12-Benzo(a)pyrene, d12-Perylene, d12-Benzo(g,h,i)perylene	x	d14-p-Terphenyl			
25	Naphthalene-d8; Acenaphthene-d10; Phenanthrene-d10; Fluoranthene-d10; Pyrene-d10; Benz[a]anthracene-d12; Benzo[a]pyrene-d12; Perylene-d12; Bibenz[a,h]anthracene-d14; Benzo [[ghi]perylene-d12	x				
26	surrogates only		Internal standards	x	no	

Qunatitation of Alkylated PAHs

Lab #	IS/surrogate added prior to extraction	Used?	**Alkylated PAHs** added prior to analysis	Used?	corrected for recovery?	others?
1	naphthalene-d8;biphenyl-d10; acenaphthalene-d10; phenanthrene-d10; fluoranthene-d10; pyrene-d10; B[a]A-d12; B[a]P-d12; perylene-d12; B[ghi]P-d12;DB[a,h]A-d14	x				
2			naphthalene-d8	x	no	
3			Fluorene-d10, Benzo(a)pyrene-d12	x	no	
4	Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, 5 alpha-Androstane, Chrysene-d12, Perylene-d12		Fluorene-d10, Pyrene-d10, Benzo(a)pyrene-d12	x	yes	
5	Nitrobenzene- d5; 2- Fluorobiphenyl; Terphenyl- d14		Naphthalene- d8; Acenapthene- d10; Chrysene- d12; Perylene- d12	x	yes	
6						
7	d8-Naphthalene, d10-Acenaphthene, d10-Phenanthrene, d12-Chrysene, d12-Perylene	x	d10-Fluorene, d12-Benzo(a)pyrene			
8	Nitrobenzene-d5, 2-Fluorobiphenyl, Terphenyl-d14		Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Chrysene-d10	x	no	
9	Naphthalene-d8, Acenaphthene-d10, Benzo[a]Pyrene-d12	x	Hexamethylbenzene			Phenanthrene-d10 - prior to size-exclusion HPLC cleanup
10	SU-Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Chrysene-d12, Perylene-d12		IS-Fluorene-d10, Pyrene-d10, Benzo(a)pyrene-d12	x	yes	
11	phenanthrene d10, benzo(a)pyrene d12, benzo(ghi)perylene d12, naphthalene d8, acenaphthylene d8, pyrene d10		2-fluorobiphenyl, p-terphenyl-d14, chrysene d12, dibenzo(a,h)anthracene d14	x	no	
12	Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Benzo[a]pyrene-d12		Fluorene-d10, Chrysene-d12	x	yes	
13	Nitrobenzene d5/p Terphenyl d14/2-Fluorobiphenyl		1,4 Dichlorobenzene d4/Naphthalene d8/Acenaphthene d10/Phenanthrene d10/Chrysene d12/Perylene d12	x	no	
14	Surrogates: Nitrobenzene-d5; 2-Fluorobiphenyl; Terphenyl-d14		Naphthalene-d8; Acenaphthene-d10; Phenanthrene-d10; Chrysene-d12; Perylene-d12		no	
15	Surr		IS	x	no	
16	2-Fluorobiphenyl, Nitrobenzene-d5, Terphenyl-d14		Acenaphthene-d10, Chrysene-d12, Naphthalene-d8, Perylene-d12, Phenanthrene-d10	x	yes	
17	Nitrobenzene d5/p Terphenyl d14/2-Fluorobiphenyl		1,4 Dichlorobenzene d4/Naphthalene d8/Acenaphthene d10/Phenanthrene d10/Chrysene d12/Perylene d12	x	no	
18			Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Chrysene-d12, Pyrene-12	x	yes	
19	Nitrobenzene-d5 (S), 2-Fluorobiphenyl (S), and Terphenyl-d14 (S)		Naphthalene-d8 (IS), Acenaphthalene-d10 (IS), Phenanthrene-d10 (IS), Chrysene-d12 (IS), and Perylene-d12 (IS)	x	no	
20	PAH0235 (Surr)		SVBIOM ISTD-00001 (IS)	x	no	
21	naphthalene-d8, acenaphtene-d10, phenenthrene-d10, chrysene-d12, and perylene-d12	x	fluorene-d10, benzo(a)pyrene-d12			
22	Surrogates	x	IS	x	yes	
23	d8Naph, d10Ace, d10Phen, d12Chry, d12B-a-P, d12Pery	x	hexamethylbenzene			
24	d8-Napthalene, d8-1-Methylnapthalene, d8-Acenaphthylene, d10-Acenaphthene, d10-Fluorene, d10-Phenanthrene, d10-Anthracene, d10-Fluoranthene, d10-Pyrene, d12-Benz(a)anthracene, d12-Chrysene, d12-Benzo(b)fluoranthene, d12-Benzo(k)fluoranthene, d12-Benzo(e)pyrene, d12-Benzo(a)pyrene, d12-Perylene, d12-Benzo(g,h,i)perylene	x	d14-p-Terphenyl			
25	Naphthalene-d8, Phenanthrene-d10, Fluoranthene-d10	x				
26	surrogates only		Internal standards	x	no	

Qunatitation of Biomarkers

Lab #	IS/surrogate added prior to extraction	Used?	**Biomarkers** added prior to analysis	Used?	corrected for recovery?	others?
1	naphthalene-d8;biphenyl-d10; acenaphthalene-d10; phenanthrene-d10; fluoranthene-d10; pyrene-d10; B[a]A-d12; B[a]P-d12; perylene-d12; B[ghi]P-d12;DB[a,h]A-d14	x				
2			phenanthrene-d10	x	no	
3			Fluorene-d10, Benzo(a)pyrene-d12	x	no	
4	Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, 5 alpha-Androstane, Chrysene-d12, Perylene-d12		Fluorene-d10, Pyrene-d10, Benzo(a)pyrene-d12	x	yes	
5	Nitrobenzene- d5; 2- Fluorobiphenyl; Terphenyl- d14		Naphthalene- d8; Acenapthene- d10; Chrysene- d12; Perylene- d12	x	yes	
6						
7	NA		NA			
8	Nitrobenzene-d5, 2-Fluorobiphenyl, Terphenyl-d14		Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Chrysene-d10	x	no	
9	NA		NA			NA
10	NA		NA			
11	NA		NA			
12	5b(H)-Cholane		Chrysene-d12	x	yes	
13	Nitrobenzene d5/p Terphenyl d14/2-Fluorobiphenyl		1,4 Dichlorobenzene d4/Naphthalene d8/Acenaphthene d10/Phenanthrene d10/Chrysene d12/Perylene d12	x	no	
14	Surrogates: Nitrobenzene-d5; 2-Fluorobiphenyl; Terphenyl-d14		Naphthalene-d8; Acenaphthene-d10; Phenanthrene-d10; Chrysene-d12; Perylene-d12		no	
15	Surr		IS	x	no	
16	2-Fluorobiphenyl, Nitrobenzene-d5, Terphenyl-d14		Acenaphthene-d10, Chrysene-d12, Naphthalene-d8, Perylene-d12, Phenanthrene-d10	x	yes	
17	Nitrobenzene d5/p Terphenyl d14/2-Fluorobiphenyl		1,4 Dichlorobenzene d4/Naphthalene d8/Acenaphthene d10/Phenanthrene d10/Chrysene d12/Perylene d12	x	no	
18						
19	Nitrobenzene-d5 (S), 2-Fluorobiphenyl (S), and Terphenyl-d14 (S)		Naphthalene-d8 (IS), Acenaphthalene-d10 (IS), Phenanthrene-d10 (IS), Chrysene-d12 (IS), and Perylene-d12 (IS)	x	no	
20	PAH0235 (Surr)		SVBIOM ISTD-00001 (IS)	x	no	
21	NA		NA			
22	Surrogates	x	IS	x	yes	
23	d42Eicosane	x	dodecylcyclohexane			
24	NA		NA			
25	n-triacontane-d62	x				
26						

PAHs - IS/surrogate used for quantitation

	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6
naphthalene	naphthalene-d8	naphthalene-d8	Fluorene-d10	Fluorene-d10 / Naphthalene-d8	Napthalene- d8	naphthalene-d8
biphenyl	biphenyl-d10		Fluorene-d10	Fluorene-d10 / Acenaphthene-d10	Acenapthene- d10	naphthalene-d8
acenaphthene	acenaphthene-d10	acenaphthene-d10	Fluorene-d10	Fluorene-d10 / Acenaphthene-d10	Acenapthene- d10	acenaphthene-d10
acenaphthylene	acenaphthene-d10	acenaphthene-d10	Fluorene-d10	Fluorene-d10 / Acenaphthene-d10	Acenapthene- d10	acenaphthylene-d8
fluorene	phenanthrene-d10	acenaphthene-d10	Fluorene-d10	Fluorene-d10 / Acenaphthene-d10	Acenapthene- d10	fluorene-d10
phenanthrene	phenanthrene-d10	phenanthrene-d10	Fluorene-d10	Pyrene-d10 / Phenanthrene-d10	Phananthrene- d10	phenanthrene-d10
anthracene	phenanthrene-d10	phenanthrene-d10	Fluorene-d10	Pyrene-d10 / Phenanthrene-d10	Phananthrene- d10	anthracene-d10
fluoranthene	fluoranathene-d10	phenanthrene-d10	Fluorene-d10	Pyrene-d10 / Chrysene-d12	Phananthrene- d10	fluoranthene-d10
pyrene	pyrene-d10	chrysene-d12	Benzo(a)pyrene-d12	Pyrene-d10 / Chrysene-d12	Chyrsene- 12	pyrene-d10
benzo[b]fluorene	NA		Benzo(a)pyrene-d12	Pyrene-d10 / Chrysene-d12	NA	
benz[a]anthracene	B[a]A-d12	chrysene-d12	Benzo(a)pyrene-d12	Pyrene-d10 / Chrysene-d12	Chyrsene- 12	benz[a]anthracene-d12
chrysene	B[a]A-d12	chrysene-d12	Benzo(a)pyrene-d12	Pyrene-d10 / Chrysene-d12	Chyrsene- 12	chrysene-d12
triphenylene	B[a]A-d12			Pyrene-d10 / Chrysene-d12	NA	
benzo[*b*]fluoranthene	B[a]P-d12	perylene-d12	Benzo(a)pyrene-d12	Benzo(a)pyrene-d12 / Chrysene-d12	Chyrsene- 12	benzo[*b*]fluoranthene-d12
benzo[*j*]fluoranthene	B[a]P-d12			Benzo(a)pyrene-d12 / Chrysene-d12	NA	
benzo[*k*]fluoranthene	B[a]P-d12	perylene-d12	Benzo(a)pyrene-d12	Benzo(a)pyrene-d12 / Chrysene-d12	Chyrsene- 12	benzo[*k*]fluoranthene-d12
benzo[a]fluoranthene	B[a]P-d12			Benzo(a)pyrene-d12 / Chrysene-d12	NA	
benzo[e]pyrene	B[a]P-d12		Benzo(a)pyrene-d12	Benzo(a)pyrene-d12 / Chrysene-d12	Chyrsene- 12	benzo[*k*]fluoranthene-d12
benzo[a]pyrene	B[a]P-d12	perylene-d12	Benzo(a)pyrene-d12	Benzo(a)pyrene-d12 / Chrysene-d12	Chyrsene- 12	benzo[a]pyrene-d12
perylene	perylene-d12		Benzo(a)pyrene-d12	Benzo(a)pyrene-d12 / Chrysene-d12	Chyrsene- 12	benzo[a]pyrene-d12
indeno[1,2,3-cd]pyrene	B[ghi]P-d12	perylene-d12	Benzo(a)pyrene-d12	Benzo(a)pyrene-d12 / Chrysene-d12	Chyrsene- 12	indeno[1,2,3-cd]pyrene-d12
benzo[ghi]perylene	B[ghi]P-d12	perylene-d12	Benzo(a)pyrene-d12	Benzo(a)pyrene-d12 / Chrysene-d12	Chyrsene- 12	benzo[ghi]perylene-d12
dibenz[a,h]anthracene	DB[a,h]A-d14	perylene-d12	Benzo(a)pyrene-d12	Benzo(a)pyrene-d12 / Chrysene-d12	Chyrsene- 12	dibenz[a,h]anthracene-d14
cis/trans-decalin	NA		Fluorene-d10	Fluorene-d10 / Naphthalene-d8	NA	
dibenzofuran	NA	acenaphthene-d10	Fluorene-d10	Fluorene-d10 / Acenaphthene-d10	NA	acenaphthylene-d8
retene	NA			Pyrene-d10 / Chrysene-d12	NA	
benzothiophene	NA		Fluorene-d10	Fluorene-d10 / Naphthalene-d8	NA	
dibenzothiophene	fluoranathene-d10		Fluorene-d10	Pyrene-d10 / Phenanthrene-d10	Phananthrene- d10	fluorene-d10
naphthobenzothiophene	NA		Benzo(a)pyrene-d12	Pyrene-d10 / Chrysene-d12	NA	

PAHs - IS/surrogate used for quantitation

	Lab 7	Lab 8	Lab 9	Lab 10	Lab 11	Lab 12
naphthalene	d8-Naphthalene	Naphthalene-d8	NPH-d8	Fluorene-d10/Phenanthrene-d10	2-fluorobiphenyl	Fluorene-d10/Naphthalene-d8
biphenyl	d10-Acenaphthene	Naphthalene-d8	ACE-d10	Fluorene-d10/Phenanthrene-d10	2-fluorobiphenyl	Fluorene-d10/Acenaphthene-d10
acenaphthene	d10-Acenaphthene	Acenaphthene-d10	ACE-d10	Fluorene-d10/Phenanthrene-d10	2-fluorobiphenyl	Fluorene-d10/Acenaphthene-d10
acenaphthylene	d10-Acenaphthene	Acenaphthene-d10	ACE-d10	Fluorene-d10/Phenanthrene-d10	2-fluorobiphenyl	Fluorene-d10/Acenaphthene-d10
fluorene	d10-Acenaphthene	Acenaphthene-d10	ACE-d10	Fluorene-d10/Phenanthrene-d10	2-fluorobiphenyl	Fluorene-d10/Acenaphthene-d10
phenanthrene	d10-Phenanthrene	Phenanthrene-d10	ACE-d10	Pyrene-d10/Phenanthrene-d10	2-fluorobiphenyl	Fluorene-d10/Phenanthrene-d10
anthracene	d10-Phenanthrene	Phenanthrene-d10	ACE-d10	Pyrene-d10/Phenanthrene-d10	2-fluorobiphenyl	Fluorene-d10/Phenanthrene-d10
fluoranthene	d10-Phenanthrene	Phenanthrene-d10	BaP-d12	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene-d10
pyrene	d10-Phenanthrene	Chrysene-d12	BaP-d12	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene-d10
benzo[b]fluorene		NA		Pyrene-d10/Phenanthrene-d10		
benz[a]anthracene	d12-Chrysene	Chrysene-d12	BaP-d12	Pyrene-d10/Phenanthrene-d10	chrysene-d12	Chrysene-d12/Phenanthrene-d10
chrysene	d12-Chrysene	Chrysene-d12		Pyrene-d10/Phenanthrene-d10	chrysene-d12	Chrysene-d12/Phenanthrene-d10
triphenylene		NA		Pyrene-d10/Phenanthrene-d10		
benzo[*b*]fluoranthene	d12-Chrysene	Chrysene-d12	BaP-d12	Benzo(a)pyrene-d12/Phenanthrene-d10	chrysene-d12	Chrysene-d12/Benzo[a]pyrene-d12
benzo[*j*]fluoranthene		NA		Benzo(a)pyrene-d12/Phenanthrene-d10	chrysene-d12	
benzo[*k*]fluoranthene	d12-Chrysene	Chrysene-d12		Benzo(a)pyrene-d12/Phenanthrene-d10	chrysene-d12	Chrysene-d12/Benzo[a]pyrene-d12
benzo[a]fluoranthene		NA		Benzo(a)pyrene-d12/Phenanthrene-d10		
benzo[e]pyrene	d12-Chrysene	Chrysene-d12	BaP-d12	Benzo(a)pyrene-d12/Phenanthrene-d10	chrysene-d12	Chrysene-d12/Benzo[a]pyrene-d12
benzo[a]pyrene	d12-Chrysene	Chrysene-d12	BaP-d12	Benzo(a)pyrene-d12/Phenanthrene-d10	chrysene-d12	Chrysene-d12/Benzo[a]pyrene-d12
perylene	d12-Perylene	Chrysene-d12	BaP-d12	Benzo(a)pyrene-d12/Phenanthrene-d10	chrysene-d12	Chrysene-d12/Benzo[a]pyrene-d12
indeno[1,2,3-cd]pyrene	d12-Chrysene	Chrysene-d12	BaP-d12	Benzo(a)pyrene-d12/Phenanthrene-d10	dibenzo(a,h)anthracene d14	Chrysene-d12/Benzo[a]pyrene-d12
benzo[ghi]perylene	d12-Chrysene	Chrysene-d12	BaP-d12	Benzo(a)pyrene-d12/Phenanthrene-d10	dibenzo(a,h)anthracene d14	Chrysene-d12/Benzo[a]pyrene-d12
dibenz[a,h]anthracene	d12-Chrysene	Chrysene-d12		Benzo(a)pyrene-d12/Phenanthrene-d10	dibenzo(a,h)anthracene d14	Chrysene-d12/Benzo[a]pyrene-d12
cis/trans-decalin		NA		Fluorene-d10/Phenanthrene-d10		Fluorene-d10/Naphthalene-d8
dibenzofuran		Acenaphthene-d10		Fluorene-d10/Phenanthrene-d10		Fluorene-d10/Acenaphthene-d10
retene		NA	ACE-d10	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene-d10
benzothiophene		NA		Fluorene-d10/Phenanthrene-d10		Fluorene-d10/Acenaphthene-d10
dibenzothiophene	d10-Phenanthrene	Acenaphthene-d10	ACE-d10	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene-d10
naphthobenzothiophene		NA		Pyrene-d10/Phenanthrene-d10		Fluorene-d10/Phenanthrene-d10

PAHs - IS/surrogate used for quantitation

	Lab 13	Lab 14	Lab 15	Lab 16	Lab 17	Lab 18
naphthalene	Naphthalene D8	Naphthalene-d8		Naphthalene-d8		Naphthalene-d8/Fluorene-d10
biphenyl	Naphthalene D8	Acenaphthene-d10		Naphthalene-d8		Naphthalene-d8/Fluorene-d10
acenaphthene	Acenaphthene D10	Acenaphthene-d10		Acenaphthene-d10		Acenaphthene-d10/Fluorene-d10
acenaphthylene	Naphthalene D8	Acenaphthene-d10		Acenaphthene-d10		Acenaphthene-d10/Fluorene-d10
fluorene	Acenaphthene D10	Acenaphthene-d10		Acenaphthene-d10		Acenaphthene-d10/Fluorene-d10
phenanthrene	Phenanthrene D10	Phenanthrene-d10		Phenanthrene-d10		Phenanthrene-d10/Fluoranthene-d10
anthracene	Phenanthrene D10	Phenanthrene-d10		Phenanthrene-d10		Phenanthrene-d10/Fluoranthene-d10
fluoranthene	Phenanthrene D10	Phenanthrene-d10		Phenanthrene-d10		Phenanthrene-d10/Fluoranthene-d10
pyrene	Phenanthrene D10	Chrysene-d12		Chrysene-d12		Chrysene-d12/Fluoranthene-d10
benzo[b]fluorene	Phenanthrene D10	_____		Chrysene-d12		Chrysene-d12/Fluoranthene-d10
benz[a]anthracene	Phenanthrene D10	Chrysene-d12		Chrysene-d12		Chrysene-d12/Terphenyl-d14
chrysene	Chrysene D12	Chrysene-d12		Chrysene-d12		Chrysene-d12/Terphenyl-d14
triphenylene	Chrysene D12	_____				Chrysene-d12/Terphenyl-d14
benzo[*b*]fluoranthene	Chrysene D12	Chrysene-d12		Chrysene-d12		Perylene-d12Terphenyl-d14
benzo[*j*]fluoranthene	Chrysene D12	_____				Perylene-d12Terphenyl-d14
benzo[*k*]fluoranthene	Chrysene D12	Chrysene-d12		Chrysene-d12		Perylene-d12Terphenyl-d14
benzo[a]fluoranthene		_____				Perylene-d12Terphenyl-d14
benzo[e]pyrene	Chrysene D12	Chrysene-d12		Chrysene-d12		Perylene-d12Terphenyl-d14
benzo[a]pyrene	Chrysene D12	Chrysene-d12		Chrysene-d12		Perylene-d12Terphenyl-d14
perylene	Perylene D12	Chrysene-d12		Chrysene-d12		Perylene-d12Terphenyl-d14
indeno[1,2,3-cd]pyrene	Perylene D12	Chrysene-d12		Chrysene-d12		Perylene-d12Terphenyl-d14
benzo[ghi]perylene	Perylene D12	Chrysene-d12		Chrysene-d12		Perylene-d12Terphenyl-d14
dibenz[a,h]anthracene		Chrysene-d12		Chrysene-d12		Perylene-d12Terphenyl-d14
cis/trans-decalin	1,4-Dichlorobenzene D4	_____				Naphthalene-d8/Fluorene-d10
dibenzofuran	Acenaphthene D10	Acenaphthene-d10		Acenaphthene-d10		Acenaphthene-d10/Fluorene-d10
retene	Phenanthrene D10	_____				Chrysene-d12/Fluoranthene-d10
benzothiophene	Naphthalene D8	_____				Naphthalene-d8/Fluorene-d10
dibenzothiophene	Acenaphthene D10	Phenanthrene-d10		Acenaphthene-d10		Phenanthrene-d10/Fluoranthene-d10
naphthobenzothiophene	Phenanthrene D10	_____				Chrysene-d12/Terphenyl-d14

PAHs - IS/surrogate used for quantitation

	Lab 19	Lab 20	Lab 21	Lab 22	Lab 23	Lab 24
naphthalene	Naphthalene-d8	Naphthalene-d8	naphthalene-d8	Acenaphthene-d10	d8-Naphthalene	d8-Napthalene
biphenyl	Acenaphthalene-d10	Naphthalene-d8	acenaphthene-d10	Acenaphthene-d10	d10-Acenaphthene	d8-Napthalene
acenaphthene	Acenaphthalene-d10	Acenaphthalene-d10	acenaphthene-d10	Acenaphthene-d10	d10-Acenaphthene	d10Acenapthene
acenaphthylene	Acenaphthalene-d10	Acenaphthalene-d10	acenaphthene-d10	Acenaphthene-d10	d10-Acenaphthene	d8Acenapthylene
fluorene	Acenaphthalene-d10	Acenaphthalene-d10	acenaphthene-d10	Acenaphthene-d10	d10-Acenaphthene	d10Fluorene
phenanthrene	Phenanthrene-d10	Phenanthrene-d10	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d10-Phenanthrene
anthracene	Phenanthrene-d10	Phenanthrene-d10	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d10-Anthracene
fluoranthene	Phenanthrene-d10	Phenanthrene-d10	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d10-Fluoranthene
pyrene	Chrysene-d12	Chrysene-d12	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d10-Pyrene
benzo[b]fluorene	Chrysene-d12		chrysene-d12	Acenaphthene-d10		d12-Benzo(b)fluoranthene
benz[a]anthracene	Chrysene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Chrysene	d12-Benz(a)anthracene
chrysene	Chrysene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Chrysene	d12-Chrysene
triphenylene	Chrysene-d12		NA	Chrysene-d12		d12-Chrysene
benzo[*b*]fluoranthene	Perylene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Benzo-a-pyrene	d12-Benzo(b)fluoranthene
benzo[*j*]fluoranthene	Perylene-d12		NA	Chrysene-d12		d12-Benzo(k)fluoranthene
benzo[*k*]fluoranthene	Perylene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Benzo-a-pyrene	d12-Benzo(k)fluoranthene
benzo[a]fluoranthene	Perylene-d12		NA	Chrysene-d12		d12-Benzo(e)pyrene
benzo[e]pyrene	Perylene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Benzo-a-pyrene	d12-Benzo(e)pyrene
benzo[a]pyrene	Perylene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Benzo-a-pyrene	d12benzo(a)pyrene
perylene	Perylene-d12	Chrysene-d12	perylene-d12	Chrysene-d12	d12-Perylene	d12perylene
indeno[1,2,3-cd]pyrene	Perylene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Benzo-a-pyrene	d12benzo(ghi)perylene
benzo[ghi]perylene	Perylene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Benzo-a-pyrene	d12benzo(ghi)perylene
dibenz[a,h]anthracene	Perylene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Benzo-a-pyrene	d12benzo(ghi)perylene
cis/trans-decalin	Naphthalene-d8		NA	Acenaphthene-d10		d8-Napthalene
dibenzofuran	Acenaphthalene-d10	Acenaphthalene-d10	NA	Acenaphthene-d10		d10Acenapthene
retene	Chrysene-d12		NA	Acenaphthene-d10		d10-Pyrene
benzothiophene	Naphthalene-d8		NA	Acenaphthene-d10		d8-Napthalene
dibenzothiophene	Acenaphthalene-d10	Acenaphthalene-d10	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d10-Phenanthrene
naphthobenzothiophene	Chrysene-d12		NA	Acenaphthene-d10		

PAHs - IS/surrogate used for quantitation

	Lab 25	Lab 26
naphthalene	napthalene-d8	Naphthalene-D8
biphenyl	napthalene-d8	Naphthalene-D8
acenaphthene	napthalene-d8	Acenapthene-D10
acenaphthylene	napthalene-d8	Acenapthene-D10
fluorene	napthalene-d8	Acenapthene-D10
phenanthrene	phenanthrene-d10	Phenanthrene-D10
anthracene	phenanthrene-d10	Phenanthrene-D10
fluoranthene	fluoranthene-d10	Phenanthrene-D10
pyrene	pyrene-d10	Chrysene-D12
benzo[b]fluorene		Perylene-D12
benz[a]anthracene	benz[a]anthracene-d12	Chrysene-D12
chrysene	benz[a]anthracene-d12	Chrysene-D12
triphenylene	benz[a]anthracene-d12	
benzo[*b*]fluoranthene	benzo[a]pyrene-d12	Perylene-D12
benzo[*j*]fluoranthene	benzo[a]pyrene-d12	
benzo[*k*]fluoranthene	benzo[a]pyrene-d12	Perylene-D12
benzo[a]fluoranthene	benzo[a]pyrene-d12	Perylene-D12
benzo[e]pyrene	benzo[a]pyrene-d12	Perylene-D12
benzo[a]pyrene	benzo[a]pyrene-d12	Perylene-D12
perylene	perylene-d12	Perylene-D12
indeno[1,2,3-cd]pyrene	benzo[ghi]perylene-d12	Perylene-D12
benzo[ghi]perylene	perylene-d12	Perylene-D12
dibenz[a,h]anthracene	dibenz[a,h]anthracene-d14	Perylene-D12
cis/trans-decalin		Naphthalene-D8
dibenzofuran		Acenapthene-D10
retene	fluoranthene-d10	Chrysene-D12
benzothiophene		Naphthalene-D8
dibenzothiophene	phenanthrene-d10	Phenanthrene-D10
naphthobenzothiophene		Chrysene-D12

Alkylated PAHs - IS/surrogate used for quantitation

	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6
1-methylnaphthalene	naphthalene-d8		Fluorene-d10	Fluorene-d10 / Naphthalene-d8	Napthalene- d8	naphthalene-d8
2-methylnaphthalene	naphthalene-d8	naphthalene-d8	Fluorene-d10	Fluorene-d10 / Naphthalene-d8	Napthalene- d8	naphthalene-d8
2,6-dimethylnaphthalene	naphthalene-d8		Fluorene-d10	Fluorene-d10 / Acenaphthene-d10	NA	naphthalene-d8
1,6,7-trimethylnaphthalene	naphthalene-d8		Fluorene-d10		NA	acenaphthylene-d8
1-methylphenanthrene	phenanthrene-d10		Fluorene-d10	Pyrene-d10 / Chrysene-d12	NA	anthracene-d10
C1-decalins	NA			Fluorene-d10 / Naphthalene-d8	NA	
C2-decalins	NA			Fluorene-d10 / Naphthalene-d8	NA	
C3-decalins	NA			Fluorene-d10 / Naphthalene-d8	NA	
C4-decalins	NA			Fluorene-d10 / Naphthalene-d8	NA	
C1-naphthalenes	naphthalene-d8		Fluorene-d10	Fluorene-d10 / Naphthalene-d8	Napthalene- d8	
C2-naphthalenes	naphthalene-d8		Fluorene-d10	Fluorene-d10 / Naphthalene-d8	Napthalene- d8	
C3-naphthalenes	naphthalene-d8		Fluorene-d10	Fluorene-d10 / Naphthalene-d8	Napthalene- d8	
C4-naphthalenes	naphthalene-d8		Fluorene-d10	Fluorene-d10 / Naphthalene-d8	Napthalene- d8	
C1-benzothiophenes	NA			Fluorene-d10 / Naphthalene-d8	NA	
C2-benzothiophenes	NA			Fluorene-d10 / Naphthalene-d8	NA	
C3-benzothiophenes	NA			Fluorene-d10 / Naphthalene-d8	NA	
C4-benzothiophenes	NA			Fluorene-d10 / Naphthalene-d8	NA	
C1-fluorenes	phenanthrene-d10		Fluorene-d10	Fluorene-d10 / Acenaphthene-d10	Acenapthene- d10	
C2-fluorenes	phenanthrene-d10		Fluorene-d10	Fluorene-d10 / Phenanthrene-d10	Acenapthene- d10	
C3-fluorenes	phenanthrene-d10		Fluorene-d10	Fluorene-d10 / Phenanthrene-d10	Acenapthene- d10	
C1-phenanthrenes/anthracenes	phenanthrene-d10		Fluorene-d10	Pyrene-d10 / Phenanthrene-d10	Phananthrene- d10	
C2-phenanthrenes/anthracenes	phenanthrene-d10		Fluorene-d10	Pyrene-d10 / Phenanthrene-d10	Phananthrene- d10	
C3-phenanthrenes/anthracenes	phenanthrene-d10		Fluorene-d10	Pyrene-d10 / Phenanthrene-d10	Phananthrene- d10	
C4-phenanthrenes/anthracenes	phenanthrene-d10		Fluorene-d10	Pyrene-d10 / Phenanthrene-d10	Phananthrene- d10	
C1-dibenzothiophenes	phenanthrene-d10		Fluorene-d10	Pyrene-d10 / Phenanthrene-d10	Phananthrene- d10	
C2-dibenzothiophenes	phenanthrene-d10		Fluorene-d10	Pyrene-d10 / Phenanthrene-d10	Phananthrene- d10	
C3-dibenzothiophenes	phenanthrene-d10		Fluorene-d10	Pyrene-d10 / Phenanthrene-d10	Phananthrene- d10	
C4-dibenzothiophenes	phenanthrene-d10		Fluorene-d10	Pyrene-d10 / Phenanthrene-d10	Phananthrene- d10	
C1-fluoranthenes/pyrenes	fluoranthene-d10		Benzo(a)pyrene-d12	Pyrene-d10 / Chrysene-d12	Chyrsene- 12	
C2-fluoranthenes/pyrenes	fluoranthene-d10		Benzo(a)pyrene-d12	Pyrene-d10 / Chrysene-d12	Chyrsene- 12	
C3-fluoranthenes/pyrenes	fluoranthene-d10		Benzo(a)pyrene-d12	Pyrene-d10 / Chrysene-d12	Chyrsene- 12	
C4-fluoranthenes/pyrenes	fluoranthene-d10			Pyrene-d10 / Chrysene-d12	NA	
C1-naphthobenzothiophenes	NA			Pyrene-d10 / Chrysene-d12	NA	
C2-naphthobenzothiophenes	NA			Pyrene-d10 / Chrysene-d12	NA	
C3-naphthobenzothiophenes	NA			Pyrene-d10 / Chrysene-d12	NA	
C4-naphthobenzothiophenes	NA			Pyrene-d10 / Chrysene-d12	NA	
C1-chrysenes	B[a]A-d12		Benzo(a)pyrene-d12	Pyrene-d10 / Chrysene-d12	Chyrsene- 12	
C2-chrysenes	B[a]A-d12		Benzo(a)pyrene-d12	Pyrene-d10 / Chrysene-d12	Chyrsene- 12	
C3-chrysenes	B[a]A-d12		Benzo(a)pyrene-d12	Pyrene-d10 / Chrysene-d12	Chyrsene- 12	
C4-chrysenes	B[a]A-d12		Benzo(a)pyrene-d12	Pyrene-d10 / Chrysene-d12	NA	

Alkylated PAHs - IS/surrogate used for quantitation

	Lab 7	Lab 8	Lab 9	Lab 10	Lab 11	Lab 12
1-methylnaphthalene	d8-Naphthalene	Naphthalene-d8	NPH-d8	Fluorene-d10/Phenanthrene d10	2-fluorobiphenyl	Fluorene-d10/Naphthalene-d8
2-methylnaphthalene	d8-Naphthalene	Naphthalene-d8	NPH-d8	Fluorene-d10/Phenanthrene d10	2-fluorobiphenyl	Fluorene-d10/Naphthalene-d8
2,6-dimethylnaphthalene	d10-Acenaphthene	Naphthalene-d8	ACE-d10	Fluorene-d10/Phenanthrene d10		Fluorene-d10/Acenaphthene-d10
1,6,7-trimethylnaphthalene	d10-Acenaphthene	Acenaphthene-d10	ACE-d10	Fluorene-d10/Phenanthrene d10		Fluorene-d10/Acenaphthene-d10
1-methylphenanthrene	d10-Phenanthrene	Phenanthrene-d10	ACE-d10	Pyrene-d10/Phenanthrene-d10		Fluorene-d10/Phenanthrene d10
C1-decalins		NA		Fluorene-d10/Phenanthrene d10		Fluorene-d10/Naphthalene-d8
C2-decalins		NA		Fluorene-d10/Phenanthrene d10		Fluorene-d10/Naphthalene-d8
C3-decalins		NA		Fluorene-d10/Phenanthrene d10		Fluorene-d10/Naphthalene-d8
C4-decalins		NA		Fluorene-d10/Phenanthrene d10		Fluorene-d10/Naphthalene-d8
C1-naphthalenes		Naphthalene-d8	ACE-d10	Fluorene-d10/Phenanthrene d10		Fluorene-d10/Naphthalene-d8
C2-naphthalenes	d8-Naphthalene	Naphthalene-d8	ACE-d10	Fluorene-d10/Phenanthrene d10	2-fluorobiphenyl	Fluorene-d10/Acenaphthene-d10
C3-naphthalenes	d8-Naphthalene	Naphthalene-d8	ACE-d10	Fluorene-d10/Phenanthrene d10	2-fluorobiphenyl	Fluorene-d10/Acenaphthene-d10
C4-naphthalenes	d8-Naphthalene	Naphthalene-d8	ACE-d10	Fluorene-d10/Phenanthrene d10	2-fluorobiphenyl	Fluorene-d10/Acenaphthene-d10
C1-benzothiophenes		NA		Fluorene-d10/Phenanthrene d10		Fluorene-d10/Acenaphthene-d10
C2-benzothiophenes		NA		Fluorene-d10/Phenanthrene d10		Fluorene-d10/Acenaphthene-d10
C3-benzothiophenes		NA		Fluorene-d10/Phenanthrene d10		Fluorene-d10/Acenaphthene-d10
C4-benzothiophenes		NA		Fluorene-d10/Phenanthrene d10		Fluorene-d10/Acenaphthene-d10
C1-fluorenes	d10-Acenaphthene	Acenaphthene-d10	ACE-d10	Fluorene-d10/Phenanthrene d10	2-fluorobiphenyl	Fluorene-d10/Acenaphthene-d10
C2-fluorenes	d10-Acenaphthene	Acenaphthene-d10	ACE-d10	Fluorene-d10/Phenanthrene d10	2-fluorobiphenyl	Fluorene-d10/Acenaphthene-d10
C3-fluorenes	d10-Acenaphthene	Acenaphthene-d10	ACE-d10	Fluorene-d10/Phenanthrene d10	2-fluorobiphenyl	Fluorene-d10/Acenaphthene-d10
C1-phenanthrenes/anthracenes	d10-Phenanthrene	Phenanthrene-d10	ACE-d10	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene d10
C2-phenanthrenes/anthracenes	d10-Phenanthrene	Phenanthrene-d10	ACE-d10	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene d10
C3-phenanthrenes/anthracenes	d10-Phenanthrene	Phenanthrene-d10	ACE-d10	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene d10
C4-phenanthrenes/anthracenes	d10-Phenanthrene	Phenanthrene-d10	ACE-d10	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene d10
C1-dibenzothiophenes	d10-Phenanthrene	Acenaphthene-d10	ACE-d10	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene d10
C2-dibenzothiophenes	d10-Phenanthrene	Acenaphthene-d10	ACE-d10	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene d10
C3-dibenzothiophenes	d10-Phenanthrene	Acenaphthene-d10	ACE-d10	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene d10
C4-dibenzothiophenes		Acenaphthene-d10	ACE-d10	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene d10
C1-fluoranthenes/pyrenes	d10-Phenanthrene	Chrysene-d12	BaP-d12	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene d10
C2-fluoranthenes/pyrenes	d10-Phenanthrene	Chrysene-d12	BaP-d12	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene d10
C3-fluoranthenes/pyrenes	d10-Phenanthrene	Chrysene-d12	BaP-d12	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene d10
C4-fluoranthenes/pyrenes		NA	BaP-d12	Pyrene-d10/Phenanthrene-d10	p-terphenyl d14	Fluorene-d10/Phenanthrene d10
C1-naphthobenzothiophenes		NA	ACE-d10	Pyrene-d10/Phenanthrene-d10		Fluorene-d10/Phenanthrene d10
C2-naphthobenzothiophenes		NA	ACE-d10	Pyrene-d10/Phenanthrene-d10		Fluorene-d10/Phenanthrene d10
C3-naphthobenzothiophenes		NA	ACE-d10	Pyrene-d10/Phenanthrene-d10		Fluorene-d10/Phenanthrene d10
C4-naphthobenzothiophenes		NA	ACE-d10	Pyrene-d10/Phenanthrene-d10		Fluorene-d10/Phenanthrene d10
C1-chrysenes	d12-Chrysene	Chrysene-d12	BaP-d12	Pyrene-d10/Phenanthrene-d10		Chrysene-d12/Phenanthrene-d10
C2-chrysenes	d12-Chrysene	Chrysene-d12	BaP-d12	Pyrene-d10/Phenanthrene-d10		Chrysene-d12/Phenanthrene-d10
C3-chrysenes	d12-Chrysene	Chrysene-d12	BaP-d12	Pyrene-d10/Phenanthrene-d10		Chrysene-d12/Phenanthrene-d10
C4-chrysenes	d12-Chrysene	Chrysene-d12	BaP-d12	Pyrene-d10/Phenanthrene-d10		Chrysene-d12/Phenanthrene-d10

Alkylated PAHs - IS/surrogate used for quantitation

	Lab 13	Lab 14	Lab 15	Lab 16	Lab 17	Lab 18
1-methylnaphthalene	Naphthalene D8	Naphthalene-d8		Naphthalene-d8		Naphthalene-d8/Fluorene-d10
2-methylnaphthalene	Naphthalene D8	Acenaphthene-d10		Naphthalene-d8		Naphthalene-d8/Fluorene-d10
2,6-dimethylnaphthalene	Naphthalene D8	Acenaphthene-d10		Naphthalene-d8		Naphthalene-d8/Fluorene-d10
1,6,7-trimethylnaphthalene		Acenaphthene-d10				Naphthalene-d8/Fluorene-d10
1-methylphenanthrene	Phenanthrene D10	Phenanthrene-d10		Phenanthrene-d10		Phenanthrene-d10/Fluoranthene-d10
C1-decalins	1,4-Dichlorobenzene D4	_____				Naphthalene-d8/Fluorene-d10
C2-decalins		_____				Naphthalene-d8/Fluorene-d10
C3-decalins		_____				Naphthalene-d8/Fluorene-d10
C4-decalins		_____				Naphthalene-d8/Fluorene-d10
C1-naphthalenes		Naphthalene-d8		Naphthalene-d8		Naphthalene-d8/Fluorene-d10
C2-naphthalenes	Naphthalene D8	Acenaphthene-d10		Naphthalene-d8		Naphthalene-d8/Fluorene-d10
C3-naphthalenes	Naphthalene D8	Acenaphthene-d10		Naphthalene-d8		Naphthalene-d8/Fluorene-d10
C4-naphthalenes	Naphthalene D8	Phenanthrene-d10		Naphthalene-d8		Naphthalene-d8/Fluorene-d10
C1-benzothiophenes	Naphthalene D8	_____				Naphthalene-d8/Fluorene-d10
C2-benzothiophenes	Naphthalene D8	_____				Naphthalene-d8/Fluorene-d10
C3-benzothiophenes	Naphthalene D8	_____				Naphthalene-d8/Fluorene-d10
C4-benzothiophenes		_____				Naphthalene-d8/Fluorene-d10
C1-fluorenes	Acenaphthene D10	Phenanthrene-d10		Acenaphthene-d10		Acenaphthene-d10/Fluorene-d10
C2-fluorenes		Phenanthrene-d10		Acenaphthene-d10		Acenaphthene-d10/Fluorene-d10
C3-fluorenes	Acenaphthene D10	Phenanthrene-d10		Acenaphthene-d10		Acenaphthene-d10/Fluorene-d10
C1-phenanthrenes/anthracenes	Phenanthrene D10	Phenanthrene-d10		Phenanthrene-d10		Phenanthrene-d10/Fluoranthene-d10
C2-phenanthrenes/anthracenes	Phenanthrene D10	Phenanthrene-d10		Phenanthrene-d10		Phenanthrene-d10/Fluoranthene-d10
C3-phenanthrenes/anthracenes	Phenanthrene D10	Chrysene-d12		Phenanthrene-d10		Phenanthrene-d10/Fluoranthene-d10
C4-phenanthrenes/anthracenes	Phenanthrene D10	Chrysene-d12		Phenanthrene-d10		Phenanthrene-d10/Fluoranthene-d10
C1-dibenzothiophenes	Phenanthrene D10	Phenanthrene-d10		Phenanthrene-d10		Phenanthrene-d10/Fluoranthene-d10
C2-dibenzothiophenes	Phenanthrene D10	Phenanthrene-d10		Phenanthrene-d10		Phenanthrene-d10/Fluoranthene-d10
C3-dibenzothiophenes	Phenanthrene D10	Phenanthrene-d10		Phenanthrene-d10		Phenanthrene-d10/Fluoranthene-d10
C4-dibenzothiophenes	Phenanthrene D10	Chrysene-d12		Phenanthrene-d10		Phenanthrene-d10/Fluoranthene-d10
C1-fluoranthenes/pyrenes	Phenanthrene D10	Chrysene-d12		Chrysene-d12		Phenanthrene-d10/Fluoranthene-d10
C2-fluoranthenes/pyrenes		Chrysene-d12		Chrysene-d12		Phenanthrene-d10/Fluoranthene-d10
C3-fluoranthenes/pyrenes	Phenanthrene D10	Chrysene-d12		Chrysene-d12		Phenanthrene-d10/Fluoranthene-d10
C4-fluoranthenes/pyrenes	Phenanthrene D10	_____				Phenanthrene-d10/Fluoranthene-d10
C1-naphthobenzothiophenes		_____				Chrysene-d12/Terphenyl-d14
C2-naphthobenzothiophenes		_____				Chrysene-d12/Terphenyl-d14
C3-naphthobenzothiophenes		_____				Chrysene-d12/Terphenyl-d14
C4-naphthobenzothiophenes		_____				Chrysene-d12/Terphenyl-d14
C1-chrysenes	Chrysene D12	Chrysene-d12		Chrysene-d12		Chrysene-d12/Terphenyl-d14
C2-chrysenes	Chrysene D12	Chrysene-d12		Chrysene-d12		Chrysene-d12/Terphenyl-d14
C3-chrysenes		Chrysene-d12		Chrysene-d12		Chrysene-d12/Terphenyl-d14
C4-chrysenes	Chrysene D12	Chrysene-d12		Chrysene-d12		Chrysene-d12/Terphenyl-d14

Alkylated PAHs - IS/surrogate used for quantitation

	Lab 19	Lab 20	Lab 21	Lab 22	Lab 23	Lab 24
1-methylnaphthalene	Naphthalene-d8	Naphthalene-d8	naphthalene-d8	Acenaphthene-d10	d8-Naphthalene	d8-Napthalene
2-methylnaphthalene	Naphthalene-d8	Naphthalene-d8	naphthalene-d8	Acenaphthene-d10	d8-Naphthalene	d8-Napthalene
2,6-dimethylnaphthalene	Acenaphthalene-d10	Naphthalene-d8	naphthalene-d8	Acenaphthene-d10	d10-Acenaphthene	d8-1-MeNaphthalene
1,6,7-trimethylnaphthalene	Acenaphthalene-d10	Phenanthrene-d10	naphthalene-d8	Acenaphthene-d10		d8-1-MeNaphthalene
1-methylphenanthrene	Phenanthrene-d10	Phenanthrene-d10	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d10-Pyrene
C1-decalins	Naphthalene-d8		NA	Acenaphthene-d10		d8-Napthalene
C2-decalins	Naphthalene-d8		NA	Acenaphthene-d10		d8-Napthalene
C3-decalins	Naphthalene-d8		NA	Acenaphthene-d10		d8-Napthalene
C4-decalins	Naphthalene-d8		NA	Acenaphthene-d10		d8-Napthalene
C1-naphthalenes	Naphthalene-d8	Naphthalene-d8	naphthalene-d8	Acenaphthene-d10	d8-Naphthalene	d8-1-MeNaphthalene
C2-naphthalenes	Naphthalene-d8	Naphthalene-d8	naphthalene-d8	Acenaphthene-d10	d10-Acenaphthene	d8-1-MeNaphthalene
C3-naphthalenes	Naphthalene-d8	Naphthalene-d8	naphthalene-d8	Acenaphthene-d10	d10-Acenaphthene	d8-1-MeNaphthalene
C4-naphthalenes	Naphthalene-d8	Naphthalene-d8	naphthalene-d8	Acenaphthene-d10	d10-Acenaphthene	d8-1-MeNaphthalene
C1-benzothiophenes	Naphthalene-d8		NA	Acenaphthene-d10		d8-1-MeNaphthalene
C2-benzothiophenes	Naphthalene-d8		NA	Acenaphthene-d10		d8-1-MeNaphthalene
C3-benzothiophenes	Naphthalene-d8		NA	Acenaphthene-d10		d8-1-MeNaphthalene
C4-benzothiophenes	Naphthalene-d8		NA	Acenaphthene-d10		d8-1-MeNaphthalene
C1-fluorenes	Acenaphthalene-d10	Acenaphthalene-d10	acenaphthene-d10	Acenaphthene-d10	d10-Acenaphthene	d10Fluorene
C2-fluorenes	Acenaphthalene-d10	Acenaphthalene-d10	acenaphthene-d10	Acenaphthene-d10	d10-Acenaphthene	d10Fluorene
C3-fluorenes	Acenaphthalene-d10	Acenaphthalene-d10	acenaphthene-d10	Acenaphthene-d10	d10-Acenaphthene	d10Fluorene
C1-phenanthrenes/anthracenes	Phenanthrene-d10	Phenanthrene-d10	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d10-Anthracene
C2-phenanthrenes/anthracenes	Phenanthrene-d10	Phenanthrene-d10	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d10-Anthracene
C3-phenanthrenes/anthracenes	Phenanthrene-d10	Phenanthrene-d10	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d10-Anthracene
C4-phenanthrenes/anthracenes	Phenanthrene-d10	Phenanthrene-d10	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d10-Anthracene
C1-dibenzothiophenes	Acenaphthalene-d10	Chrysene-d12	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d8-dibenzothiophene
C2-dibenzothiophenes	Acenaphthalene-d10	Chrysene-d12	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d8-dibenzothiophene
C3-dibenzothiophenes	Acenaphthalene-d10	Chrysene-d12	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d8-dibenzothiophene
C4-dibenzothiophenes	Acenaphthalene-d10	Chrysene-d12	NA	Acenaphthene-d10	d10-Phenanthrene	d8-dibenzothiophene
C1-fluoranthenes/pyrenes	Phenanthrene-d10	Chrysene-d12	phenenthrene-d10	Acenaphthene-d10	d10-Phenanthrene	d10-Fluoranthene
C2-fluoranthenes/pyrenes	Phenanthrene-d10	Chrysene-d12	NA	Acenaphthene-d10	d10-Phenanthrene	d10-Fluoranthene
C3-fluoranthenes/pyrenes	Phenanthrene-d10	Chrysene-d12	NA	Acenaphthene-d10	d10-Phenanthrene	d10-Fluoranthene
C4-fluoranthenes/pyrenes	Phenanthrene-d10		NA	Acenaphthene-d10	d10-Phenanthrene	d10-Fluoranthene
C1-naphthobenzothiophenes	Chrysene-d12		NA	Acenaphthene-d10		
C2-naphthobenzothiophenes	Chrysene-d12		NA	Acenaphthene-d10		
C3-naphthobenzothiophenes	Chrysene-d12		NA	Acenaphthene-d10		
C4-naphthobenzothiophenes	Chrysene-d12		NA	Acenaphthene-d10		
C1-chrysenes	Chrysene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Chrysene	d12-Chrysene
C2-chrysenes	Chrysene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Chrysene	d12-Chrysene
C3-chrysenes	Chrysene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Chrysene	d12-Chrysene
C4-chrysenes	Chrysene-d12	Chrysene-d12	chrysene-d12	Chrysene-d12	d12-Chrysene	d12-Chrysene

Alkylated PAHs - IS/surrogate used for quantitation

	Lab 25	Lab 26
1-methylnaphthalene		Naphthalene-D8
2-methylnaphthalene		Naphthalene-D8
2,6-dimethylnaphthalene	napthalene-d8	Naphthalene-D8
1,6,7-trimethylnaphthalene		Naphthalene-D8
1-methylphenanthrene	phenanthrene-d10	Phenanthrene-D10
C1-decalins		Naphthalene-D8
C2-decalins		Naphthalene-D8
C3-decalins		Naphthalene-D8
C4-decalins		Naphthalene-D8
C1-naphthalenes		Naphthalene-D8
C2-naphthalenes		Naphthalene-D8
C3-naphthalenes		Naphthalene-D8
C4-naphthalenes		Naphthalene-D8
C1-benzothiophenes		Naphthalene-D8
C2-benzothiophenes		Naphthalene-D8
C3-benzothiophenes		Naphthalene-D8
C4-benzothiophenes		Naphthalene-D8
C1-fluorenes		Acenapthene-D10
C2-fluorenes		Acenapthene-D10
C3-fluorenes		Acenapthene-D10
C1-phenanthrenes/anthracenes		Phenanthrene-D10
C2-phenanthrenes/anthracenes		Phenanthrene-D10
C3-phenanthrenes/anthracenes		Phenanthrene-D10
C4-phenanthrenes/anthracenes		Phenanthrene-D10
C1-dibenzothiophenes		Phenanthrene-D10
C2-dibenzothiophenes		Phenanthrene-D10
C3-dibenzothiophenes		Phenanthrene-D10
C4-dibenzothiophenes		Phenanthrene-D10
C1-fluoranthenes/pyrenes		Phenanthrene-D10
C2-fluoranthenes/pyrenes		Phenanthrene-D10
C3-fluoranthenes/pyrenes		Phenanthrene-D10
C4-fluoranthenes/pyrenes		Phenanthrene-D10
C1-naphthobenzothiophenes		Chrysene-D12
C2-naphthobenzothiophenes		Chrysene-D12
C3-naphthobenzothiophenes		Chrysene-D12
C4-naphthobenzothiophenes		Chrysene-D12
C1-chrysenes		Chrysene-D12
C2-chrysenes		Chrysene-D12
C3-chrysenes		Chrysene-D12
C4-chrysenes		Chrysene-D12

Biomarkers - IS/surrogate used for quantitation

	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10	Lab 11	Lab 12	Lab 13
Carbazole	NA		Benzo(a)pyrene-d12	Pyrene-d10 / Phenanthrene-d10	NA			NA		NA		Chrysene-d12/5b(H)Cholane	Chrysene D12
18a(H)-22,29,30-Trisnorneohopane	NA		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	
17a(H)-22,29,30-Trisnorhopane	B[a]A-d12		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	Chrysene D12
17α(H),21β(H)-30-Norhopane	B[a]A-d12		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	
18a(H)-30-Norneohopane	NA		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	
17a(H)-Diahopane	NA		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	
17α(H),21β(H)-Hopane	B[a]A-d12		Benzo(a)pyrene-d12	Benzo(a)pyrene-d12 / Chrysene-d12	Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	Chrysene D12
17α(H),21β(H)-22R-Homohopane	B[a]A-d12		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	
17α(H),21β(H)-22S-Homohopane	B[a]A-d12		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	
13b(H)17a(H)-Diacholestane 20S	NA		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	
5a(H),14a(H),17a(H)-Cholestane 20S	NA		Benzo(a)pyrene-d12		NA			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	
5a(H),14a(H),17a(H)-Cholestane 20R	B[a]A-d12		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	Chrysene D12
5a(H),14a(H),17a(H)-24-Ethylcholestane 20S	NA		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	
5a(H),14a(H),17a(H)-24-Ethylcholestane 20R	B[a]A-d12		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	Chrysene D12
5a(H),14b(H),17b(H)-Cholestane 20R	B[a]A-d12		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	
5a(H),14b(H),17b(H)-Cholestane 20S	NA		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	
5a(H),14b(H),17b(H)-24-Ethylcholestane 20R	B[a]A-d12		Benzo(a)pyrene-d12		Chyrsene- 12			Chrysene-d12		NA		Chrysene-d12/5b(H)Cholane	
5a(H),14b(H),17b(H)-24-Ethylcholestane 20S	NA				Chyrsene- 12			Chrysene-d12		NA			

Biomarkers - IS/surrogate used for quantitation

	Lab 14	Lab 15	Lab 16	Lab 17	Lab 18	Lab 19	Lab 20	Lab 21	Lab 22	Lab 23	Lab 24	Lab 25	Lab 26
Carbazole			Chrysene-d12		Phenanthrene-d10/Fluoranthene-d10	Phenanthrene-d10		phenenthrene-d10	Chrysene-d12				
18a(H)-22,29,30-Trisnorneohopane			Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH			
17a(H)-22,29,30-Trisnorhopane	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH		n-triacontane-d62	
17α(H),21β(H)-30-Norhopane	Chrysene-d12		Chrysene-d12			Perylene-d12	Chrysene-d12	NA	Chrysene-d12	DCH		n-triacontane-d62	
18a(H)-30-Norneohopane	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH			
17a(H)-Diahopane	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12				
17α(H),21β(H)-Hopane	Chrysene-d12		Chrysene-d12		Chrysene-d12/Terphenyl-d14		Chrysene-d12	NA	Chrysene-d12	DCH		n-triacontane-d62	
17α(H),21β(H)-22R-Homohopane	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH		n-triacontane-d62	
17α(H),21β(H)-22S-Homohopane	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH		n-triacontane-d62	
13b(H)17a(H)-Diacholestane 20S	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12				
5a(H),14a(H),17a(H)-Cholestane 20S	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH			
5a(H),14a(H),17a(H)-Cholestane 20R	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH		n-triacontane-d62	
5a(H),14a(H),17a(H)-24-Ethylcholestane 20S	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH			
5a(H),14a(H),17a(H)-24-Ethylcholestane 20R	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH		n-triacontane-d62	
5a(H),14b(H),17b(H)-Cholestane 20R	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH		n-triacontane-d62	
5a(H),14b(H),17b(H)-Cholestane 20S	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH			
5a(H),14b(H),17b(H)-24-Ethylcholestane 20R	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH		n-triacontane-d62	
5a(H),14b(H),17b(H)-24-Ethylcholestane 20S	Chrysene-d12		Chrysene-d12				Chrysene-d12	NA	Chrysene-d12	DCH			

PAHs - Associated % recovery / acceptance ranges

	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10
naphthalene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
biphenyl				40%-120%	minus 50 to plus 100		50-120	60-140		60-120
acenaphthene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
acenaphthylene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
fluorene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
phenanthrene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
anthracene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
fluoranthene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
pyrene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
benzo[b]fluorene				40%-120%	minus 50 to plus 100			NA		60-120
benz[a]anthracene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
chrysene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
triphenylene				40%-120%	minus 50 to plus 100			NA		NA
benzo[*b*]fluoranthene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
benzo[*j*]fluoranthene				40%-120%	minus 50 to plus 100			NA		NA
benzo[*k*]fluoranthene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
benzo[a]fluoranthene				40%-120%	minus 50 to plus 100			NA		60-120
benzo[e]pyrene				40%-120%	minus 50 to plus 100		50-120	60-140		60-120
benzo[a]pyrene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
perylene				40%-120%	minus 50 to plus 100		50-120	60-140		60-120
indeno[1,2,3-cd]pyrene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
benzo[ghi]perylene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
dibenz[a,h]anthracene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
cis/trans-decalin				40%-120%	minus 50 to plus 100			NA		60-120
dibenzofuran		50-200		40%-120%	minus 50 to plus 100			60-140		60-120
retene				40%-120%	minus 50 to plus 100			NA		60-120
benzothiophene				40%-120%	minus 50 to plus 100			NA		60-120
dibenzothiophene				40%-120%	minus 50 to plus 100		50-120	60-140		60-120
naphthobenzothiophene				40%-120%	minus 50 to plus 100			NA		60-120

PAHs - Associated % recovery / acceptance ranges

	Lab 11	Lab 12	Lab 13	Lab 14	Lab 15	Lab 16	Lab 17	Lab 18	Lab 19	Lab 20
naphthalene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
biphenyl	50-150	70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
acenaphthene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
acenaphthylene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
fluorene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
phenanthrene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
anthracene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
fluoranthene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
pyrene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
benzo[b]fluorene	50-150		70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
benz[a]anthracene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
chrysene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
triphenylene	50-150		70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
benzo[*b*]fluoranthene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
benzo[*j*]fluoranthene	50-150		70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
benzo[*k*]fluoranthene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
benzo[a]fluoranthene	50-150		70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
benzo[e]pyrene	50-150	70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
benzo[a]pyrene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
perylene	50-150	70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
indeno[1,2,3-cd]pyrene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
benzo[ghi]perylene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
dibenz[a,h]anthracene	50-150	70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
cis/trans-decalin	50-150	70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
dibenzofuran	50-150	70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
retene	50-150	70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
benzothiophene	50-150	70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
dibenzothiophene	50-150	70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
naphthobenzothiophene	50-150	70 - 130%	70-130					40-120	-50% to + 100%	

PAHs - Associated % recovery / acceptance ranges

	Lab 21	Lab 22	Lab 23	Lab 24	Lab 25	Lab 26
naphthalene	50-150	40-120	30-120			
biphenyl	50-150	40-120	30-120			
acenaphthene	50-150	40-120	30-120			
acenaphthylene	50-150	40-120	30-120			
fluorene	50-150	40-120	30-120			
phenanthrene	50-150	40-120	30-120			
anthracene	50-150	40-120	30-120			
fluoranthene	50-150	40-120	30-120			
pyrene	50-150	40-120	30-120			
benzo[b]fluorene	50-150	40-120				
benz[a]anthracene	50-150	40-120	30-120			
chrysene	50-150	40-120	30-120			
triphenylene	NA	40-120				
benzo[*b*]fluoranthene	50-150	40-120	30-120			
benzo[*j*]fluoranthene	NA	40-120				
benzo[*k*]fluoranthene	50-150	40-120	30-120			
benzo[a]fluoranthene	NA	40-120				
benzo[e]pyrene	50-150	40-120	30-120			
benzo[a]pyrene	50-150	40-120	30-120			
perylene	50-150	40-120	30-120			
indeno[1,2,3-cd]pyrene	50-150	40-120	30-120			
benzo[ghi]perylene	50-150	40-120	30-120			
dibenz[a,h]anthracene	50-150	40-120	30-120			
cis/trans-decalin	NA	40-120				
dibenzofuran	NA	40-120				
retene	NA	40-120				
benzothiophene	NA	40-120				
dibenzothiophene	50-150	40-120	30-120			
naphthobenzothiophene	NA	40-120				

Alkylated PAHs - Associated % recovery / acceptance ranges

	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10
1-methylnaphthalene				40%-120%	minus 50 to plus 100		50-120	60-140		60-120
2-methylnaphthalene		50-200		40%-120%	minus 50 to plus 100		50-120	60-140		60-120
2,6-dimethylnaphthalene				40%-120%	minus 50 to plus 100		50-120	60-140		60-120
1,6,7-trimethylnaphthalene					minus 50 to plus 100		50-120	60-140		60-120
1-methylphenanthrene				40%-120%	minus 50 to plus 100		50-120	60-140		NA
C1-decalins				40%-120%	minus 50 to plus 100			NA		NA
C2-decalins				40%-120%	minus 50 to plus 100			NA		NA
C3-decalins				40%-120%	minus 50 to plus 100			NA		NA
C4-decalins				40%-120%	minus 50 to plus 100			NA		NA
C1-naphthalenes				40%-120%	minus 50 to plus 100			NA		NA
C2-naphthalenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C3-naphthalenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C4-naphthalenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C1-benzothiophenes				40%-120%	minus 50 to plus 100			NA		NA
C2-benzothiophenes				40%-120%	minus 50 to plus 100			NA		NA
C3-benzothiophenes				40%-120%	minus 50 to plus 100			NA		NA
C4-benzothiophenes				40%-120%	minus 50 to plus 100			NA		NA
C1-fluorenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C2-fluorenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C3-fluorenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C1-phenanthrenes/anthracenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C2-phenanthrenes/anthracenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C3-phenanthrenes/anthracenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C4-phenanthrenes/anthracenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C1-dibenzothiophenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C2-dibenzothiophenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C3-dibenzothiophenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C4-dibenzothiophenes				40%-120%	minus 50 to plus 100			NA		NA
C1-fluoranthenes/pyrenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C2-fluoranthenes/pyrenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C3-fluoranthenes/pyrenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C4-fluoranthenes/pyrenes				40%-120%	minus 50 to plus 100			NA		NA
C1-naphthobenzothiophenes				40%-120%	minus 50 to plus 100			NA		NA
C2-naphthobenzothiophenes				40%-120%	minus 50 to plus 100			NA		NA
C3-naphthobenzothiophenes				40%-120%	minus 50 to plus 100			NA		NA
C4-naphthobenzothiophenes				40%-120%	minus 50 to plus 100			NA		NA
C1-chrysenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C2-chrysenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C3-chrysenes				40%-120%	minus 50 to plus 100		50-120	NA		NA
C4-chrysenes				40%-120%	minus 50 to plus 100		50-120	NA		NA

Alkylated PAHs - Associated % recovery / acceptance ranges

	Lab 11	Lab 12	Lab 13	Lab 14	Lab 15	Lab 16	Lab 17	Lab 18	Lab 19	Lab 20
1-methylnaphthalene		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
2-methylnaphthalene		70 - 130%	70-130	60 - 140		50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
2,6-dimethylnaphthalene		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
1,6,7-trimethylnaphthalene		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
1-methylphenanthrene		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C1-decalins		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
C2-decalins		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
C3-decalins		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
C4-decalins		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
C1-naphthalenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C2-naphthalenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C3-naphthalenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C4-naphthalenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C1-benzothiophenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
C2-benzothiophenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
C3-benzothiophenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
C4-benzothiophenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
C1-fluorenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C2-fluorenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C3-fluorenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C1-phenanthrenes/anthracenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C2-phenanthrenes/anthracenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C3-phenanthrenes/anthracenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C4-phenanthrenes/anthracenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C1-dibenzothiophenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C2-dibenzothiophenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C3-dibenzothiophenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C4-dibenzothiophenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C1-fluoranthenes/pyrenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C2-fluoranthenes/pyrenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C3-fluoranthenes/pyrenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C4-fluoranthenes/pyrenes			70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C1-naphthobenzothiophenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
C2-naphthobenzothiophenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
C3-naphthobenzothiophenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
C4-naphthobenzothiophenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	
C1-chrysenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C2-chrysenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C3-chrysenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140
C4-chrysenes		70 - 130%	70-130			50-200% of IS value in CCV		40-120	-50% to + 100%	60-140

Alkylated PAHs - Associated % recovery / acceptance ranges

	Lab 21	Lab 22	Lab 23	Lab 24	Lab 25	Lab 26
1-methylnaphthalene	50-150	40-120	30-120			
2-methylnaphthalene	50-150	40-120	30-120			
2,6-dimethylnaphthalene	50-150	40-120	30-120			
1,6,7-trimethylnaphthalene	50-150	40-120				
1-methylphenanthrene	50-150	40-120	30-120			
C1-decalins	NA	40-120				
C2-decalins	NA	40-120				
C3-decalins	NA	40-120				
C4-decalins	NA	40-120				
C1-naphthalenes	50-150	40-120	30-120			
C2-naphthalenes	50-150	40-120	30-120			
C3-naphthalenes	50-150	40-120	30-120			
C4-naphthalenes	50-150	40-120	30-120			
C1-benzothiophenes	NA	40-120				
C2-benzothiophenes	NA	40-120				
C3-benzothiophenes	NA	40-120				
C4-benzothiophenes	NA	40-120				
C1-fluorenes	50-150	40-120	30-120			
C2-fluorenes	50-150	40-120	30-120			
C3-fluorenes	50-150	40-120	30-120			
C1-phenanthrenes/anthracenes	50-150	40-120	30-120			
C2-phenanthrenes/anthracenes	50-150	40-120	30-120			
C3-phenanthrenes/anthracenes	50-150	40-120	30-120			
C4-phenanthrenes/anthracenes	50-150	40-120	30-120			
C1-dibenzothiophenes	50-150	40-120	30-120			
C2-dibenzothiophenes	50-150	40-120	30-120			
C3-dibenzothiophenes	50-150	40-120	30-120			
C4-dibenzothiophenes	NA	40-120	30-120			
C1-fluoranthenes/pyrenes	50-150	40-120	30-120			
C2-fluoranthenes/pyrenes	NA	40-120	30-120			
C3-fluoranthenes/pyrenes	NA	40-120	30-120			
C4-fluoranthenes/pyrenes	NA	40-120	30-120			
C1-naphthobenzothiophenes	NA	40-120				
C2-naphthobenzothiophenes	NA	40-120				
C3-naphthobenzothiophenes	NA	40-120				
C4-naphthobenzothiophenes	NA	40-120				
C1-chrysenes	50-150	40-120	30-120			
C2-chrysenes	50-150	40-120	30-120			
C3-chrysenes	50-150	40-120	30-120			
C4-chrysenes	50-150	40-120	30-120			

Biomarkers - Associated % recovery / acceptance ranges

	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10	Lab 11	Lab 12	Lab 13
Carbazole				40%-120%	minus 50 to plus 100			NA		NA			70-130
18a(H)-22,29,30-Trisnorneohopane					minus 50 to plus 100			NA		NA		70 - 130%	70-130
17a(H)-22,29,30-Trisnorhopane					minus 50 to plus 100			NA		NA		70 - 130%	70-130
17α(H),21β(H)-30-Norhopane					minus 50 to plus 100			NA		NA		70 - 130%	70-130
18a(H)-30-Norneohopane					minus 50 to plus 100			NA		NA		70 - 130%	70-130
17a(H)-Diahopane					minus 50 to plus 100			NA		NA		70 - 130%	70-130
17α(H),21β(H)-Hopane				40%-120%	minus 50 to plus 100			60-140		NA		70 - 130%	70-130
17α(H),21β(H)-22R-Homohopane					minus 50 to plus 100			NA		NA		70 - 130%	70-130
17α(H),21β(H)-22S-Homohopane					minus 50 to plus 100			NA		NA		70 - 130%	70-130
13b(H)17a(H)-Diacholestane 20S					minus 50 to plus 100			NA		NA		70 - 130%	70-130
5a(H),14a(H),17a(H)-Cholestane 20S					minus 50 to plus 100			NA		NA		70 - 130%	70-130
5a(H),14a(H),17a(H)-Cholestane 20R					minus 50 to plus 100			NA		NA		70 - 130%	70-130
5a(H),14a(H),17a(H)-24-Ethylcholestane 20S					minus 50 to plus 100			NA		NA		70 - 130%	70-130
5a(H),14a(H),17a(H)-24-Ethylcholestane 20R					minus 50 to plus 100			NA		NA		70 - 130%	70-130
5a(H),14b(H),17b(H)-Cholestane 20R					minus 50 to plus 100			NA		NA		70 - 130%	70-130
5a(H),14b(H),17b(H)-Cholestane 20S					minus 50 to plus 100			NA		NA		70 - 130%	70-130
5a(H),14b(H),17b(H)-24-Ethylcholestane 20R					minus 50 to plus 100			NA		NA		70 - 130%	70-130
5a(H),14b(H),17b(H)-24-Ethylcholestane 20S					minus 50 to plus 100			NA		NA		70 - 130%	70-130

Biomarkers - Associated % recovery / acceptance ranges

	Lab 14	Lab 15	Lab 16	Lab 17	Lab 18	Lab 19	Lab 20	Lab 21	Lab 22	Lab 23	Lab 24	Lab 25	Lab 26
Carbazole			50-200% of IS value in CCV		40-120	-50% to + 100%		50-150	50-130				
18a(H)-22,29,30-Trisnorneohopane			50-200% of IS value in CCV				60-140	NA	50-130	80-120			
17a(H)-22,29,30-Trisnorhopane			50-200% of IS value in CCV				60-140	NA	50-130	80-120			
17α(H),21β(H)-30-Norhopane			50-200% of IS value in CCV			-50% to + 100%	60-140	NA	50-130	80-120			
18a(H)-30-Norneohopane			50-200% of IS value in CCV				60-140	NA	50-130	80-120			
17a(H)-Diahopane			50-200% of IS value in CCV				60-140	NA	50-130				
17α(H),21β(H)-Hopane			50-200% of IS value in CCV		40-120		60-140	NA	50-130	80-120			
17α(H),21β(H)-22R-Homohopane			50-200% of IS value in CCV				60-140	NA	50-130	80-120			
17α(H),21β(H)-22S-Homohopane			50-200% of IS value in CCV				60-140	NA	50-130	80-120			
13b(H)17a(H)-Diacholestane 20S			50-200% of IS value in CCV				60-140	NA	50-130				
5a(H),14a(H),17a(H)-Cholestane 20S			50-200% of IS value in CCV				60-140	NA	50-130	80-120			
5a(H),14a(H),17a(H)-Cholestane 20R			50-200% of IS value in CCV				60-140	NA	50-130	80-120			
5a(H),14a(H),17a(H)-24-Ethylcholestane 20S			50-200% of IS value in CCV				60-140	NA	50-130	80-120			
5a(H),14a(H),17a(H)-24-Ethylcholestane 20R			50-200% of IS value in CCV				60-140	NA	50-130	80-120			
5a(H),14b(H),17b(H)-Cholestane 20R			50-200% of IS value in CCV				60-140	NA	50-130	80-120			
5a(H),14b(H),17b(H)-Cholestane 20S			50-200% of IS value in CCV				60-140	NA	50-130	80-120			
5a(H),14b(H),17b(H)-24-Ethylcholestane 20R			50-200% of IS value in CCV				60-140	NA	50-130	80-120			
5a(H),14b(H),17b(H)-24-Ethylcholestane 20S			50-200% of IS value in CCV				60-140	NA	50-130	80-120			

PAHs -If "representative compound" used for quantitation, list the compound

	Lab 7	Lab 9	Lab 10	Lab 20	Lab 24
naphthalene			NA	naphthalene	
biphenyl	Secondary ion		NA	biphenyl	
acenaphthene	Secondary ion		NA	acenaphthene	
acenaphthylene	Secondary ion		NA	acenaphthylene	
fluorene	Secondary ion		NA	fluorene	
phenanthrene			NA	phenanthrene	
anthracene			NA	anthracene	
fluoranthene			NA	fluoranthene	
pyrene			NA	pyrene	
benzo[b]fluorene			NA		
benz[a]anthracene			NA	benz[a]anthracene	
chrysene			NA	chrysene	
triphenylene			chrysene		
benzo[*b*]fluoranthene			NA	benzo[b]fluoranthene	
benzo[*j*]fluoranthene			benzo[k]fluoranthene		
benzo[*k*]fluoranthene			NA	benzo[k]fluoranthene	benzo[*b*]fluoranthene
benzo[a]fluoranthene			benzo[k]fluoranthene		
benzo[e]pyrene			NA	benzo[e]pyrene	
benzo[a]pyrene			NA	benzo[a]pyrene	
perylene			NA	perylene	
indeno[1,2,3-cd]pyrene			NA	indeno[1,2,3-cd]pyrene	
benzo[ghi]perylene			NA	benzo[ghi]perylene	
dibenz[a,h]anthracene			NA	dibenz[a,h]anthracene	
cis/trans-decalin			NA		
dibenzofuran			NA	dibenzofuran	
retene		1-methylphenanthrene	NA		
benzothiophene			NA		
dibenzothiophene			NA	dibenzothiophene	
naphthobenzothiophene		dibenzothiophene	NA		

Alkylated PAHs -If "representative compound" used for quantitation, list the compound

	Lab 1	Lab 3	Lab 4	Lab 5	Lab 7	Lab 8	Lab 9
1-methylnaphthalene				NA		NA	
2-methylnaphthalene			naphthalene	NA		NA	
2,6-dimethylnaphthalene			naphthalene	NA		NA	
1,6,7-trimethylnaphthalene				NA		NA	
1-methylphenanthrene			phenanthrene	NA		NA	
C1-decalins			cis/trans-decalin	NA		NA	
C2-decalins			cis/trans-decalin	NA		NA	
C3-decalins			cis/trans-decalin	NA		NA	
C4-decalins			cis/trans-decalin	NA		NA	
C1-naphthalenes	1-me and 2-menaphthalene	Naphthalene	naphthalene	Napthalene		Naphthalene	
C2-naphthalenes	2,6-dimehtylnaphthalene	Naphthalene	naphthalene	Napthalene	naphthalene	Naphthalene	2,6-dimethylnaphthalene
C3-naphthalenes	2,3,5-trimethylnaphthalene	Naphthalene	naphthalene	Napthalene	naphthalene	Naphthalene	1,6,7-trimethylnaphthalene
C4-naphthalenes	2,3,5-trimethylnaphthalene	Naphthalene	naphthalene	Napthalene	naphthalene	Naphthalene	1,6,7-trimethylnaphthalene
C1-benzothiophenes			benzothiophene	NA		NA	
C2-benzothiophenes			benzothiophene	NA		NA	
C3-benzothiophenes			benzothiophene	NA		NA	
C4-benzothiophenes			benzothiophene	NA		NA	
C1-fluorenes	fluorene	Fluorene	fluorene	Flourene	fluorene/secondary ion	Fluorene	fluorene
C2-fluorenes		Fluorene	fluorene	Flourene	fluorene/secondary ion	Fluorene	fluorene
C3-fluorenes		Fluorene	fluorene	Flourene	fluorene/secondary ion	Fluorene	fluorene
C1-phenanthrenes/anthracenes	1-me, 2-me, 3-me, and 9-mephenanthrene plus 2-meanthracene	Phenanthrene	phenanthrene	Phenanthrene	anthracene	Phenanthrene	1-methylphenanthrene
C2-phenanthrenes/anthracenes	1,7-dimethylphenanthrene	Phenanthrene	phenanthrene	Phenanthrene	anthracene	Phenanthrene	1-methylphenanthrene
C3-phenanthrenes/anthracenes	1,7-dimethylphenanthrene	Phenanthrene	phenanthrene	Phenanthrene	anthracene	Phenanthrene	1-methylphenanthrene
C4-phenanthrenes/anthracenes	1,7-dimethylphenanthrene	Phenanthrene	phenanthrene	Phenanthrene	anthracene	Phenanthrene	1-methylphenanthrene
C1-dibenzothiophenes	dibenzothiophene	Dibenzothiophene	dibenzothiophene	Dibenzothiophene	dibenzothiophene	Dibenzothiophene	dibenzothiophene
C2-dibenzothiophenes	dibenzothiophene	Dibenzothiophene	dibenzothiophene	Dibenzothiophene	dibenzothiophene	Dibenzothiophene	dibenzothiophene
C3-dibenzothiophenes	dibenzothiophene	Dibenzothiophene	dibenzothiophene	Dibenzothiophene	dibenzothiophene	Dibenzothiophene	dibenzothiophene
C4-dibenzothiophenes	dibenzothiophene	Dibenzothiophene	dibenzothiophene	Dibenzothiophene		Dibenzothiophene	dibenzothiophene
C1-fluoranthenes/pyrenes	1-me and 3-mefluoranthene plus 1-me and 4-mepyrene	Pyrene	pyrene	Pyrene	pyrene	Pyrene	fluoranthene
C2-fluoranthenes/pyrenes	1-me and 3-mefluoranthene plus 1-me and 4-mepyrene	Pyrene	pyrene	Pyrene	pyrene	Pyrene	fluoranthene
C3-fluoranthenes/pyrenes	1-me and 3-mefluoranthene plus 1-me and 4-mepyrene	Pyrene	pyrene	Pyrene	pyrene	Pyrene	fluoranthene
C4-fluoranthenes/pyrenes	1-me and 3-mefluoranthene plus 1-me and 4-mepyrene		pyrene	NA		NA	fluoranthene
C1-naphthobenzothiophenes			naphthobenzothiophene	NA		NA	dibenzothiophene
C2-naphthobenzothiophenes			naphthobenzothiophene	NA		NA	dibenzothiophene
C3-naphthobenzothiophenes			naphthobenzothiophene	NA		NA	dibenzothiophene
C4-naphthobenzothiophenes			naphthobenzothiophene	NA		NA	dibenzothiophene
C1-chrysenes	3-me and 6-mechyrsne	Chrysene	chrysene/triphenylene	Chyrsene	chrysene	Chrysene	chrysene
C2-chrysenes	3-me and 6-mechyrsne	Chrysene	chrysene/triphenylene	Chyrsene	chrysene	Chrysene	chrysene
C3-chrysenes	3-me and 6-mechyrsne	Chrysene	chrysene/triphenylene	Chyrsene	chrysene	Chrysene	chrysene
C4-chrysenes	3-me and 6-mechyrsne	Chrysene	chrysene/triphenylene	NA	chrysene	Chrysene	chrysene

Alkylated PAHs -If "representative compound" used for quantitation, list the compound

	Lab 10	Lab 12	Lab 13	Lab 14	Lab 17	Lab 18	Lab 19
1-methylnaphthalene	NA						
2-methylnaphthalene	NA						
2,6-dimethylnaphthalene	NA						
1,6,7-trimethylnaphthalene	NA						
1-methylphenanthrene	phenanthrene					Phenanthrene	
C1-decalins	cis/trans-decalin	trans-decalin				Decalin	trans-Decalin
C2-decalins	cis/trans-decalin	trans-decalin				Decalin	trans-Decalin
C3-decalins	cis/trans-decalin	trans-decalin				Decalin	trans-Decalin
C4-decalins	cis/trans-decalin	trans-decalin				Decalin	trans-Decalin
C1-naphthalenes	naphthalene	naphthalene		Naphthalene	2-methylnaphthalene	Naphthalene	2-Methylnaphthalene
C2-naphthalenes	naphthalene	naphthalene	AVG [2-Ethylnaphtalene/2,6 dimethylnaphthalene/1,8-dimethylnaphthalene/1,3-dimethylnaphthalene]	Naphthalene	1-ethylnaphthalene	Naphthalene	Naphthalene
C3-naphthalenes	naphthalene	naphthalene	2,3,5-trimethylnaphthalene	Naphthalene	2-isopropylnaphthalene	Naphthalene	Naphthalene
C4-naphthalenes	naphthalene	naphthalene	1,4,6,7-tetramethylnaphthalene	Naphthalene	1,4,6,7-tetramethylnaphthalene	Naphthalene	Naphthalene
C1-benzothiophenes	benzothiophene	benzothiophene	4-methylbenzothiophene		4-methylbenzothiophene	Benzothiophene	Benzothiophene
C2-benzothiophenes	benzothiophene	benzothiophene	2,3-dimethylbenzothiophene		2,3-dimethylbenzothiophene	Benzothiophene	Benzothiophene
C3-benzothiophenes	benzothiophene	benzothiophene	2,3,4/2,3,6-trimethylbenzothiophenes		2,3,4-trimethylbenzothiophene	Benzothiophene	Benzothiophene
C4-benzothiophenes	benzothiophene	benzothiophene			_____	Benzothiophene	Benzothiophene
C1-fluorenes	fluorene	fluorene	1-methylfluorene	Fluorene	1-methylfluorene	Fluorene	Fluorene
C2-fluorenes	fluorene	fluorene		Fluorene	_____	Fluorene	Fluorene
C3-fluorenes	fluorene	fluorene	9N-propylfluorene	Fluorene	9-n-propylfluorene	Fluorene	Fluorene
C1-phenanthrenes/anthracenes	phenanthrene	phenanthrene	AVG [1-methylphenanthrene/9-methylphenanthrene/2methylanthracene	Phenanthrene	2-methylphenanthrene	Phenanthrene	Phenanthrene
C2-phenanthrenes/anthracenes	phenanthrene	phenanthrene	3-ethylphenanthrene	Phenanthrene	3-ethylphenanthrene	Phenanthrene	Phenanthrene
C3-phenanthrenes/anthracenes	phenanthrene	phenanthrene	1,2,5/1,2,7-trimethylphenanthrene	Phenanthrene	1,2,5-trimethylphenanthrene	Phenanthrene	Phenanthrene
C4-phenanthrenes/anthracenes	phenanthrene	phenanthrene	tertbutylanthracene	Phenanthrene	_____	Phenanthrene	Phenanthrene
C1-dibenzothiophenes	dibenzothiophene	dibenzothiophene	3-methyldibenzothiophene	Dibenzothiophene	3-methyldibenzothiophenes	Dibenzothiophene	Dibenzothiophene
C2-dibenzothiophenes	dibenzothiophene	dibenzothiophene	4-ethyldibenzothiophene	Dibenzothiophene	_____	Dibenzothiophene	Dibenzothiophene
C3-dibenzothiophenes	dibenzothiophene	dibenzothiophene	4-propyldibenzothiophene	Dibenzothiophene	_____	Dibenzothiophene	Dibenzothiophene
C4-dibenzothiophenes	dibenzothiophene	dibenzothiophene	4,6-diethyldibenzothiophene	Dibenzothiophene	_____	Dibenzothiophene	Dibenzothiophene
C1-fluoranthenes/pyrenes	fluoranthene	pyrene	[AVG 2-methylfluoranthene/1methylpyrene]	Pyrene	1-methylpyrene	Fluoranthene	Fluoranthene
C2-fluoranthenes/pyrenes	fluoranthene	pyrene		Pyrene	_____	Fluoranthene	Fluoranthene
C3-fluoranthenes/pyrenes	fluoranthene	pyrene	1N-propylpyrene	Pyrene	1,n-propylpyrene	Fluoranthene	Fluoranthene
C4-fluoranthenes/pyrenes	fluoranthene		1N-butylpyrene		1,n-butylpyrene	Fluoranthene	Fluoranthene
C1-naphthobenzothiophenes	naphthobenzothiophene	naphthobenzothiophene			_____	Naphthobenzothiophene	Naphthobenzothiophene
C2-naphthobenzothiophenes	naphthobenzothiophene	naphthobenzothiophene			_____	Naphthobenzothiophene	Naphthobenzothiophene
C3-naphthobenzothiophenes	naphthobenzothiophene	naphthobenzothiophene			_____	Naphthobenzothiophene	Naphthobenzothiophene
C4-naphthobenzothiophenes	naphthobenzothiophene	naphthobenzothiophene			_____	Naphthobenzothiophene	Naphthobenzothiophene
C1-chrysenes	chrysene	chrysene	6-methylchrysene	Chrysene	5-methylchrysene	Chrysene	Chrysene/Triphenylene
C2-chrysenes	chrysene	chrysene	6-ethylchrysene	Chrysene	6-ethylethylchrysene	Chrysene	Chrysene/Triphenylene
C3-chrysenes	chrysene	chrysene		Chrysene		Chrysene	Chrysene/Triphenylene
C4-chrysenes	chrysene	chrysene	6N-butylchrysene	Chrysene		Chrysene	Chrysene/Triphenylene

Alkylated PAHs -If "representative compound" used for quantitation, list the compound

	Lab 20	Lab 21	Lab 22	Lab 23	Lab 24	Lab 26
1-methylnaphthalene	1-methylnaphthalene					
2-methylnaphthalene	2-methylnaphthalene					
2,6-dimethylnaphthalene	2,6-dimethylnaphthalene					
1,6,7-trimethylnaphthalene	1,6,7-trimethylnaphthalene	naphthalene				
1-methylphenanthrene	1-methylphenanthrene					
C1-decalins			trans-decalin			cis/trans-decalin
C2-decalins			trans-decalin			cis/trans-decalin
C3-decalins			trans-decalin			cis/trans-decalin
C4-decalins			trans-decalin			cis/trans-decalin
C1-naphthalenes	Naphthalene	1- and 2-Methylnaphthalene are added from the individual compounds	naphthalene		1+2-methylnapthalene	Naphthalene
C2-naphthalenes	Naphthalene	naphthalene	naphthalene	2,6-dimethylnaphthalene	2,6-dimethylnaphthalene	Naphthalene
C3-naphthalenes	Naphthalene	naphthalene	naphthalene	2,3,5-trimethylnaphthalene	1,6,7-trimethylnaphthalene	Naphthalene
C4-naphthalenes	Naphthalene	naphthalene	naphthalene	2,3,5-trimethylnaphthalene	1,6,7-trimethylnaphthalene	Naphthalene
C1-benzothiophenes			benzothiophene		benzothiophene	benzothiophene
C2-benzothiophenes			benzothiophene		benzothiophene	benzothiophene
C3-benzothiophenes			benzothiophene		benzothiophene	benzothiophene
C4-benzothiophenes			benzothiophene		benzothiophene	benzothiophene
C1-fluorenes	fluorene	fluorene	fluorene	fluorene	Fluorene	Fluorene
C2-fluorenes	fluorene	fluorene	fluorene	fluorene	Fluorene	Fluorene
C3-fluorenes	fluorene	fluorene	fluorene	fluorene	Fluorene	Fluorene
C1-phenanthrenes/anthracenes	phenanthrene	phenanthrene	phenanthrene	1-methylphenanthrene	1-methylphenanthrene	Phenanthrene
C2-phenanthrenes/anthracenes	phenanthrene	phenanthrene	phenanthrene	1-methylphenanthrene	1-methylphenanthrene	Phenanthrene
C3-phenanthrenes/anthracenes	phenanthrene	phenanthrene	phenanthrene	1-methylphenanthrene	1-methylphenanthrene	Phenanthrene
C4-phenanthrenes/anthracenes	phenanthrene	phenanthrene	phenanthrene	1-methylphenanthrene	1-methylphenanthrene	Phenanthrene
C1-dibenzothiophenes	dibenzothiophene	dibenzotiophene	dibenzothiophene	dibenzothiophene	dibenzothiophene	Dibenzothiophene
C2-dibenzothiophenes	dibenzothiophene	dibenzotiophene	dibenzothiophene	dibenzothiophene	dibenzothiophene	Dibenzothiophene
C3-dibenzothiophenes	dibenzothiophene	dibenzotiophene	dibenzothiophene	dibenzothiophene	dibenzothiophene	Dibenzothiophene
C4-dibenzothiophenes	dibenzothiophene		dibenzothiophene	dibenzothiophene	dibenzothiophene	Dibenzothiophene
C1-fluoranthenes/pyrenes	pyrene	fluoranthene	pyrene	pyrene	fluoranthene	Fluoranthene
C2-fluoranthenes/pyrenes	pyrene		pyrene	pyrene	fluoranthene	Fluoranthene
C3-fluoranthenes/pyrenes	pyrene		pyrene	pyrene	fluoranthene	Fluoranthene
C4-fluoranthenes/pyrenes	pyrene		pyrene	pyrene	fluoranthene	Fluoranthene
C1-naphthobenzothiophenes			naphthobenzothiophene			naphthobenzothiophene
C2-naphthobenzothiophenes			naphthobenzothiophene			naphthobenzothiophene
C3-naphthobenzothiophenes			naphthobenzothiophene			naphthobenzothiophene
C4-naphthobenzothiophenes			naphthobenzothiophene			naphthobenzothiophene
C1-chrysenes	chrysene	chrysene	chrysene	chrysene	chrysene+triphenylene	Chysene
C2-chrysenes	chrysene	chrysene	chrysene	chrysene	chrysene+triphenylene	Chysene
C3-chrysenes	chrysene	chrysene	chrysene	chrysene	chrysene+triphenylene	Chysene
C4-chrysenes	chrysene	chrysene	chrysene	chrysene	chrysene+triphenylene	Chysene

Biomarkers -If "representative compound" used for quantitation, list the compound

	Lab 3	Lab 5	Lab 8	Lab 12	Lab 14	Lab 20	Lab 22	Lab 23
Carbazole			NA					
18a(H)-22,29,30-Trisnorneohopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17β(H),21β(H)-Hopane		17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17α(H),21β(H)-Hopane
17a(H)-22,29,30-Trisnorhopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17b(H)21b(H)Hopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	
17α(H),21β(H)-30-Norhopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17b(H)21b(H)Hopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17α(H),21β(H)-Hopane
18a(H)-30-Norneohopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17b(H)21b(H)Hopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17α(H),21β(H)-Hopane
17a(H)-Diahopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17b(H)21b(H)Hopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	
17α(H),21β(H)-Hopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17b(H)21b(H)Hopane	17b(H)21b(H) Hopane		
17α(H),21β(H)-22R-Homohopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17b(H)21b(H)Hopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17α(H),21β(H)-Hopane
17α(H),21β(H)-22S-Homohopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17β(H),21β(H)-Hopane	17b(H)21b(H)Hopane	17b(H)21b(H) Hopane	17α(H),21β(H)-Hopane	17α(H),21β(H)-Hopane
13b(H)17a(H)-Diacholestane 20S	5a-Cholestane	5(a) Cholestane	5α - Cholestane	ααα 20R-Cholestane	5a-Cholestane	5a-Cholestane	5b(H)Cholane	
5a(H),14a(H),17a(H)-Cholestane 20S	5a-Cholestane		5α - Cholestane	ααα 20R-Cholestane	5a-Cholestane	5a-Cholestane	5b(H)Cholane	
5a(H),14a(H),17a(H)-Cholestane 20R	5a-Cholestane	5(a) Cholestane	5α - Cholestane		5a-Cholestane	5a-Cholestane	5b(H)Cholane	5a(H),14a(H),17a(H)-Cholestane 20S
5a(H),14a(H),17a(H)-24-Ethylcholestane	5a-Cholestane	5(a) Cholestane	5α - Cholestane	ααα 20R-Cholestane	5a-Cholestane	5a-Cholestane	5b(H)Cholane	5a(H),14a(H),17a(H)-Cholestane 20S
5a(H),14a(H),17a(H)-24-Ethylcholestane	5a-Cholestane	5(a) Cholestane	5α - Cholestane	ααα 20R-Cholestane	5a-Cholestane	5a-Cholestane	5b(H)Cholane	5a(H),14a(H),17a(H)-Cholestane 20S
5a(H),14b(H),17b(H)-Cholestane 20R	5a-Cholestane	5(a) Cholestane	5α - Cholestane	ααα 20R-Cholestane	5a-Cholestane	5a-Cholestane	5b(H)Cholane	5a(H),14a(H),17a(H)-Cholestane 20S
5a(H),14b(H),17b(H)-Cholestane 20S	5a-Cholestane	5(a) Cholestane	5α - Cholestane	ααα 20R-Cholestane	5a-Cholestane	5a-Cholestane	5b(H)Cholane	5a(H),14a(H),17a(H)-Cholestane 20S
5a(H),14b(H),17b(H)-24-Ethylcholestane	5a-Cholestane	5(a) Cholestane	5α - Cholestane	ααα 20R-Cholestane	5a-Cholestane	5a-Cholestane	5b(H)Cholane	5a(H),14a(H),17a(H)-Cholestane 20S
5a(H),14b(H),17b(H)-24-Ethylcholestane	5a-Cholestane	5(a) Cholestane	5α - Cholestane	ααα 20R-Cholestane	5a-Cholestane	5a-Cholestane	5b(H)Cholane	5a(H),14a(H),17a(H)-Cholestane 20S

APPENDIX C

Laboratory Notes Submitted with the Data

Lab	Notes								
1		QA10OIL01 Sample 1 (µg/g)	QA10OIL01 Sample 2 (µg/g)	QA10OIL01 Sample 3 (µg/g)	SRM 1582 Sample 1 (µg/g)	SRM 1582 Sample 2 (µg/g)	SRM 1582 Sample 3 (µg/g)		
	chrysene and triphenylene	45.1	46.8	45.8	18.4	17.4	18.1		
	dibenz[a,c]anthracene	1.92	2.05	1.99	<1	<1	<1		
2	Results reported below 500 ug/g are less than the quantitation limit.								
3	Method quantification lower limit = 20ug/g								
5	RL is 30ug/g. Any values less than 30 will be considered as estimated "J" values.								
	NA are compounds not calibrated for								
	DL are compounds that were diluted out.								
6	Samples were analyzed at dilutions of 1:100 and 1:1000 to meet calibrated response range								
7	ND: Not Detected								
8	Quantitation values less than 5.00 ug/g for QA10OIL01 are considered estimated ("J" flag) as these values are below the concentration of the Initial Calibration Curve.								
	Quantitation values less than 10.0 ug/g for SRM 1582 are considered estimated ("J" flag) as these values are below the concentration of the Initial Calibration Curve.								
9		QA10OIL01 Sample 1 (µg/g)	QA10OIL01 Sample 2 (µg/g)	QA10OIL01 Sample 3 (µg/g)	SRM 1582 Sample 1 (µg/g)	SRM 1582 Sample 2 (µg/g)	SRM 1582 Sample 3 (µg/g)	IS/surrogate qunatitation	If "representative compound" used for quantitation list the compound used here.
	chrysene + triphenylene	49.9	55.7	56.1	27.5	26.0	25.6	BaP-d12	
	benzo[j]fluoranthene + benzo[k]fluoranthene	1.22	1.28	1.32	1.02	0.924	1.01	BaP-d12	
	dibenz[a,h]anthracene + dibenz[a,c]anthracene	2.10	2.31	2.36	0.809	0.838	0.916	BaP-d12	
	benzo[b]naphtho[2,1-d]thiophene	18.0	20.0	20.6	17.3	15.9	16.1	ACE-d10	dibenzothiophene
	benzo[b]naphtho[1,2-d]thiophene	3.32	3.55	3.65	6.40	6.01	6.06	ACE-d10	dibenzothiophene
	benzo[b]naphtho[2,3-d]thiophene	2.33	2.82	2.81	4.55	4.15	4.07	ACE-d10	dibenzothiophene
	1,6,7-trimethylnapthalene (also known as 2,3,5-trimethylnaphthalene, CAS # 2245-38-7), partially coelutes with another C3-naphthalene, however this coeluting peak was split off during peak integration.								
	NPH-d8 recovery range 102-105%								
	ACE-d10 recovery range 102-106%								
	BaP-d12 recovery range 108-111%								
	These recoveries were within the acceptable range of 60-130%								
10	<symbol refers to values less than our MDL								
	The reported value of chrysene is the sum of chrysene and triphenylene								
	The reported value of benzo(j)fluoranthene is the sum of benzo(k)fluoranthene and benzo(j)fluoranthene								

Lab	Notes

11 Benzo[b]fluroanthene and benzo [j] fluoranthene determined as combined benzo[b&j]fluoranthene; results below(µg/g):

	QA10OIL01 Sample 1 (µg/g)	QA10OIL01 Sample 2 (µg/g)	QA10OIL01 Sample 3 (µg/g)	SRM 1582 Sample 1 (µg/g)
Benzo[b&j]fluoranthene	3.6	3.5	3.8	1.7

Biomarkers were measured as peak height ratios only and were not quantitated. These are used diagnostically to match hydrocarbon sources. Ratio results are listed below.

	Diagnostic Ratios of Hopanes (m/e 191)										
	DR-C28	DR-C29	DR-C28+C29	DR-27Ts	DR-28ab	DR-25nor30ab	DR-29Ts	DR-30O	DR-30G	DR-29ab	DR-30d
Bottle 113	0.2318	0.2423	0.4741	1.2774	0.0801	0.0000	0.2304	0.0000	0.0291	0.4896	0.1409
Bottle 148	0.2084	0.2234	0.4318	1.2953	0.0771	0.0000	0.2218	0.0000	0.0315	0.4663	0.1303
Bottle 216	0.1925	0.2008	0.3934	1.3395	0.0680	0.0000	0.2084	0.0000	0.0287	0.4620	0.1239

DR-C28	C28 Tricyclic Terpanes / 17a(H),21b(H)-Hopane
DR-C29	C29 Tricyclic Terpanes / 17a(H),21b(H)-Hopane
DR-C28+C29	(C28 Tricyclic Terpanes + C29 Tricyclic Terpanes) / 17a(H),21b(H)-Hopane
DR-27Ts	18a(H)-22,29,30-Trisnorhopane / 17a(H)-22,29,30-Trisnorhopane
DR-28ab	17a(H),21b(H)-28,30-Bisnorhopane / 17a(H),21b(H)-Hopane
DR-25nor30ab	17a(H)21b(H)-25-Norhopane / 17a(H)21b(H)-Hopane
DR-29Ts	18a(H)-30-Norneohopane / 17a(H),21b(H)-Hopane
DR-30O	18a(H)-3Oleane / 17a(H),21b(H)-Hopane
DR-30G	Gammacerane / 17a(H),21b(H)-Hopane
DR-29ab	17a(H),21b(H)-30-Norhopane / 17a(H),21b(H)-Hopane
DR-30d	15a-methyl-17a(H)-27-Norhopane / 17a(H),21b(H)-Hopane

DR-29aaS	24-ethyl-5a(H),14a(H),17a,20S-cholestane / 24-ethyl-5a(H),14a(H),17a,20R-cholestane
DR-29bb	(24-ethyl-5a(H),14b(H),17b,20S-cholestane + 24-ethyl-5a(H),14b(H),17b,20R-cholestane / (24-ethyl-5a(H),14a(H),17a,20S-cholestane + 24-ethyl-5a(H),14a(H),17a,20R-cholestane)
D-27bbSTER	5a(H),14b(H),17b,20(S+R)-cholestane / (24-methyl-5a(H),14b(H),17b,20(S+R)-cholestane + 24-ethyl-5a(H),14b(H),17b,20(S+R)-cholestane)
D-28bbSTER	24-methyl-5a(H),14b(H),17b,20(S+R)-cholestane / (5a(H),14b(H),17b,20(S+R)-cholestane + 24-ethyl-5a(H),14b(H),17b,20(S+R)-cholestane)
D-29bbSTER	24-ethyl-5a(H),14b(H),17b,20(S+R)-cholestane / (5a(H),14b(H),17b,20(S+R)-cholestane + 24-ethyl-5a(H),14b(H),17b,20(S+R)-cholestane)

DR-SES1-2	C_{14}-sesquiterpane(1) / C_{14}-sesquiterpane(2)[1]
DR-SES3-5	C_{15}-sesquiterpane(3) / C_{15}-8b(H)-drimane(5)[1]
DR-SES4-6	C_{15}-sesquiterpane(1) / C_{15}-sesquiterpane(2)[1]
DR-SES5-10	C_{15}-8b(H)-drimane(5) / C_{16}-8b(H)-homodrimane(10)[1]

[1]Identification and numbering from Oil spill identification - Waterborne petroleum and petroeum products - Part 2: Analytical methodology and interpretation of results. CEN/TR 15522-2:2006: E

13

	QA10OIL01 Sample 1 (µg/g)	QA10OIL01 Sample 2 (µg/g)	QA10OIL01 Sample 3 (µg/g)	SRM 1582 Sample 1 (µg/g)
Methyl Cholestane	10.6	7.85	8.02	51.1
17β(H),21α(H)-Hopane	12	5.97	10.6	73.7

Lab	Notes		
13 (cont)		QA10OIL01	QA10OIL01
		Sample 4	Sample 5
	Sample Jar number	309	366
		(µg/g)	(µg/g)
	naphthalene	1050	1050
	biphenyl	211	202
	acenaphthene	85.3	83
	acenaphthylene	13.2	11.1
	fluorene	162	165
	phenanthrene	375	378
	anthracene	28.6	24.1
	fluoranthene	5.32	8.78
	pyrene	14.9	16.6
	benzo[b]fluorene	8.41	9.64
	benz[a]anthracene	5.88	6.36
	chrysene	64.7	63.8
	triphenylene	35.8	35.2
	benzo[*b*]fluoranthene	7.1	7.65
	benzo[*j*]fluoranthene	1.5	1.7
	benzo[*k*]fluoranthene	0.564	0.594
	benzo[a]fluoranthene	N/A	N/A
	benzo[e]pyrene	9.56	8.55
	benzo[a]pyrene	2	1.21
	perylene	0.315	0.523
	indeno[1,2,3-cd]pyrene	216	216
	benzo[ghi]perylene	6.49	2.52
	dibenz[a,h]anthracene	N/A	N/A
	cis/trans-decalin	1290	1280
	dibenzofuran	35.9	36.3
	retene	11	12.8
	benzothiophene	20.7	19.7
	dibenzothiophene	47.7	49.9
	naphthobenzothiophene	1.87	2
	1-methylnaphthalene	1050	1050
	2-methylnaphthalene	1720	1730
	2,6-dimethylnaphthalene	204	193
	1,6,7-trimethylnaphthalene	N/A	N/A
	1-methylphenanthrene	119	121
	C1-decalins	N/A	N/A
	C2-decalins	N/A	N/A
	C3-decalins	N/A	N/A
	C4-decalins	N/A	N/A
	C1-naphthalenes	2770	2780
	C2-naphthalenes	3090	3090
	C3-naphthalenes	2040	2070
	C4-naphthalenes	281	393
	C1-benzothiophenes	218	223
	C2-benzothiophenes	4160	4990
	C3-benzothiophenes	309	385
	C4-benzothiophenes	N/A	N/A
	C1-fluorenes	621	655
	C2-fluorenes	N/A	N/A
	C3-fluorenes	538	639
	C1-phenanthrenes/anthracenes	832	888
	C2-phenanthrenes/anthracenes	740	895
	C3-phenanthrenes/anthracenes	169	195
	C4-phenanthrenes/anthracenes	68.4	70.4
	C1-dibenzothiophenes	4.99	8.75
	C2-dibenzothiophenes	104	103
	C3-dibenzothiophenes	74.5	82.7
	C4-dibenzothiophenes	45.1	51.4
	C1-fluoranthenes/pyrenes	52.7	50.4
	C2-fluoranthenes/pyrenes	N/A	N/A
	C3-fluoranthenes/pyrenes	55.5	62.7
	C4-fluoranthenes/pyrenes	5.75	10.4
	C1-naphthobenzothiophenes	N/A	N/A
	C2-naphthobenzothiophenes	N/A	N/A
	C3-naphthobenzothiophenes	N/A	N/A
	C4-naphthobenzothiophenes	N/A	N/A
	C1-chrysenes	180	182
	C2-chrysenes	15.7	15.9
	C3-chrysenes	N/A	N/A
	C4-chrysenes	4.38	4.4
	Carbazole	9.66	9.2
	18a(H)-22,29,30-Trisnorhopane	N/A	N/A
	17a(H)-22,29,30-Trisnorhopane	28.7	27.1
	17α(H),21β(H)-30-Norhopane	N/A	N/A
	18a(H)-30-Normoohopane	N/A	N/A
	17a(H)-Diahopane	N/A	N/A
	17α(H),21β(H)-Hopane	43.2	44.4
	17α(H),21β(H)-22R-Homohopane	N/A	N/A
	17α(H),21β(H)-22S-Homohopane	N/A	N/A
	13b(H)17a(H)-Diacholestane 20S	N/A	N/A
	5a(H),14a(H),17a(H)-Cholestane 20S	N/A	N/A
	5a(H),14a(H),17a(H)-Cholestane 20R	46.9	33.5
	5a(H),14a(H),17a(H)-24-Ethylcholestane 20S	N/A	N/A
	5a(H),14a(H),17a(H)-24-Ethylcholestane 20R	15.8	15.5
	5a(H),14b(H),17b(H)-Cholestane 20R	N/A	N/A
	5a(H),14b(H),17b(H)-Cholestane 20S	N/A	N/A
	5a(H),14b(H),17b(H)-24-Ethylcholestane 20R	N/A	N/A
	5a(H),14b(H),17b(H)-24-Ethylcholestane 20S	N/A	N/A
	Methyl Cholestane	8.21	10.7
	17β(H),21α(H)-Hopane	5.24	11.2

Lab	Notes								
18	*	Triphenylene cannot be resolved from Chrysene under the chromatographic conditions used							
	**	Benzo(j)fluoranthene cannot be resolved from Benzo(k)fluoranthene under the chromatographic condition used							
	Other	Detection limit was elevated sue to matrix interference.							
19		QA10OIL01	QA10OIL01	QA10OIL01	SRM 1582	SRM 1582	SRM 1582		
		Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3	IS/surrogate	Associated % recovery
		(µg/g)	(µg/g)	(µg/g)	(µg/g)	(µg/g)	(µg/g)	qunatitation	acceptance ranges
	4-Methyldibenzothiophene	128	106	126	76.2	65.6	89.1	Phen-d10	-50% to + 100%
	2/3-Methyldibenzothiophene	51	43.3	50.2	41	36.3	50.7	Phen-d10	-50% to + 100%
	1-Methyldibenzothiophene	34.2	29.4	34.2	36.8	32.1	42.9	Phen-d10	-50% to + 100%
	3-Methylphenanthrene	238	181	209	94.5	83.6	115	Phen-d10	-50% to + 100%
	2-Methylphenanthrene	94.8	80.7	94.9	49.6	44	54.1	Phen-d10	-50% to + 100%
	2-Methylanthracene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	Phen-d10	-50% to + 100%
	4/9-Methylphenanthrene	136	109	126	55.1	55	64.9	Phen-d10	-50% to + 100%
	2-Chloronaphthalene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	Acenaphthalene-d10	-50% to + 100%
	(chrysene + triphenylene)	43.9	37.3	43.9	11.2	9.41	17.9		
	benzo (A and B)fluoranthene	5.22	4.09	4.85	<0.02	<0.02	<0.02		
21	* We do have performance based ranges for recoveries but we keep the 50 to 150% for consistency with the original method.								
	We have not conducted an MDL study with oils so the reporting limits are estimated at 5 ug/g, below this point the uncertainity of the confirmation ion ratios become too great.								
	We analyzed larger amounts of the samples to improve the detection but is not our normal procedure.								
	The lowest calibration solution is equivalent to 2ug/g.								
	Because this is a direct injection method all samples were analyzed in triplicates in one single batch.								
	GC/MS analyses were conducted in different days with different calibrations.								
	Both samples were treated in identical manner. Concnetrated samples (2.5x and 5x the regular analyzed amounts) were used to determine PAHs with lower concentrations (HMW-PAHs)								
22	1) chrysene is reported as a coelution of both chrysene and triphenylene.								
	2) benzo[k]fluoranthene is reported as a coelution of both benzo[j]fluoranthene and benzo[k]fluoranthene.								

Lab	Notes
24	Most data reported here are for 1% dilutions of QA10OIL and SRM1582. We only analyzed 1582 once at this level. Where data are reported for three 1582 samples, the values come from analysis of samples diluted 1 part per thousand.
	Figures lacking three significant figures should be assumed to have lost trailing zeroes.
	Chrysene and triphenylene quantified together as one chromatographic peak.
	Benzo[j]fluoranthene and benzo[k]fluoranthene quantified together as one chromatographic peak.
	2,6- and 2,7-methylnaphthalene were quantified together (although we do not assume both are present in samples) as one chromatographic peak.
	Cis- and trans-decalin were mostly, if not all, trans-decalin.
	Detection limits were roughly 5 to 10 ug/g.
	Other: See calibration nonconformances.

Other analytes:

	QA10OIL-169	QA10OIL-327	QA10OIL-349	SRM 1582	SRM 1582	SRM 1582	IS/surrogate qunatitation	If "reprentative compound" used for quantitation list the compound used here.
1,3-Dimethylnapthalene	985	937	1041	313	NA	NA	d8-Acenapthylene	
1,6-Dimethylnapthalene	554	443	455	378	NA	NA	d10-Acenapthene	
1,4-Dimethylnapthalene	233	216	230	168	NA	NA	d10-Acenapthene	
1,5-Dimethylnapthalene	128	116	136	76	NA	NA	d10-Acenapthene	
1,2-Dimethylnapthalene	167	183	180	107	NA	NA	d8-Acenapthylene	
1,8-Dimethylnapthalene	DL	DL	DL	DL	NA	NA	d8-Acenapthylene	
1,4,6-Trimethylnapthalene	578	699	551	400	NA	NA	d8-Acenapthylene	1,6,7-trimethylnaphthalene
2,3,6-Trimethylnapthalene	302	378	352	261	NA	NA	d8-Acenapthylene	
1,2,5-Trimethylnapthalene	167	221	256	191	NA	NA	d8-Acenapthylene	1,6,7-trimethylnaphthalene
1,4,6,7-Tetramethylnaphthalene	248	230	361	218	NA	NA	d10-Phenanthrene	2,3,6-trimethylnaphthalene
1-MeFluorene	172	185	203	109	NA	NA	d10-Fluorene	
1,2,5,6-Tetramethylnaphthalene	98.2	85.1	129	94.5	NA	NA	d10-Phenanthrene	2,3,6-trimethylnaphthalene
4-MeDibenzothiophene	87.1	86.7	86.4	59.1	NA	NA	d8-Dibenzothiophene	
2-MeDibenzothiophene	29.2	32.6	31.3	33.6	NA	NA	d8-Dibenzothiophene	
3-MePhenanthrene	246	218	366	114	NA	NA	d10-Phenanthrene	
2-MePhenanthrene	262	260	261	138	NA	NA	d10-Anthracene	
2-MeAnthracene	DL	DL	DL	5.52	NA	NA	d10-Fluoranthene	
1-MeAnthracene	327	330	314	136	NA	NA	d10-Anthracene	
Retene	19.8	21.6	19.8	59	NA	NA	d10-Pyrene	
11H-Benzo[a]fluorene	37.2	37.7	36.6	DL	NA	NA	d10-Pyrene	
C1-Benzofluoranthenes/benzopyrenes	49.6	49.2	50.4	32.5	NA	NA	d12-Benzo(e)pyrene	benzo[e]pyrene
C2-Benzofluoranthenes/benzopyrenes	56.3	48.7	58.6	35.6	NA	NA	d12-Benzo(e)pyrene	benzo[e]pyrene
C3-Benzofluoranthenes/benzopyrenes	46	45	44.2	31	NA	NA	d12-Benzo(e)pyrene	benzo[e]pyrene
C4-Benzofluoranthenes/benzopyrenes	32.9	33.5	33.6	43.8	NA	NA	d12-Benzo(e)pyrene	benzo[e]pyrene
cis/trans-decalin	436	370	310	208	NA	NA		
C1-decalins	1250	878	744	694	NA	NA		

25	QA10OIL01 Sample 1 (µg/g)	QA10OIL01 Sample 2 (µg/g)	QA10OIL01 Sample 3 (µg/g)	SRM 1582 Sample 1 (µg/g)	SRM 1582 Sample 2 (µg/g)	SRM 1582 Sample 3 (µg/g)	IS/surrogate qunatitation
abb 20R 24S-methylcholestane	24.1	19.6	21.9	220	249	224	n-triacontane-d62
4-methylpyrene	25.2	25.5	22.8	14.7	15.9	15.3	fluoranthene-d10
1-methylpyrene	14.6	14.1	14.3	10.7	11.1	10.7	fluoranthene-d10
3-methylchrysene	18.7	18.0	18.3	6.73	6.77	6.49	fluoranthene-d10
6-methylchrysene	15.1	14.4	15.1	7.49	7.50	6.80	fluoranthene-d10
3-methylphenanthrene	262	248	247	114	120	117	phenanthrene-d10
2-methylphenanthrene	224	213	213	71	109	102	phenanthrene-d10
2-methylanthracene	23.4	24.9	24.4	10.4	11.0	11.2	phenanthrene-d10
9-methylphenanthrene	265	252	251	107	113	108	phenanthrene-d10
2,6-dimethylphenanthrene	159	162	164	150	149	146	phenanthrene-d10
benzo[b]chrysene	0.614	0.621	0.626	0.302	0.289	0.272	benzo[ghi]perylene-d12
picene	2.17	2.18	2.24	0.925	0.904	0.783	benzo[ghi]perylene-d12
dibenzo[ah]pyrene	1.27	1.19	1.20	0.439	0.430	0.478	benzo[ghi]perylene-d12

APPENDIX D

Charts of QA10OIL01 and SRM 1582 Results by Analyte

See Tables 1 through 3 for results reported as <*number*, detection limit, etc.

For QA10OIL01 plots:

Solid line: exercise assigned value

Dotted line: z = ± 1, i. e., 25 % from assigned value

Dotted/dashed line: z = ± 2, i. e., 50 % from assigned value

Dashed line: z = ± 3, i. e., 75 % from assigned value

For SRM 1582 plots:

Solid line: material certified concentration or target value (see caption of each plot)

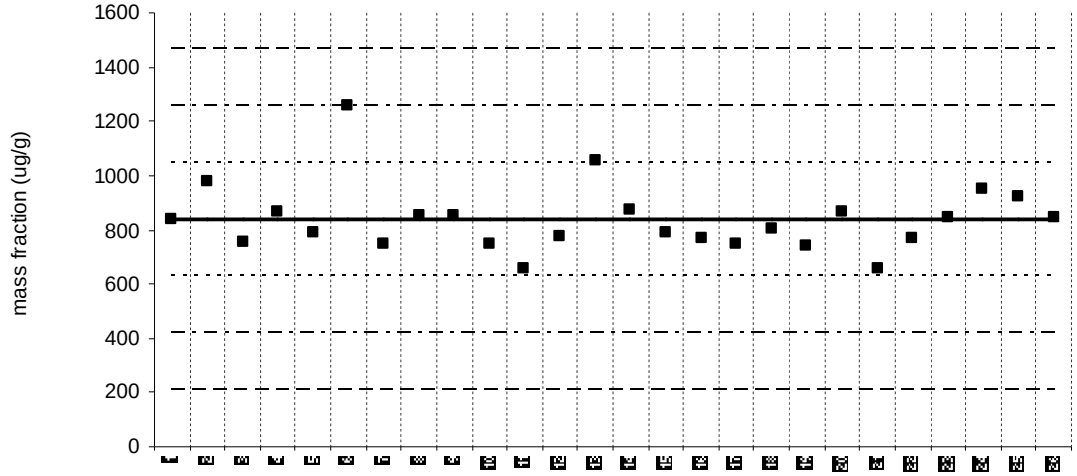
Dotted line: 95 % confidence interval (CI)

Dashed line: 30 % from 95 % confidence interval (CI)

naphthalene **QA10OIL01**

Assigned mean = 837 ug/g s = 126 ug/g 95% CI = 48 ug/g Assigned median = 820 ug/g

Reported Results: 26 Quantitative Results: 26

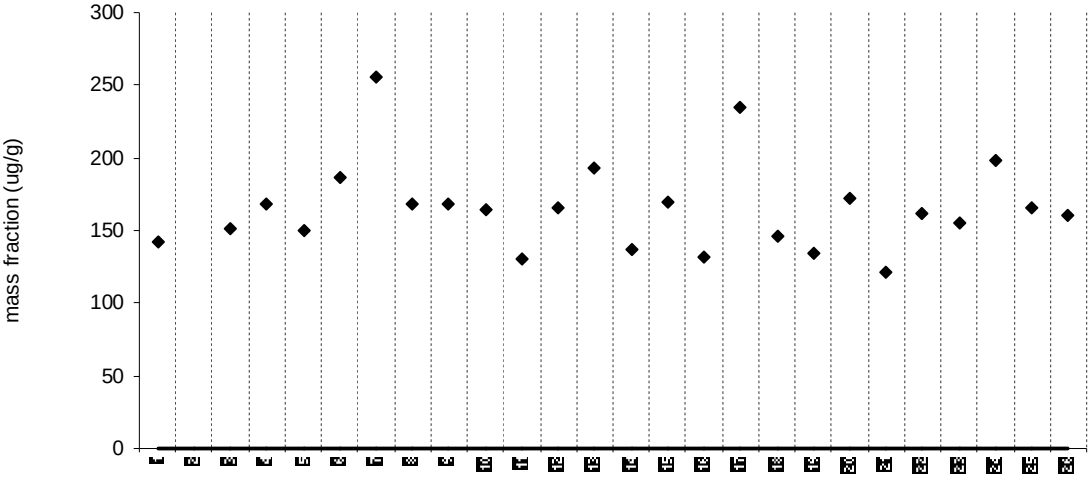


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

naphthalene **SRM 1582**

Target Value = no target ug/g

Reported Results: 25 Quantitative Results: 25 Median of Reported Results: 164 ug/g

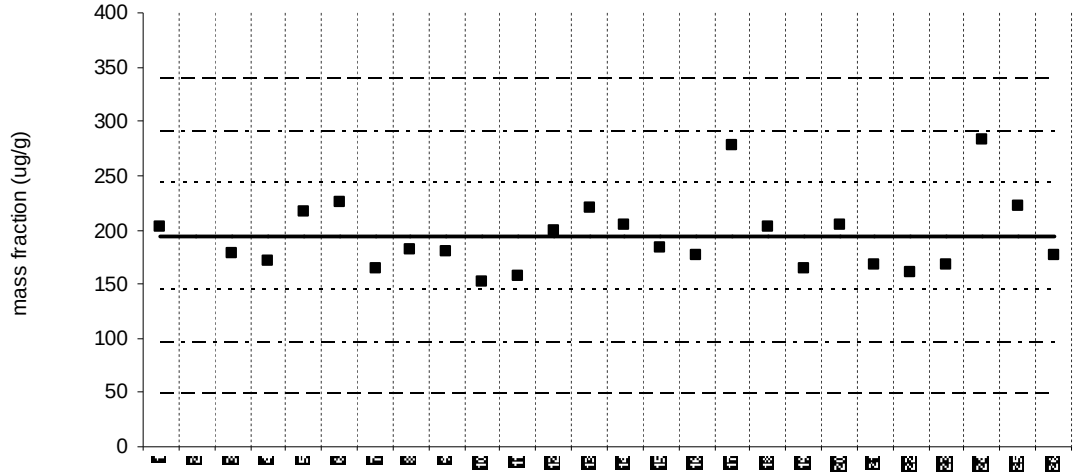


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

biphenyl **QA10OIL01**

Assigned mean = 194 ug/g s = 34 ug/g 95% CI = 13 ug/g Assigned median = 181 ug/g

Reported Results: 25 Quantitative Results: 25



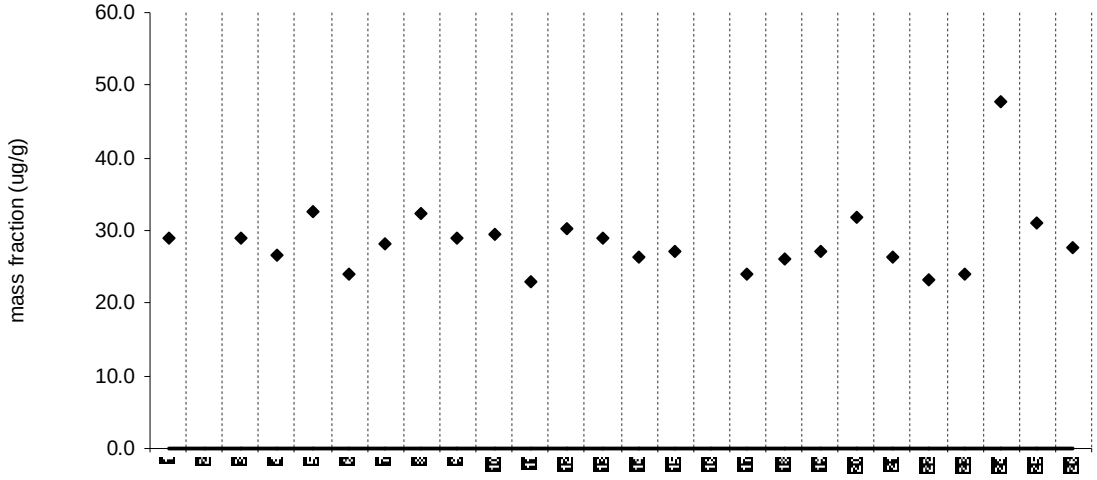
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

biphenyl **SRM 1582**

Target Value = no target ug/g

Reported Results: 25 Quantitative Results: 24 Median of Reported Results: 27.9 ug/g



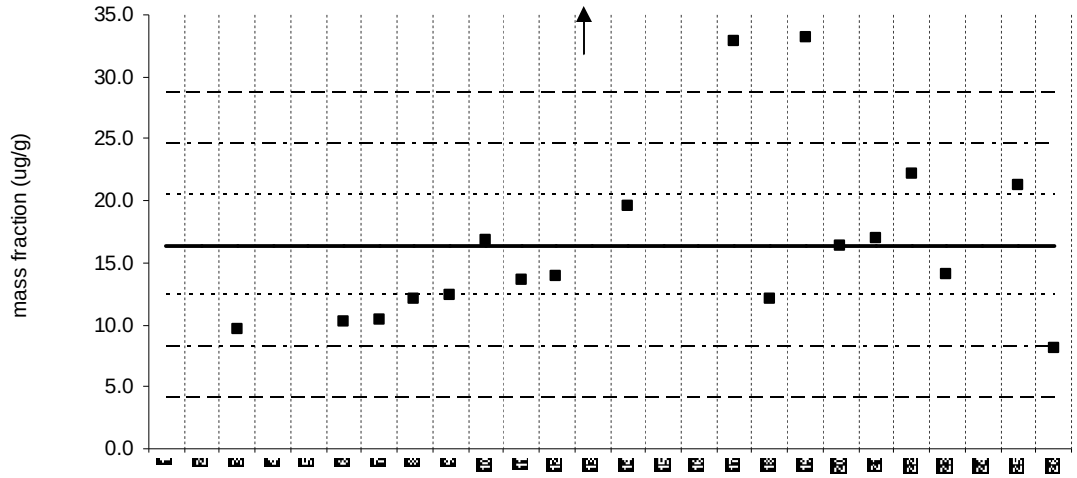
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

acenaphthene **QA10OIL01**

Assigned mean = 16.4 ug/g s = 7.2 ug/g 95% CI = 3.3 ug/g Assigned median = 14.0 ug/g

Reported Results: 26 Quantitative Results: 19

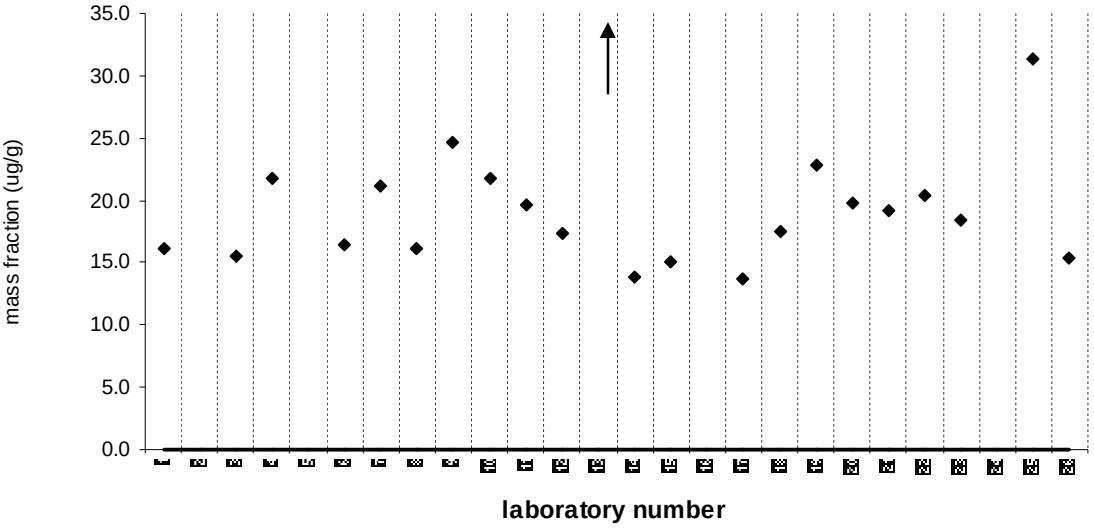


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

acenaphthene **SRM 1582**

Target Value = no target ug/g

Reported Results: 25 Quantitative Results: 22 Median of Reported Results: 18.8 ug/g

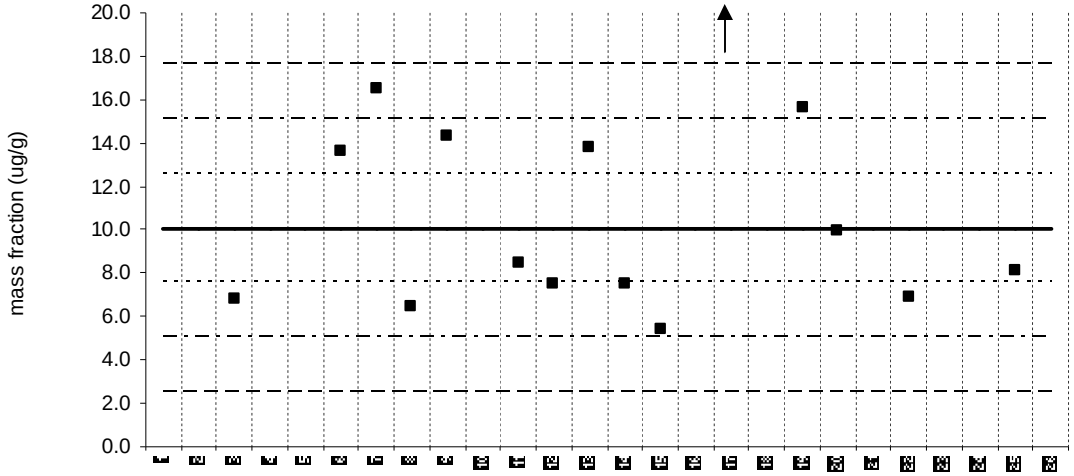


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

acenaphthylene **QA10OIL01**

Assigned mean = 10.1 ug/g s = 3.8 ug/g 95% CI = 2.0 ug/g Assigned median = 8.3 ug/g

Reported Results: 26 Quantitative Results: 15



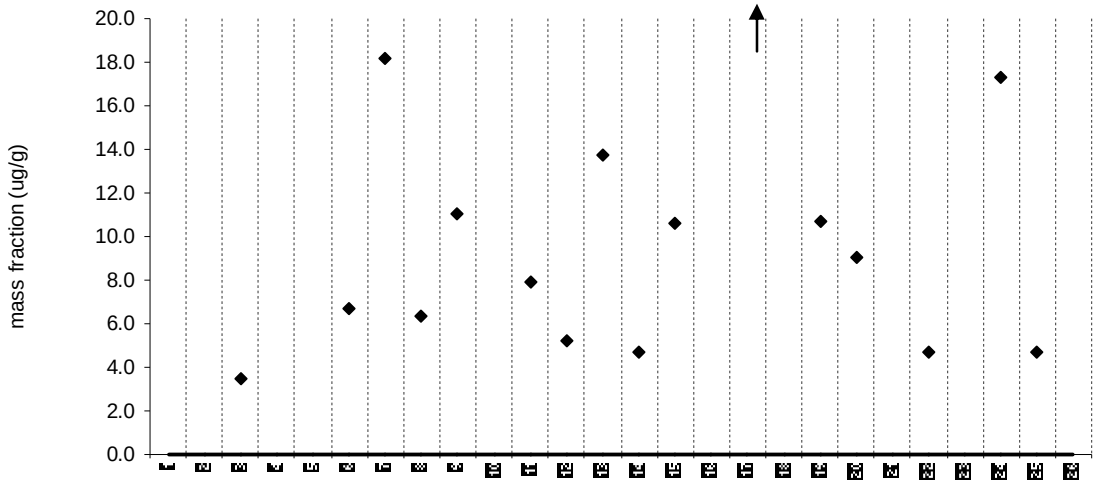
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

acenaphthylene **SRM 1582**

Target Value = no target ug/g

Reported Results: 25 Quantitative Results: 16 Median of Reported Results: 8.47 ug/g



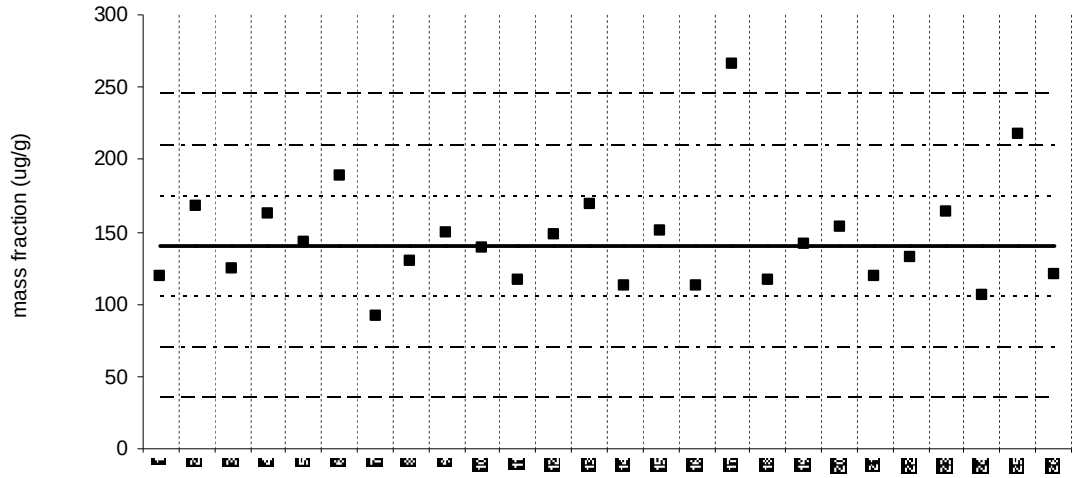
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

fluorene **QA10OIL01**

Assigned mean = 140 ug/g s = 28 ug/g 95% CI = 11 ug/g Assigned median = 139 ug/g

Reported Results: 26 Quantitative Results: 26



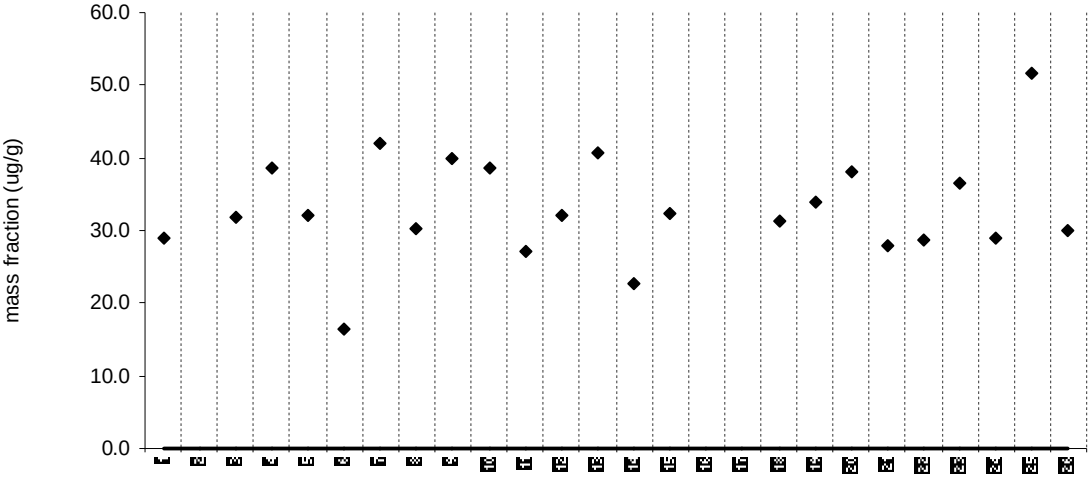
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

fluorene **SRM 1582**

Target Value = no target ug/g

Reported Results: 25 Quantitative Results: 23 Median of Reported Results: 32.0 ug/g



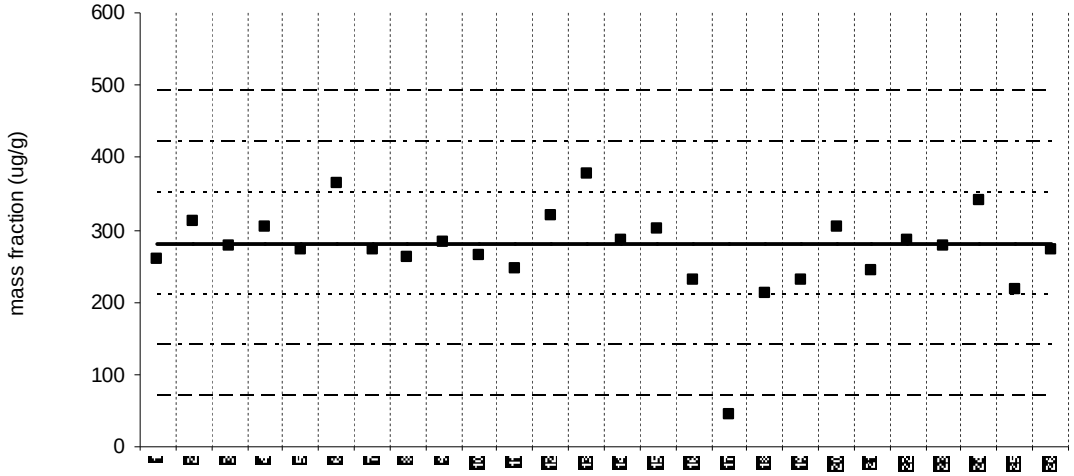
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

phenanthrene **QA10OIL01**

Assigned mean = 281 ug/g s = 42 ug/g 95% CI = 16 ug/g Assigned median = 277 ug/g

Reported Results: 26 Quantitative Results: 26



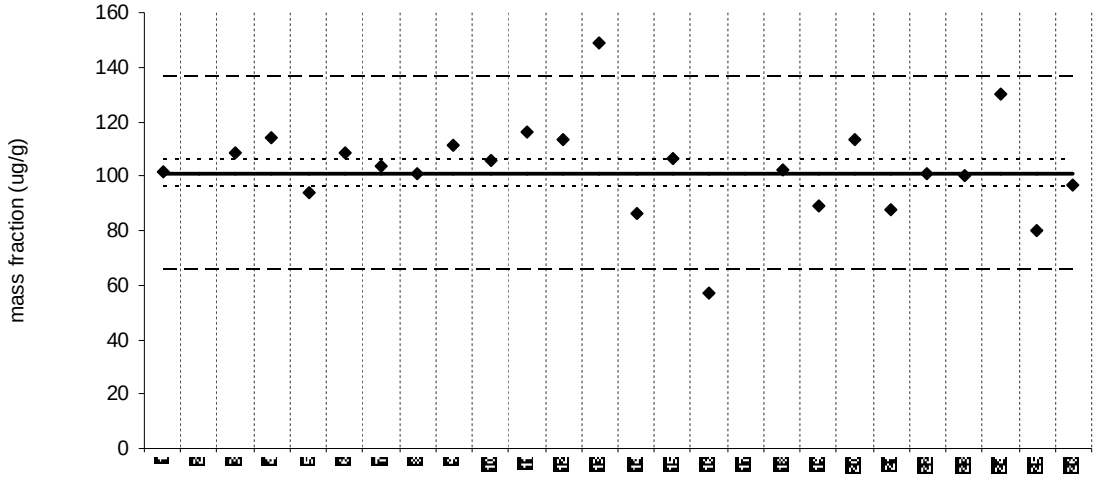
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

phenanthrene **SRM 1582**

certified Value = 101 ug/g ; 95% CI 5 ug/g

Reported Results: 25 Quantitative Results: 24 Median of Reported Results: 103 ug/g



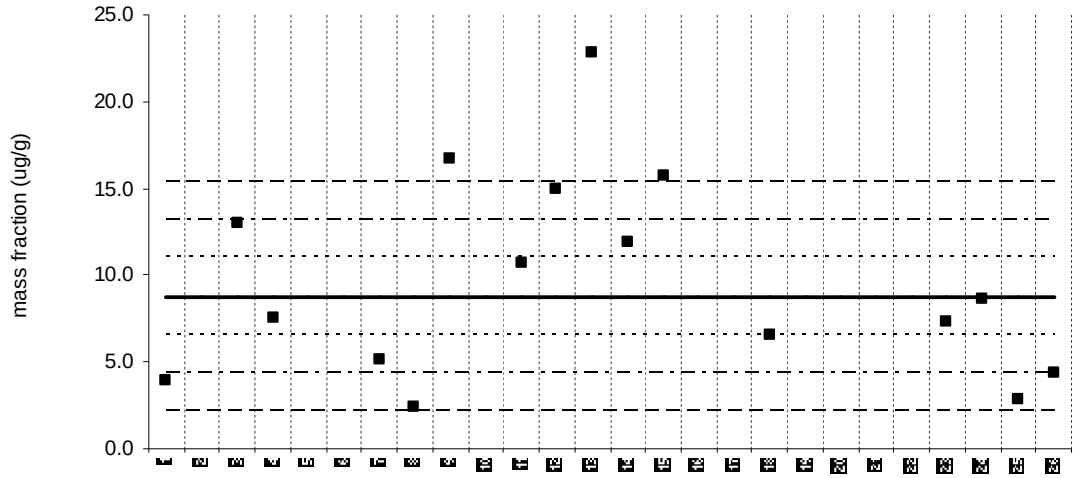
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

anthracene **QA10OIL01**

Assigned mean = 8.79 ug/g s = 4.79 ug/g 95% CI = 2.42 ug/g Assigned median = 7.52 ug/g

Reported Results: 26 Quantitative Results: 16

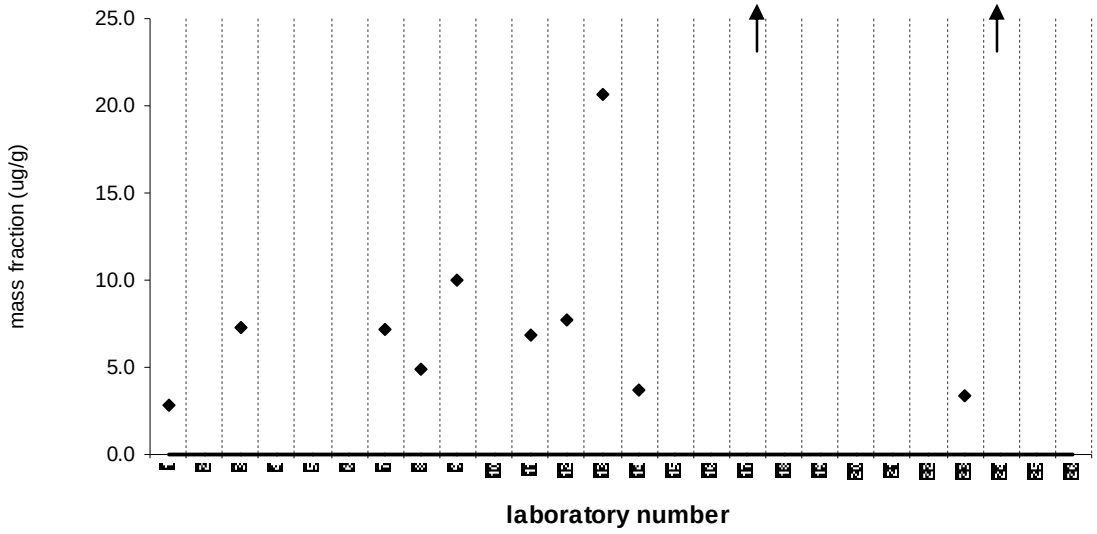


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

anthracene **SRM 1582**

Target Value = no target ug/g

Reported Results: 25 Quantitative Results: 12 Median of Reported Results: 7.20 ug/g

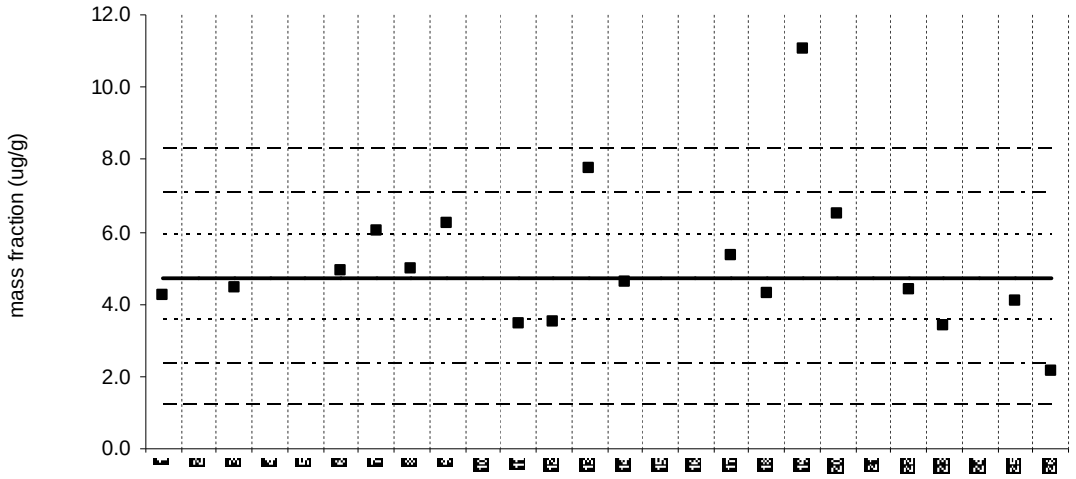


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

fluoranthene **QA10OIL01**

Assigned mean = 4.72 ug/g s = 1.36 ug/g 95% CI = 0.64 ug/g Assigned median = 4.44 ug/g

Reported Results: 26 Quantitative Results: 18

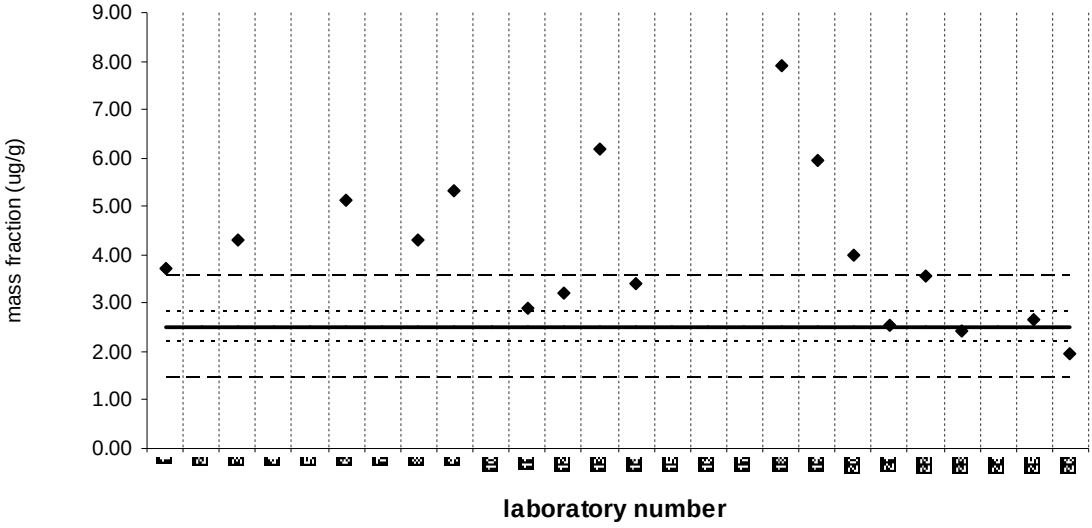


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

fluoranthene **SRM 1582**

certified Value = 2.5 ug/g ; 95% CI 0.3 ug/g

Reported Results: 25 Quantitative Results: 17 Median of Reported Results: 3.7 ug/g

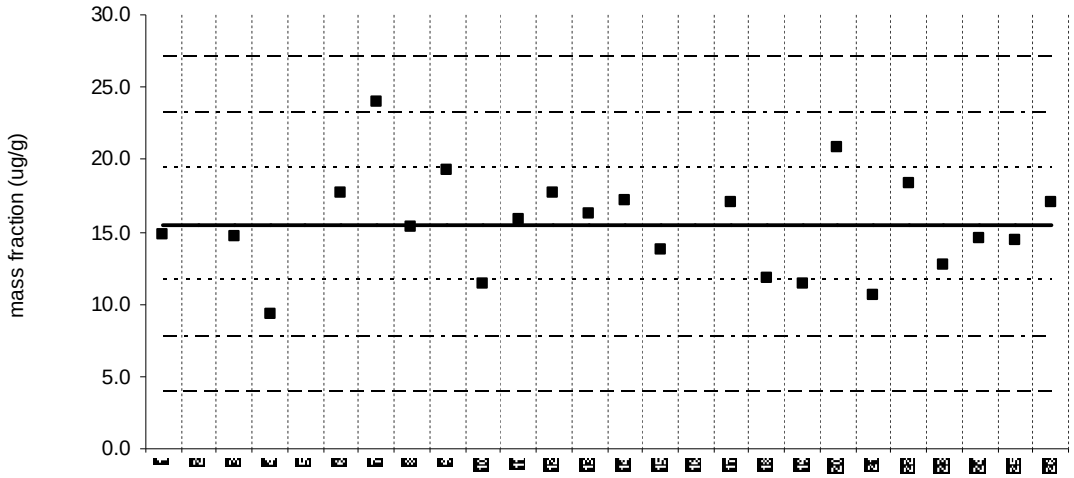


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

pyrene **QA10OIL01**

Assigned mean = 15.5 ug/g s = 3.5 ug/g 95% CI = 1.4 ug/g Assigned median = 15.3 ug/g

Reported Results: 26 Quantitative Results: 23

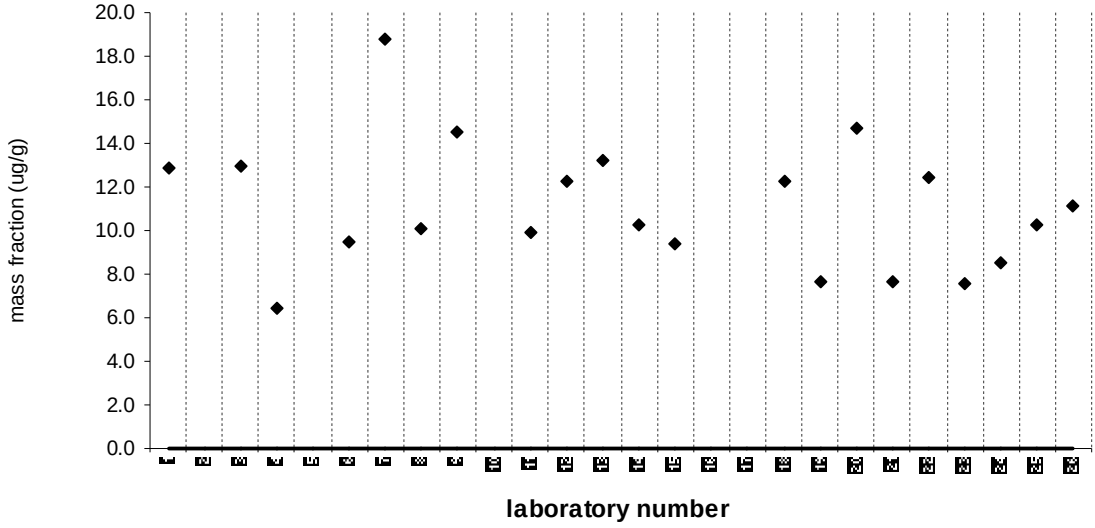


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

pyrene **SRM 1582**

Target Value = no target ug/g

Reported Results: 25 Quantitative Results: 21 Median of Reported Results: 10.3 ug/g

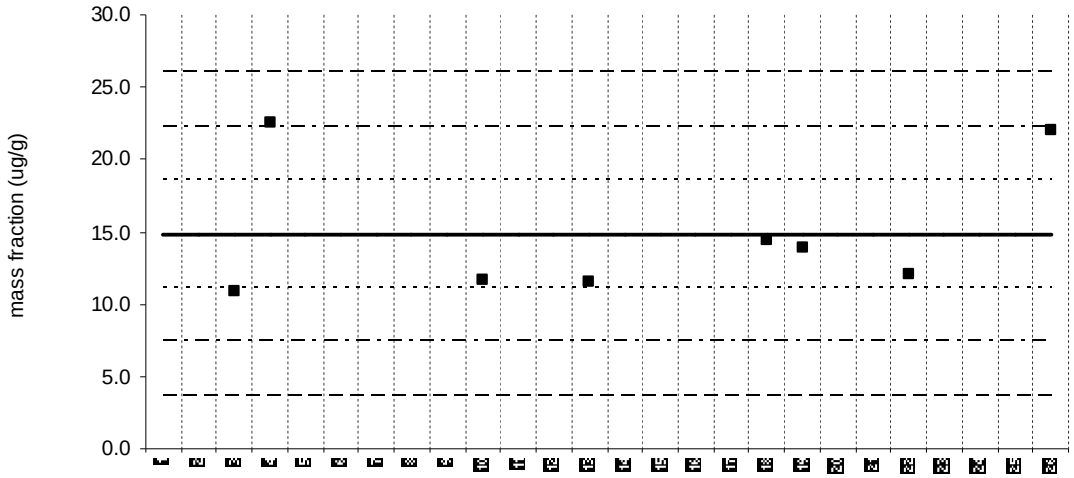


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

benzo[b]fluorene **QA10OIL01**

Assigned mean = 14.9 ug/g s = 4.7 ug/g 95% CI = 3.3 ug/g Assigned median = 13.0 ug/g

Reported Results: 11 Quantitative Results: 8

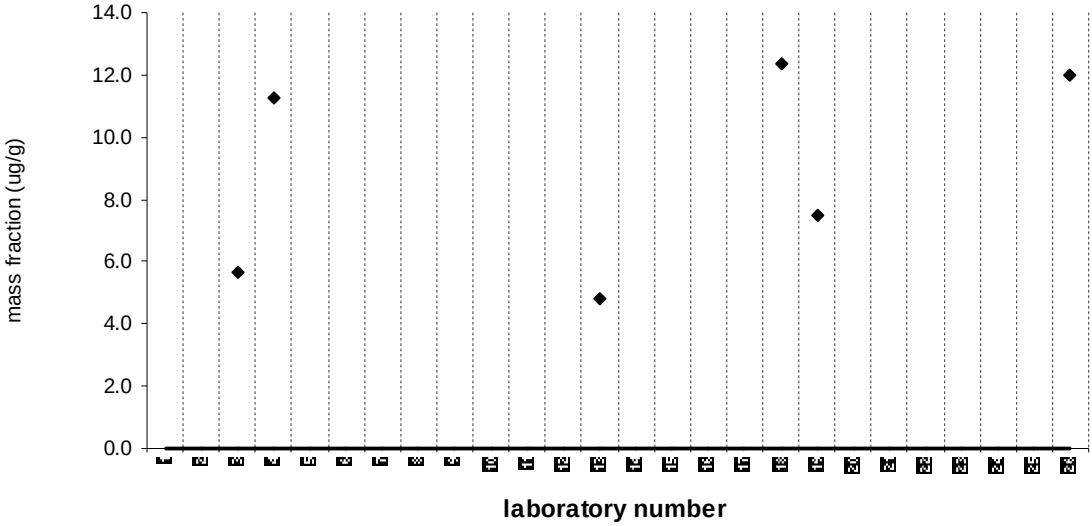


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

benzo[b]fluorene **SRM 1582**

Target Value = no target ug/g

Reported Results: 11 Quantitative Results: 6 Median of Reported Results: 9.38 ug/g

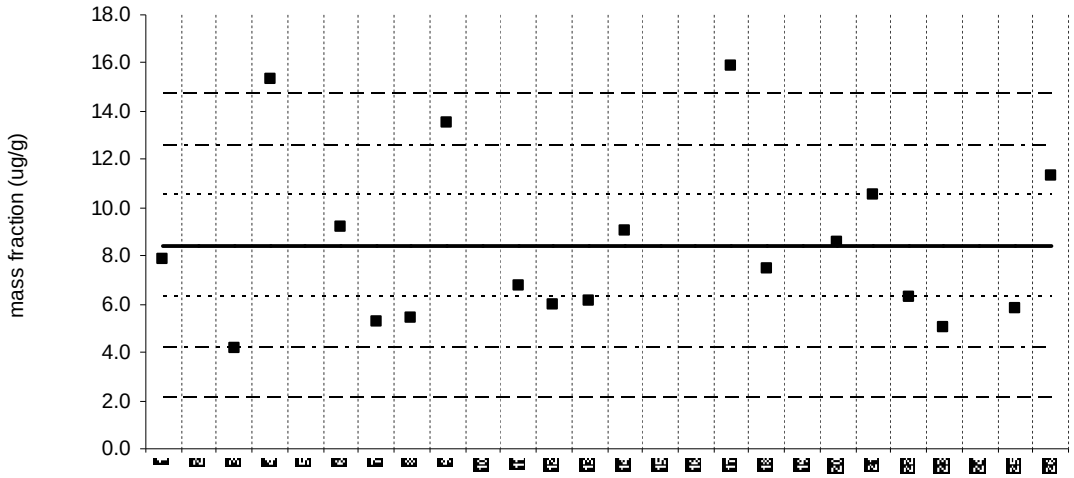


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

benz[a]anthracene **QA10OIL01**

Assigned mean = 8.40 ug/g s = 3.47 ug/g 95% CI = 1.56 ug/g Assigned median = 7.68 ug/g

Reported Results: 26 Quantitative Results: 19

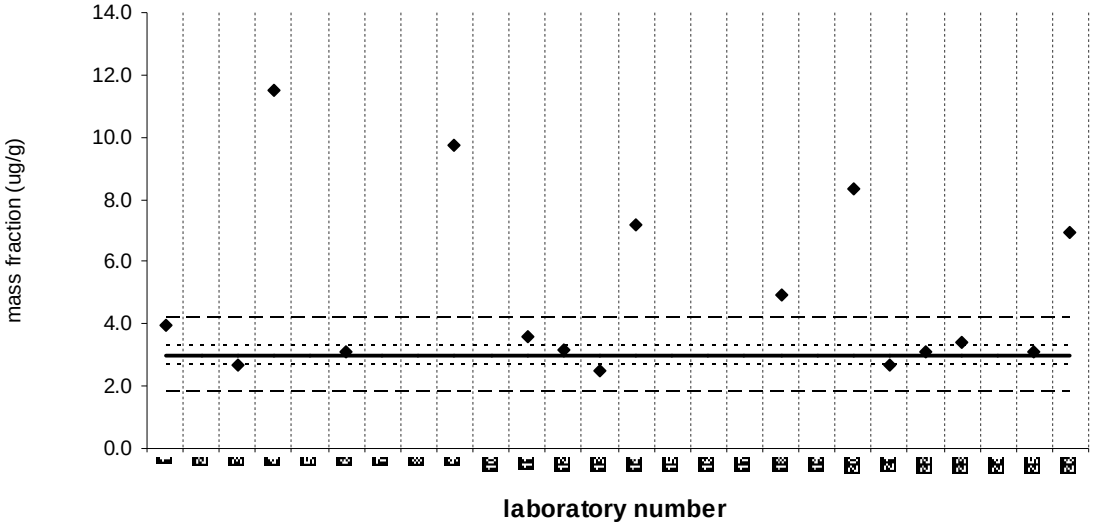


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

benz[a]anthracene **SRM 1582**

certified Value = 3.0 ug/g ; 95% CI 0.3 ug/g

Reported Results: 25 Quantitative Results: 16 Median of Reported Results: 3.50 ug/g

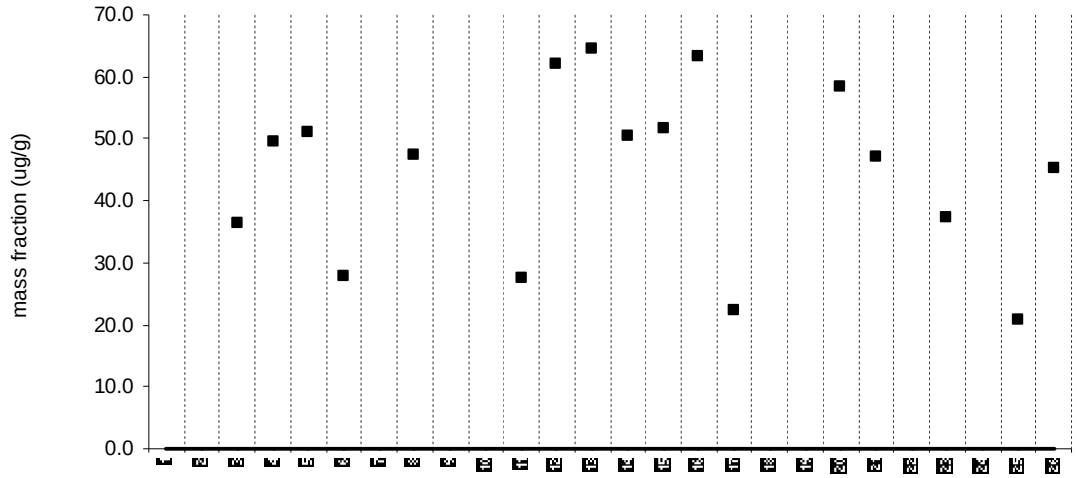


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

chrysene **QA10OIL01**

Assigned value = No assigned value

Reported Results: 18 Quantitative Results: 17



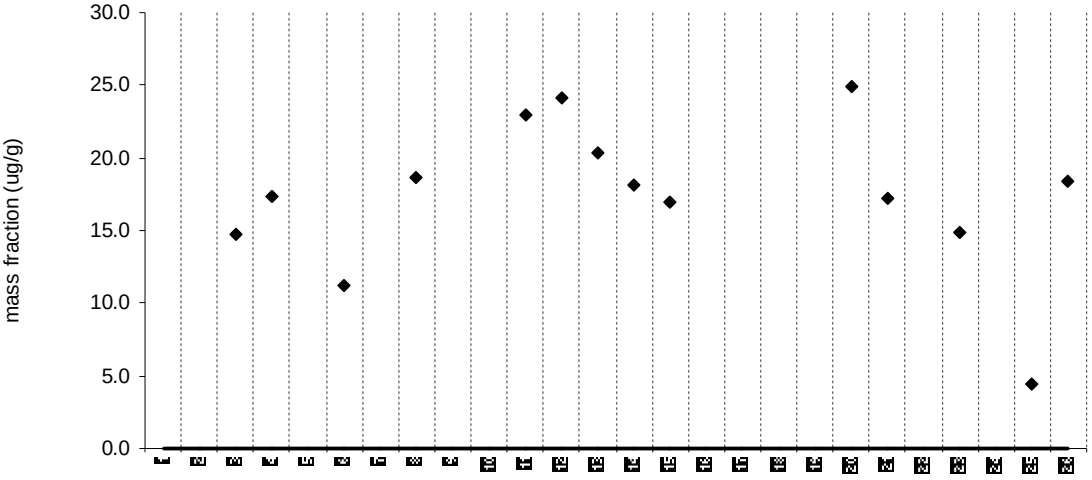
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

chrysene **SRM 1582**

Target Value = no target ug/g

Reported Results: 17 Quantitative Results: 14 Median of Reported Results: not calculated



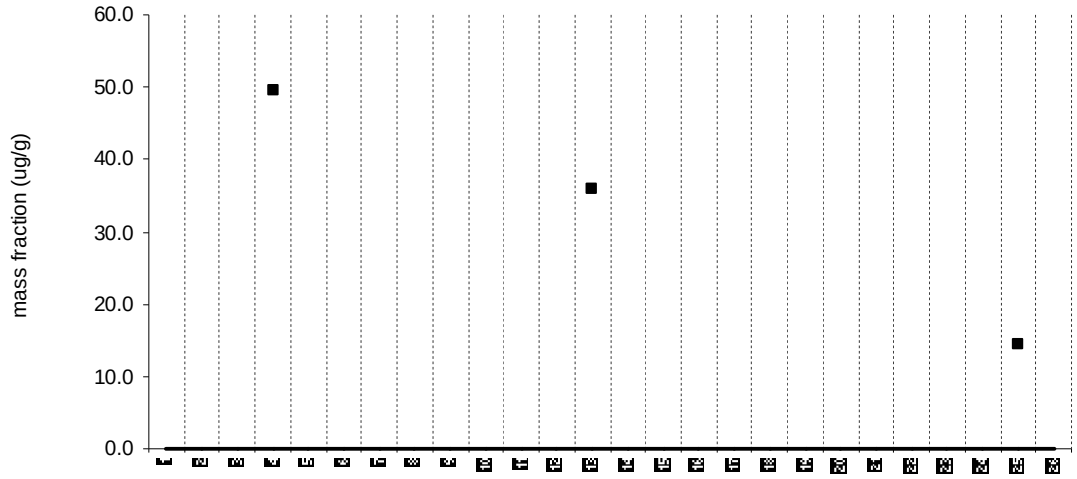
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

triphenylene **QA10OIL01**

Assigned value = No assigned value

Reported Results: 4 Quantitative Results: 3



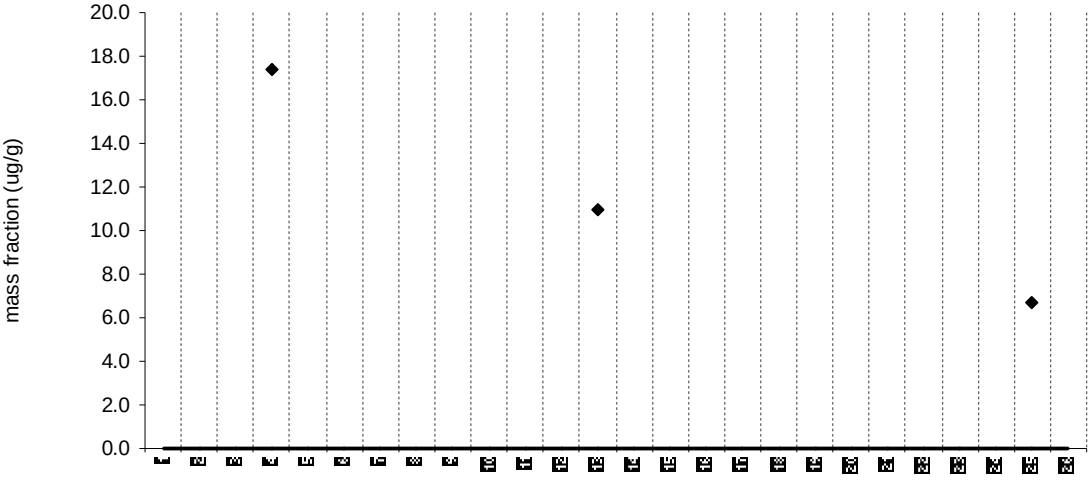
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

triphenylene **SRM 1582**

Target Value = no target ug/g

Reported Results: 4 Quantitative Results: 3 Median of Reported Results: not calculated



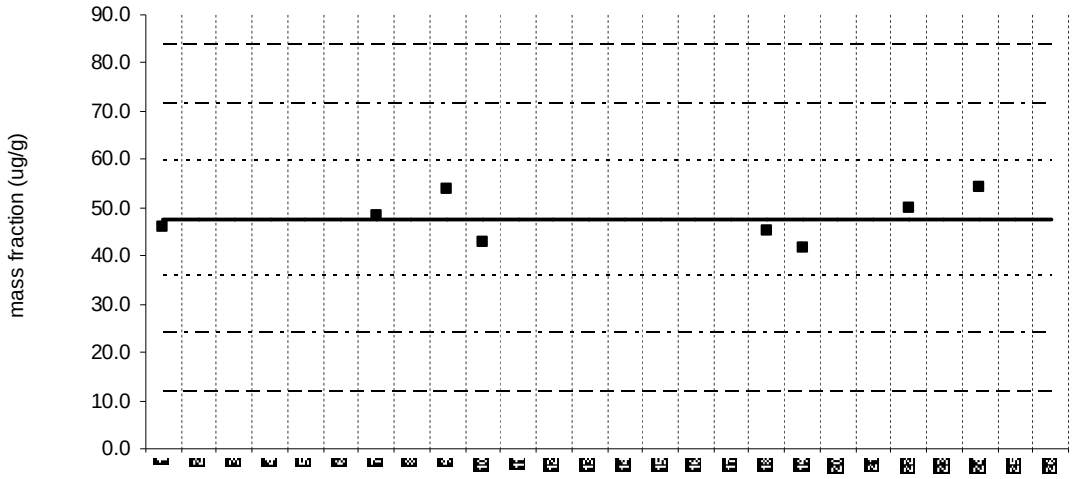
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

chrysene + triphenylene **QA10OIL01**

Assigned mean = 47.7 ug/g s = 4.7 ug/g 95% CI = 3.3 ug/g Assigned median = 47.2 ug/g

Reported Results: 8 Quantitative Results: 8

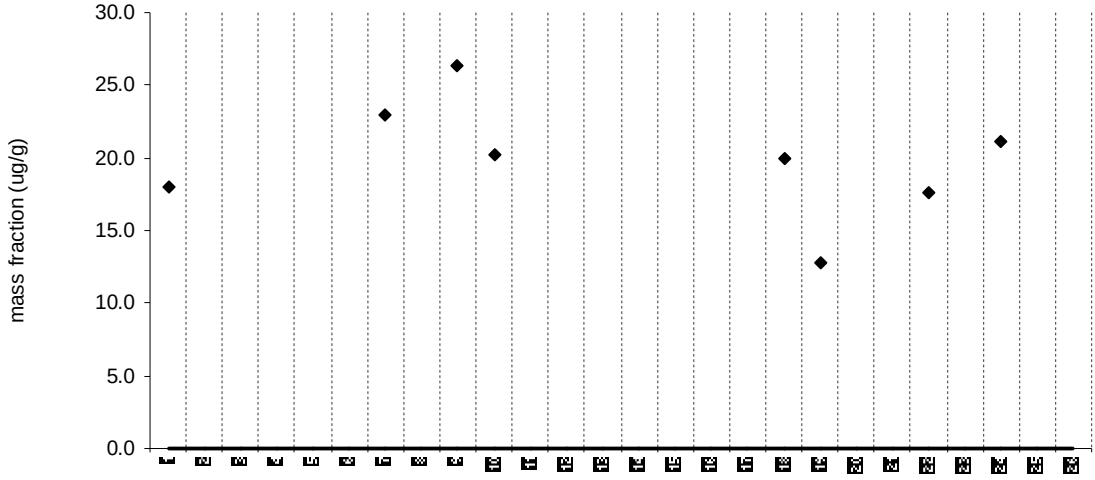


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

chrysene + triphenylene **SRM 1582**

Value = no target ug/g

Reported Results: 8 Quantitative Results: 8 Median of Reported Results: 20.1 ug/g

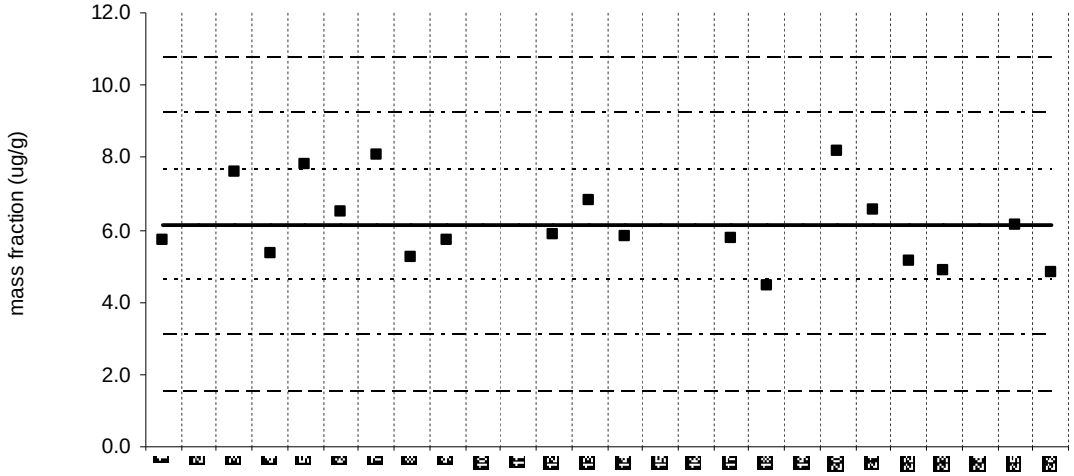


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

benzo[b]fluoranthene **QA10OIL01**

Assigned mean = 6.13 ug/g s = 1.13 ug/g 95% CI = 0.51 ug/g Assigned median = 5.83 ug/g

Reported Results: 23 Quantitative Results: 19

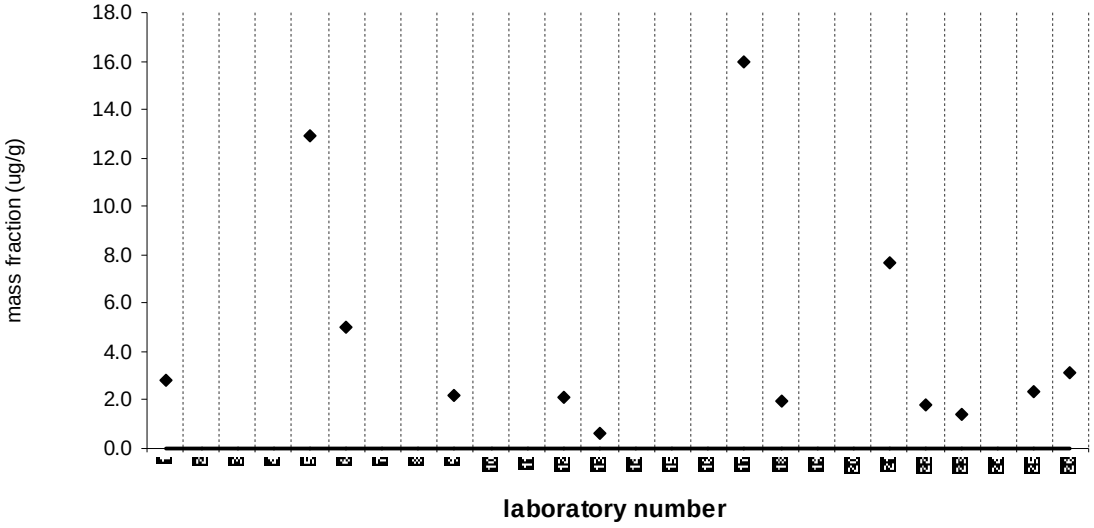


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

benzo[b]fluoranthene **SRM 1582**

Target Value = no target ug/g

Reported Results: 21 Quantitative Results: 13 Median of Reported Results: 2.32 ug/g

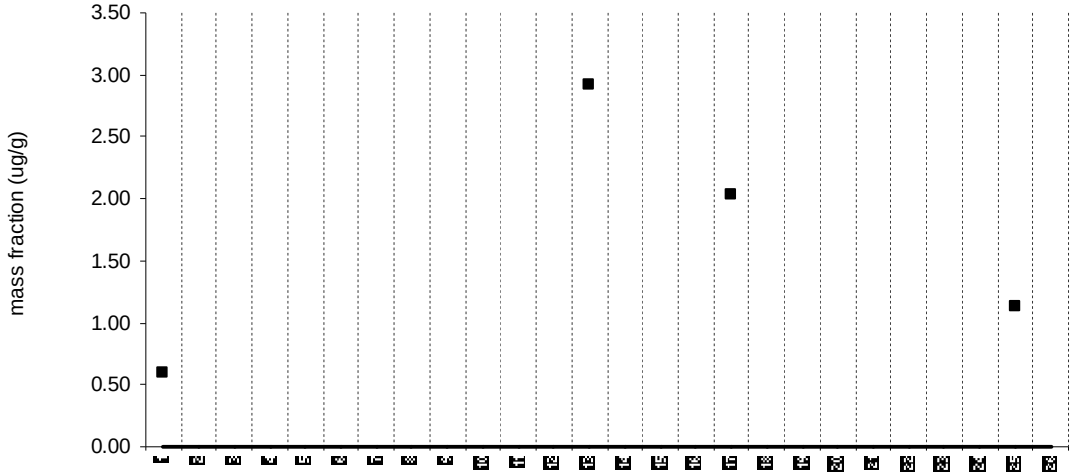


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

benzo[j]fluoranthene **QA10OIL01**

Assigned value = No assigned value

Reported Results: 6 Quantitative Results: 4



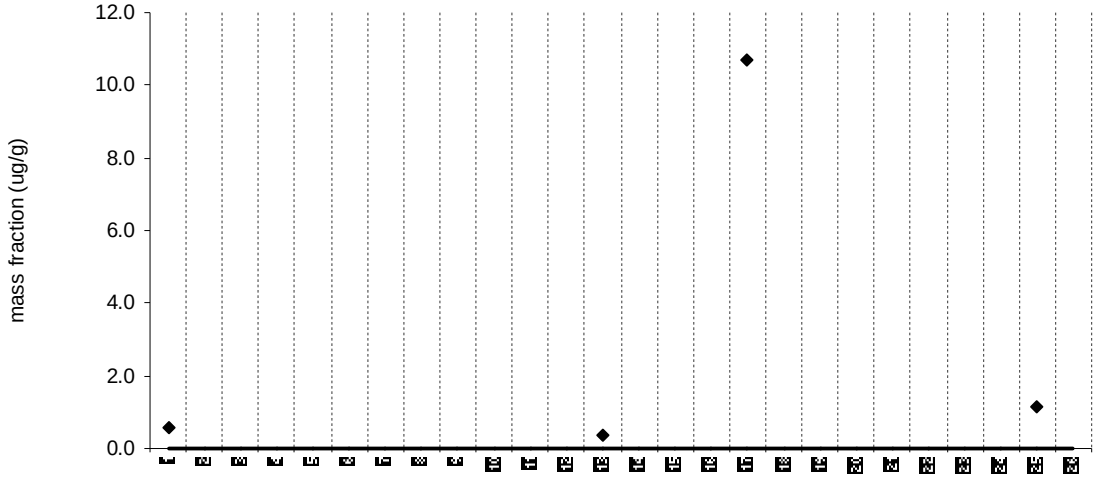
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

benzo[j]fluoranthene **SRM 1582**

Target Value = no target ug/g

Reported Results: 5 Quantitative Results: 4 Median of Reported Results: 0.858 ug/g



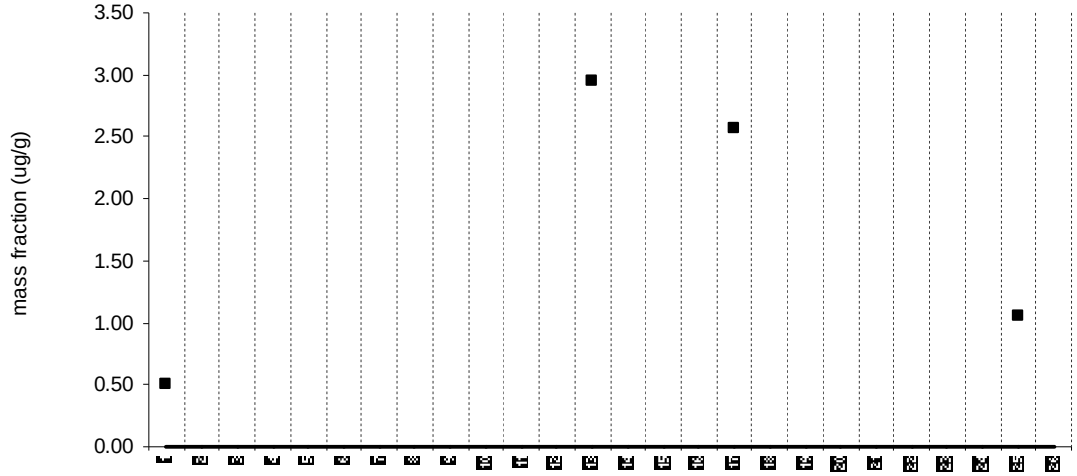
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

benzo[k]fluoranthene **QA10OIL01**

Assigned value = No assigned value

Reported Results: 19 Quantitative Results: 4



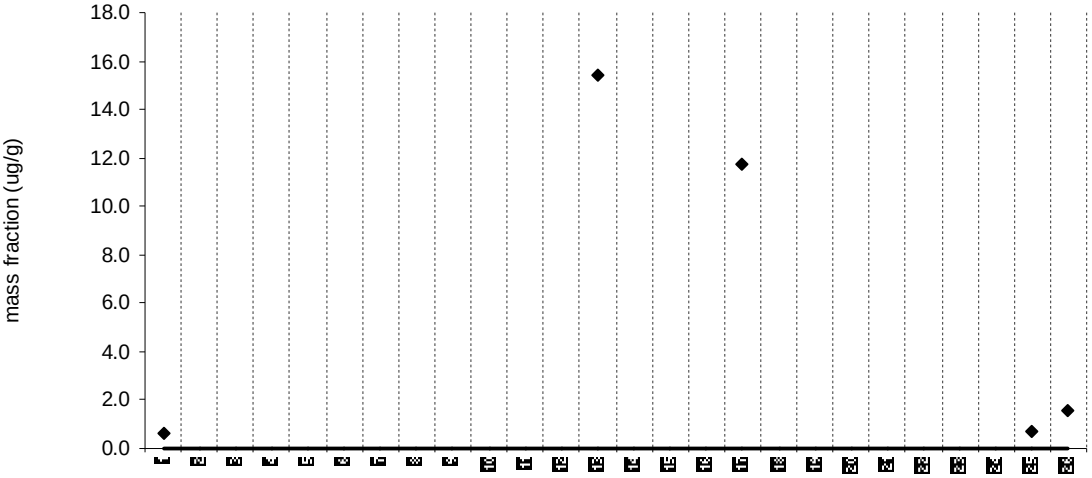
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

benzo[k]fluoranthene **SRM 1582**

Target Value = no target ug/g

Reported Results: 18 Quantitative Results: 5 Median of Reported Results: 1.57 ug/g



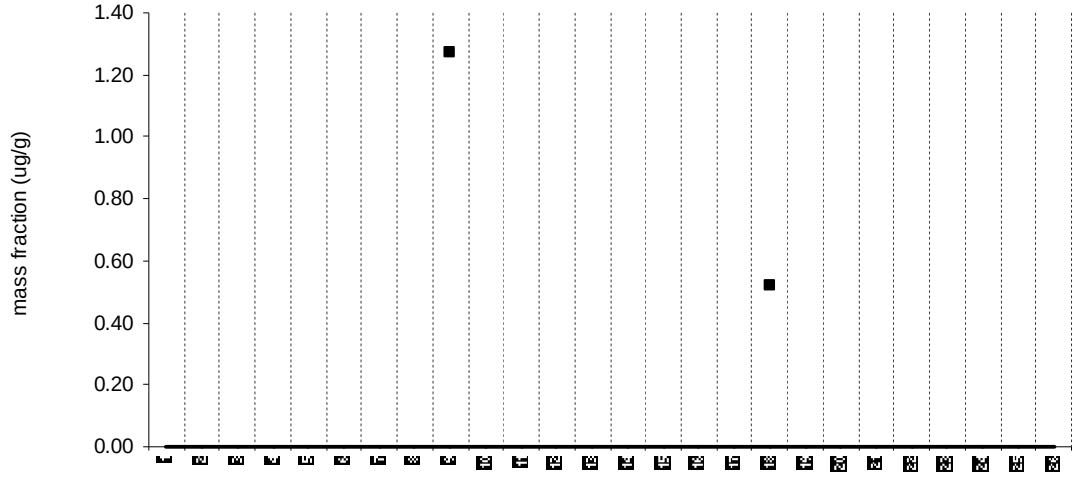
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

benzo[j]fluoranthene + benzo[k]fluoranthene **QA10OIL01**

Assigned value = No assigned value

Reported Results: 4 Quantitative Results: 2



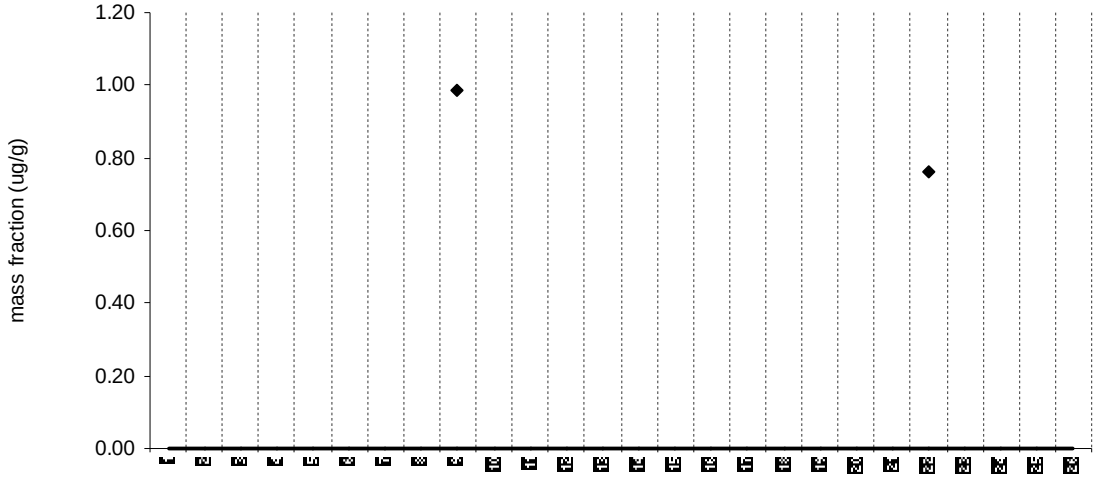
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

benzo[j]fluoranthene + benzo[k]fluoranthene **SRM 1582**

Value = no target ug/g

Reported Results: 4 Quantitative Results: 2 Median of Reported Results: 0.873 ug/g



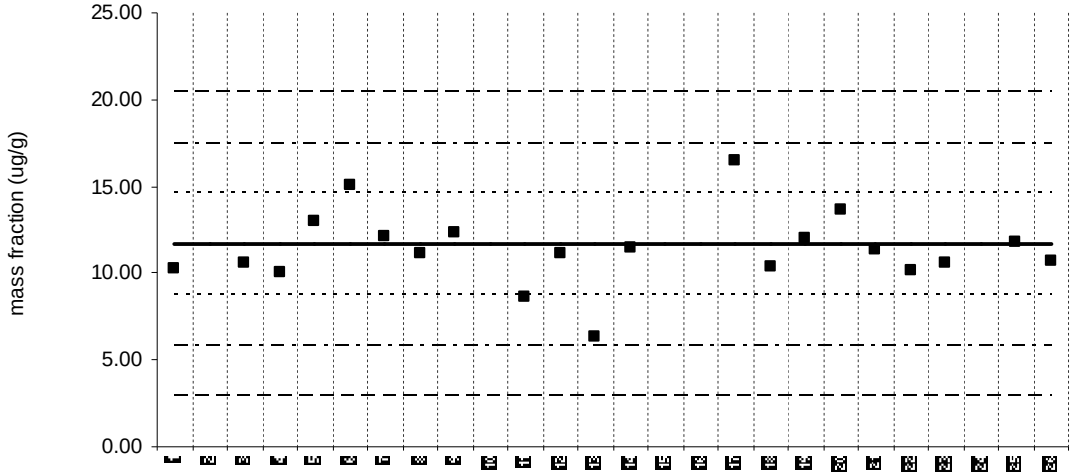
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

benzo[e]pyrene **QA10OIL01**

Assigned mean = 11.7 ug/g s = 1.8 ug/g 95% CI = 0.8 ug/g Assigned median = 11.3 ug/g

Reported Results: 25 Quantitative Results: 21

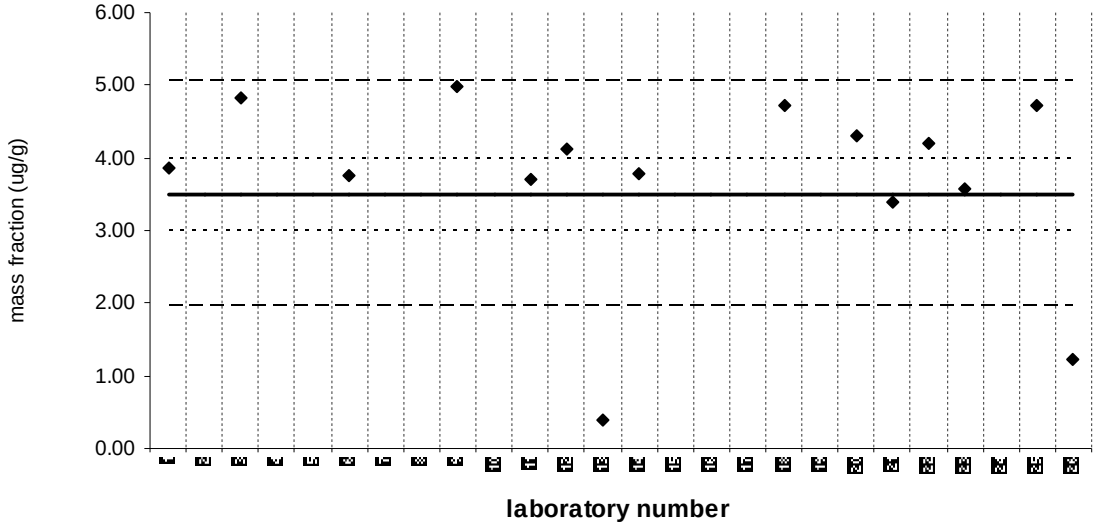


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

benzo[e]pyrene **SRM 1582**

Reference Value = 3.5 ug/g ; 95% CI 0.5 ug/g

Reported Results: 25 Quantitative Results: 15 Median of Reported Results: 3.86 ug/g

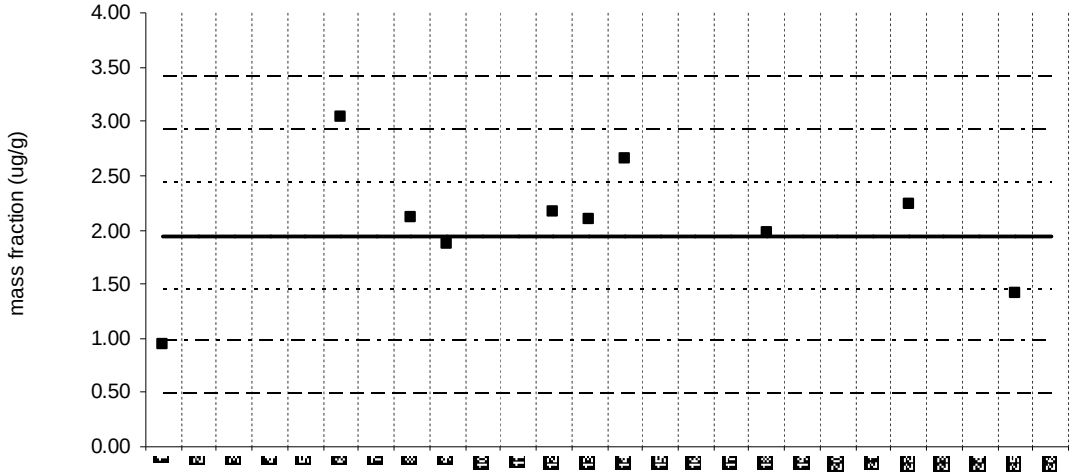


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

benzo[a]pyrene **QA10OIL01**

Assigned mean = 1.94 ug/g s = 0.50 ug/g 95% CI = 0.32 ug/g Assigned median = 2.10 ug/g

Reported Results: 26 Quantitative Results: 10

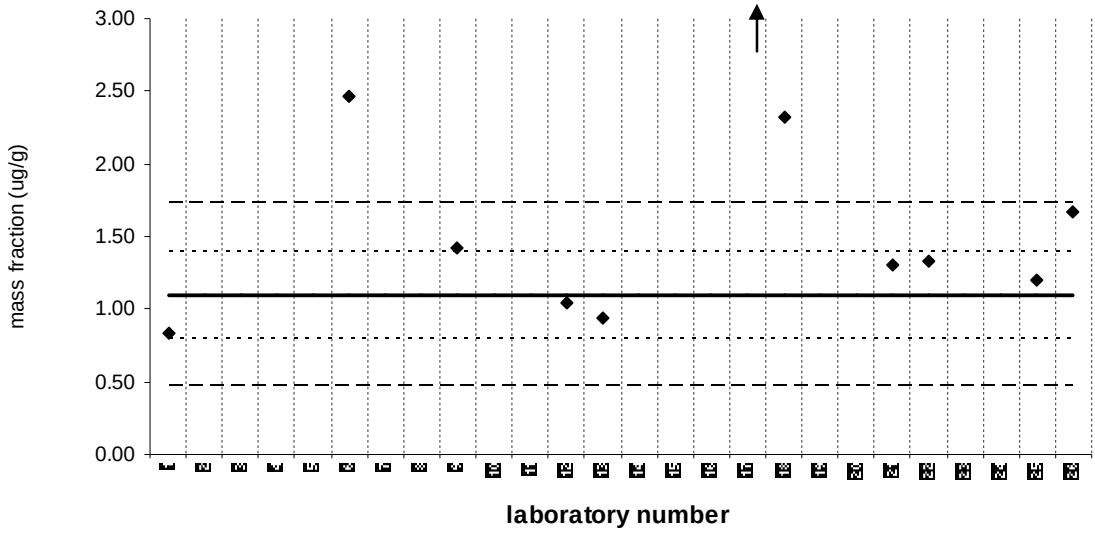


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

benzo[a]pyrene **SRM 1582**

certified Value = 1.1 ug/g ; 95% CI 0.3 ug/g

Reported Results: 25 Quantitative Results: 11 Median of Reported Results: 1.34 ug/g

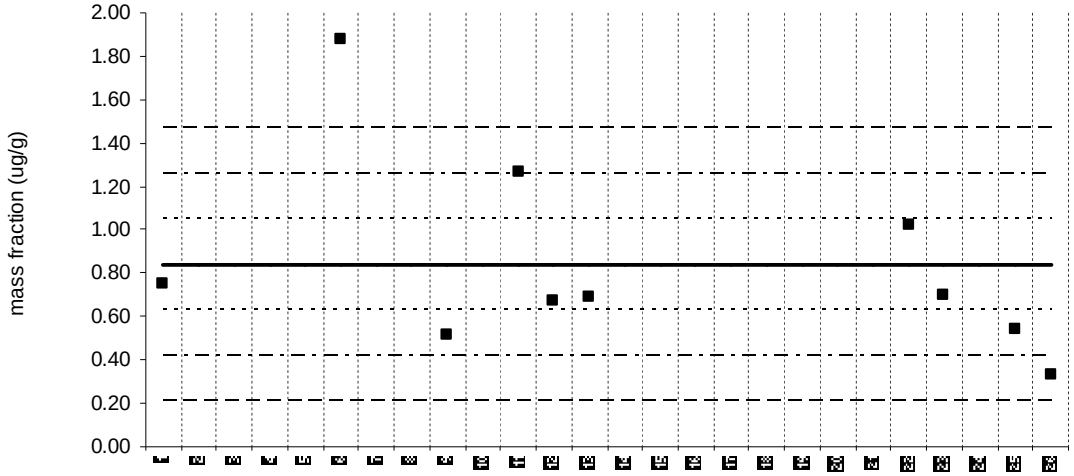


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

perylene **QA10OIL01**

Assigned mean = 0.838 ug/g s = 0.450 ug/g 95% CI = 0.279 ug/g Assigned median = 0.694 ug/g

Reported Results: 25 Quantitative Results: 10



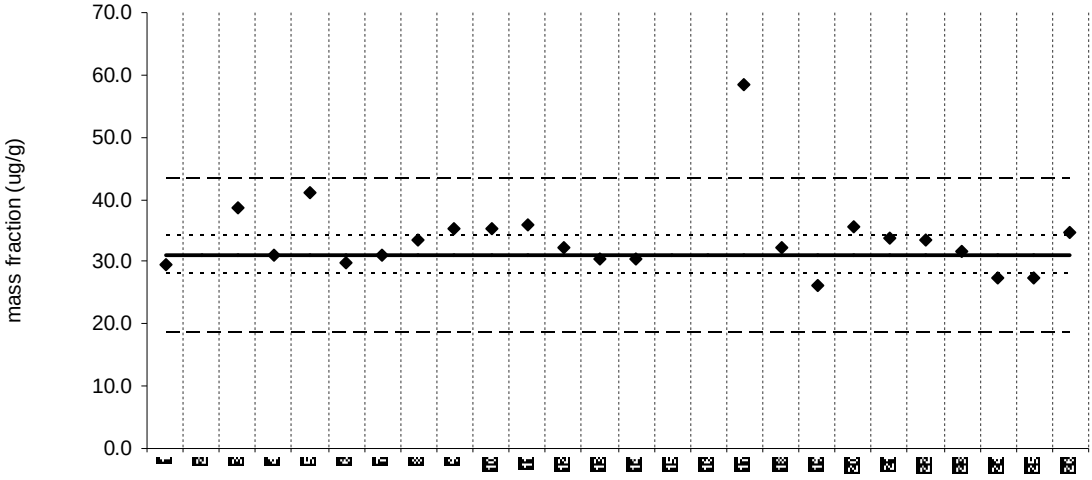
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

perylene **SRM 1582**

certified Value = 31.0 ug/g ; 95% CI 3.0 ug/g

Reported Results: 25 Quantitative Results: 23 Median of Reported Results: 32.4



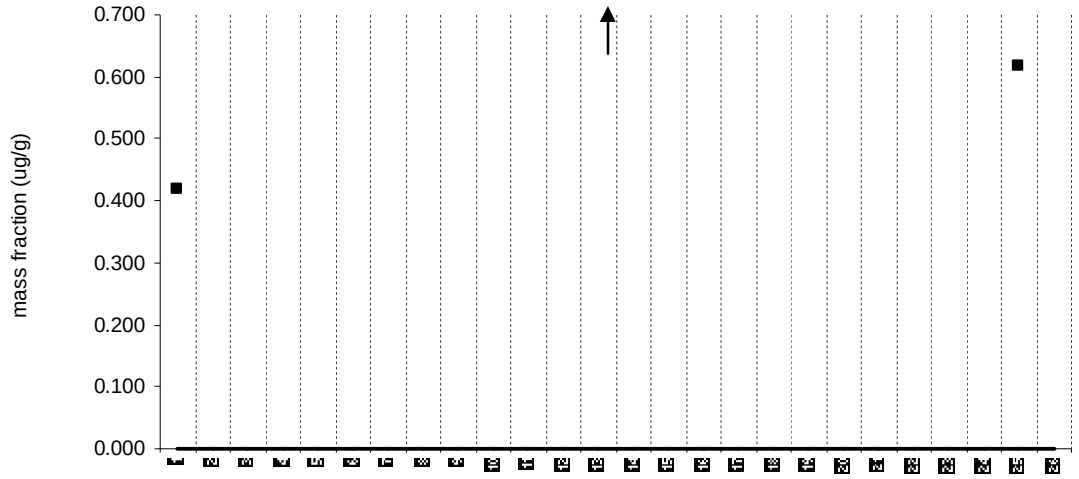
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

indeno[1,2,3-cd]pyrene **QA10OIL01**

Assigned value = No assigned value

Reported Results: 26 Quantitative Results: 3



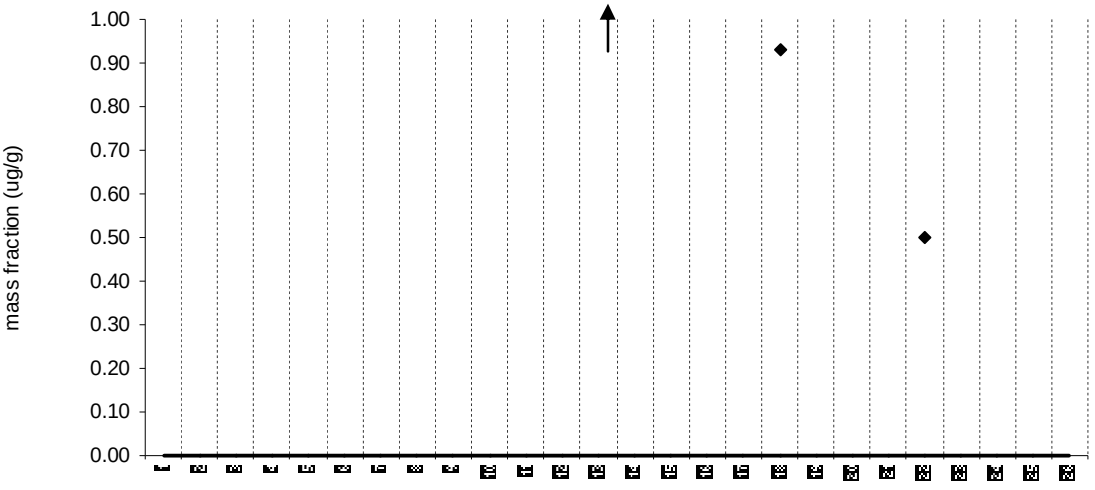
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

indeno[1,2,3-cd]pyrene **SRM 1582**

Target Value = no target ug/g

Reported Results: 25 Quantitative Results: 3 Median of Reported Results: not calculated



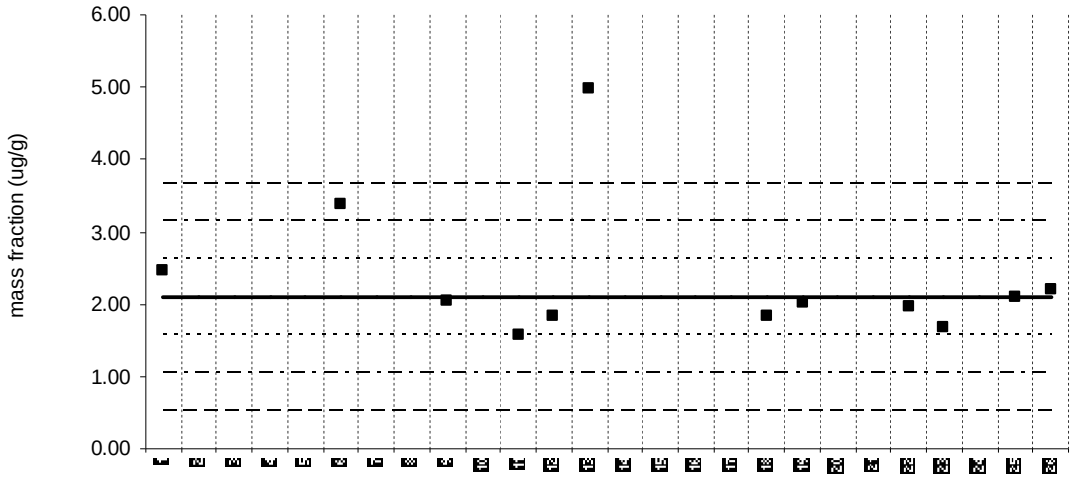
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

benzo[ghi]perylene **QA10OIL01**

Assigned mean = 2.10 ug/g s = 0.49 ug/g 95% CI = 0.29 ug/g Assigned median = 2.01 ug/g

Reported Results: 26 Quantitative Results: 12



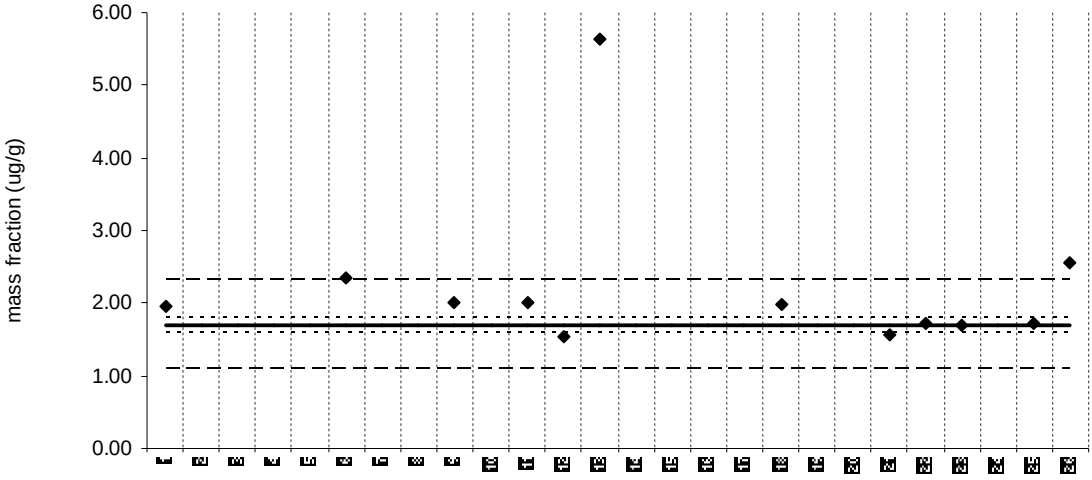
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

benzo[ghi]perylene **SRM 1582**

Reference Value = 1.7 ug/g ; 95% CI 0.1 ug/g

Reported Results: 25 Quantitative Results: 12 Median of Reported Results: 1.97 ug/g



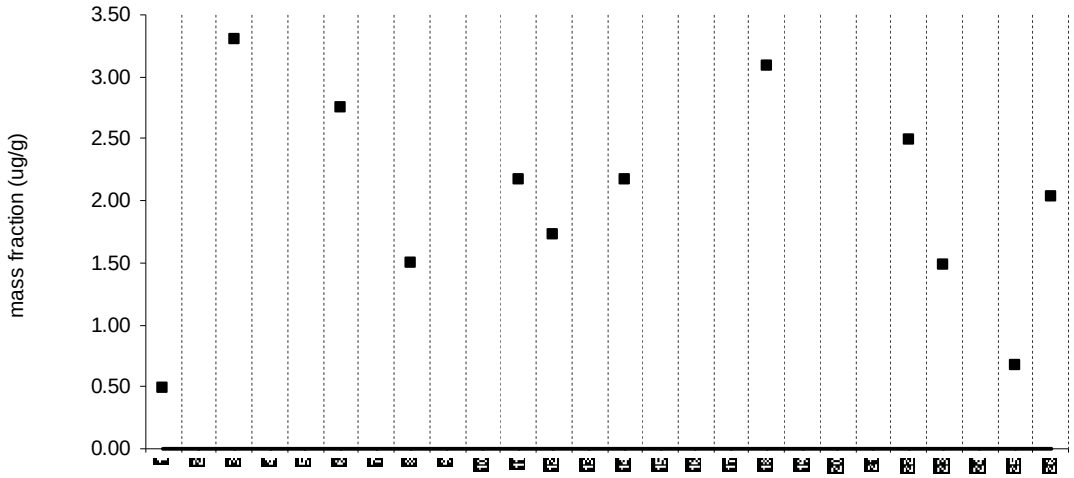
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

dibenz[a,h]anthracene **QA10OIL01**

Assigned value = No assigned value

Reported Results: 24 Quantitative Results: 12



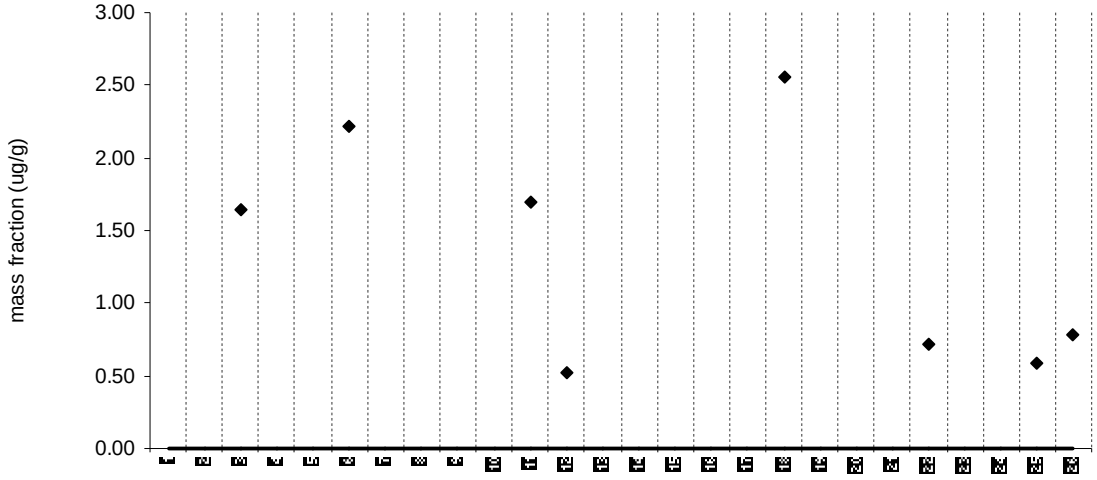
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

dibenz[a,h]anthracene **SRM 1582**

Target Value = no target ug/g

Reported Results: 22 Quantitative Results: 8 Median of Reported Results: 1.22 ug/g



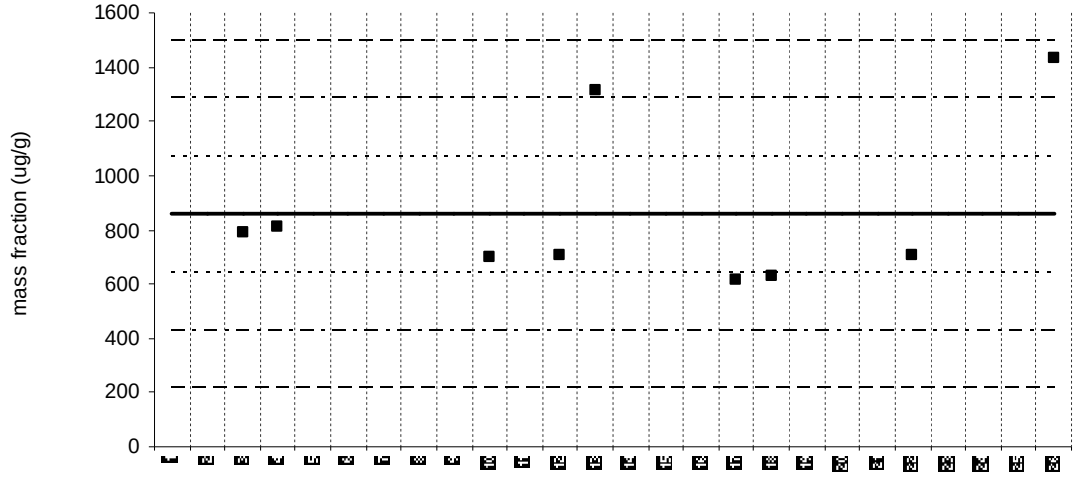
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

cis/trans-decalin **QA10OIL01**

Assigned mean = 856 ug/g s = 302 ug/g 95% CI = 198 ug/g Assigned median = 704 ug/g

Reported Results: 9 Quantitative Results: 9

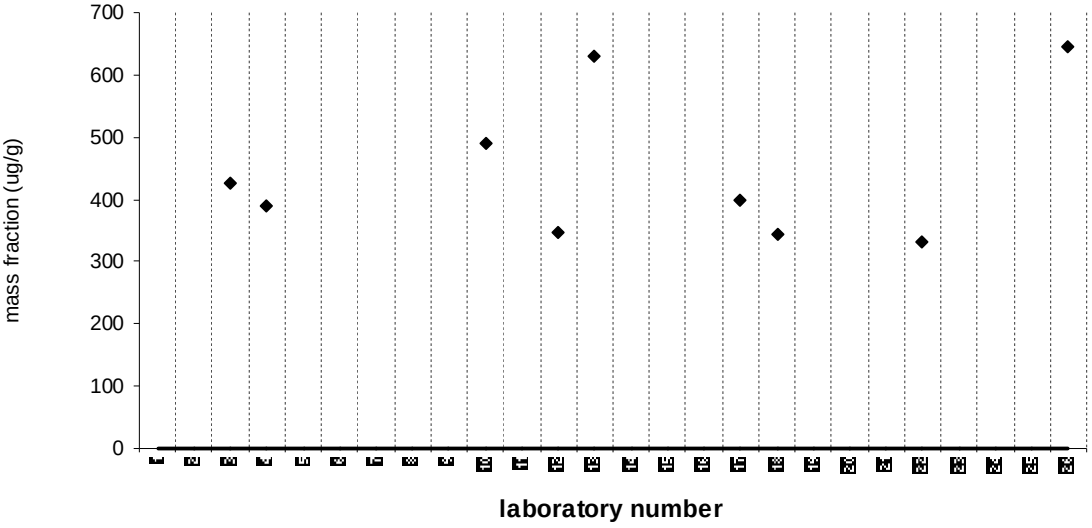


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

cis/trans-decalin **SRM 1582**

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 9 Median of Reported Results: 400 ug/g

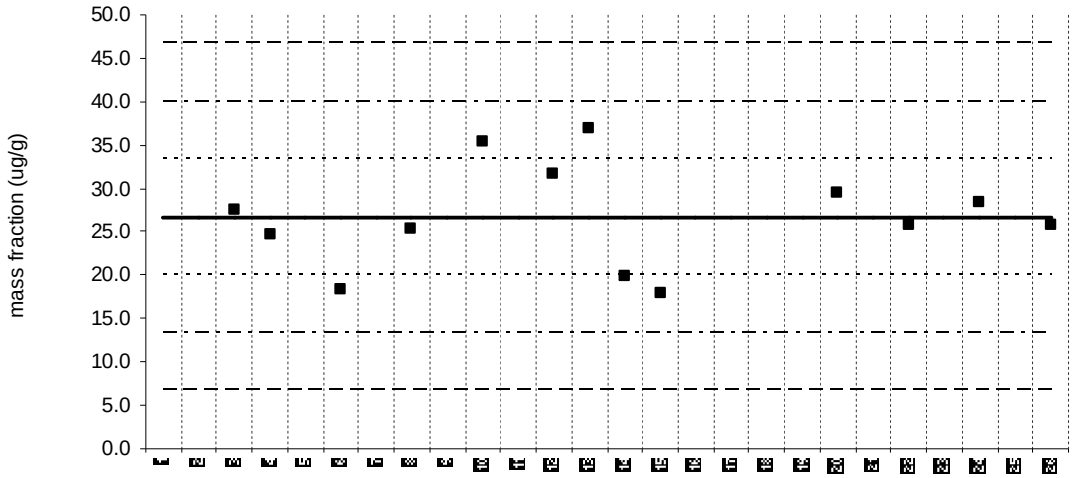


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

dibenzofuran **QA10OIL01**

Assigned mean = 26.7 ug/g s = 5.9 ug/g 95% CI = 3.2 ug/g Assigned median = 25.7 ug/g

Reported Results: 18 Quantitative Results: 13

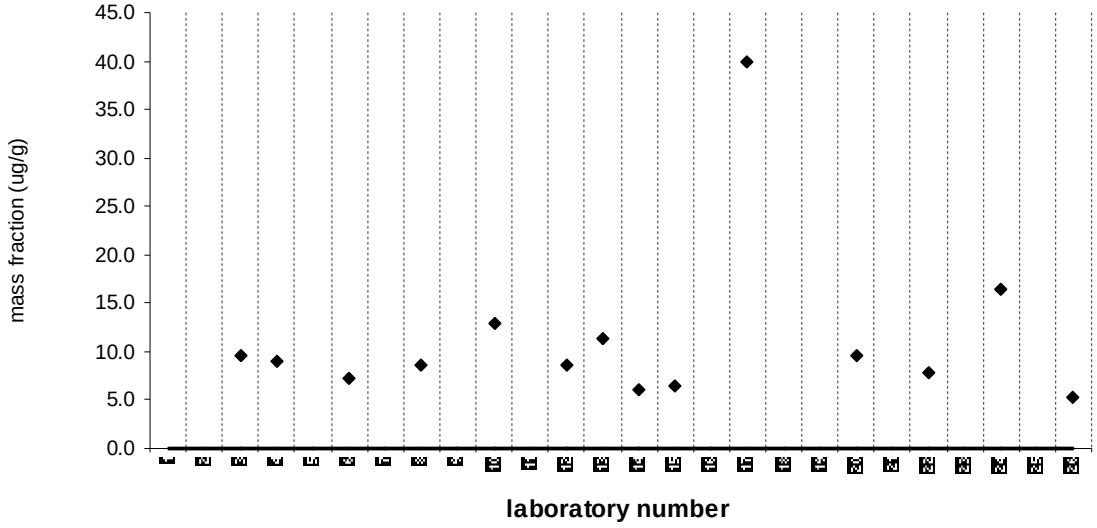


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

dibenzofuran **SRM 1582**

Target Value = no target ug/g

Reported Results: 17 Quantitative Results: 14 Median of Reported Results: 8.87 ug/g

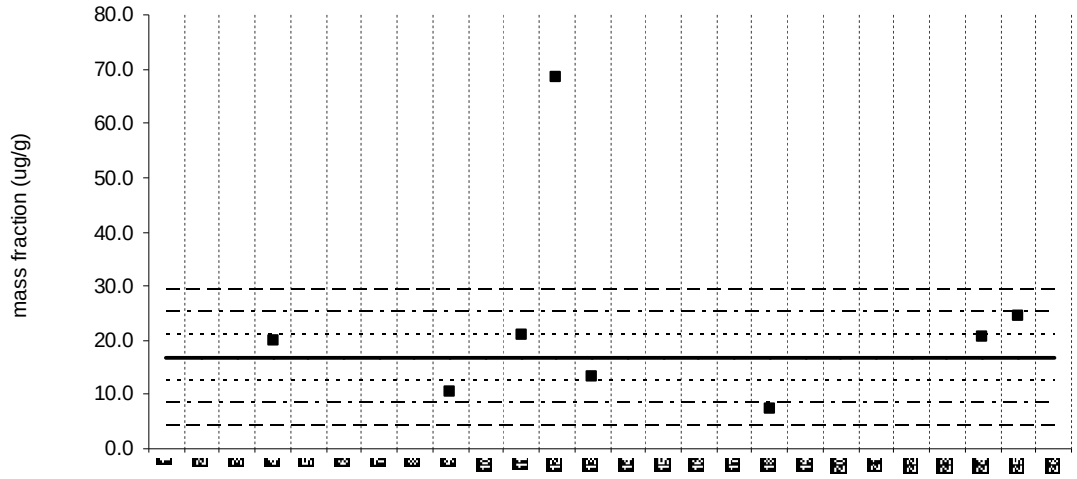


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

retene **QA10OIL01**

Assigned mean = 16.7 ug/g s = 6.3 ug/g 95% CI = 4.7 ug/g Assigned median = 19.8 ug/g

Reported Results: 11 Quantitative Results: 8

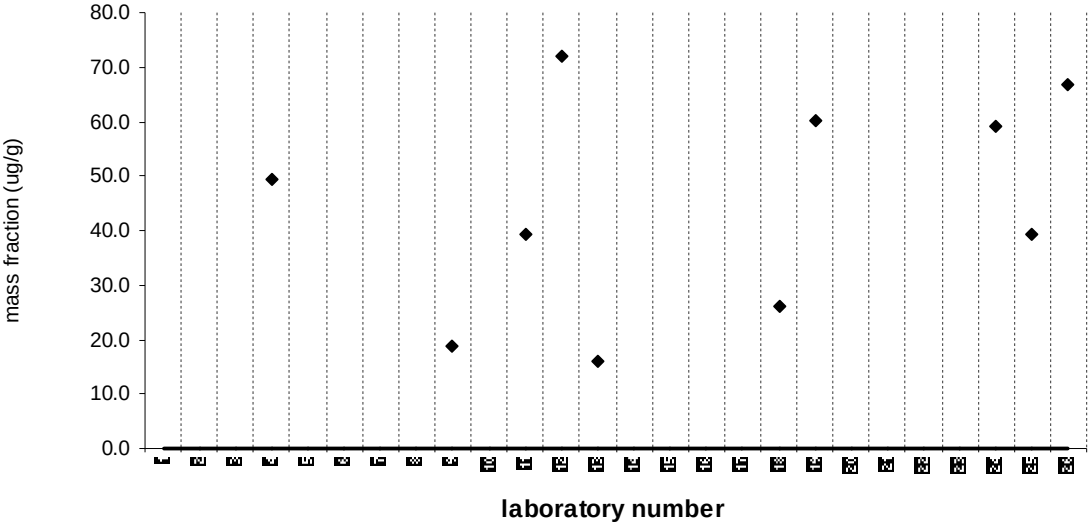


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

retene **SRM 1582**

Target Value = no target ug/g

Reported Results: 12 Quantitative Results: 10 Median of Reported Results: 44.5 ug/g

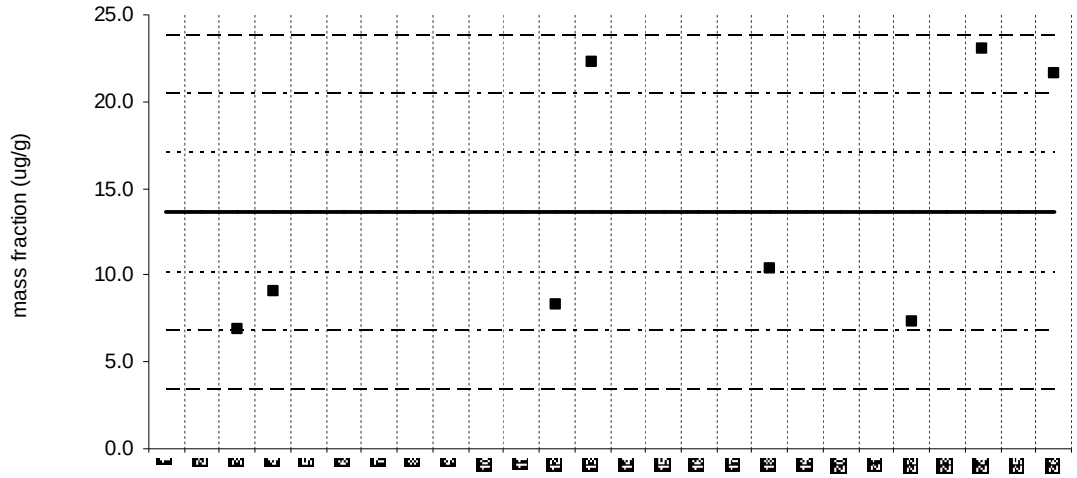


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

benzothiophene **QA10OIL01**

Assigned mean = 13.6 ug/g s = 7.3 ug/g 95% CI = 5.1 ug/g Assigned median = 9.68 ug/g

Reported Results: 11 Quantitative Results: 8

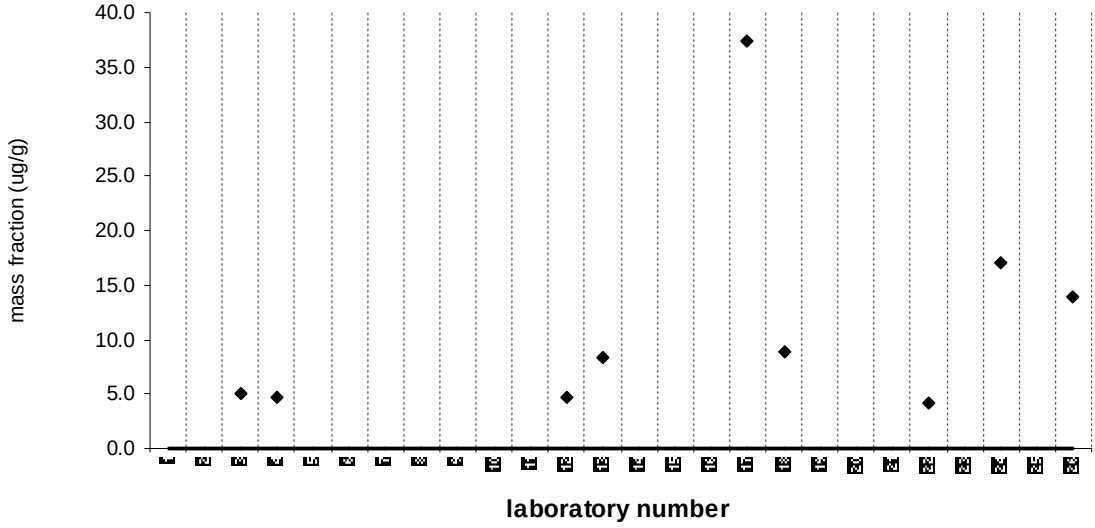


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

benzothiophene **SRM 1582**

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 9 Median of Reported Results: 8.31 ug/g

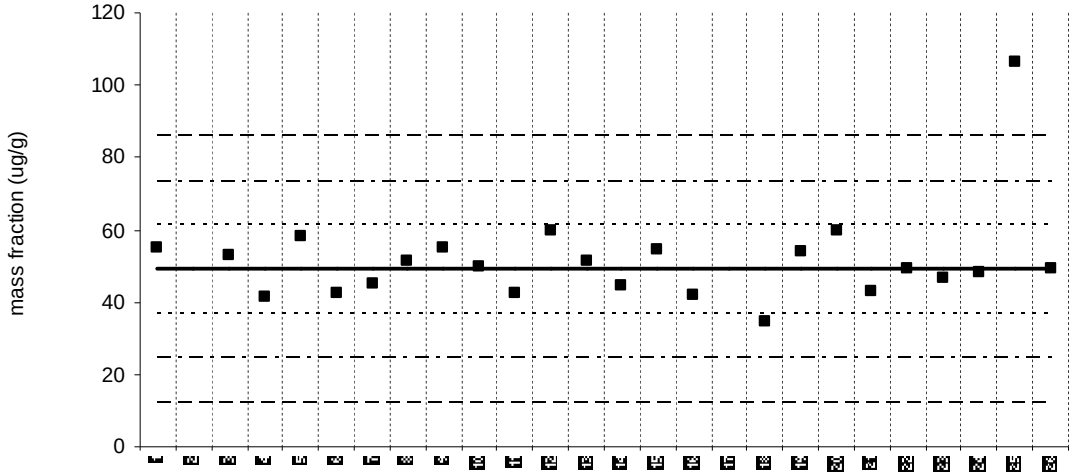


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

dibenzothiophene **QA10OIL01**

Assigned mean = 49.1 ug/g s = 6.6 ug/g 95% CI = 2.7 ug/g Assigned median = 49.3 ug/g

Reported Results: 25 Quantitative Results: 24

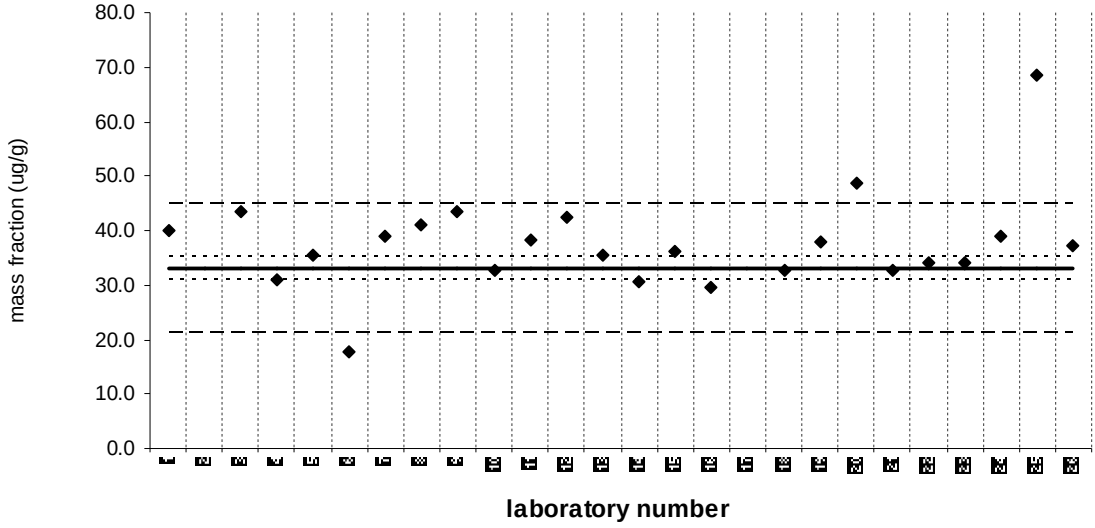


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

dibenzothiophene **SRM 1582**

certified Value = 33 ug/g ; 95% CI 2 ug/g

Reported Results: 25 Quantitative Results: 24 Median of Reported Results: 36.8 ug/g

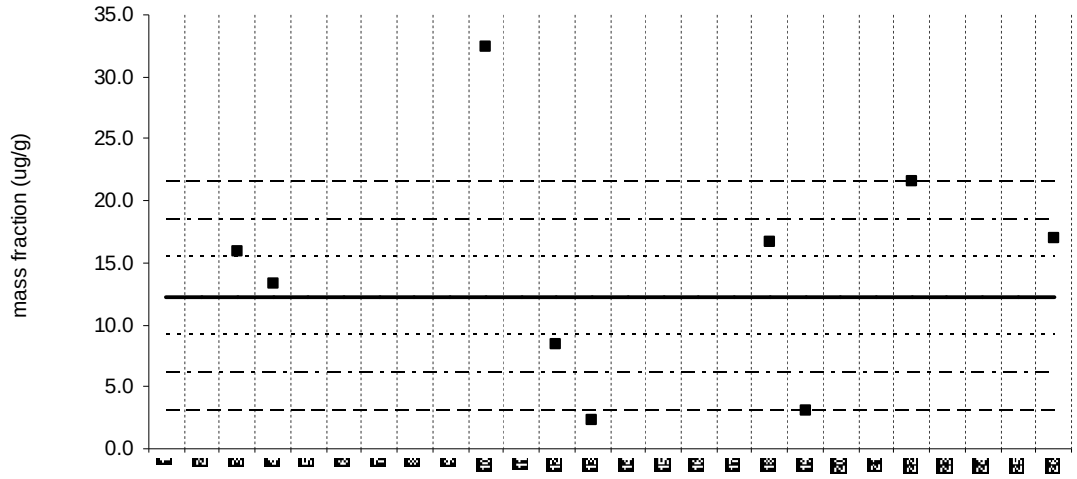


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

naphthobenzothiophene **QA10OIL01**

Assigned mean = 12.3 ug/g s = 7.0 ug/g 95% CI = 4.8 ug/g Assigned median = 14.6 ug/g

Reported Results: 10 Quantitative Results: 9



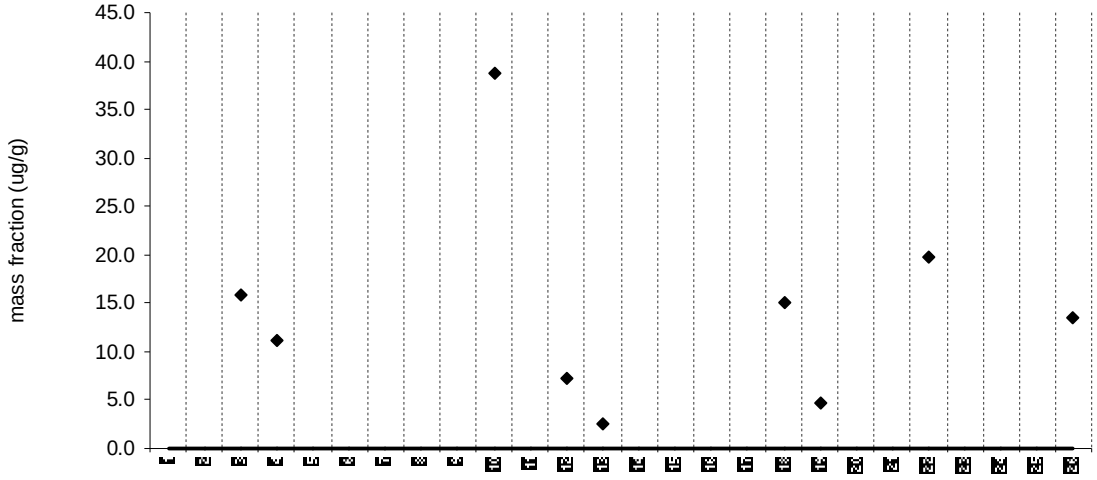
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

naphthobenzothiophene **SRM 1582**

Target Value = no target ug/g

Reported Results: 10 Quantitative Results: 9 Median of Reported Results: 13.5 ug/g



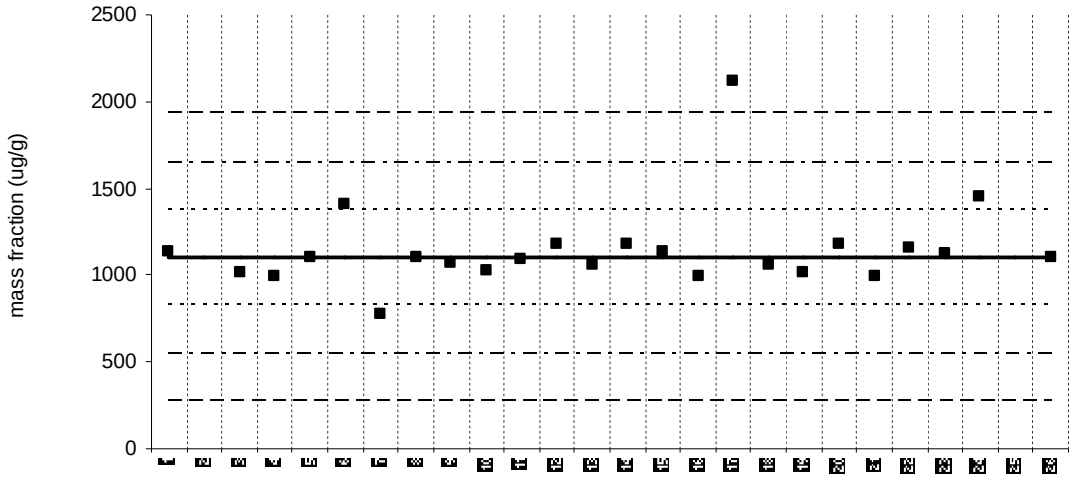
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

1-methylnaphthalene **QA10OIL01**

Assigned mean = 1102 ug/g s = 137 ug/g 95% CI = 56 ug/g Assigned median = 1100 ug/g

Reported Results: 24 Quantitative Results: 24

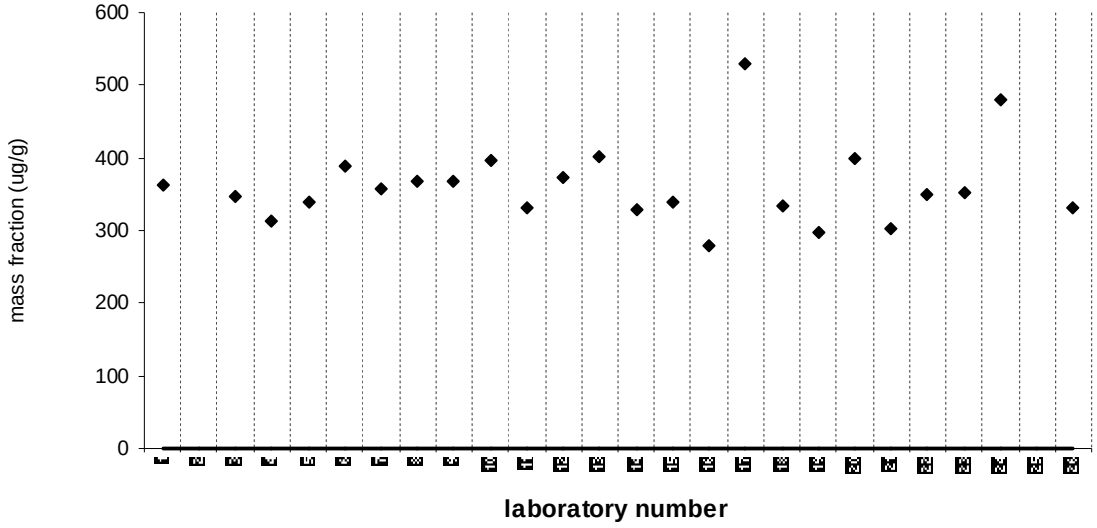


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

1-methylnaphthalene **SRM 1582**

Target Value = no target ug/g

Reported Results: 24 Quantitative Results: 24 Median of Reported Results: 351 ug/g

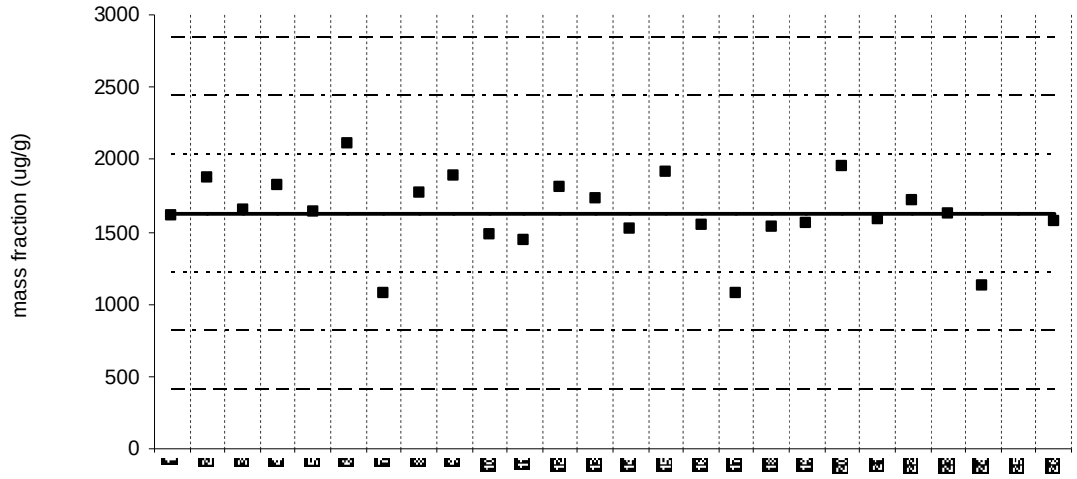


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

2-methylnaphthalene **QA10OIL01**

Assigned mean = 1623 ug/g s = 259 ug/g 95% CI = 101 ug/g Assigned median = 1621 ug/g

Reported Results: 25 Quantitative Results: 25

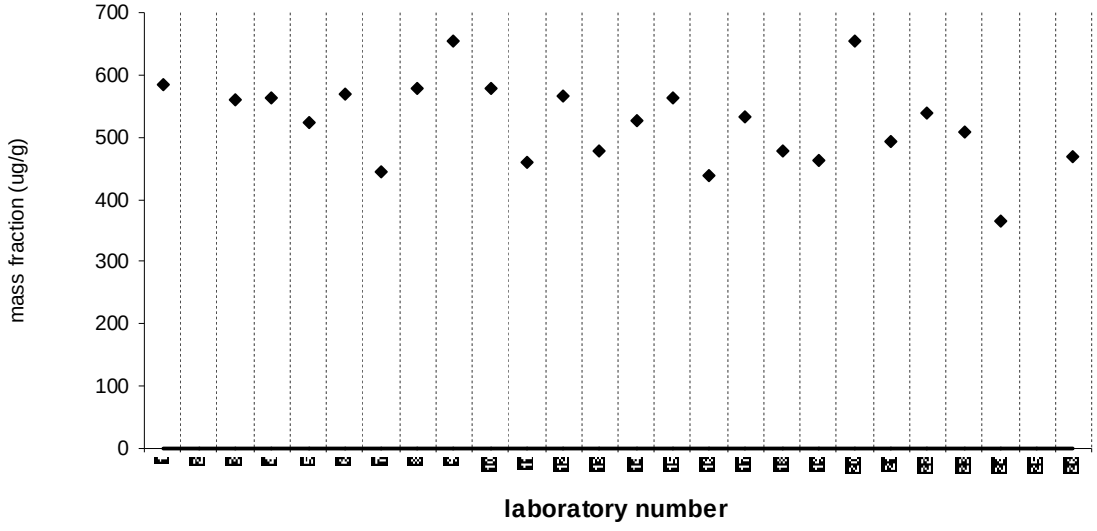


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

2-methylnaphthalene **SRM 1582**

Target Value = no target ug/g

Reported Results: 24 Quantitative Results: 24 Median of Reported Results: 528 ug/g

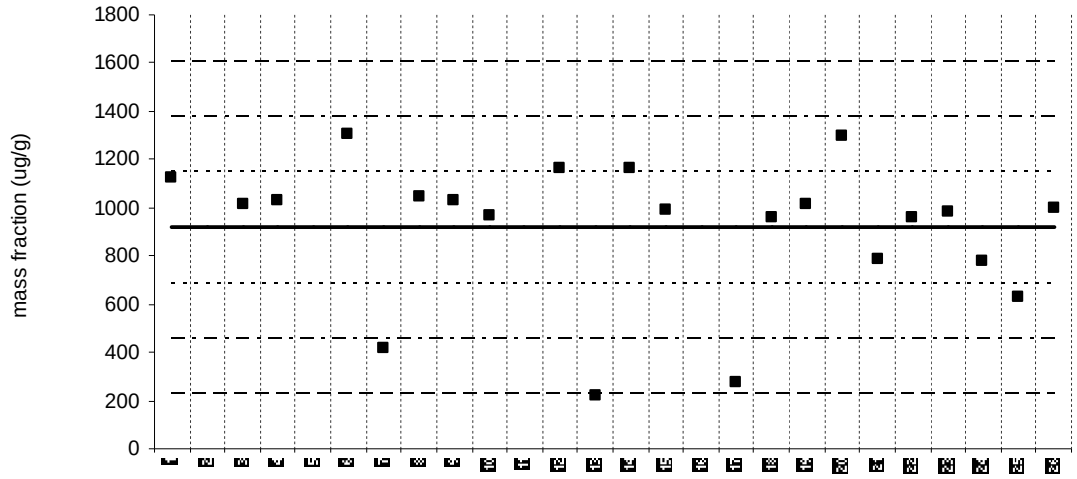


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

2,6-dimethylnaphthalene **QA10OIL01**

Assigned mean = 916 ug/g s = 293 ug/g 95% CI = 122 ug/g Assigned median = 997 ug/g

Reported Results: 23 Quantitative Results: 22



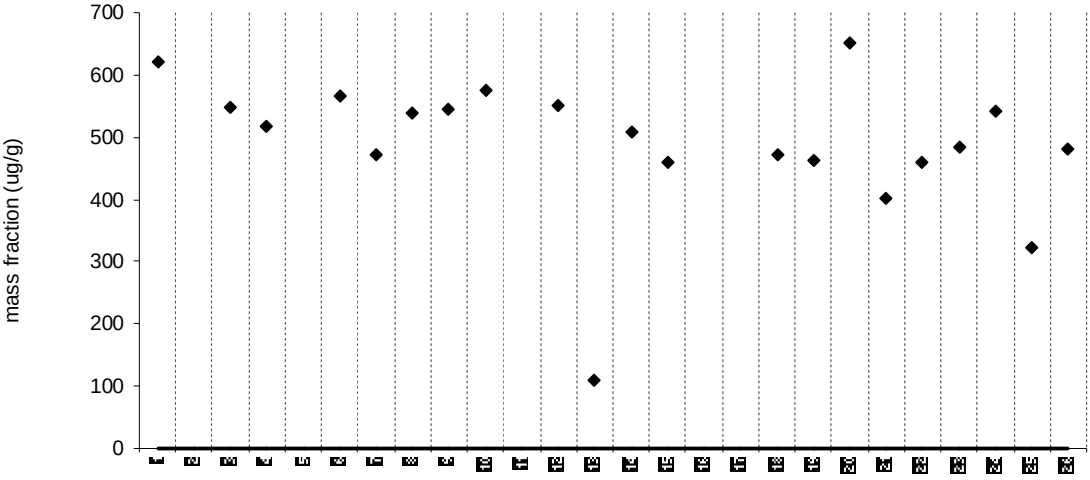
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

2,6-dimethylnaphthalene **SRM 1582**

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 21 Median of Reported Results: 509 ug/g



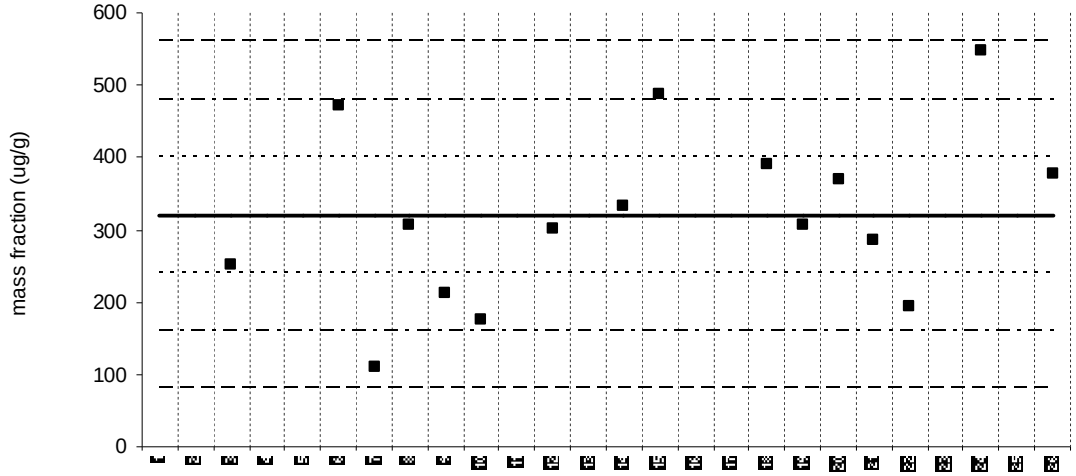
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

1,6,7-trimethylnaphthalene **QA10OIL01**

Assigned mean = 320 ug/g s = 119 ug/g 95% CI = 58 ug/g Assigned median = 306 ug/g

Reported Results: 16 Quantitative Results: 16



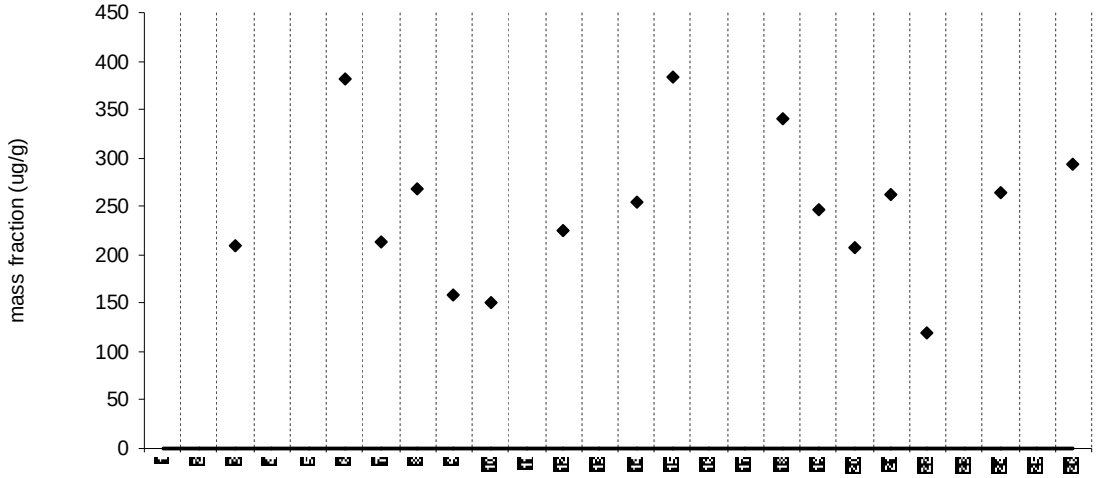
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

1,6,7-trimethylnaphthalene **SRM 1582**

Target Value = no target ug/g

Reported Results: 16 Quantitative Results: 16 Median of Reported Results: 250 ug/g



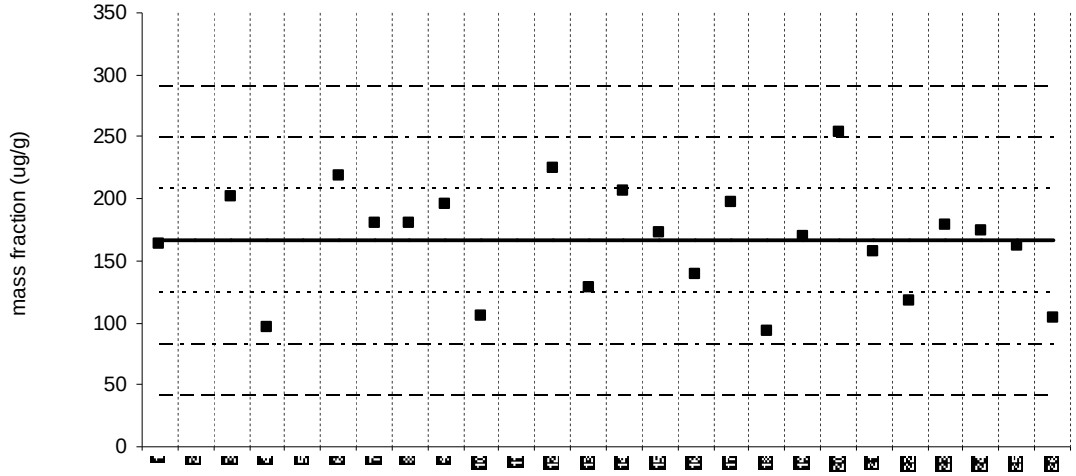
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

1-methylphenanthrene **QA10OIL01**

Assigned mean = 166 ug/g s = 43 ug/g 95% CI = 18 ug/g Assigned median = 173 ug/g

Reported Results: 23 Quantitative Results: 23

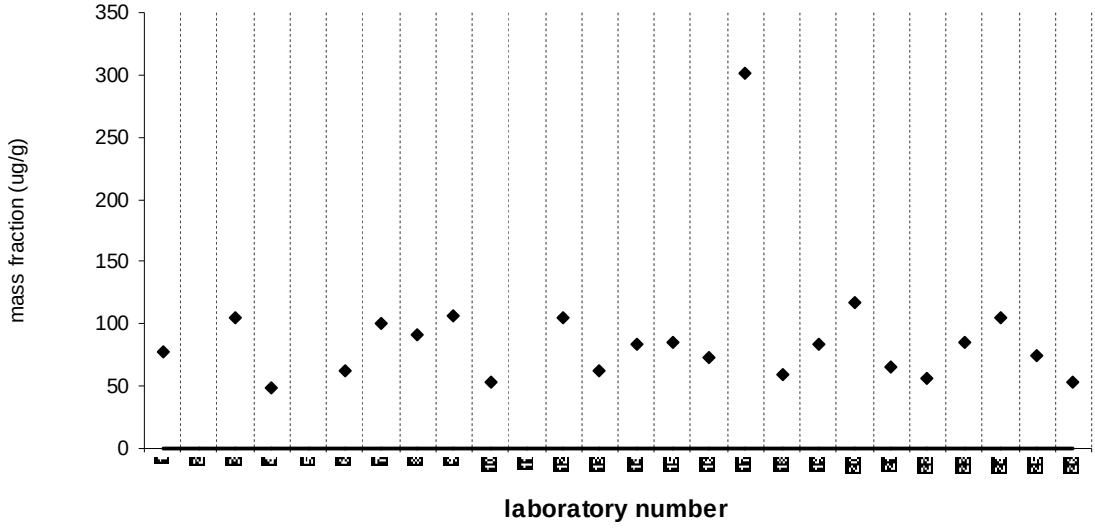


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

1-methylphenanthrene **SRM 1582**

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 23 Median of Reported Results: 83.3 ug/g

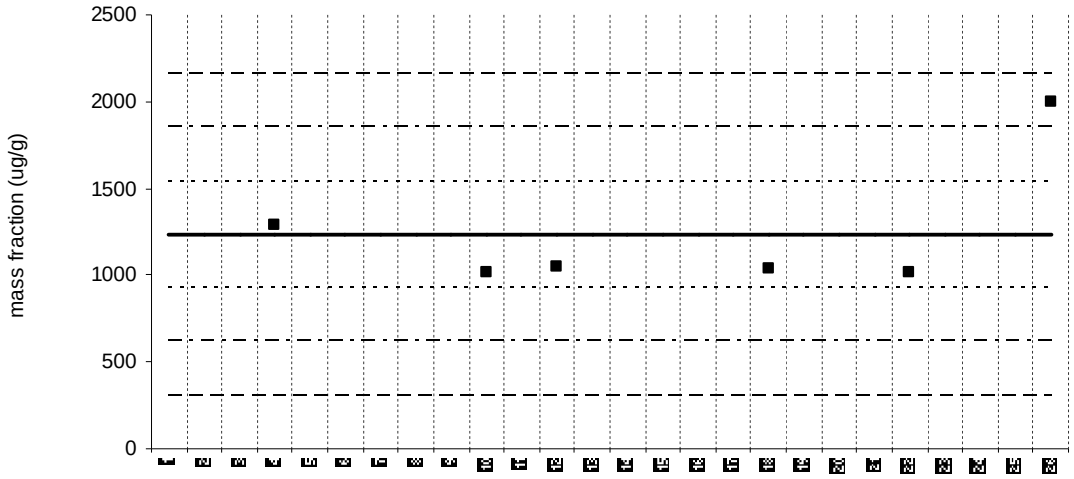


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C1-decalins **QA10OIL01**

Assigned mean = 1235 ug/g s = 390 ug/g 95% CI = 312 ug/g Assigned median = 1042 ug/g

Reported Results: 9 Quantitative Results: 6



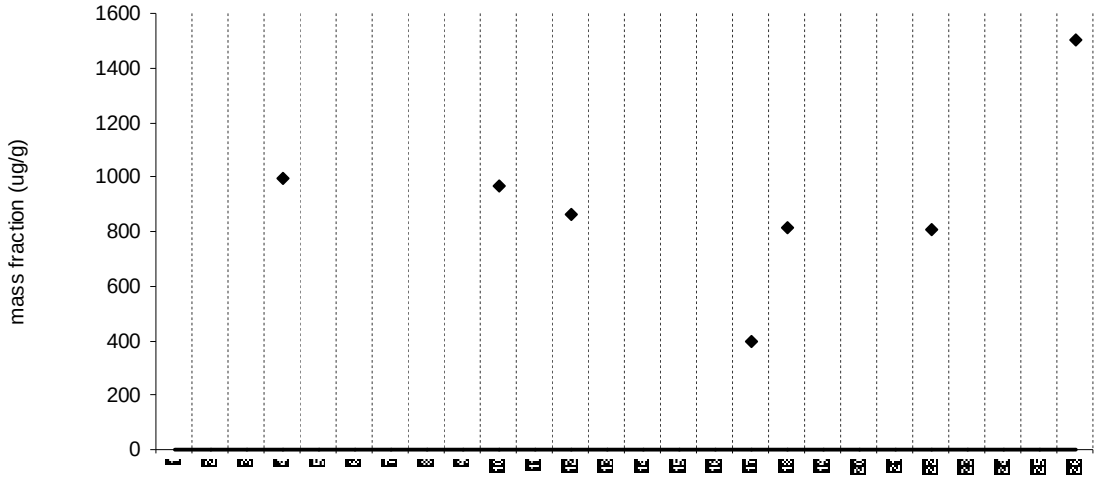
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C1-decalins **SRM 1582**

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 7 Median of Reported Results: 859 ug/g



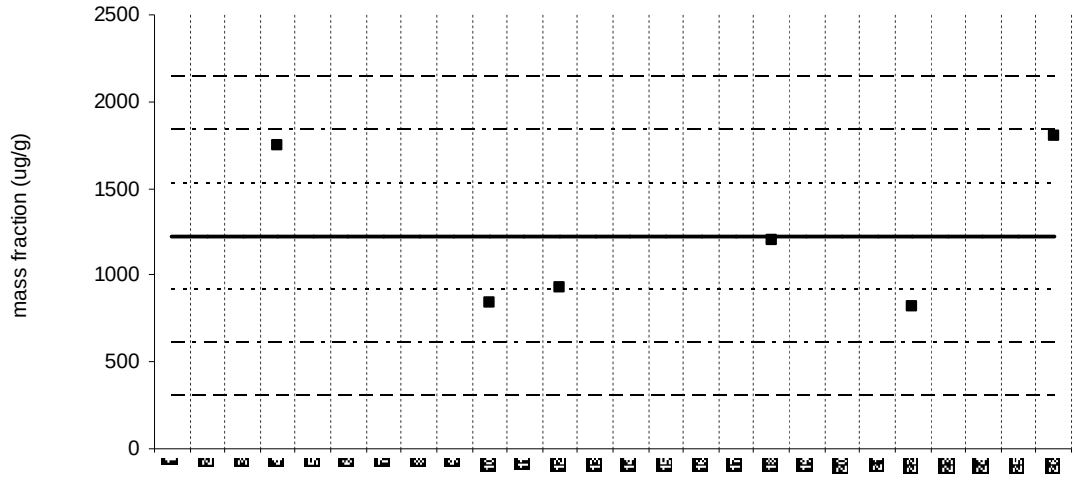
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C2-decalins **QA10OIL01**

Assigned mean = 1221 ug/g s = 448 ug/g 95% CI = 359 ug/g Assigned median = 1064 ug/g

Reported Results: 9 Quantitative Results: 6

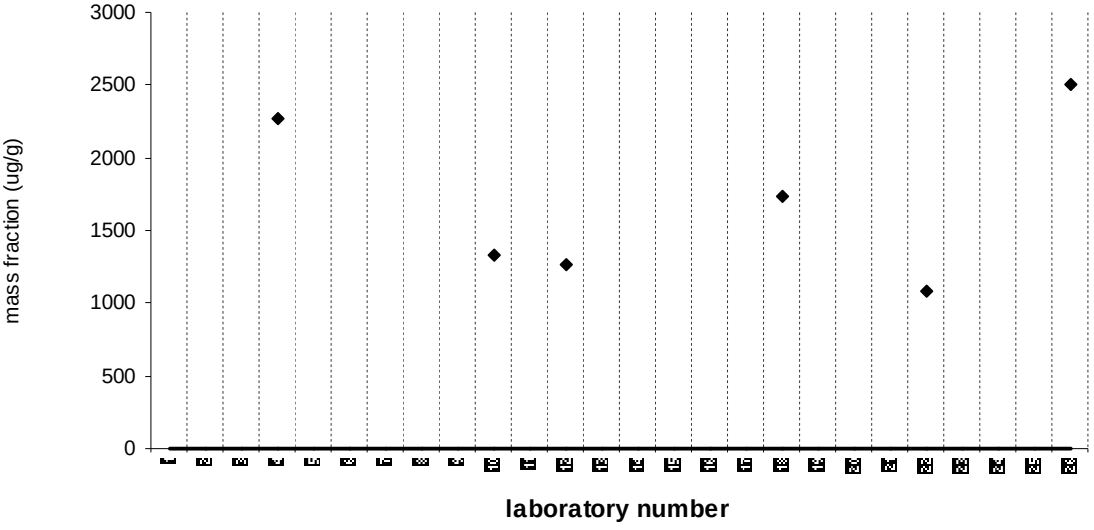


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C2-decalins **SRM 1582**

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 6 Median of Reported Results: 1533 ug/g

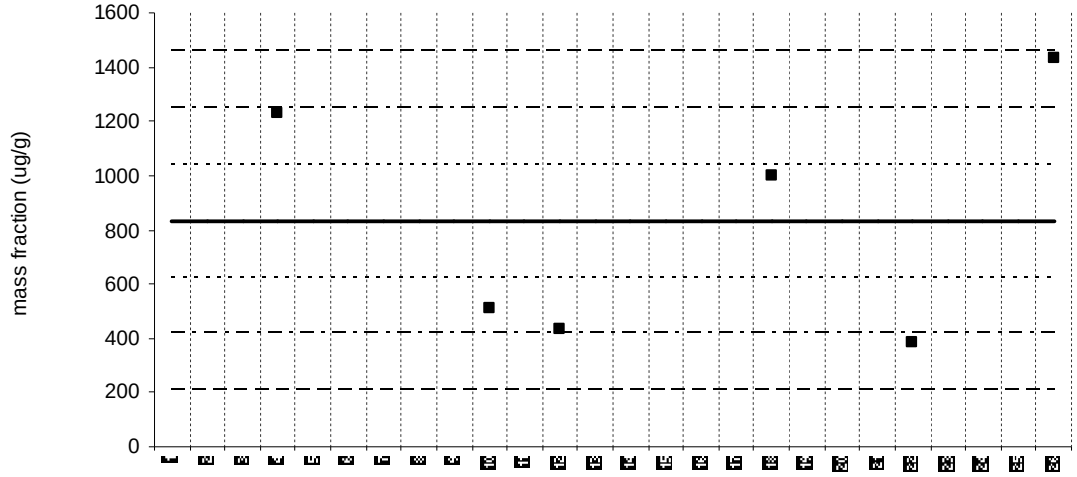


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C3-decalins **QA10OIL01**

Assigned mean = 833 ug/g s = 449 ug/g 95% CI = 359 ug/g Assigned median = 757 ug/g

Reported Results: 9 Quantitative Results: 6



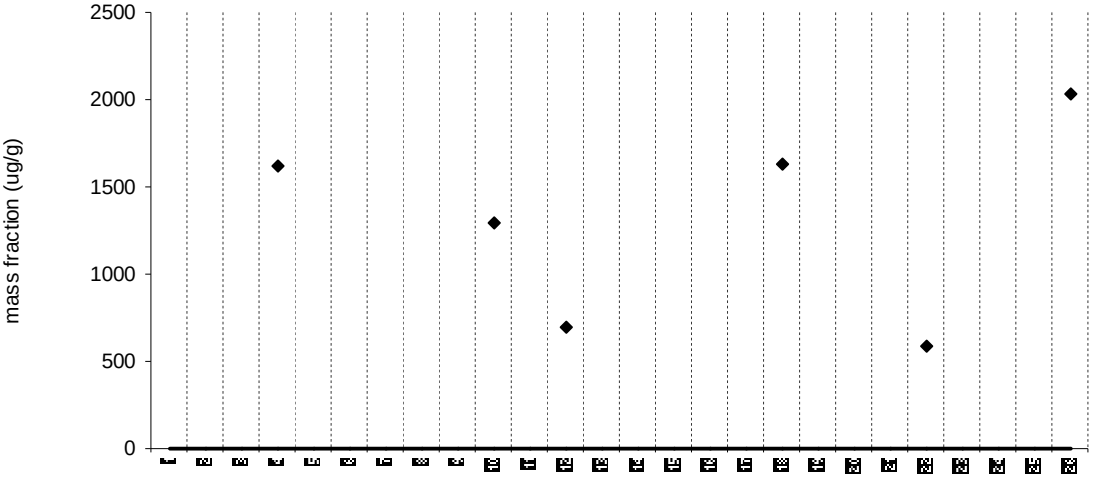
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C3-decalins **SRM 1582**

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 6 Median of Reported Results: 1457 ug/g



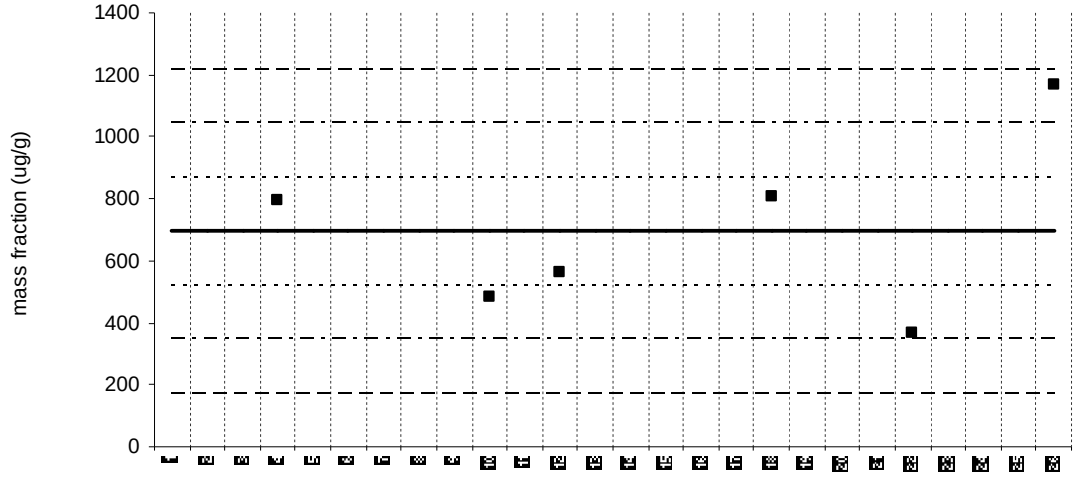
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C4-decalins **QA10OIL01**

Assigned mean = 696 ug/g s = 289 ug/g 95% CI = 231 ug/g Assigned median = 678 ug/g

Reported Results: 9 Quantitative Results: 6



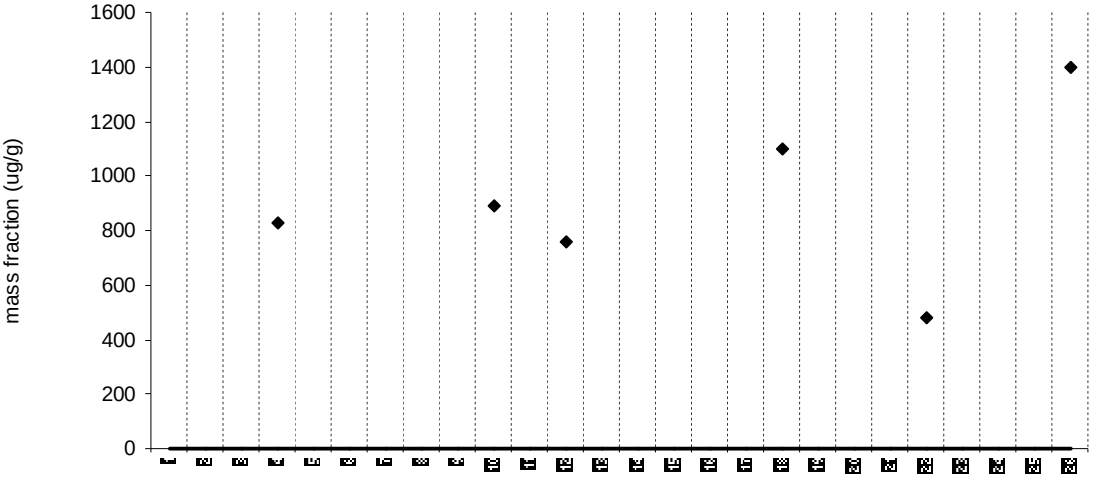
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C4-decalins **SRM 1582**

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 6 Median of Reported Results: 860 ug/g



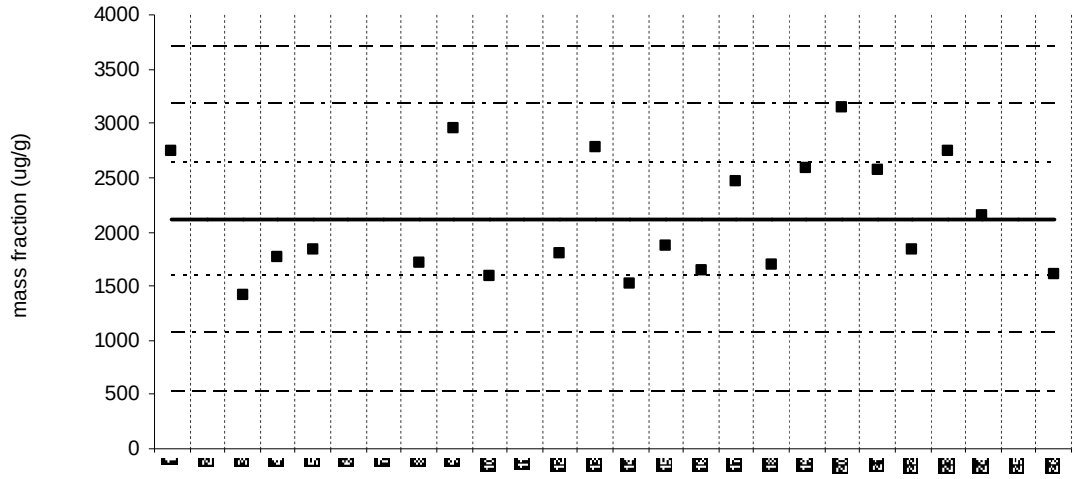
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C1-naphthalenes **QA10OIL01**

Assigned mean = 2115 ug/g s = 544 ug/g 95% CI = 233 ug/g Assigned median = 1833 ug/g

Reported Results: 21 Quantitative Results: 21



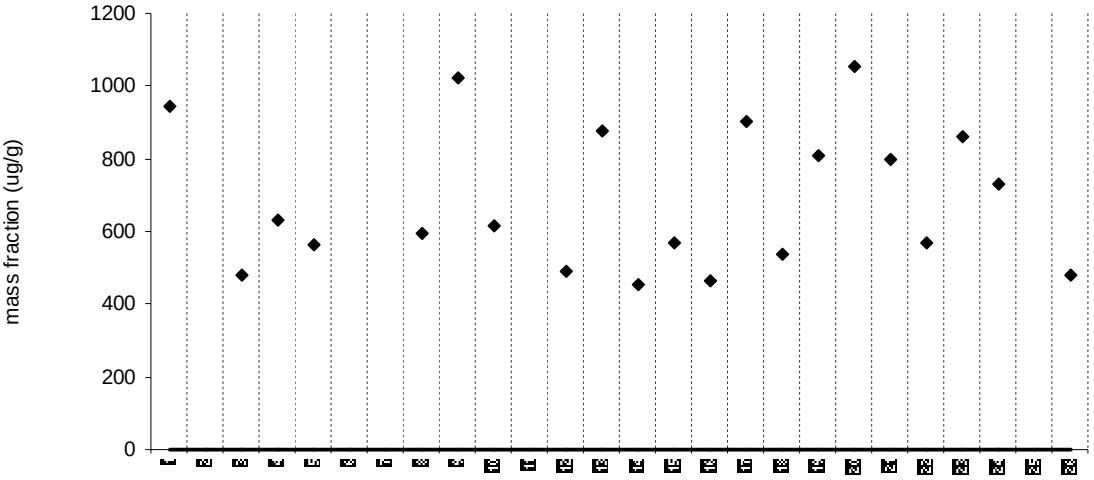
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C1-naphthalenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 21 Quantitative Results: 21 Median of Reported Results: 615 ug/g



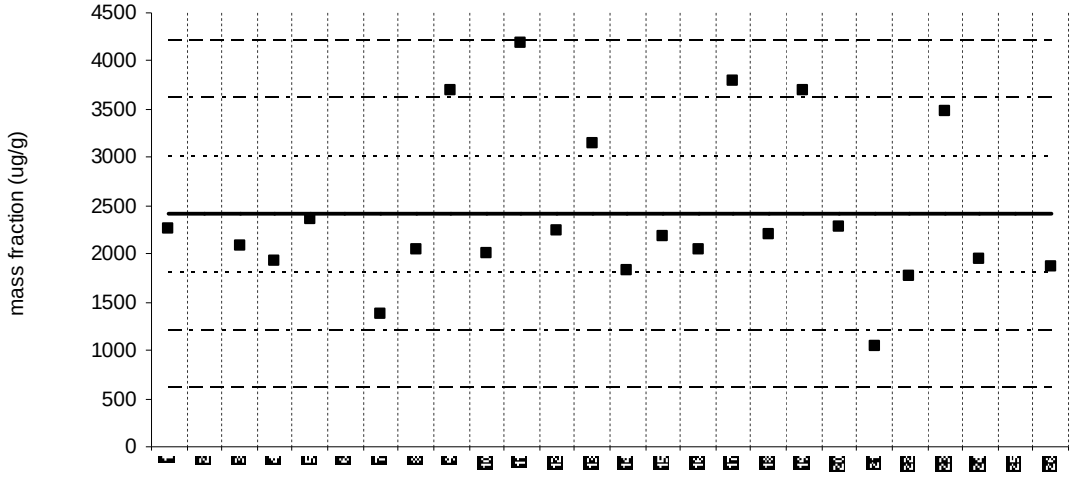
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C2-naphthalenes **QA10OIL01**

Assigned mean = 2409 ug/g s = 830 ug/g 95% CI = 339 ug/g Assigned median = 2173 ug/g

Reported Results: 23 Quantitative Results: 23

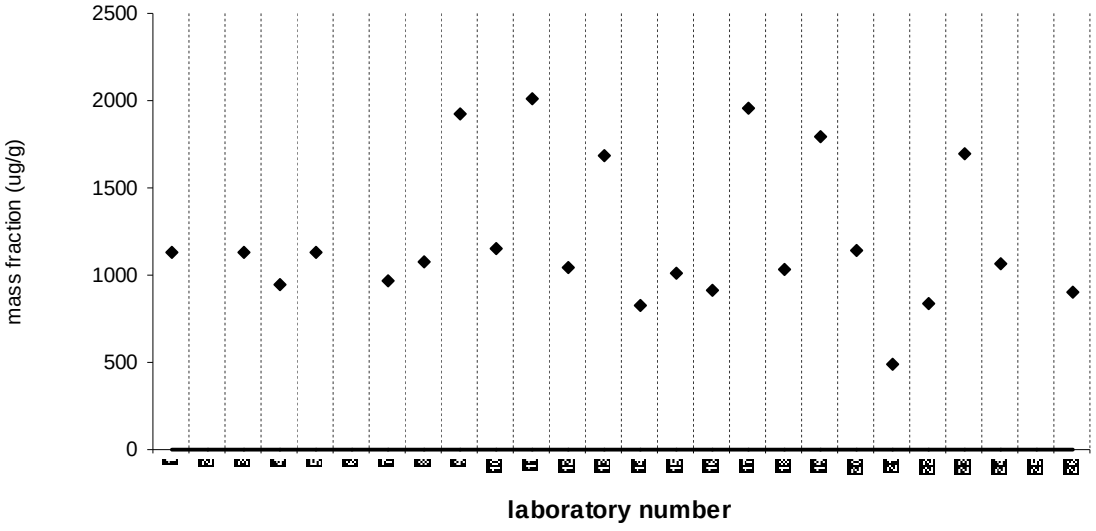


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C2-naphthalenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 23 Median of Reported Results: 1080 ug/g

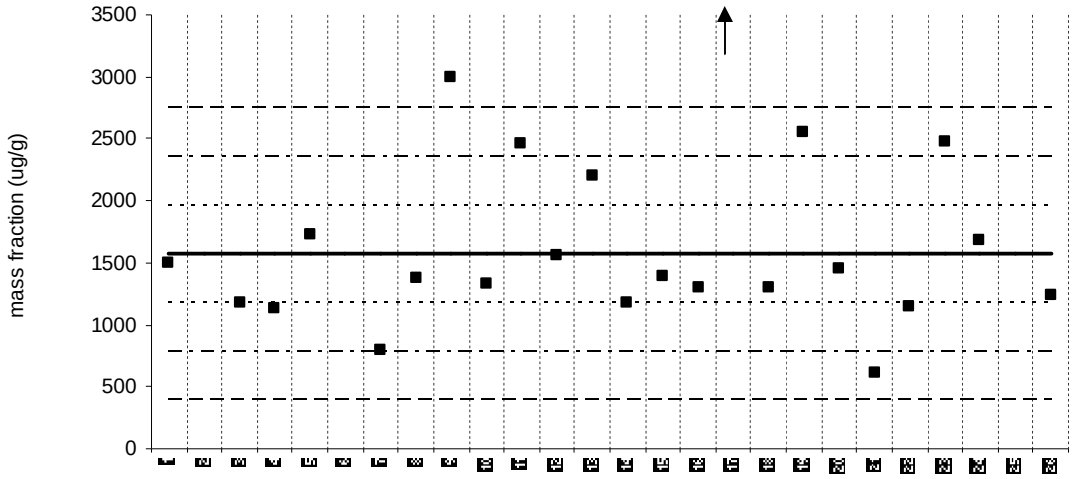


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C3-naphthalenes **QA10OIL01**

Assigned mean = 1571 ug/g s = 604 ug/g 95% CI = 252 ug/g Assigned median = 1383 ug/g

Reported Results: 23 Quantitative Results: 23



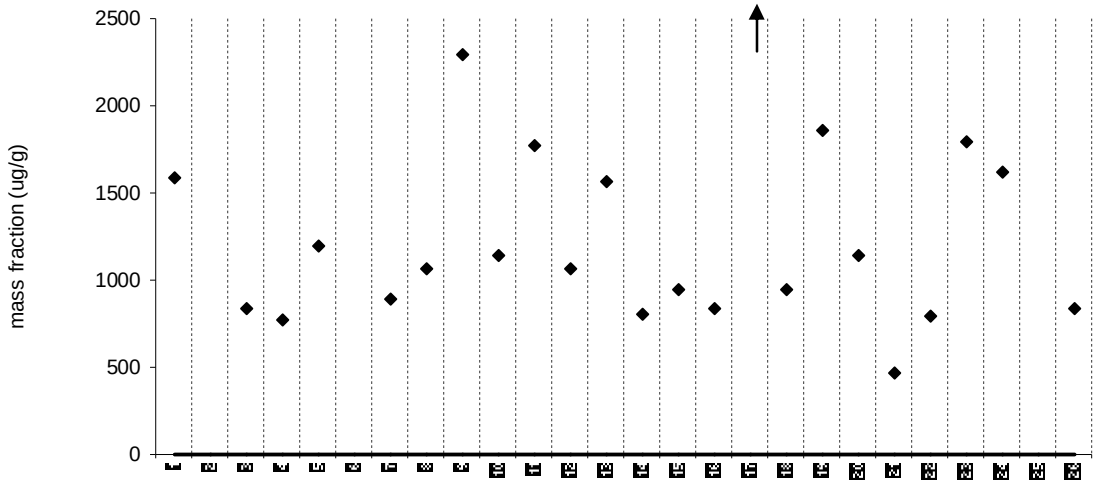
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C3-naphthalenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 23 Median of Reported Results: 1062 ug/g



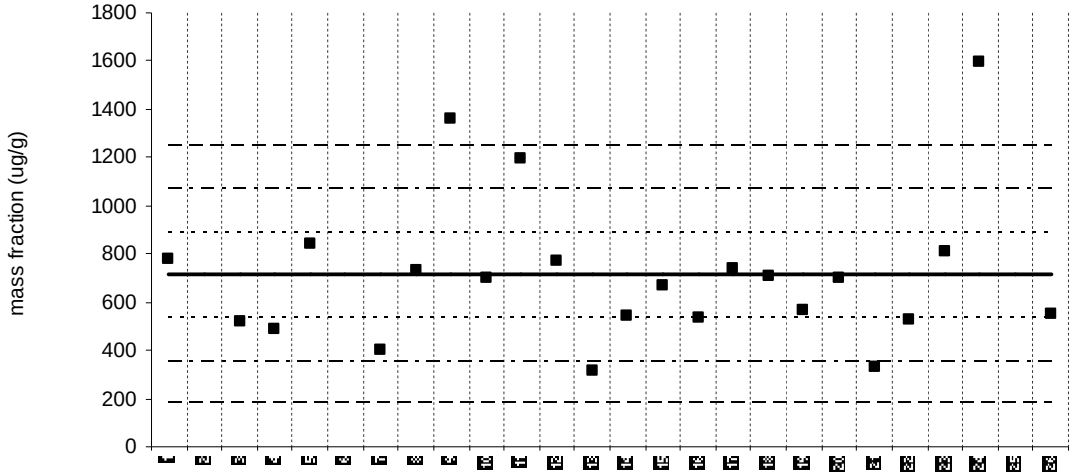
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C4-naphthalenes **QA10OIL01**

Assigned mean = 712 ug/g s = 308 ug/g 95% CI = 126 ug/g Assigned median = 698 ug/g

Reported Results: 23 Quantitative Results: 23

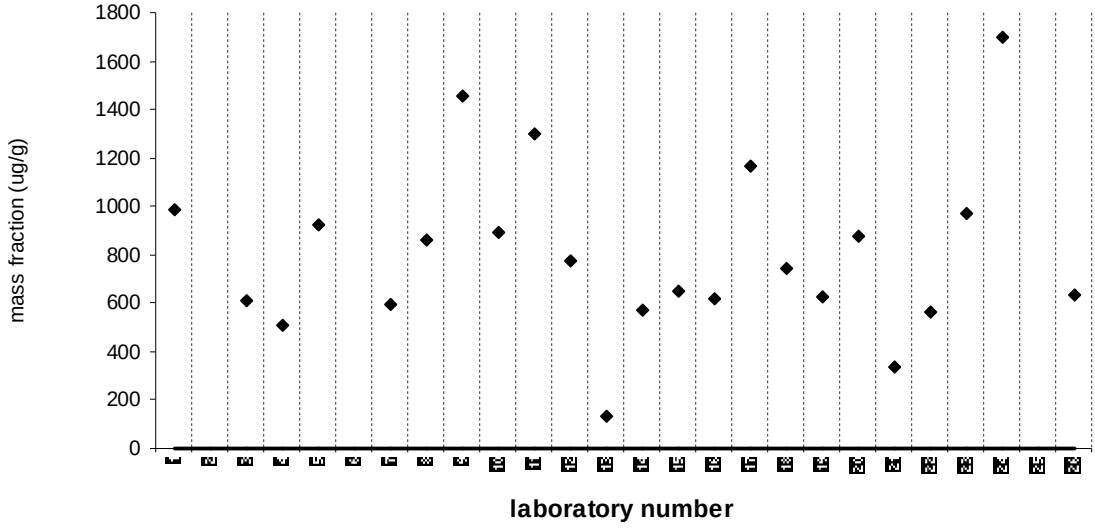


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C4-naphthalenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 23 Median of Reported Results: 740 ug/g

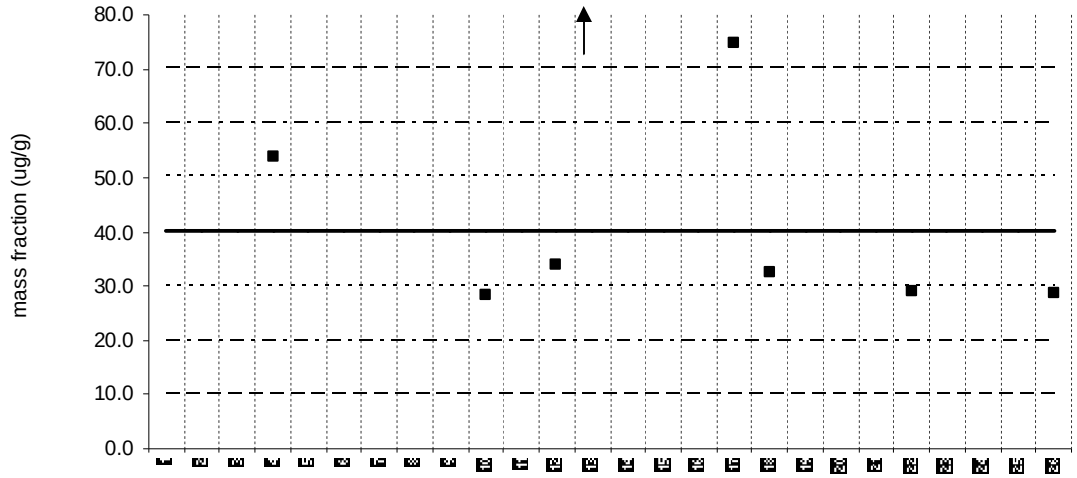


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C1-benzothiophenes — QA10OIL01

Assigned mean = 40.1 ug/g s = 17.8 ug/g 95% CI = 13.2 ug/g Assigned median = 32.3 ug/g

Reported Results: 9 Quantitative Results: 8

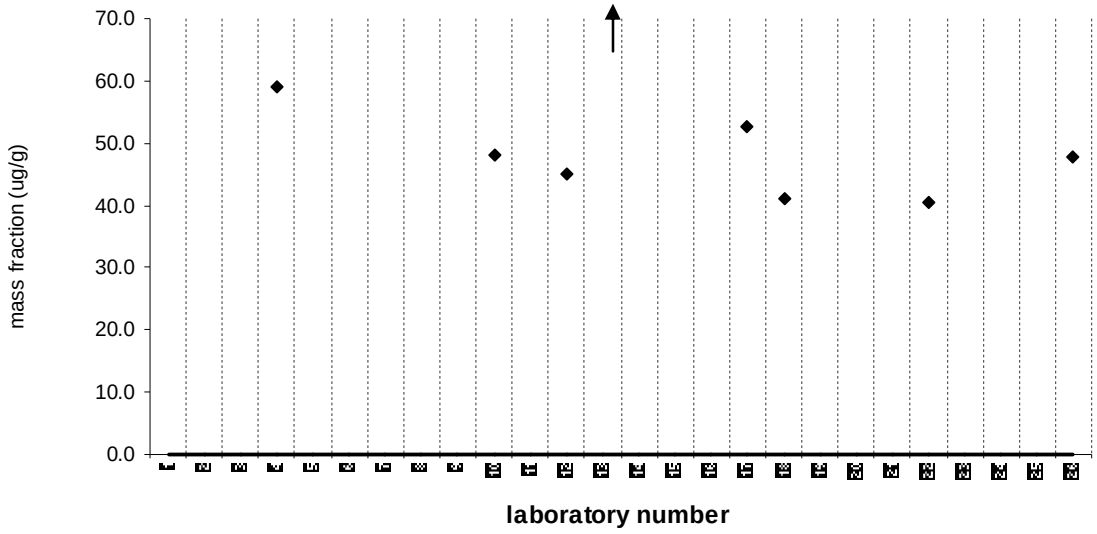


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C1-benzothiophenes — SRM 1582

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 8 Median of Reported Results: 47.9 ug/g

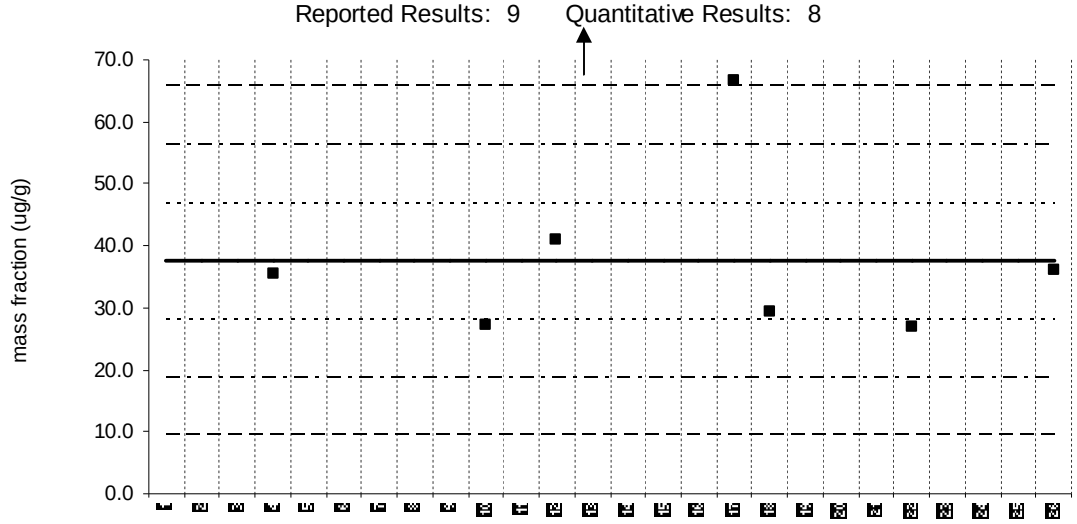


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C2-benzothiophenes **QA10OIL01**

Assigned mean = 37.5 ug/g s = 13.8 ug/g 95% CI = 10.2 ug/g Assigned median = 35.6 ug/g

Reported Results: 9 Quantitative Results: 8

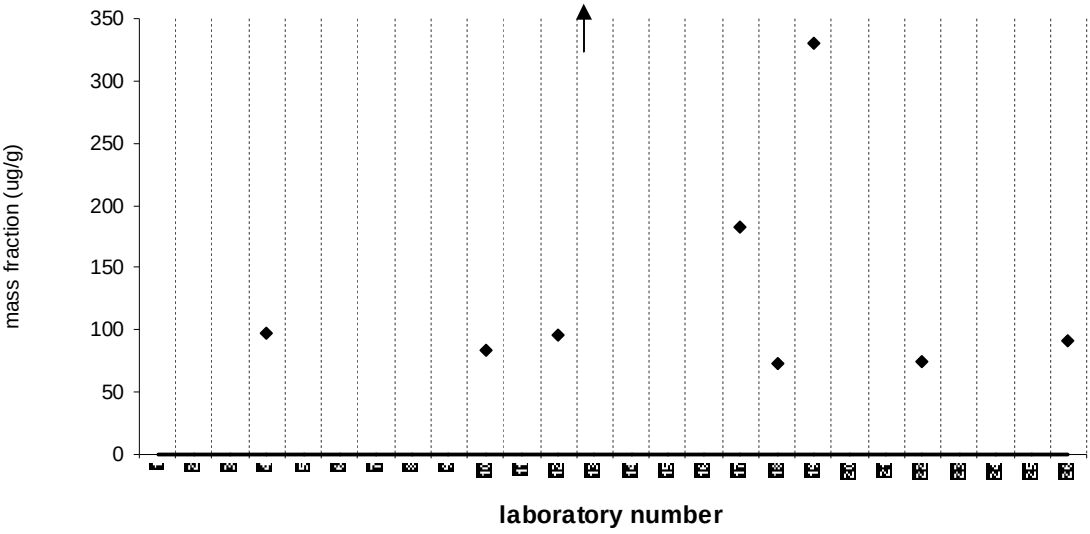


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C2-benzothiophenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 9 Median of Reported Results: 96.2 ug/g

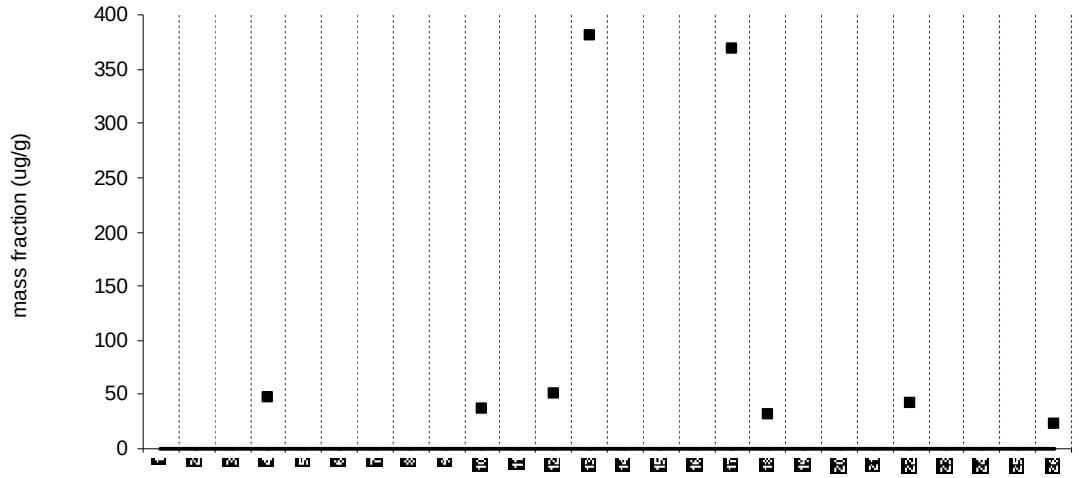


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C3-benzothiophenes **QA10OIL01**

Assigned value = No assigned value

Reported Results: 9 Quantitative Results: 8



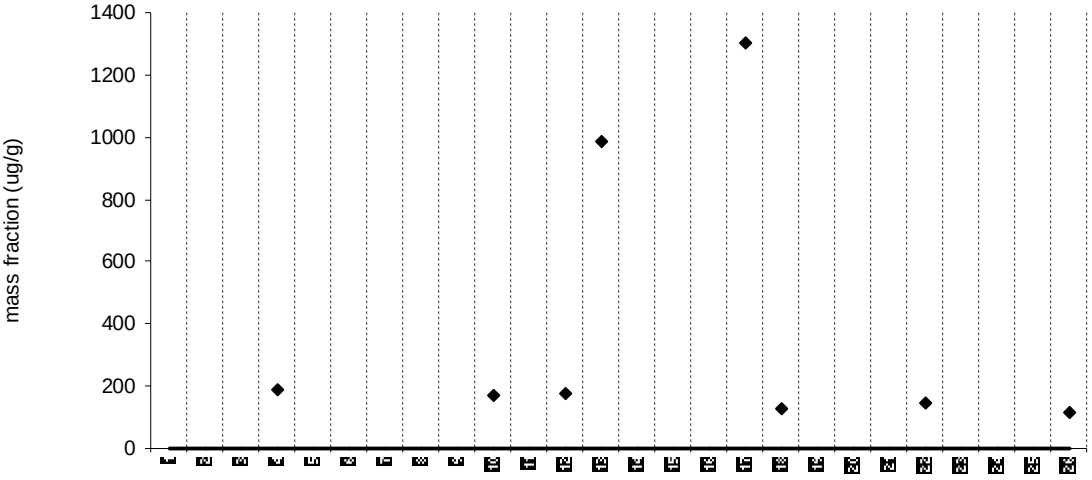
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C3-benzothiophenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 8 Median of Reported Results: not calculated



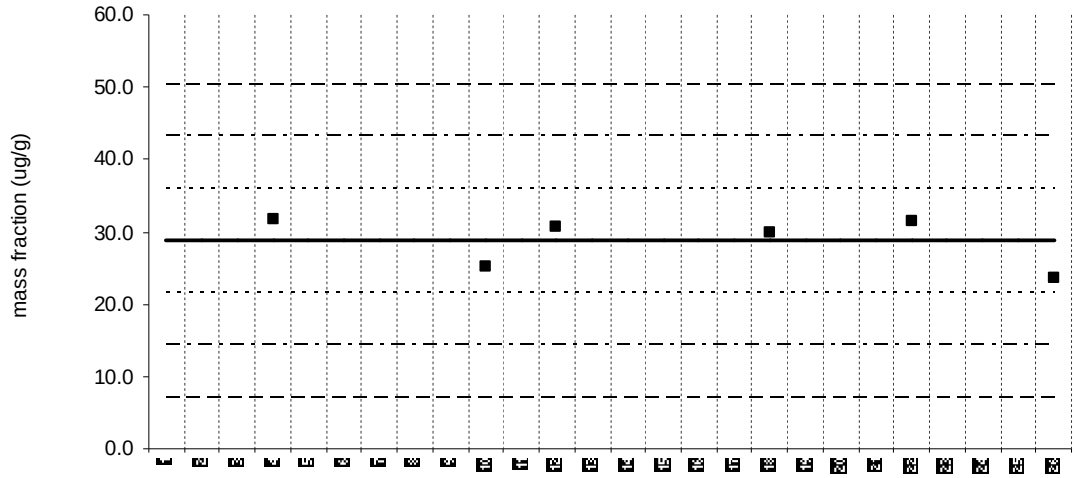
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C4-benzothiophenes **QA10OIL01**

Assigned mean = 28.8 ug/g s = 3.5 ug/g 95% CI = 2.8 ug/g Assigned median = 30.3 ug/g

Reported Results: 8 Quantitative Results: 6

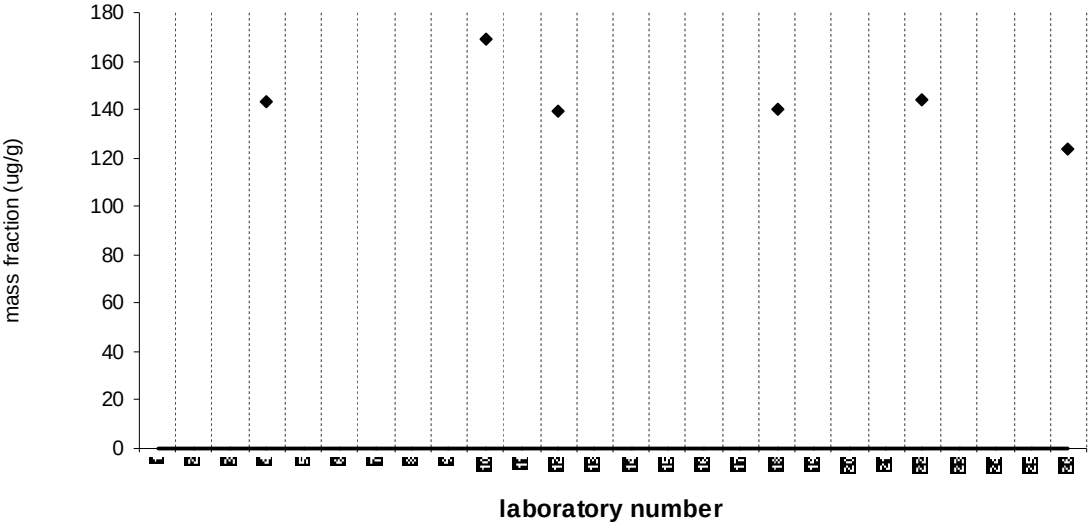


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C4-benzothiophenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 8 Quantitative Results: 6 Median of Reported Results: 142 ug/g

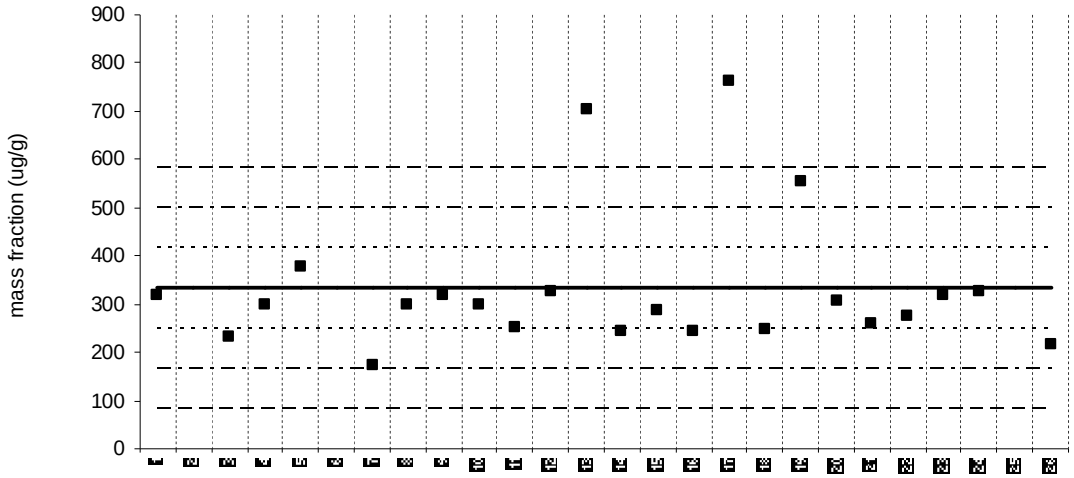


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C1-fluorenes **QA10OIL01**

Assigned mean = 332 ug/g s = 146 ug/g 95% CI = 60 ug/g Assigned median = 299 ug/g

Reported Results: 23 Quantitative Results: 23



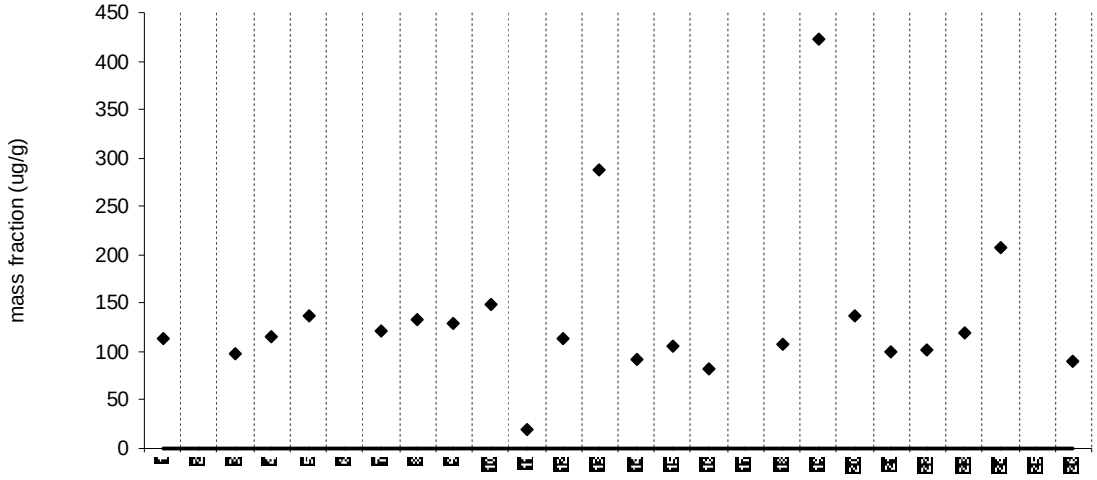
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C1-fluorenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 22 Median of Reported Results: 115 ug/g



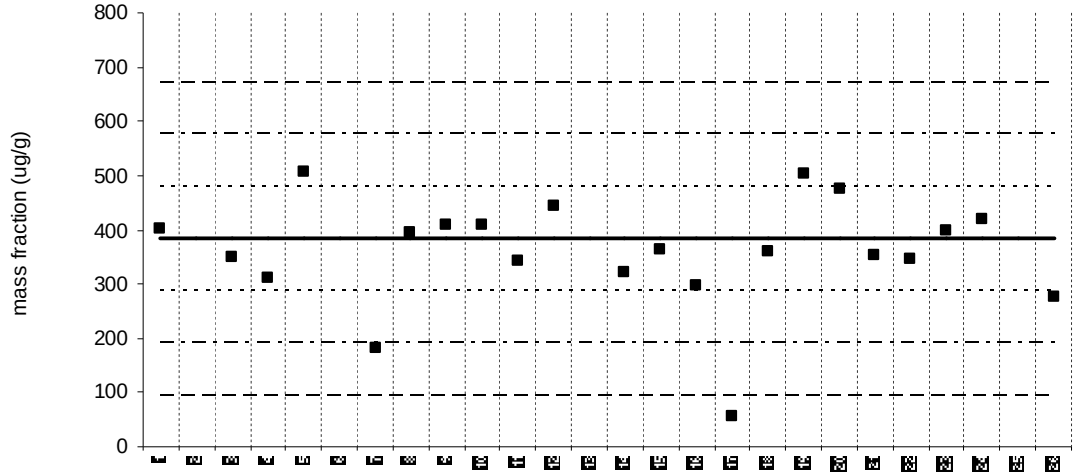
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C2-fluorenes **QA10OIL01**

Assigned mean = 384 ug/g s = 64 ug/g 95% CI = 28 ug/g Assigned median = 380 ug/g

Reported Results: 22 Quantitative Results: 22



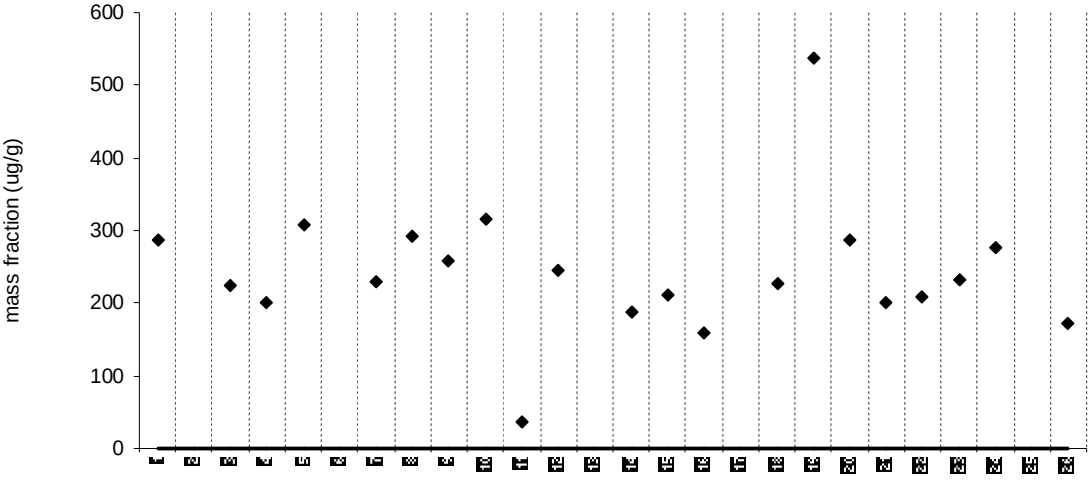
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C2-fluorenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 22 Quantitative Results: 21 Median of Reported Results: 229 ug/g



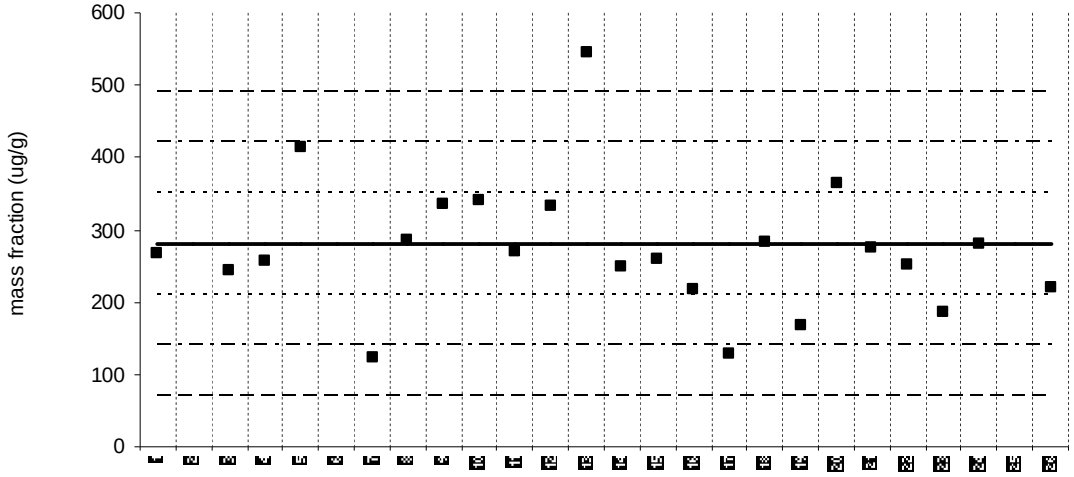
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C3-fluorenes **QA10OIL01**

Assigned mean = 280 ug/g s = 87 ug/g 95% CI = 37 ug/g Assigned median = 267 ug/g

Reported Results: 23 Quantitative Results: 23



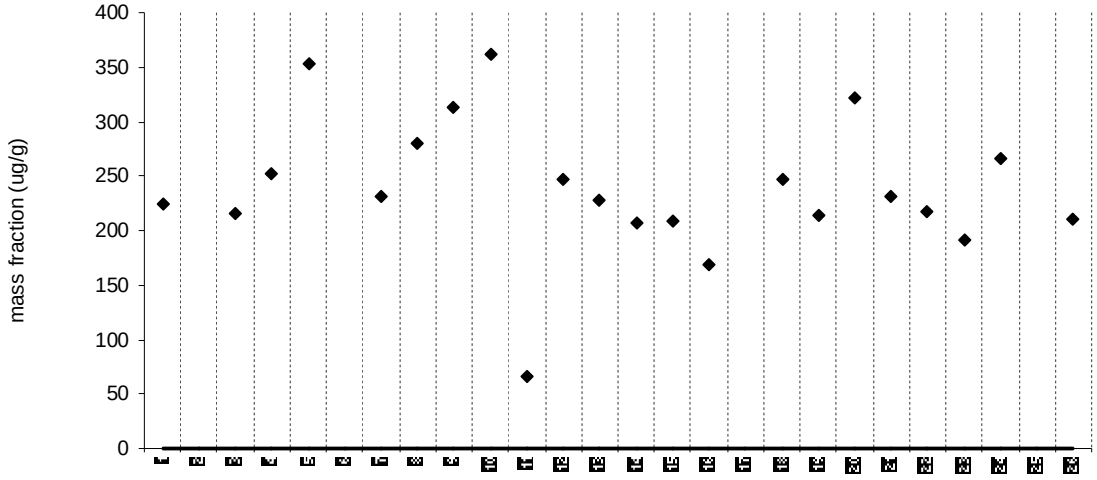
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C3-fluorenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 22 Quantitative Results: 22 Median of Reported Results: 230 ug/g



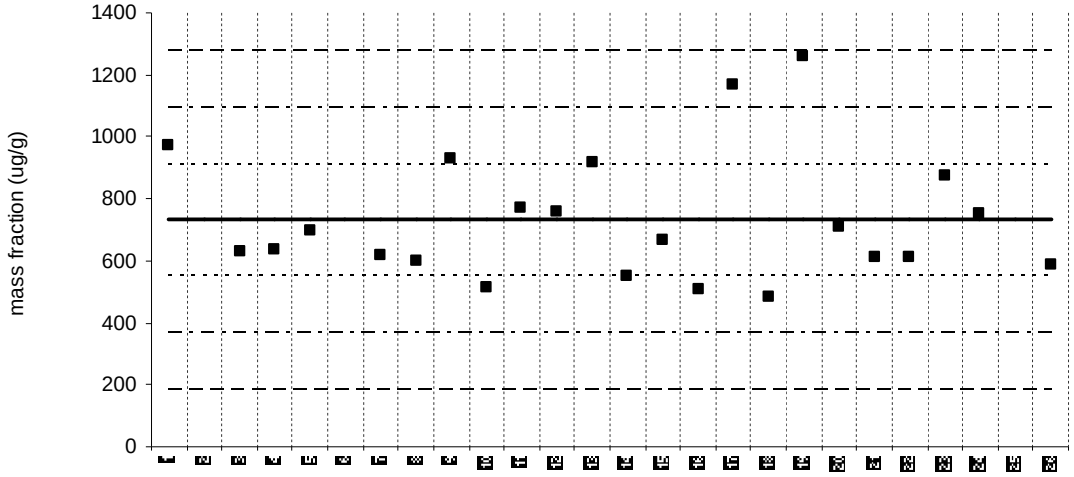
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C1-phenanthrenes/anthracenes **QA10OIL01**

Assigned mean = 731 ug/g s = 204 ug/g 95% CI = 83 ug/g Assigned median = 667 ug/g

Reported Results: 23 Quantitative Results: 23



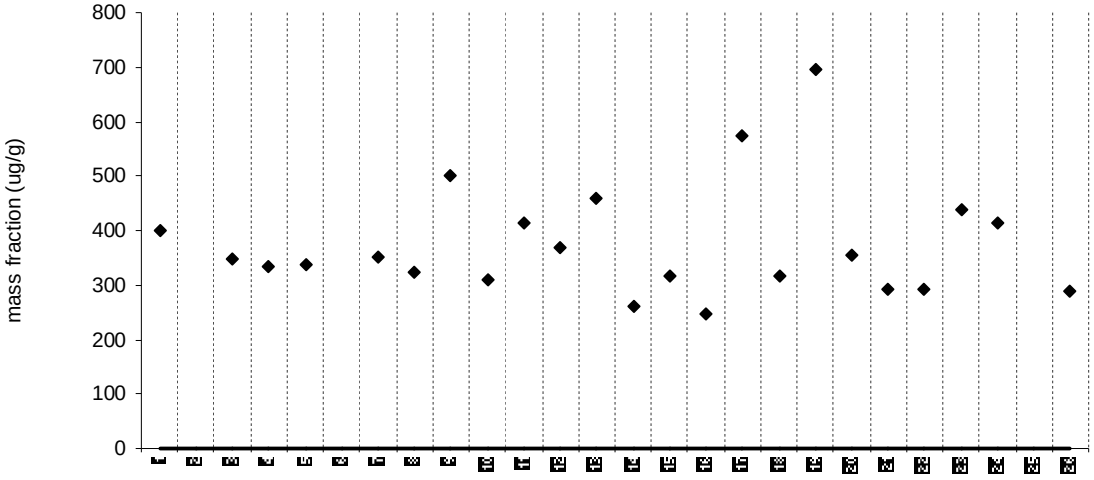
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C1-phenanthrenes/anthracenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 23 Median of Reported Results: 347 ug/g



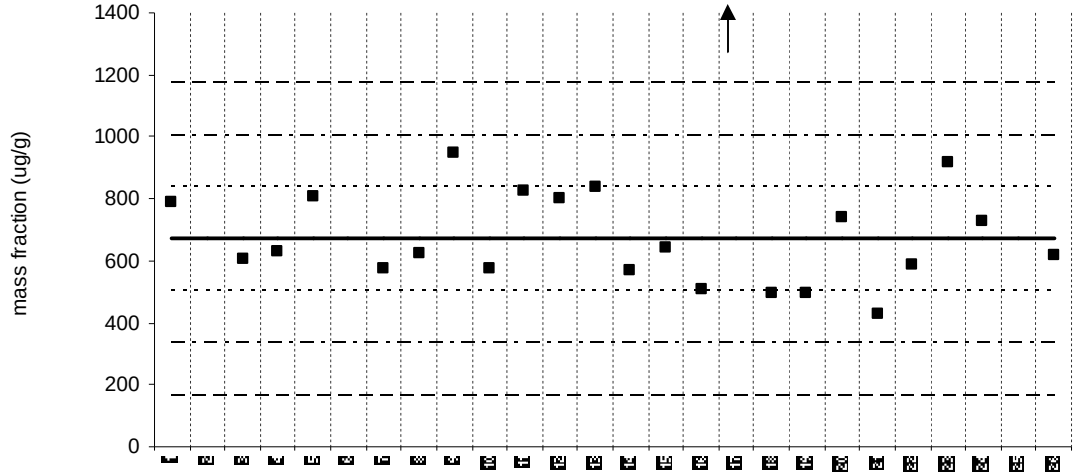
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C2-phenanthrenes/anthracenes — QA10OIL01

Assigned mean = 670 ug/g s = 146 ug/g 95% CI = 61 ug/g Assigned median = 628 ug/g

Reported Results: 23 Quantitative Results: 23

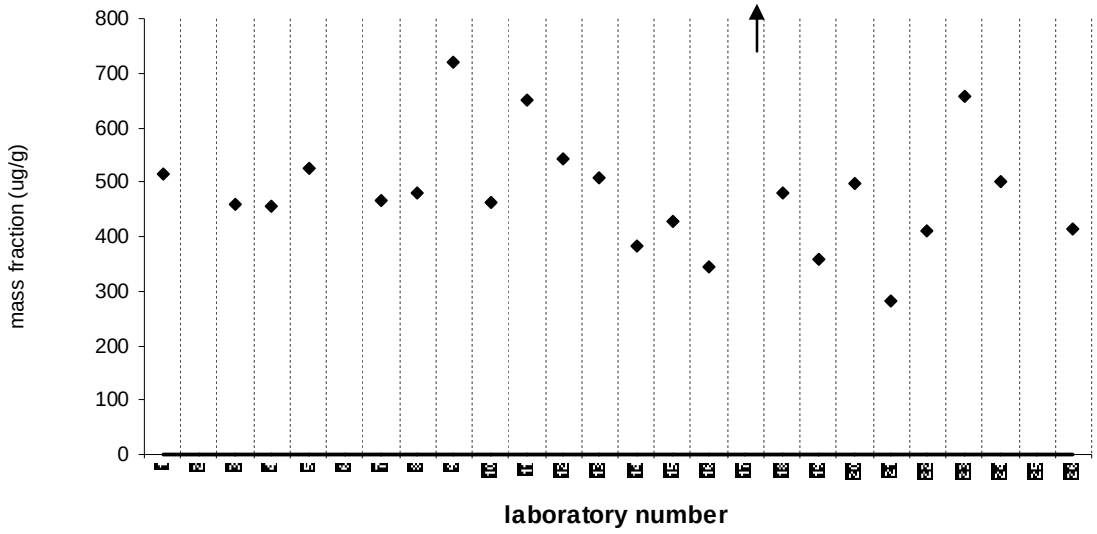


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C2-phenanthrenes/anthracenes — SRM 1582

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 23 Median of Reported Results: 480 ug/g

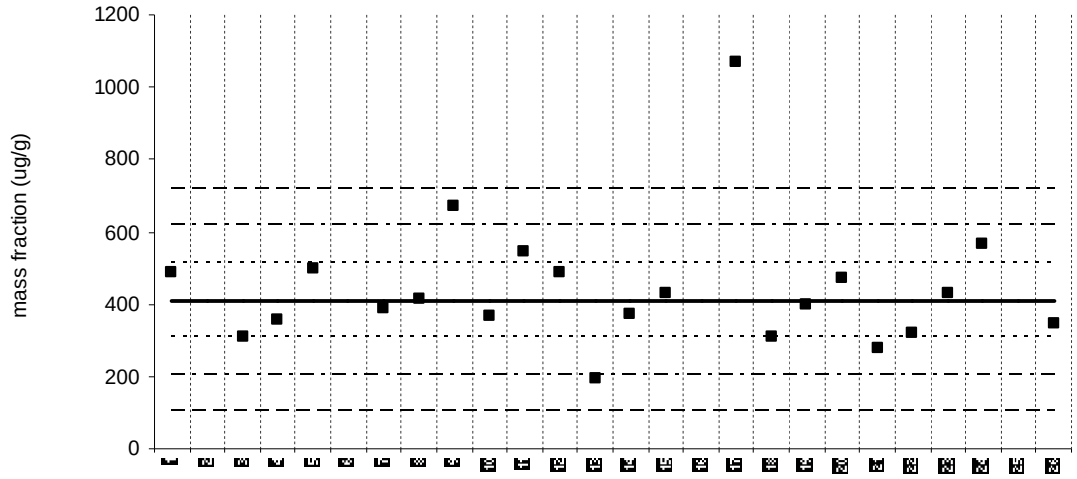


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C3-phenanthrenes/anthracenes QA10OIL01

Assigned mean = 411 ug/g s = 109 ug/g 95% CI = 47 ug/g Assigned median = 398 ug/g

Reported Results: 23 Quantitative Results: 22



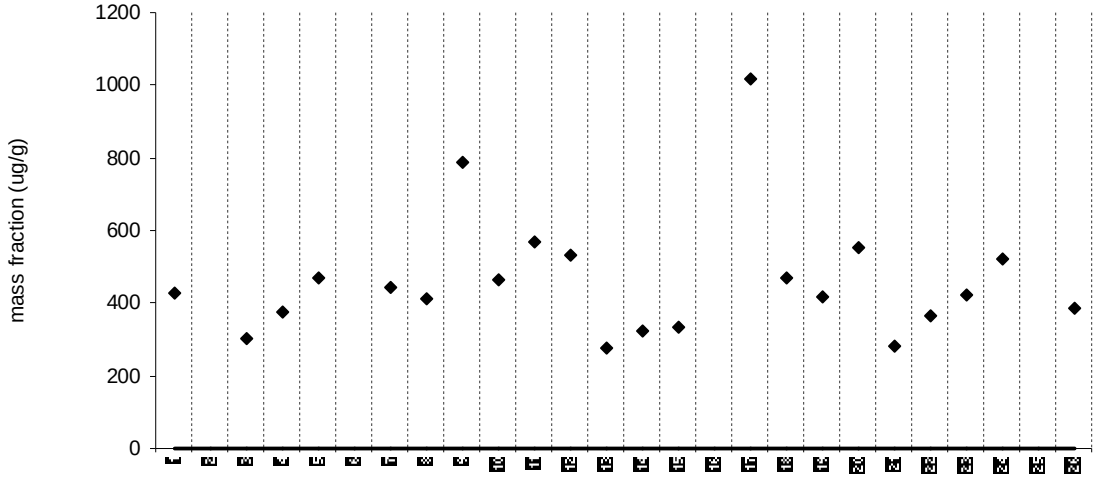
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C3-phenanthrenes/anthracenes SRM 1582

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 22 Median of Reported Results: 427 ug/g



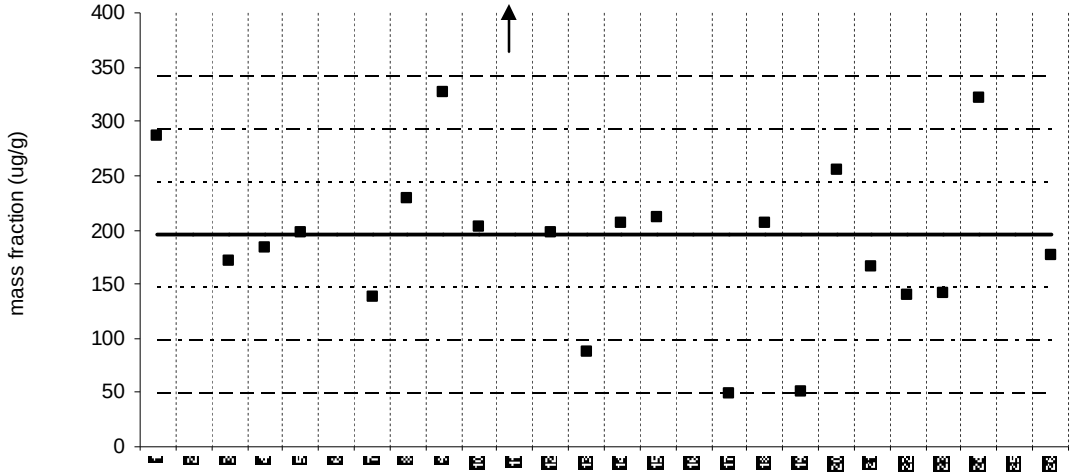
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C4-phenanthrenes/anthracenes — QA10OIL01

Assigned mean = 195 ug/g s = 69 ug/g 95% CI = 30 ug/g Assigned median = 197 ug/g

Reported Results: 23 Quantitative Results: 22

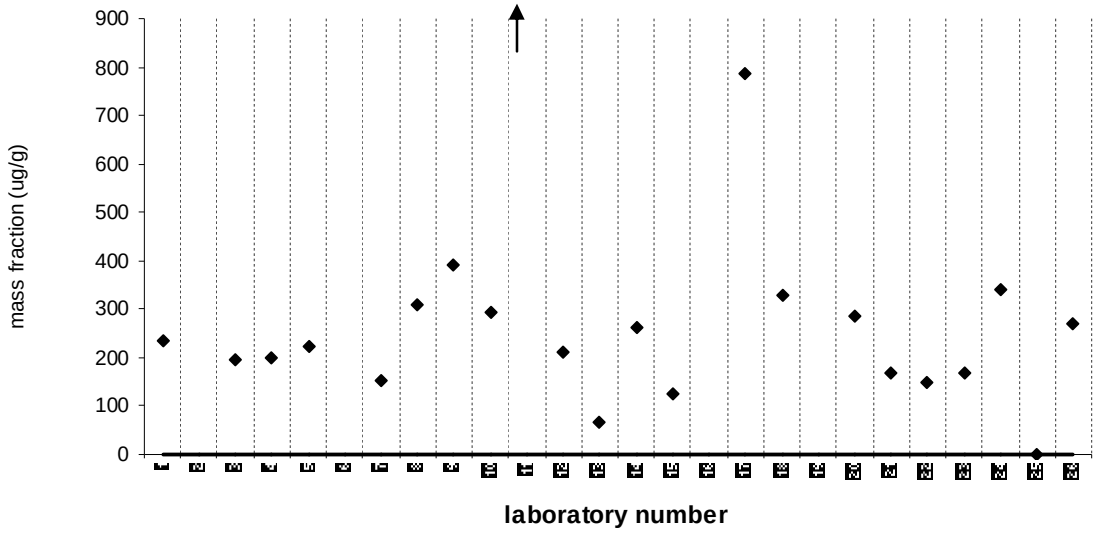


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C4-phenanthrenes/anthracenes — SRM 1582

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 21 Median of Reported Results: 235 ug/g

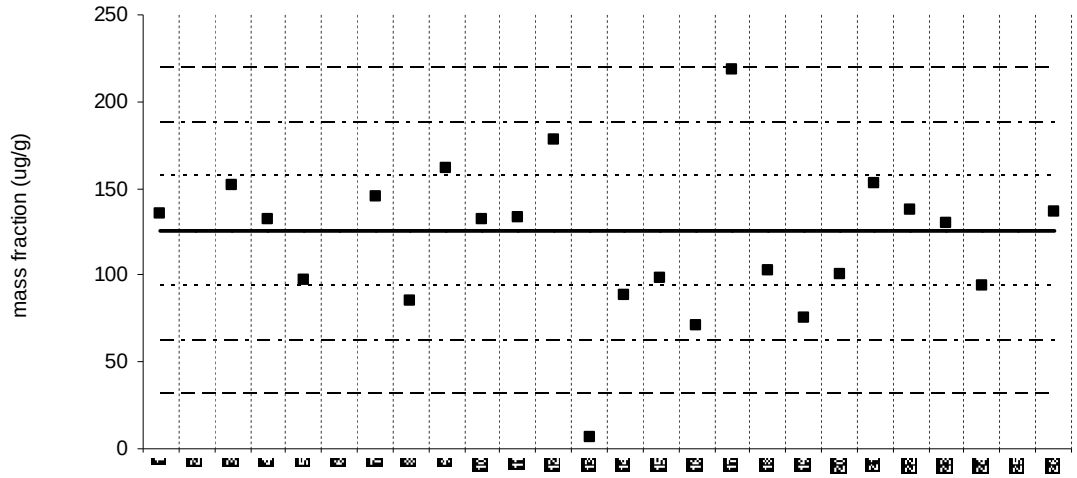


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C1-dibenzothiophenes QA10OIL01

Assigned mean = 125 ug/g s = 36 ug/g 95% CI = 15 ug/g Assigned median = 132 ug/g

Reported Results: 23 Quantitative Results: 23



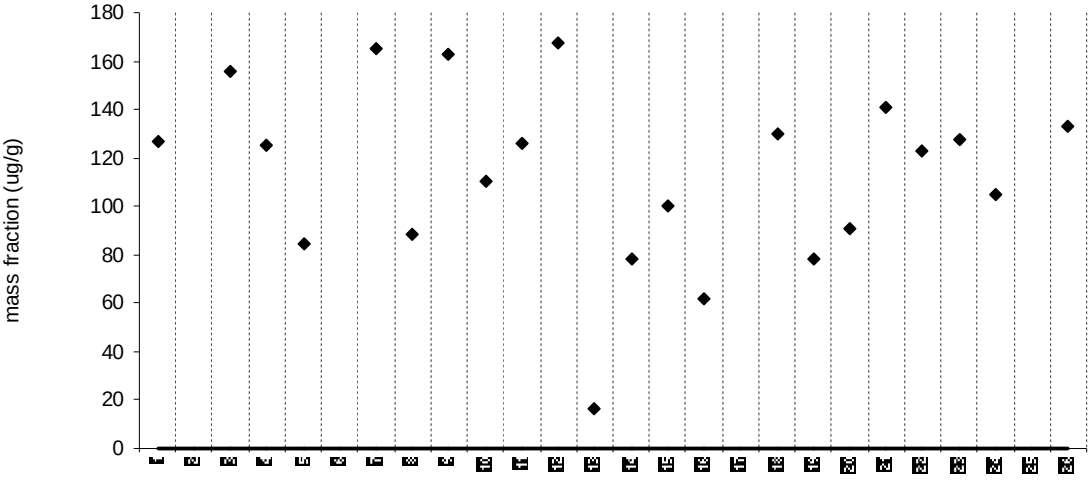
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C1-dibenzothiophenes SRM 1582

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 22 Median of Reported Results: 124 ug/g



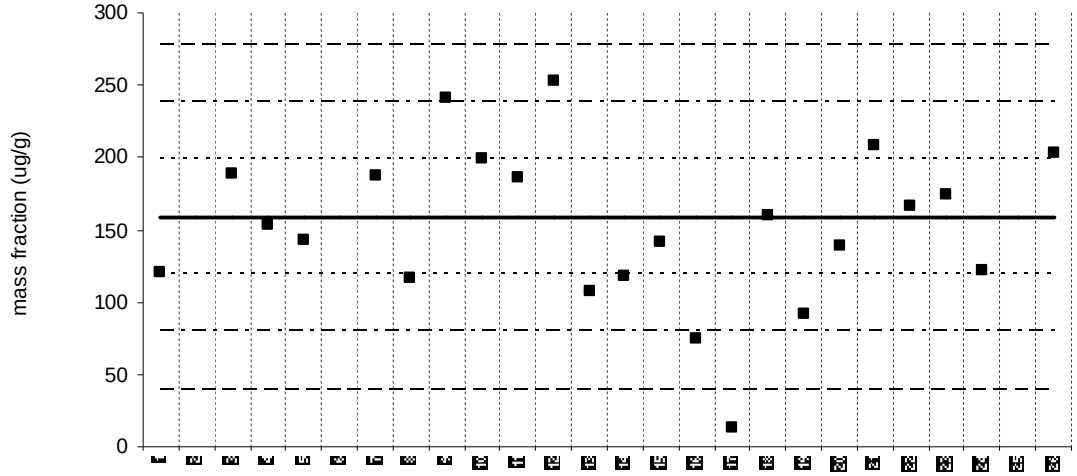
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C2-dibenzothiophenes **QA10OIL01**

Assigned mean = 159 ug/g s = 47 ug/g 95% CI = 20 ug/g Assigned median = 156 ug/g

Reported Results: 23 Quantitative Results: 23



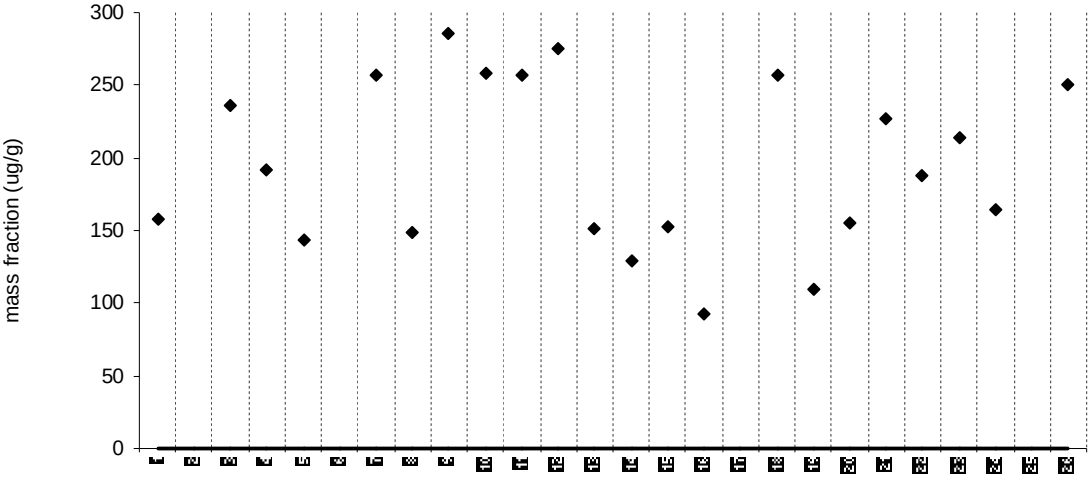
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C2-dibenzothiophenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 22 Median of Reported Results: 190 ug/g



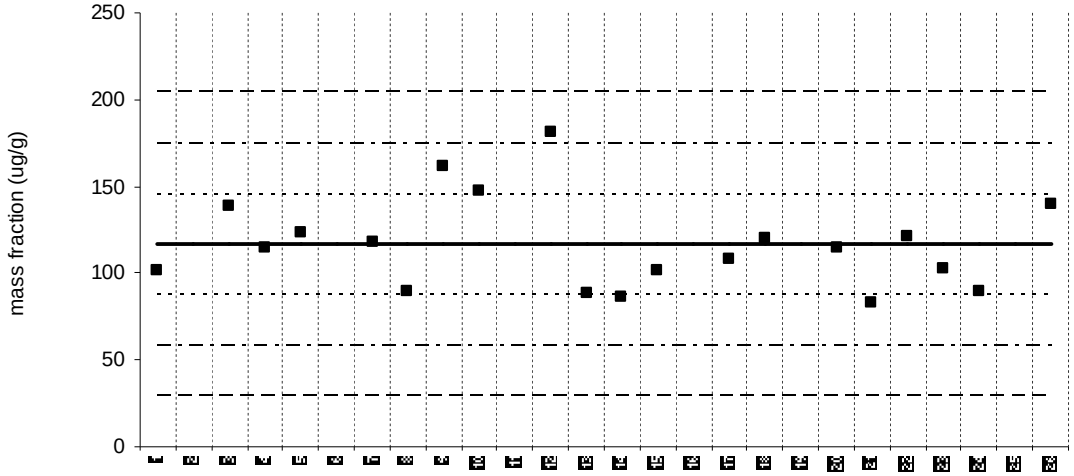
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C3-dibenzothiophenes QA10OIL01

Assigned mean = 117 ug/g s = 26 ug/g 95% CI = 12 ug/g Assigned median = 114 ug/g

Reported Results: 22 Quantitative Results: 20

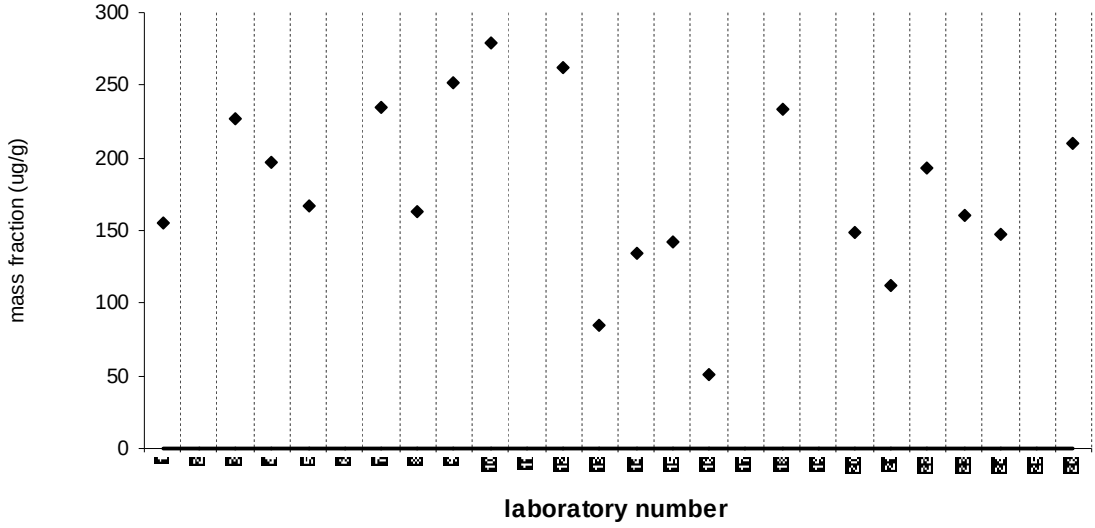


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C3-dibenzothiophenes SRM 1582

Target Value = no target ug/g

Reported Results: 22 Quantitative Results: 20 Median of Reported Results: 165 ug/g

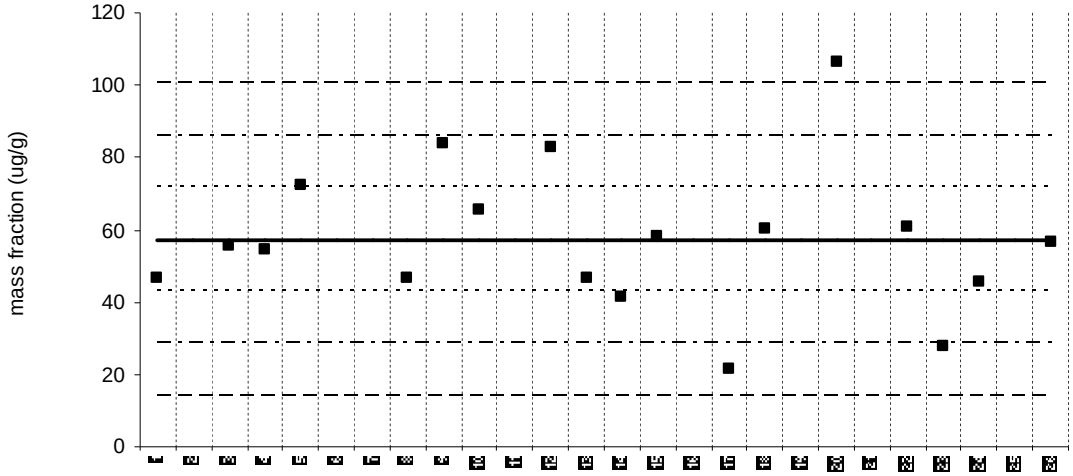


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C4-dibenzothiophenes QA10OIL01

Assigned mean = 57.4 ug/g s = 20.2 ug/g 95% CI = 9.3 ug/g Assigned median = 56.0 ug/g

Reported Results: 20 Quantitative Results: 18

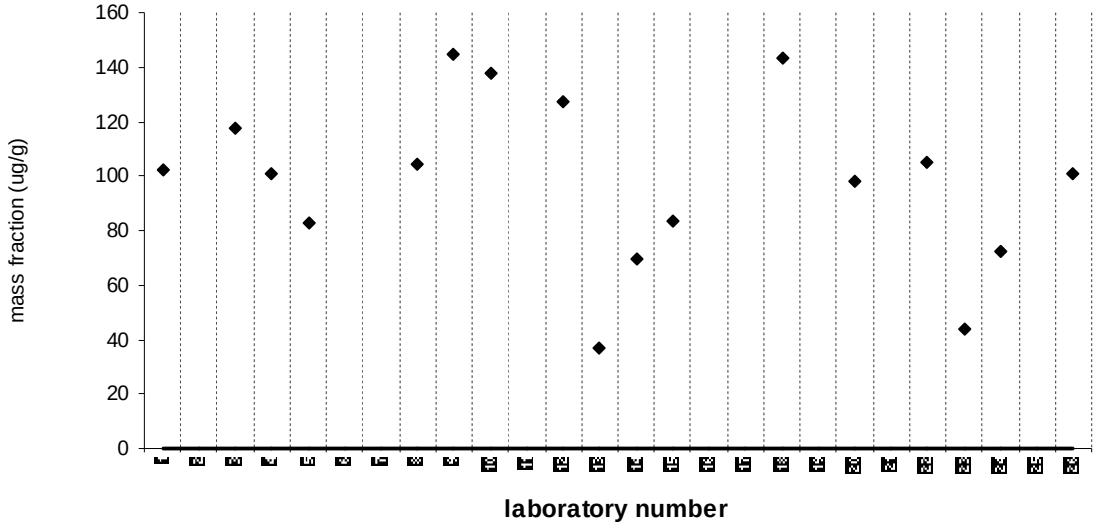


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C4-dibenzothiophenes SRM 1582

Target Value = no target ug/g

Reported Results: 20 Quantitative Results: 17 Median of Reported Results: 101 ug/g

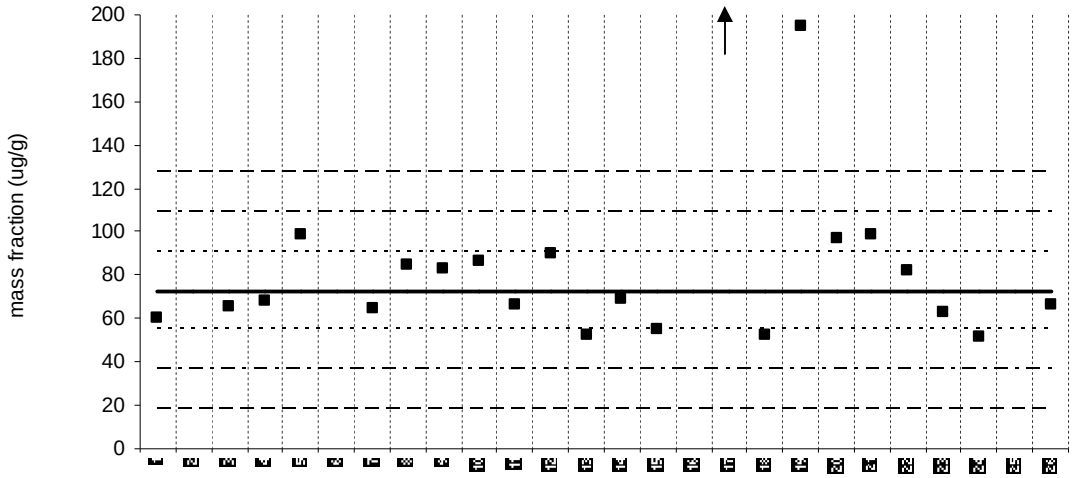


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C1-fluoranthenes/pyrenes — QA10OIL01

Assigned mean = 72.8 ug/g s = 15.9 ug/g 95% CI = 7.0 ug/g Assigned median = 67.2 ug/g

Reported Results: 23 Quantitative Results: 22

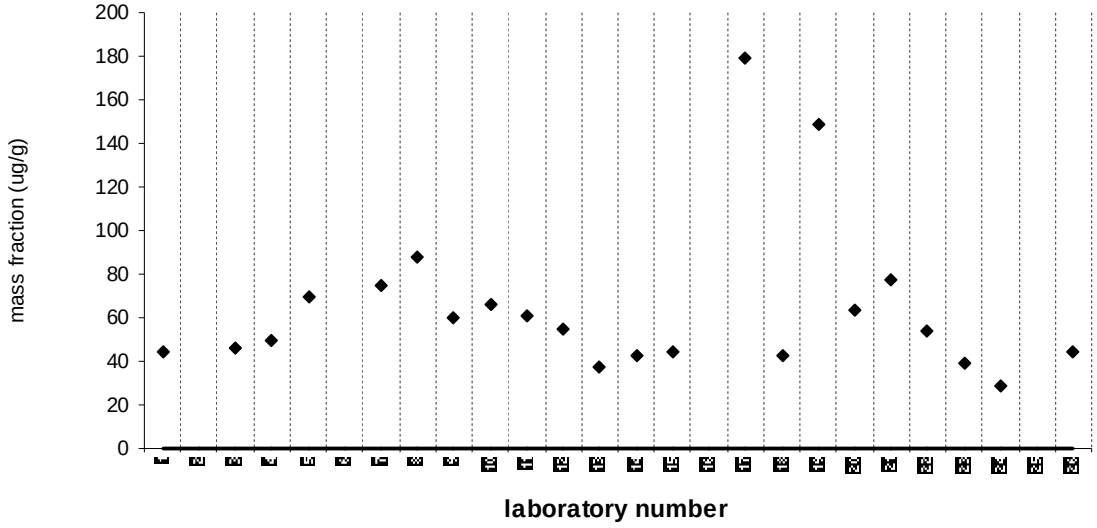


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C1-fluoranthenes/pyrenes — SRM 1582

Target Value = no target ug/g

Reported Results: 23 Quantitative Results: 22 Median of Reported Results: 54.4 ug/g

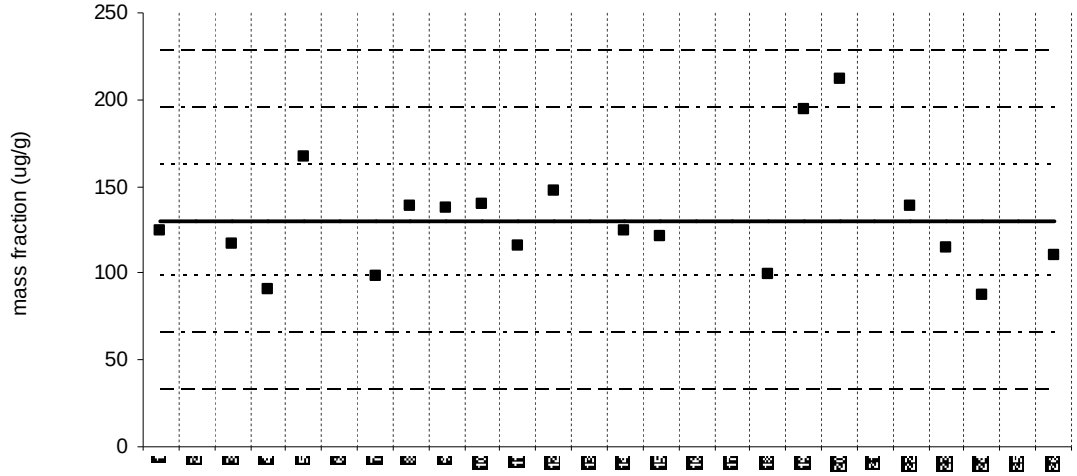


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C2-fluoranthenes/pyrenes — QA10OIL01

Assigned mean = 130 ug/g s = 33 ug/g 95% CI = 15 ug/g Assigned median = 125 ug/g

Reported Results: 21 Quantitative Results: 19



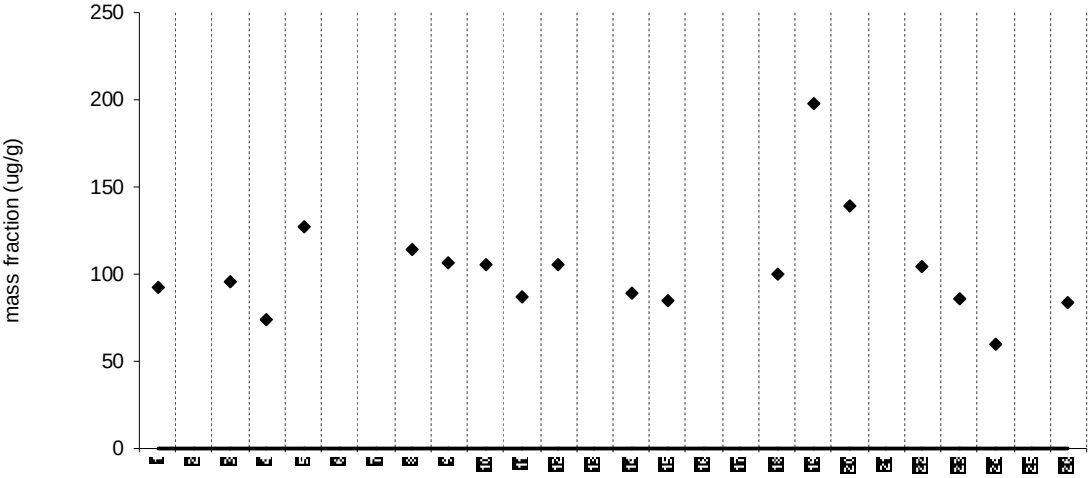
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C2-fluoranthenes/pyrenes — SRM 1582

Target Value = no target ug/g

Reported Results: 20 Quantitative Results: 18 Median of Reported Results: 98.0 ug/g



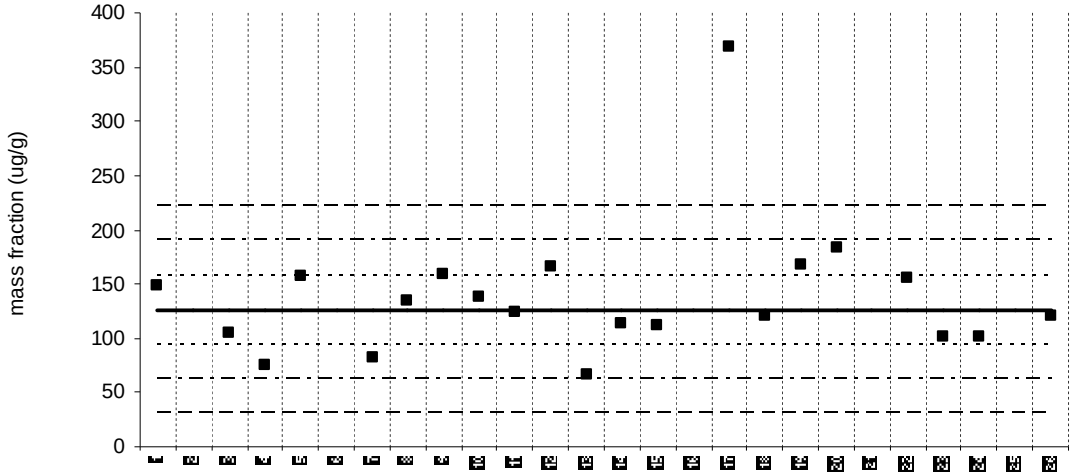
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C3-fluoranthenes/pyrenes — QA10OIL01

Assigned mean = 126 ug/g s = 33 ug/g 95% CI = 14 ug/g Assigned median = 122 ug/g

Reported Results: 22 Quantitative Results: 21

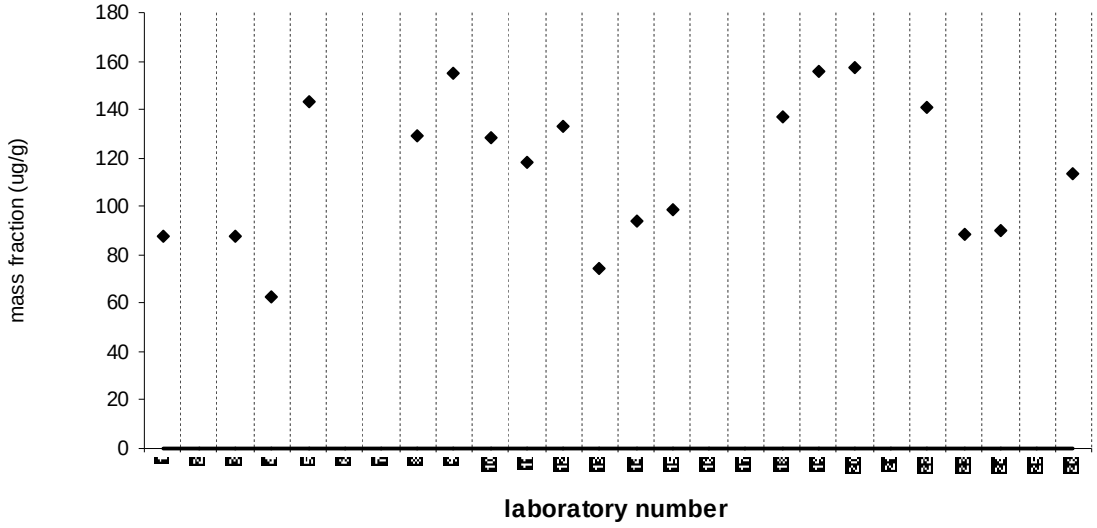


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C3-fluoranthenes/pyrenes — SRM 1582

Target Value = no target ug/g

Reported Results: 21 Quantitative Results: 19 Median of Reported Results: 118 ug/g

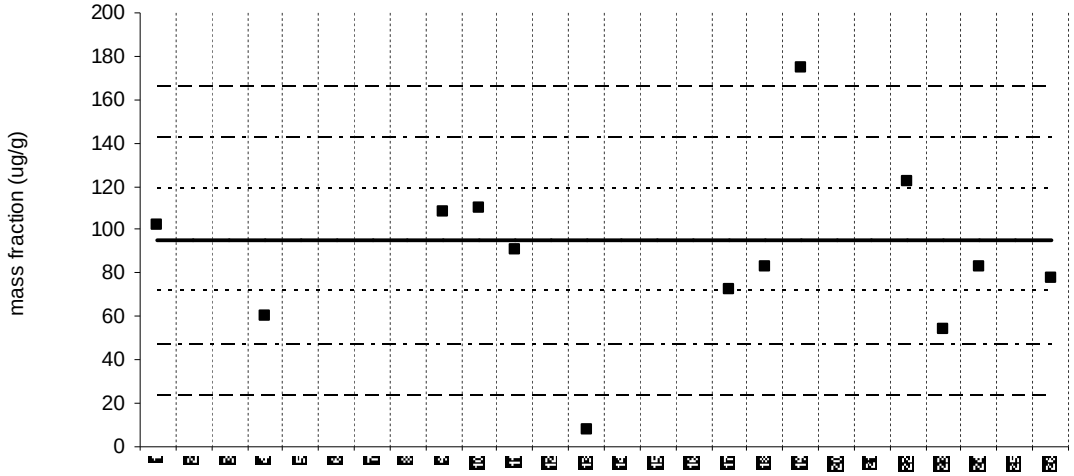


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C4-fluoranthenes/pyrenes — QA10OIL01

Assigned mean = 95.0 ug/g s = 32.5 ug/g 95% CI = 18.4 ug/g Assigned median = 87.0 ug/g

Reported Results: 13 Quantitative Results: 13

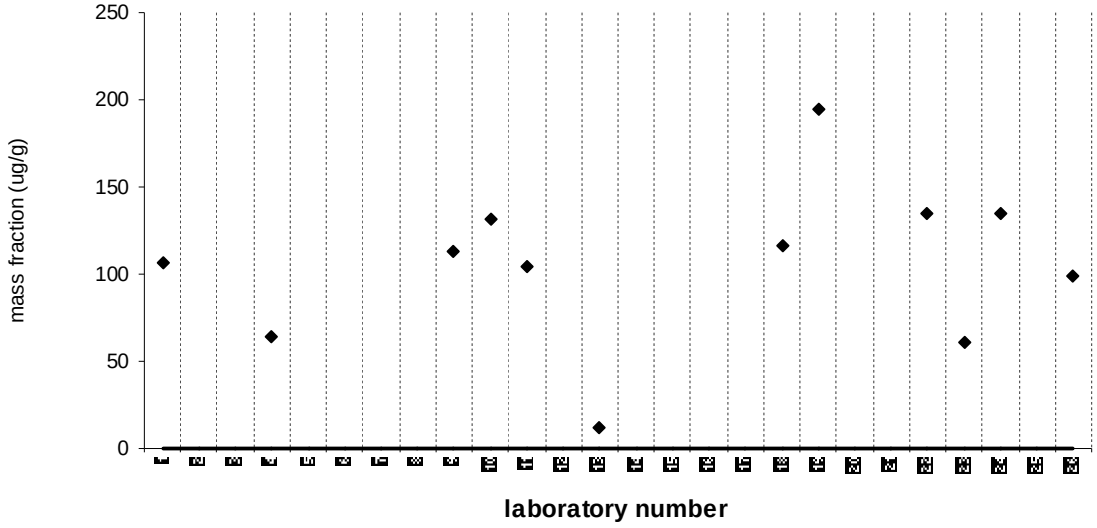


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C4-fluoranthenes/pyrenes — SRM 1582

Target Value = no target ug/g

Reported Results: 13 Quantitative Results: 12 Median of Reported Results: 110 ug/g

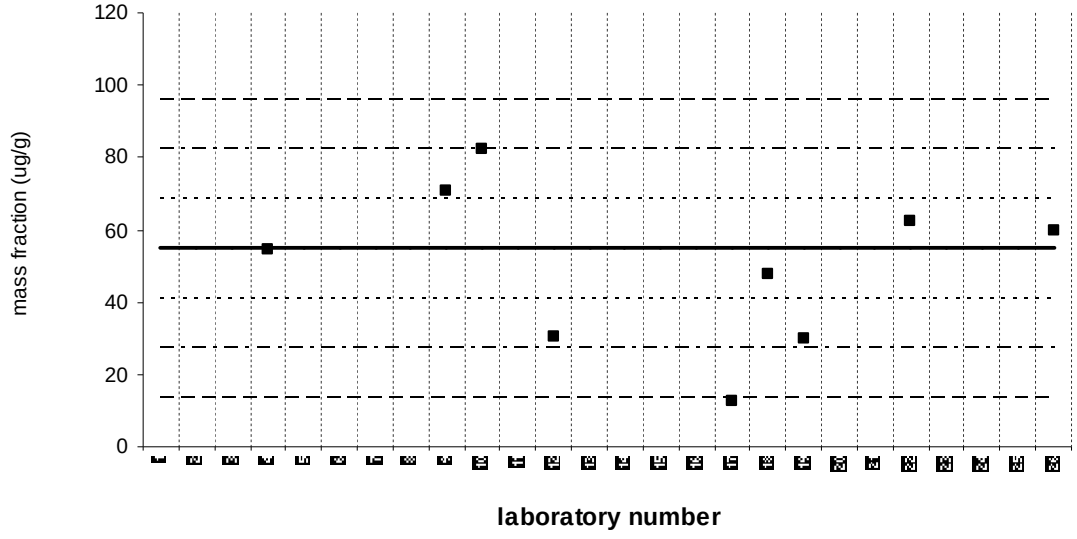


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C1-naphthobenzothiophenes — QA10OIL01

Assigned mean = 54.8 ug/g s = 18.4 ug/g 95% CI = 12.7 ug/g Assigned median = 57.1 ug/g

Reported Results: 9 Quantitative Results: 9

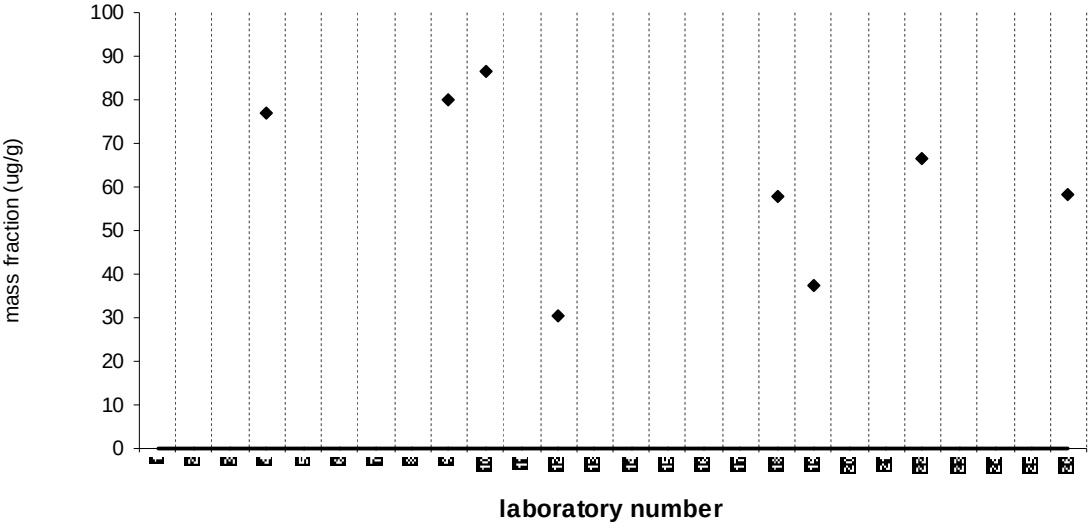


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C1-naphthobenzothiophenes — SRM 1582

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 8 Median of Reported Results: 62.4 ug/g

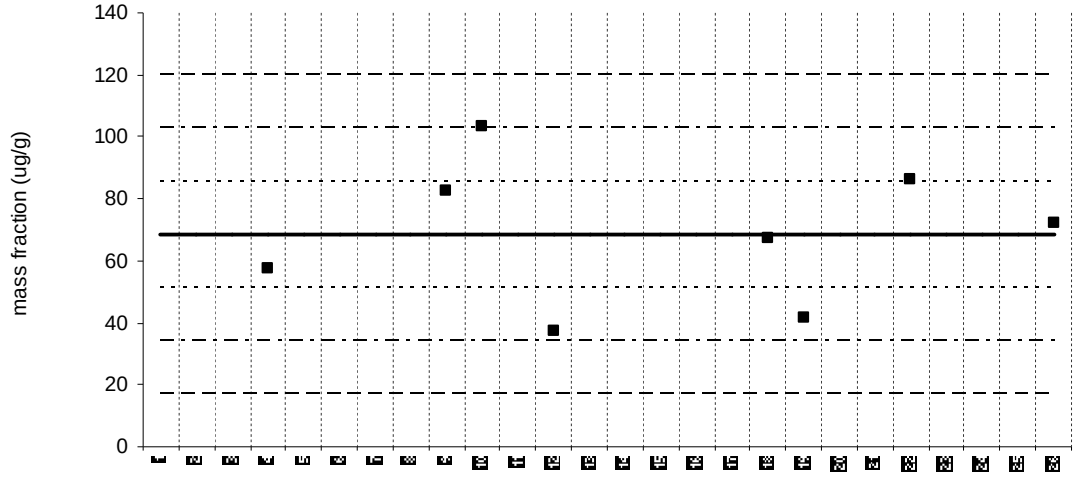


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C2-naphthobenzothiophenes QA10OIL01

Assigned mean = 68.4 ug/g s = 22.7 ug/g 95% CI = 15.7 ug/g Assigned median = 69.7 ug/g

Reported Results: 9 Quantitative Results: 8

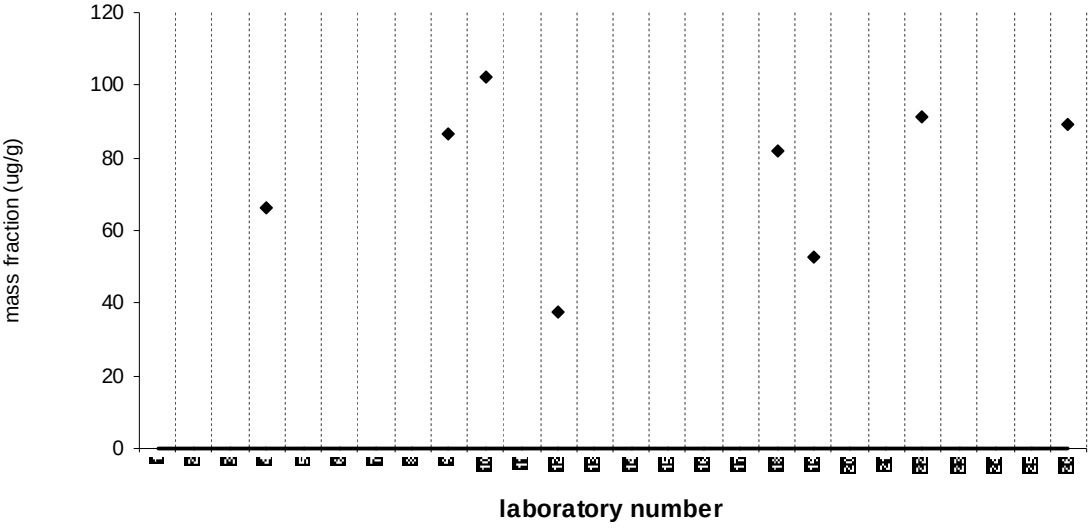


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C2-naphthobenzothiophenes SRM 1582

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 8 Median of Reported Results: 84.2 ug/g

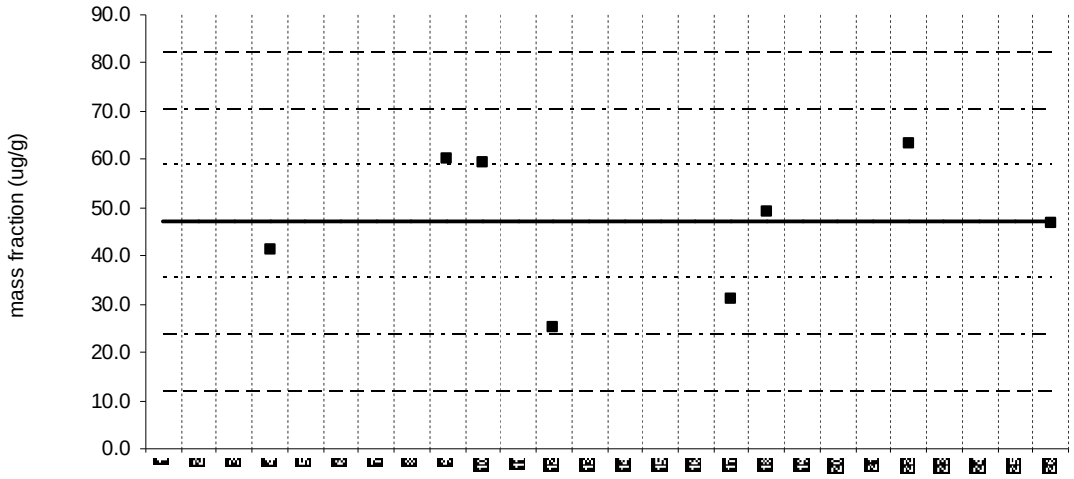


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C3-naphthobenzothiophenes QA10OIL01

Assigned mean = 47.0 ug/g s = 14.0 ug/g 95% CI = 9.7 ug/g Assigned median = 47.8 ug/g

Reported Results: 9 Quantitative Results: 8



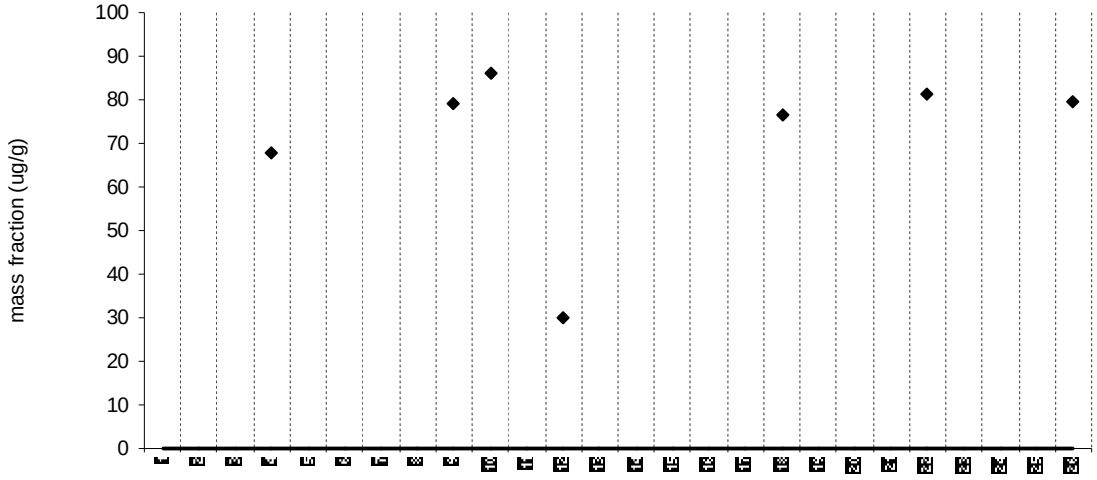
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C3-naphthobenzothiophenes SRM 1582

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 7 Median of Reported Results: 79.2 ug/g



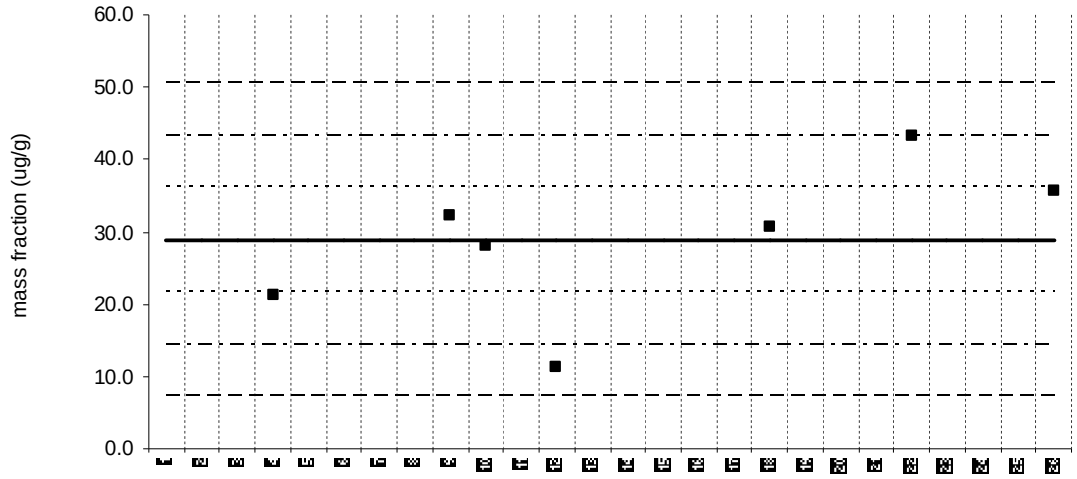
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C4-naphthobenzothiophenes QA10OIL01

Assigned mean = 28.9 ug/g s = 10.3 ug/g 95% CI = 7.6 ug/g Assigned median = 30.7 ug/g

Reported Results: 9 Quantitative Results: 7

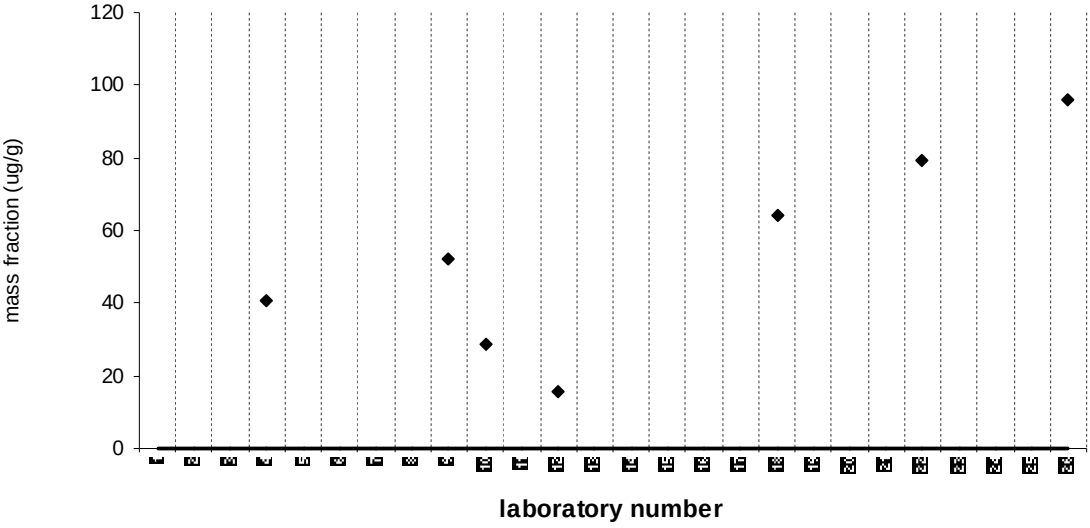


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C4-naphthobenzothiophenes SRM 1582

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 7 Median of Reported Results: 52.3 ug/g

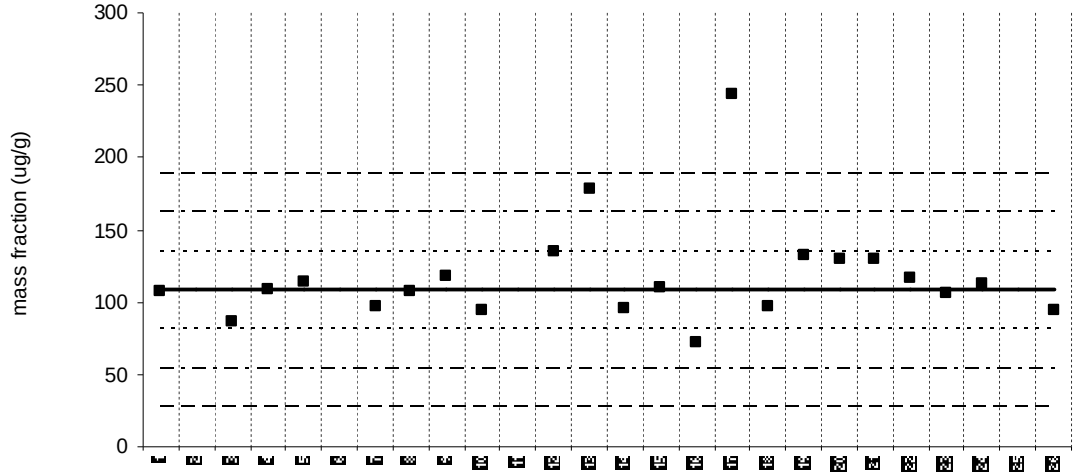


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C1-chrysenes **QA10OIL01**

Assigned mean = 108 ug/g s = 16 ug/g 95% CI = 7 ug/g Assigned median = 108 ug/g

Reported Results: 22 Quantitative Results: 22



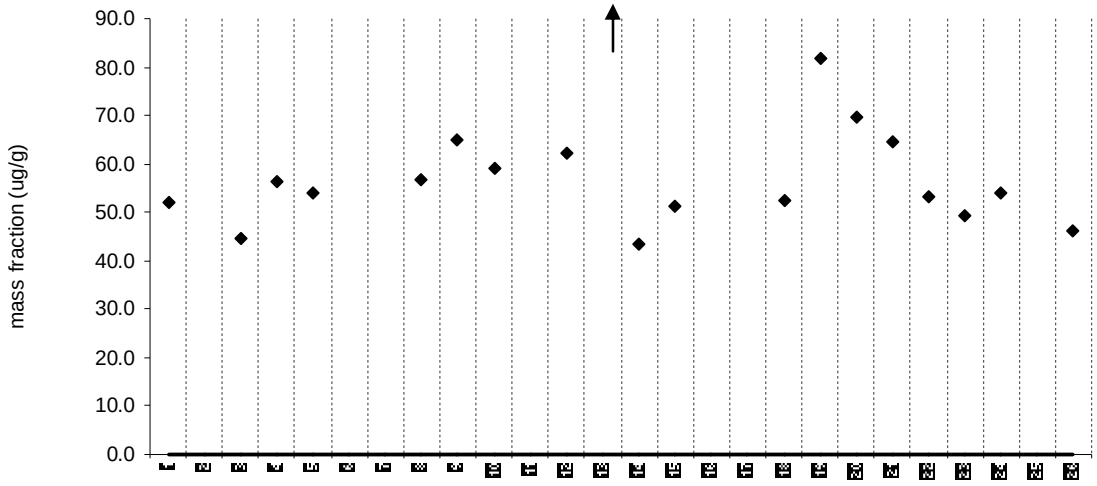
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C1-chrysenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 21 Quantitative Results: 19 Median of Reported Results: 54.0 ug/g



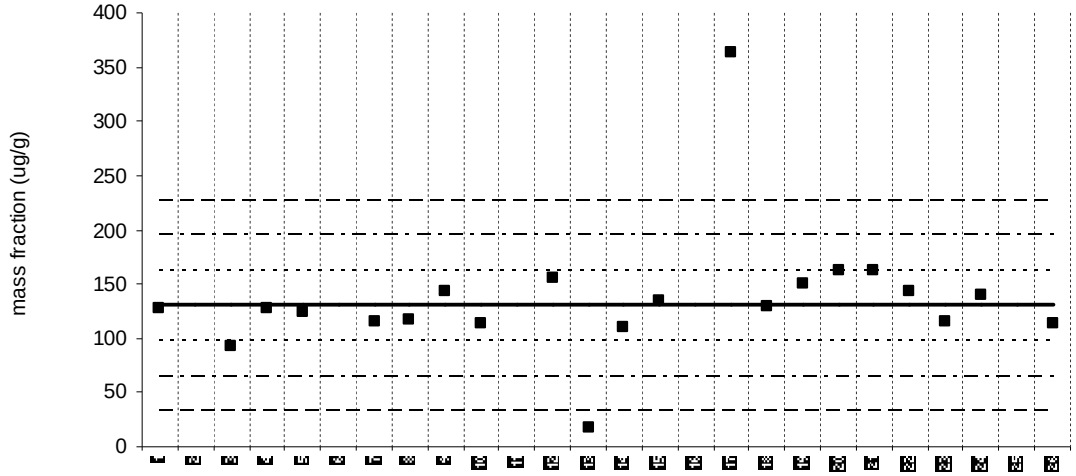
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C2-chrysenes **QA10OIL01**

Assigned mean = 130 ug/g s = 19 ug/g 95% CI = 9 ug/g Assigned median = 128 ug/g

Reported Results: 22 Quantitative Results: 21



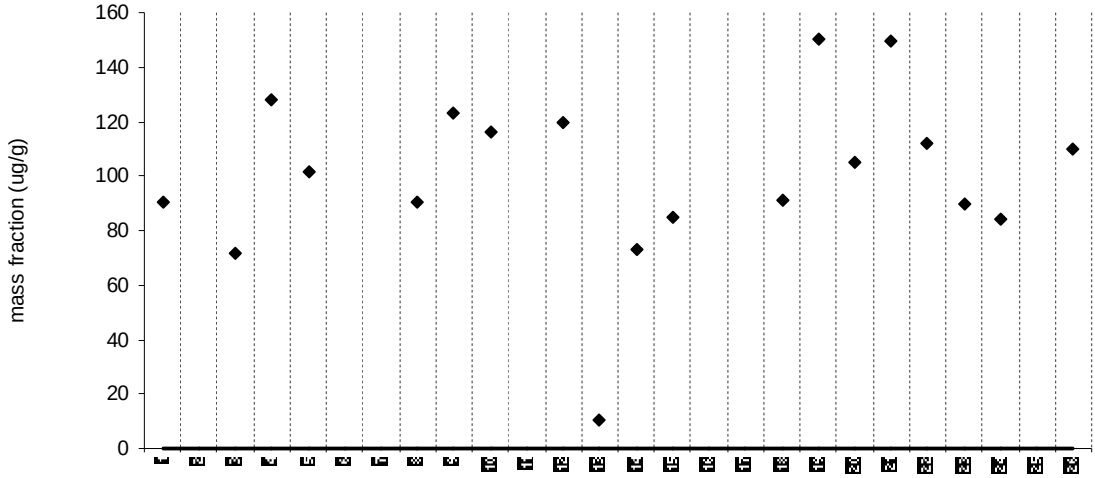
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C2-chrysenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 21 Quantitative Results: 19 Median of Reported Results: 102 ug/g



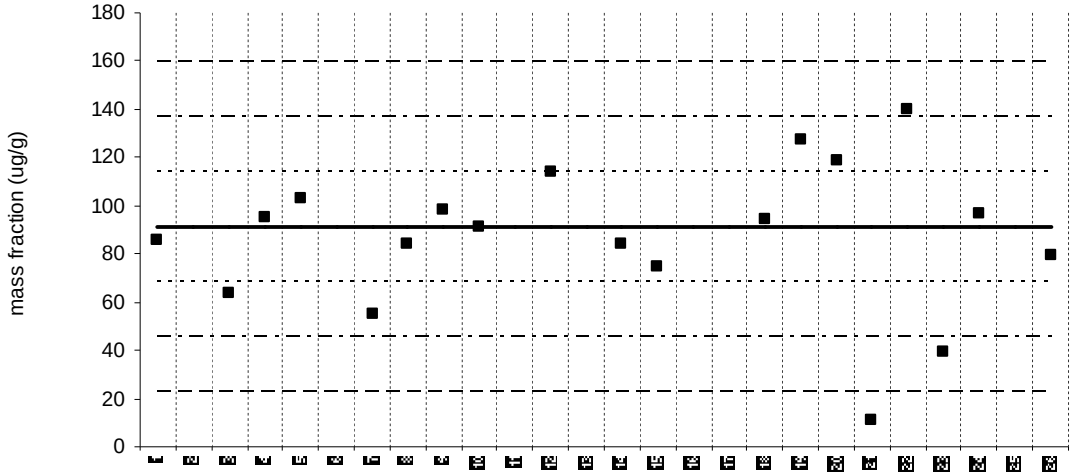
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C3-chrysenes **QA10OIL01**

Assigned mean = 91.3 ug/g s = 24.7 ug/g 95% CI = 11.4 ug/g Assigned median = 92.7 ug/g

Reported Results: 21 Quantitative Results: 19

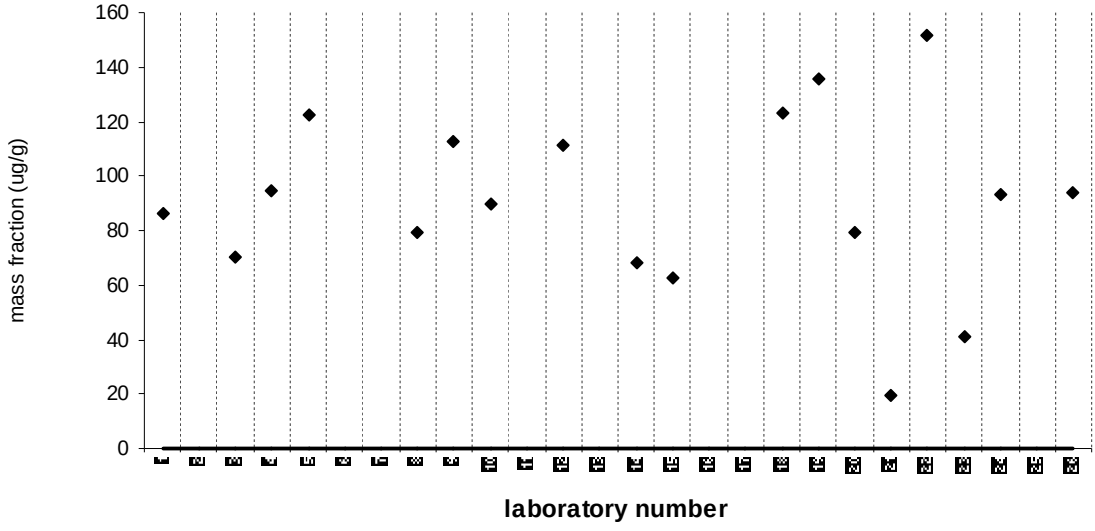


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C3-chrysenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 20 Quantitative Results: 18 Median of Reported Results: 91.5 ug/g

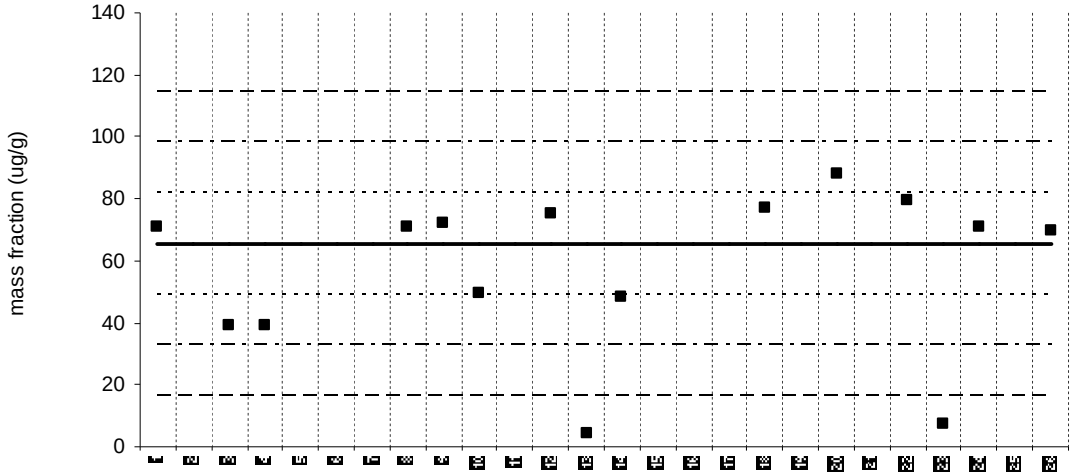


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

C4-chrysenes **QA10OIL01**

Assigned mean = 65.4 ug/g s = 15.8 ug/g 95% CI = 8.6 ug/g Assigned median = 70.9 ug/g

Reported Results: 19 Quantitative Results: 15

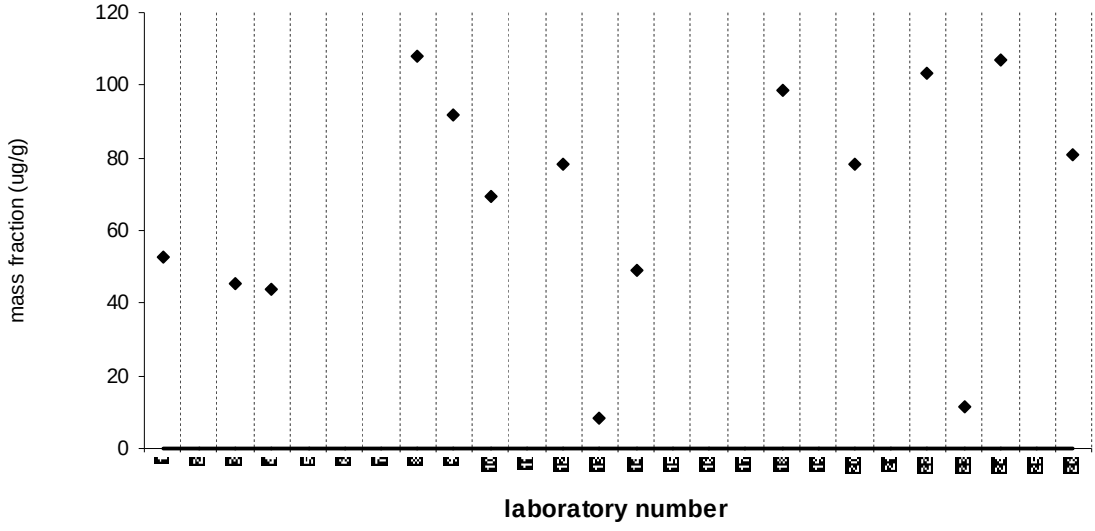


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

C4-chrysenes **SRM 1582**

Target Value = no target ug/g

Reported Results: 18 Quantitative Results: 15 Median of Reported Results: 78.1 ug/g

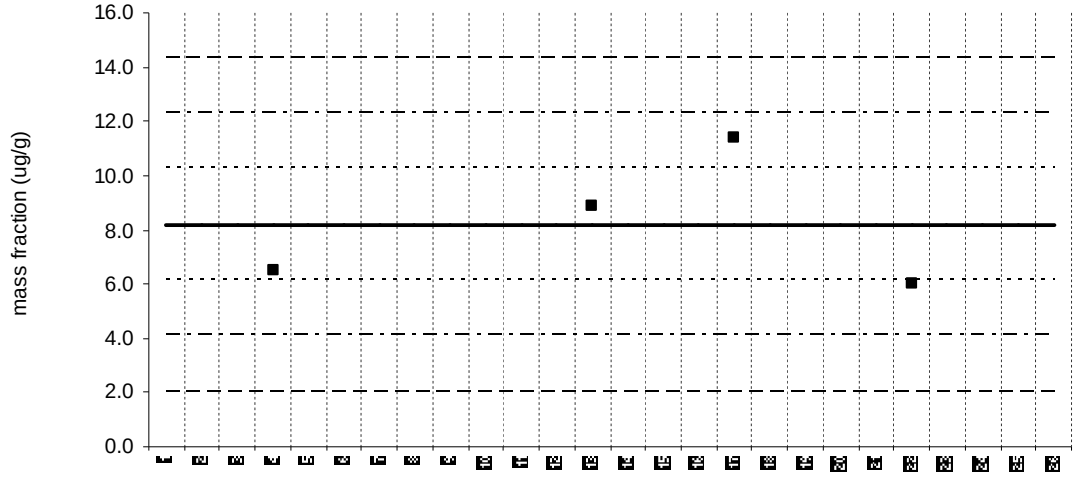


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

Carbazole **QA10OIL01**

Assigned mean = 8.19 ug/g s = 2.48 ug/g 95% CI = 2.43 ug/g Assigned median = 7.68 ug/g

Reported Results: 7 Quantitative Results: 4

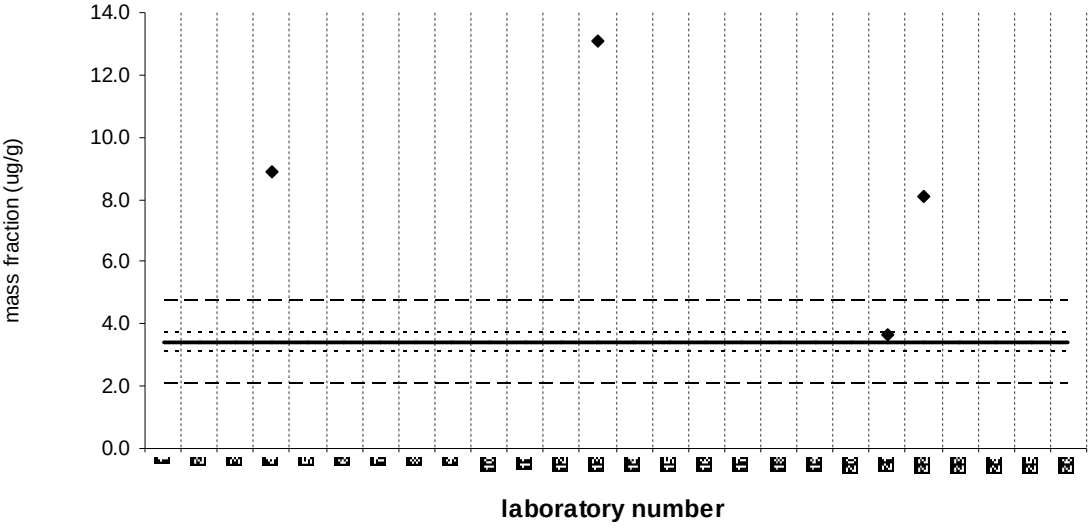


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

Carbazole **SRM 1582**

Reference Value = 3.4 ug/g ; 95% CI 0.3 ug/g

Reported Results: 6 Quantitative Results: 4 Median of Reported Results: 8.49 ug/g

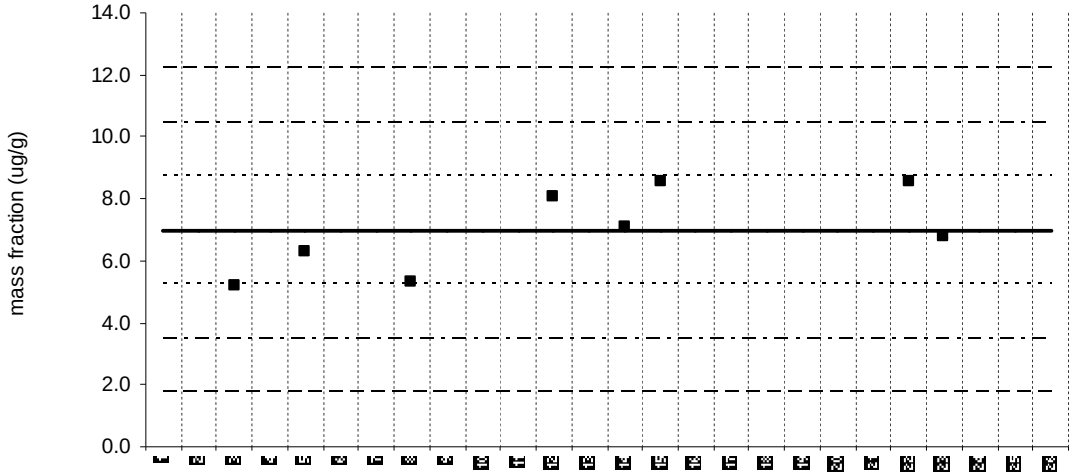


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

18a(H)-22,29,30-Trisnorhopane — QA10OIL01

Assigned mean = 6.97 ug/g s = 1.35 ug/g 95% CI = 0.94 ug/g Assigned median = 6.93 ug/g

Reported Results: 11 Quantitative Results: 8

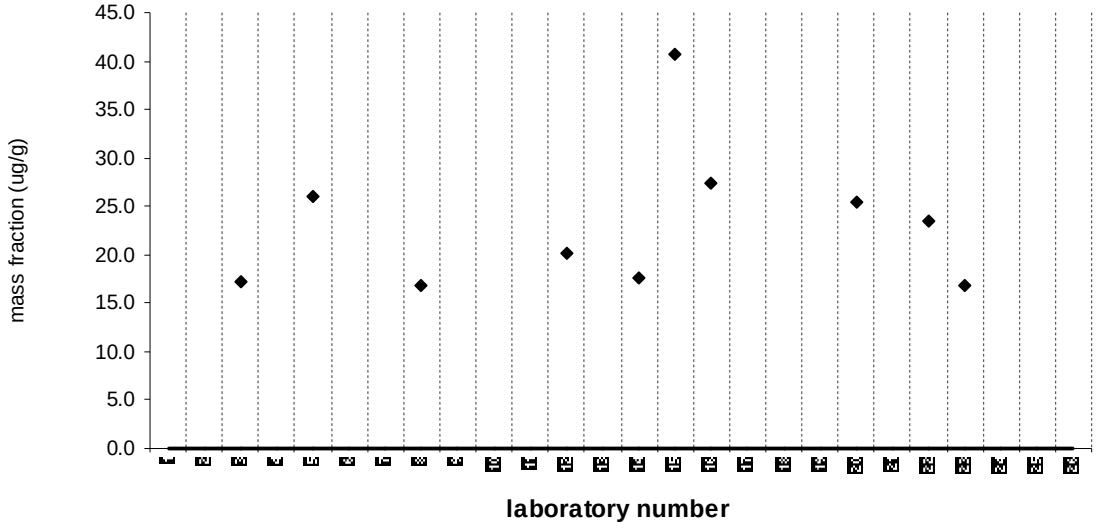


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

18a(H)-22,29,30-Trisnorhopane — SRM 1582

Target Value = no target ug/g

Reported Results: 10 Quantitative Results: 10 Median of Reported Results: 21.8 ug/g

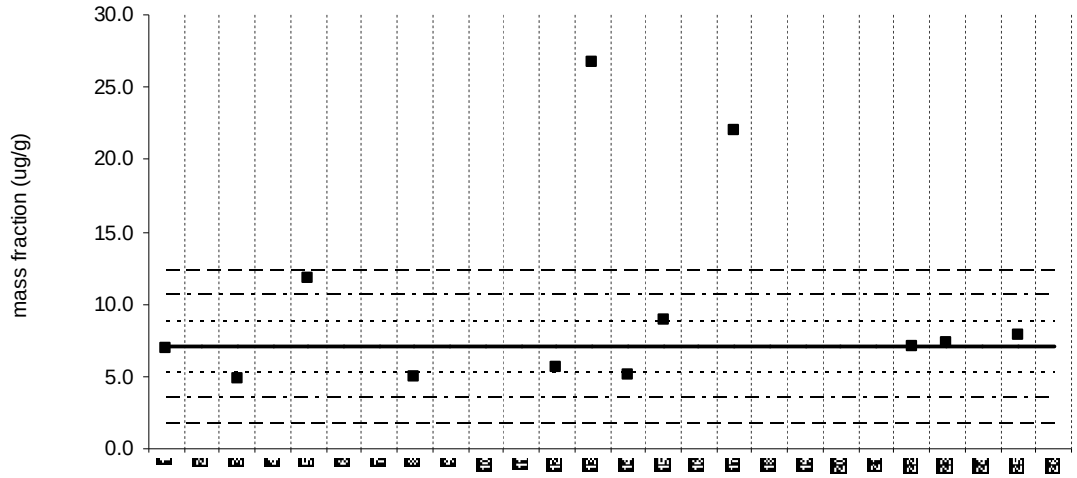


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

17a(H)-22,29,30-Trisnorhopane QA10OIL01

Assigned mean = 7.07 ug/g s = 2.16 ug/g 95% CI = 1.34 ug/g Assigned median = 6.98 ug/g

Reported Results: 15 Quantitative Results: 12

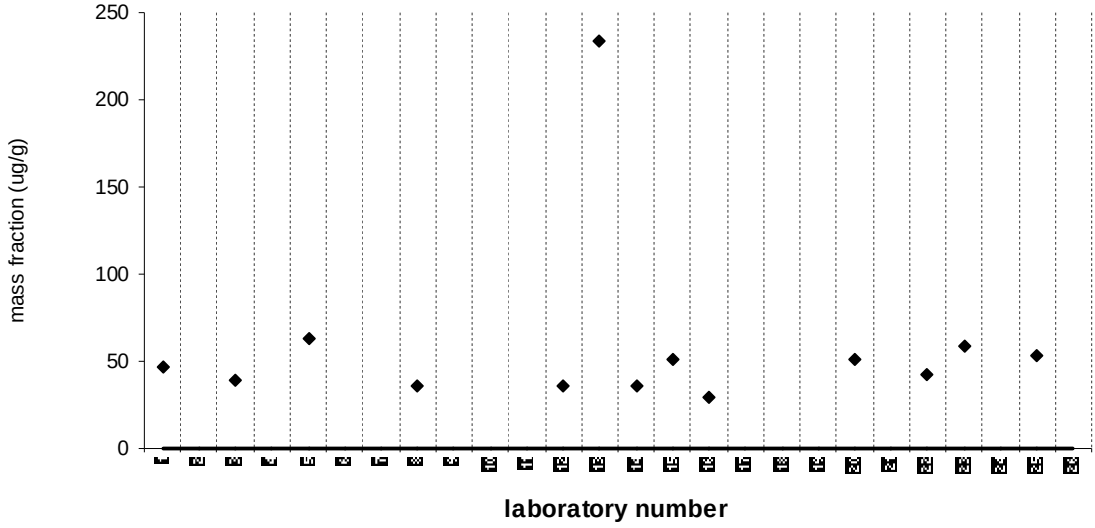


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

17a(H)-22,29,30-Trisnorhopane SRM 1582

Target Value = no target ug/g

Reported Results: 14 Quantitative Results: 13 Median of Reported Results: 47.0 ug/g

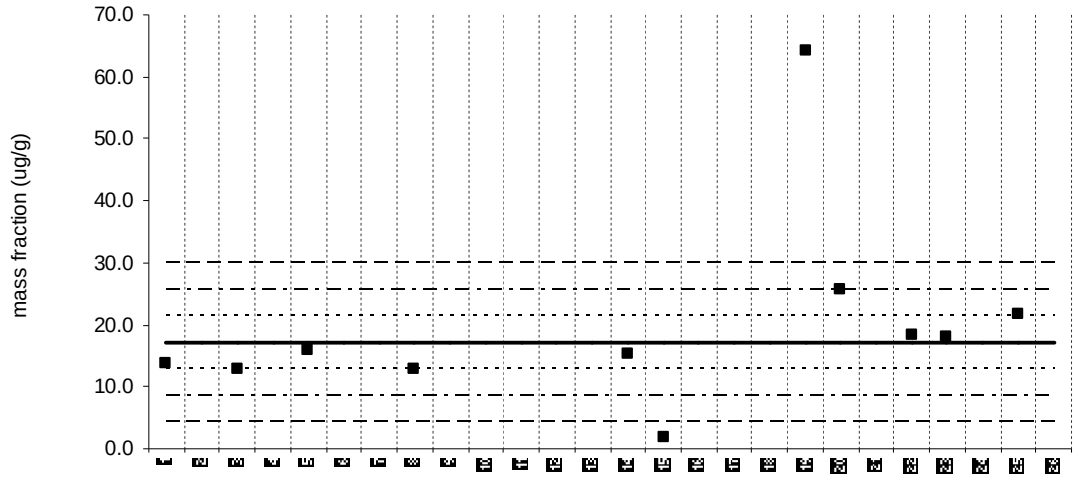


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

17α(H),21β(H)-30-Norhopane — QA10OIL01

Assigned mean = 17.1 ug/g s = 4.3 ug/g 95% CI = 2.8 ug/g Assigned median = 15.9 ug/g

Reported Results: 14 Quantitative Results: 11

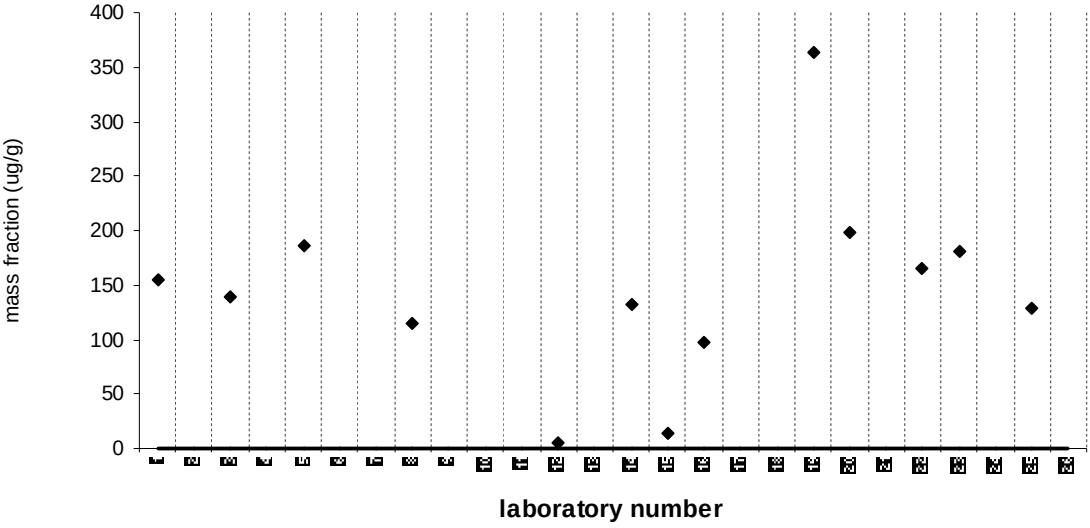


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

17α(H),21β(H)-30-Norhopane — SRM 1582

Target Value = no target ug/g

Reported Results: 13 Quantitative Results: 13 Median of Reported Results: 139 ug/g

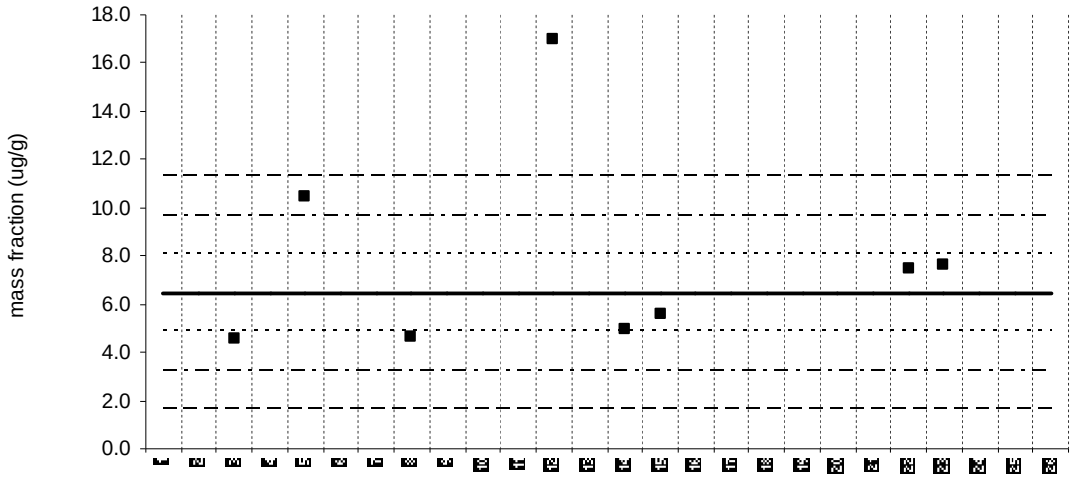


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

18a(H)-30-Norneohopane — QA10OIL01

Assigned mean = 6.46 ug/g s = 2.17 ug/g 95% CI = 1.60 ug/g Assigned median = 5.58 ug/g

Reported Results: 11 Quantitative Results: 8

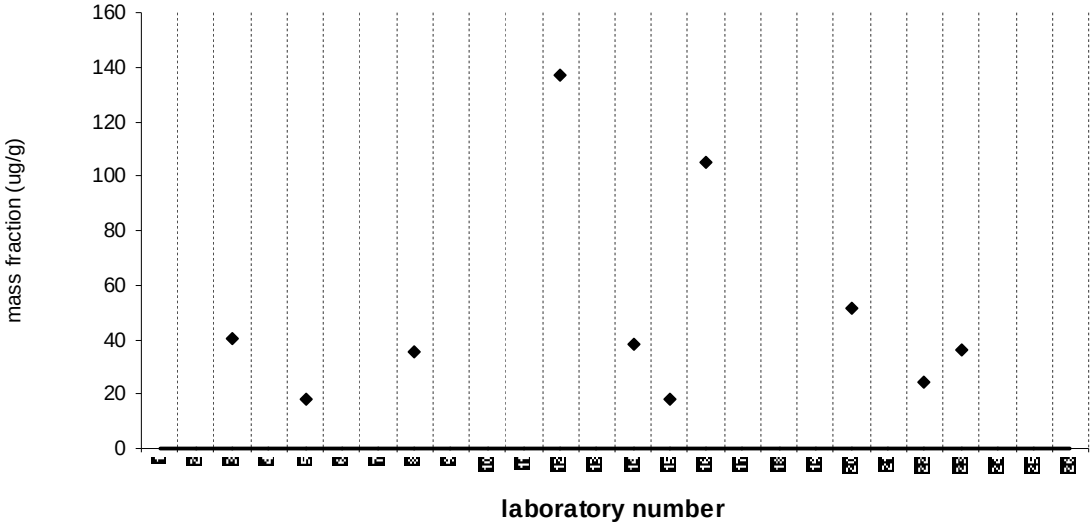


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

18a(H)-30-Norneohopane — SRM 1582

Target Value = no target ug/g

Reported Results: 10 Quantitative Results: 10 Median of Reported Results: 37.1 ug/g

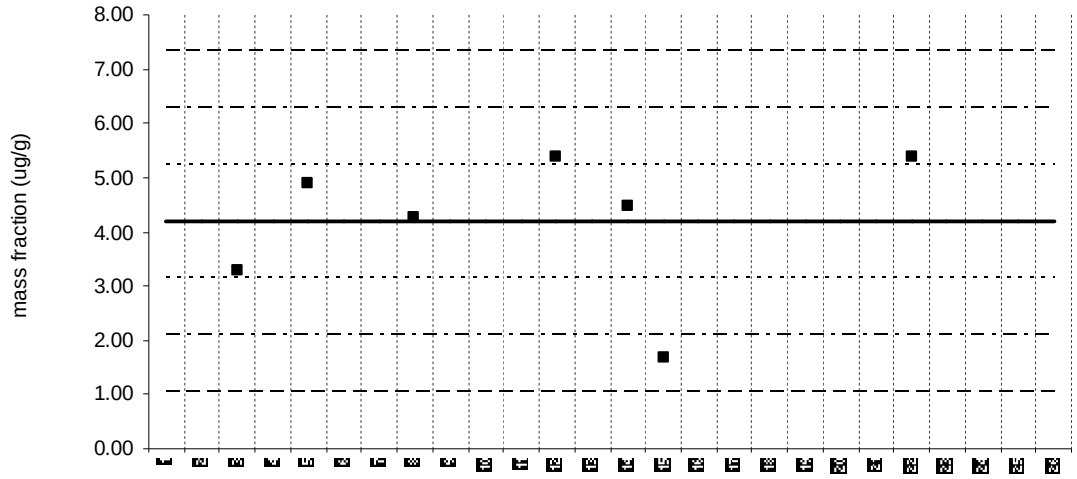


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

17a(H)-Diahopane **QA10OIL01**

Assigned mean = 4.19 ug/g s = 1.33 ug/g 95% CI = 0.98 ug/g Assigned median = 4.47 ug/g

Reported Results: 10 Quantitative Results: 7

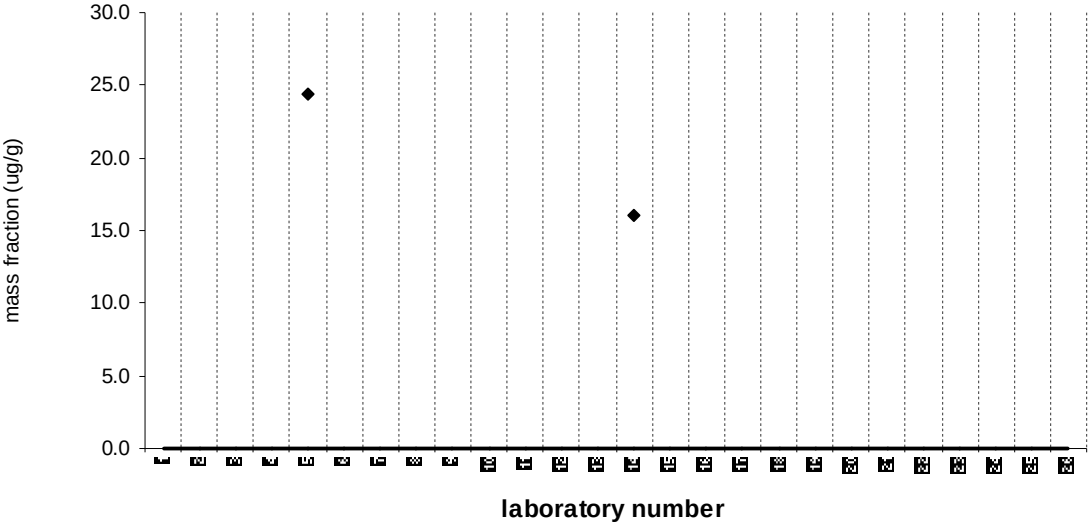


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

17a(H)-Diahopane **SRM 1582**

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 2 Median of Reported Results: not calculated

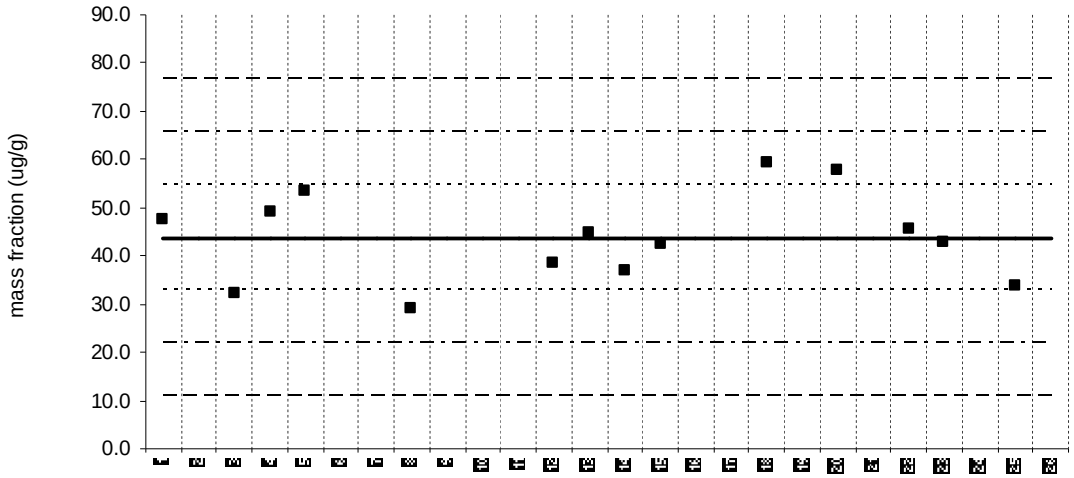


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

17α(H),21β(H)-Hopane — QA10OIL01

Assigned mean = 43.8 ug/g s = 9.2 ug/g 95% CI = 4.8 ug/g Assigned median = 43.6 ug/g

Reported Results: 16 Quantitative Results: 14

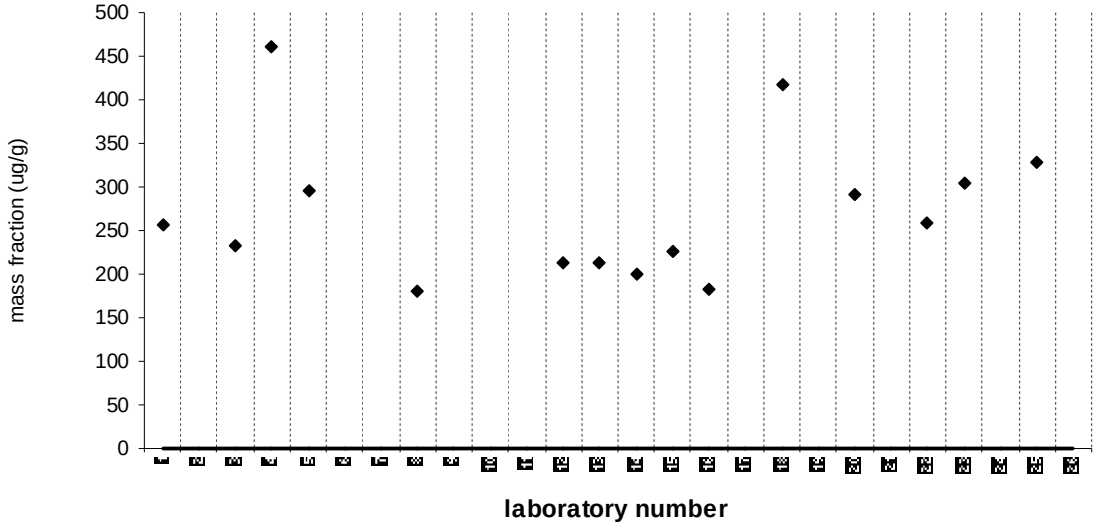


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

17α(H),21β(H)-Hopane — SRM 1582

Target Value = no target ug/g

Reported Results: 15 Quantitative Results: 15 Median of Reported Results: 256 ug/g

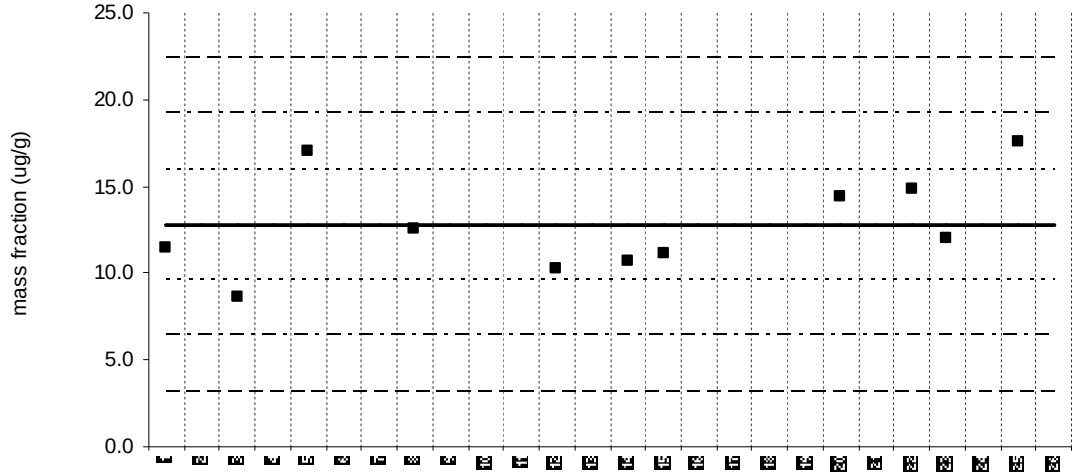


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

17α(H),21β(H)-22R-Homohopane — QA10OIL01

Assigned mean = 12.8 ug/g s = 2.8 ug/g 95% CI = 1.7 ug/g Assigned median = 12.1 ug/g

Reported Results: 12 Quantitative Results: 11



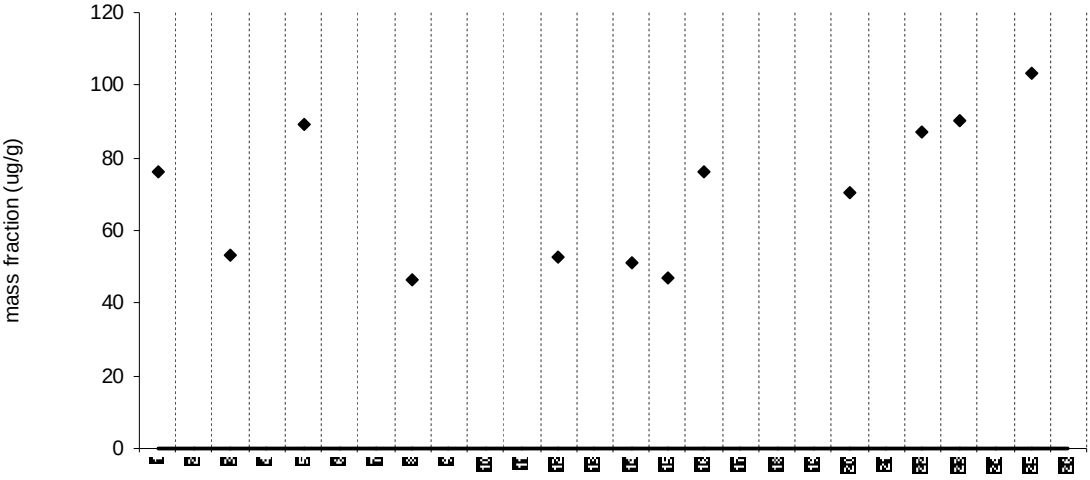
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

17α(H),21β(H)-22R-Homohopane — SRM 1582

Target Value = no target ug/g

Reported Results: 12 Quantitative Results: 12 Median of Reported Results: 73.3 ug/g



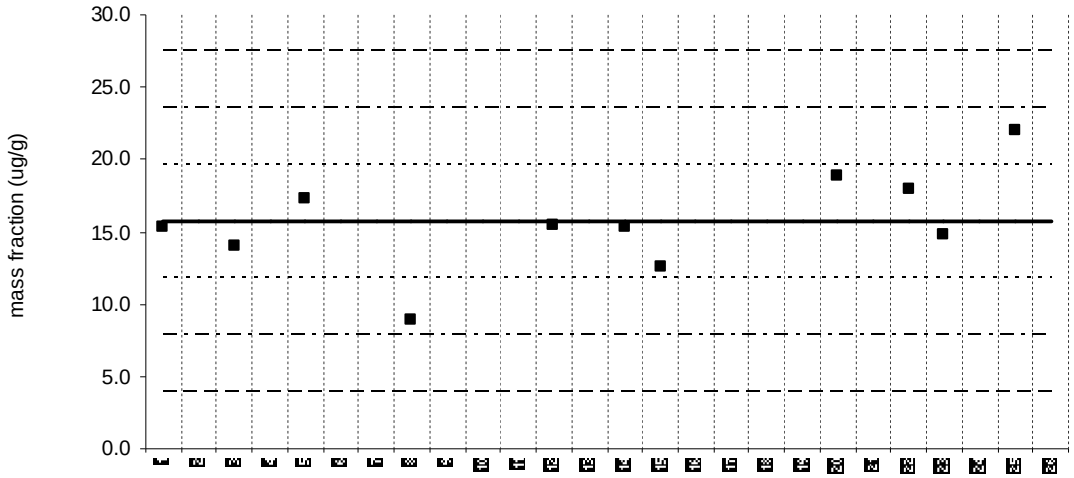
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

17α(H),21β(H)-22S-Homohopane — QA10OIL01

Assigned mean = 15.7 ug/g s = 3.4 ug/g 95% CI = 2.0 ug/g Assigned median = 15.4 ug/g

Reported Results: 12 Quantitative Results: 11



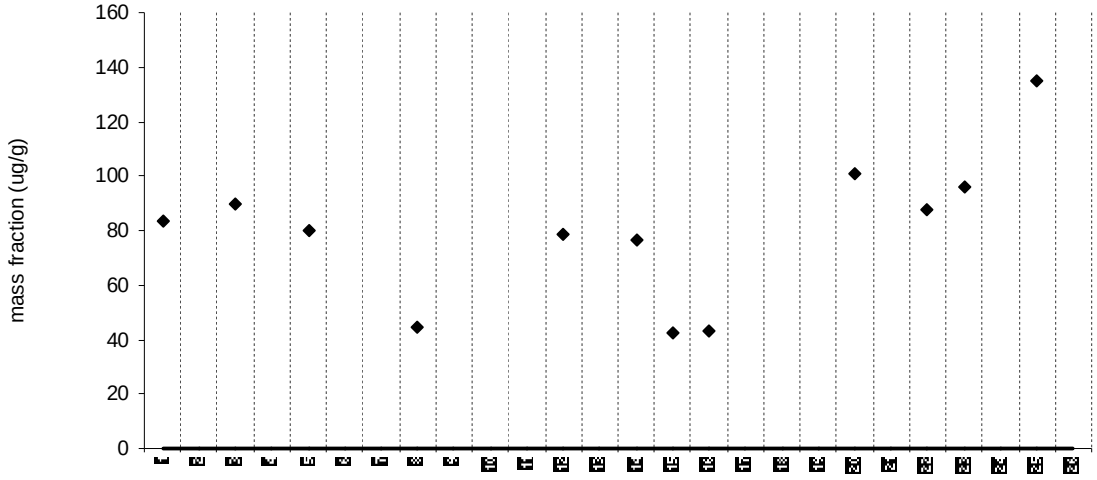
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

17α(H),21β(H)-22S-Homohopane — SRM 1582

Target Value = no target ug/g

Reported Results: 12 Quantitative Results: 12 Median of Reported Results: 81.7 ug/g



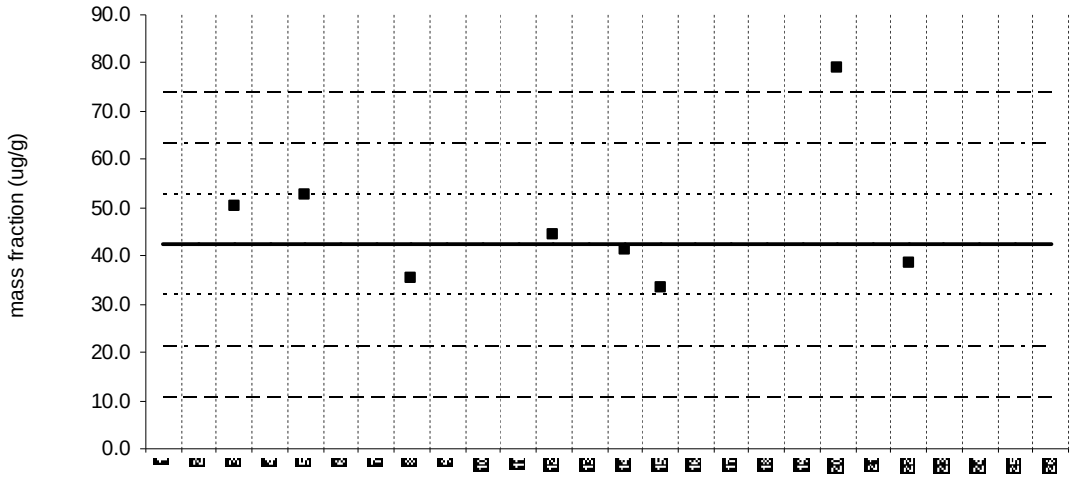
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

13b(H)17a(H)-Diacholestane 20S — QA10OIL01

Assigned mean = 42.3 ug/g s = 7.2 ug/g 95% CI = 5.3 ug/g Assigned median = 41.2 ug/g

Reported Results: 10 Quantitative Results: 8

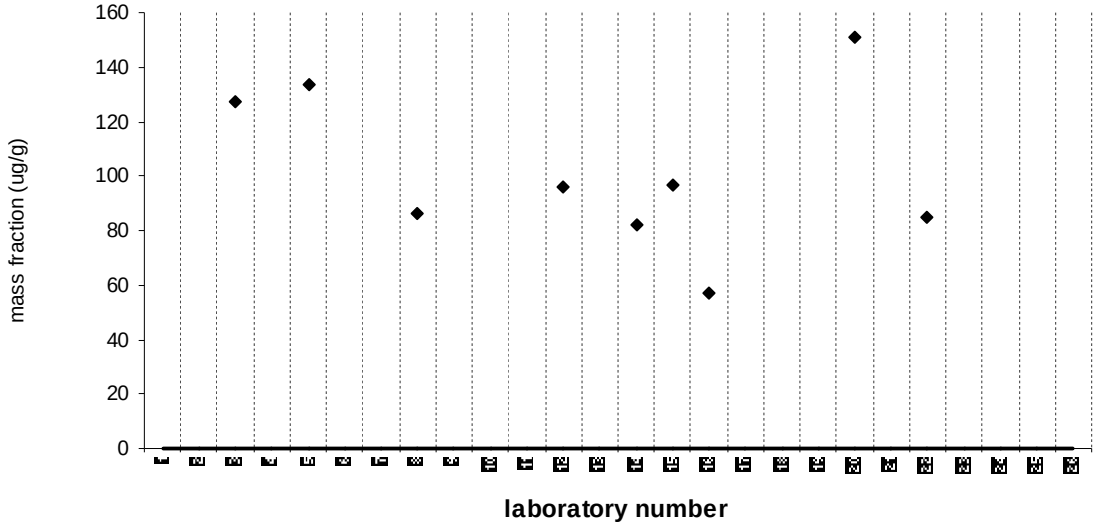


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

13b(H)17a(H)-Diacholestane 20S — SRM 1582

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 9 Median of Reported Results: 95.7 ug/g

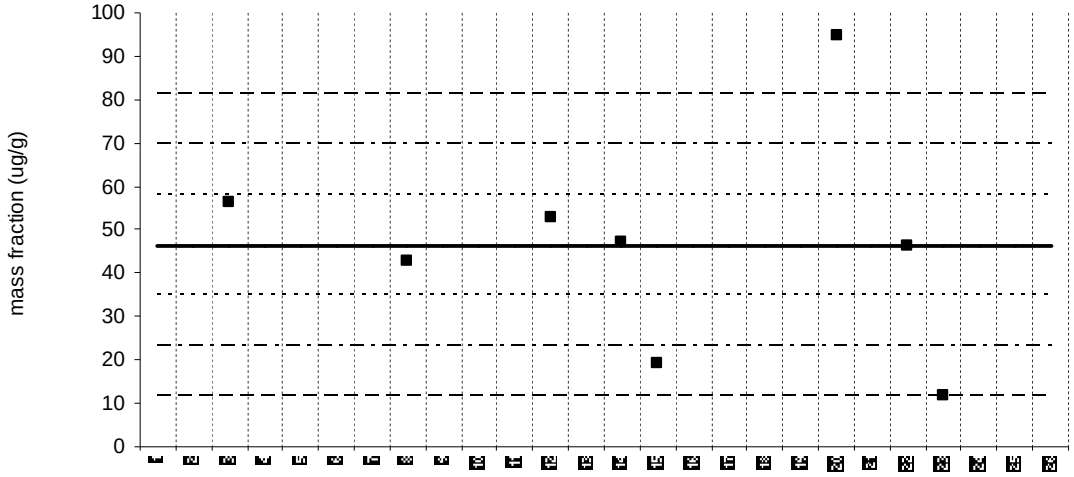


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

5a(H),14a(H),17a(H)-Cholestane 20S — QA10OIL01

Assigned mean = 46.5 ug/g s = 25.2 ug/g 95% CI = 17.4 ug/g Assigned median = 46.9 ug/g

Reported Results: 10 Quantitative Results: 8

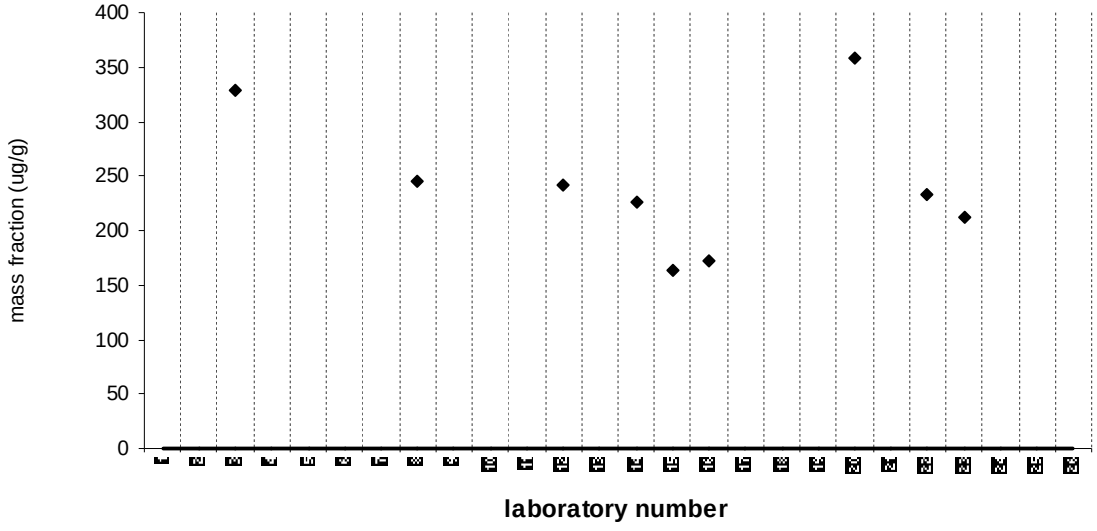


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

5a(H),14a(H),17a(H)-Cholestane 20S — SRM 1582

Target Value = no target ug/g

Reported Results: 9 Quantitative Results: 9 Median of Reported Results: 233 ug/g

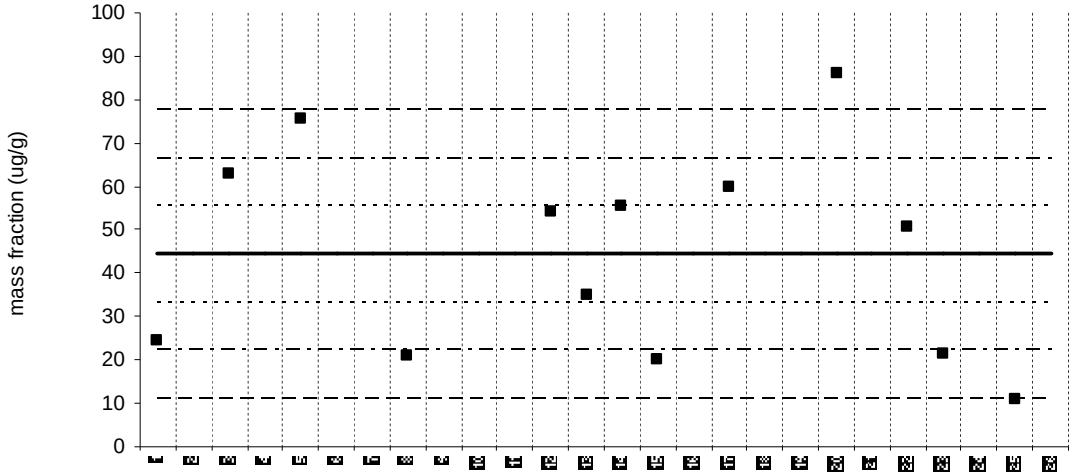


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

5a(H),14a(H),17a(H)-Cholestane 20R **QA10OIL01**

Assigned mean = 44.4 ug/g s = 23.9 ug/g 95% CI = 13.0 ug/g Assigned median = 50.5 ug/g

Reported Results: 15 Quantitative Results: 13

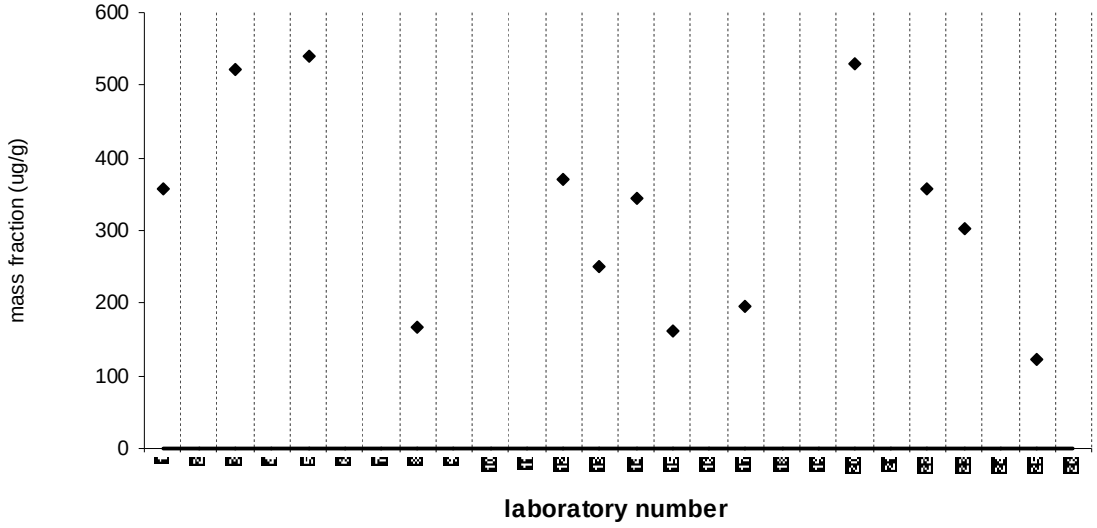


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

5a(H),14a(H),17a(H)-Cholestane 20R **SRM 1582**

Target Value = no target ug/g

Reported Results: 14 Quantitative Results: 13 Median of Reported Results: 344 ug/g

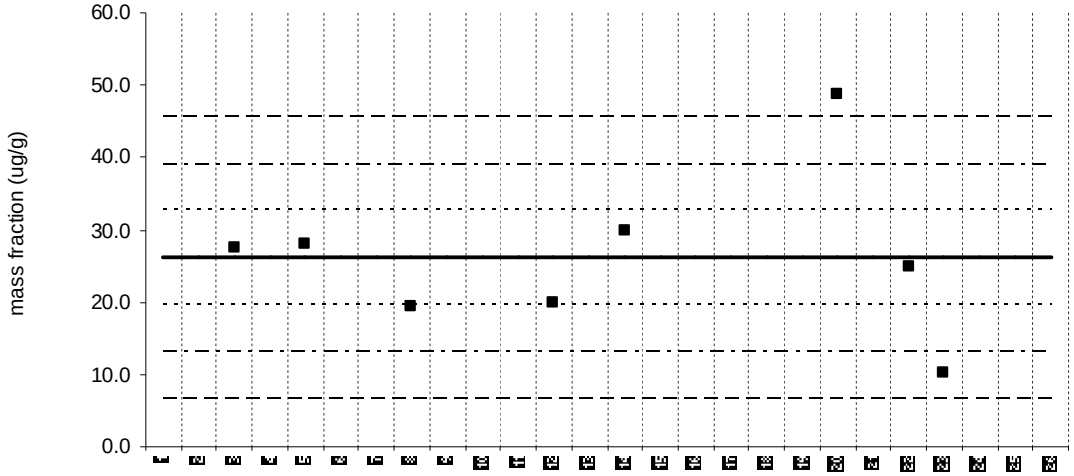


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

5a(H),14a(H),17a(H)-24-Ethylcholestane 20S — QA10OIL01

Assigned mean = 26.1 ug/g s = 11.2 ug/g 95% CI = 7.7 ug/g Assigned median = 26.2 ug/g

Reported Results: 10 Quantitative Results: 8



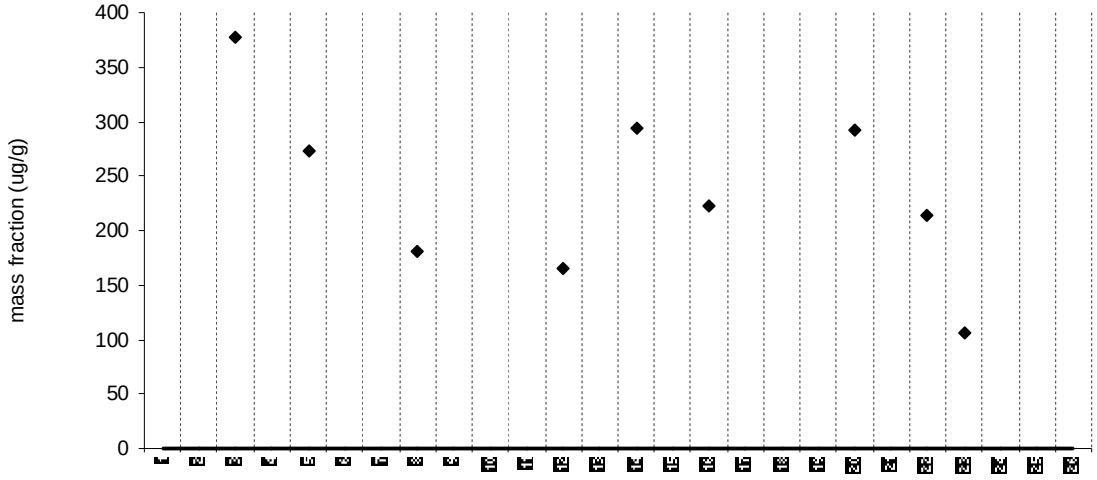
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

5a(H),14a(H),17a(H)-24-Ethylcholestane 20S — SRM 1582

Target Value = no target ug/g

Reported Results: 11 Quantitative Results: 9 Median of Reported Results: 223 ug/g



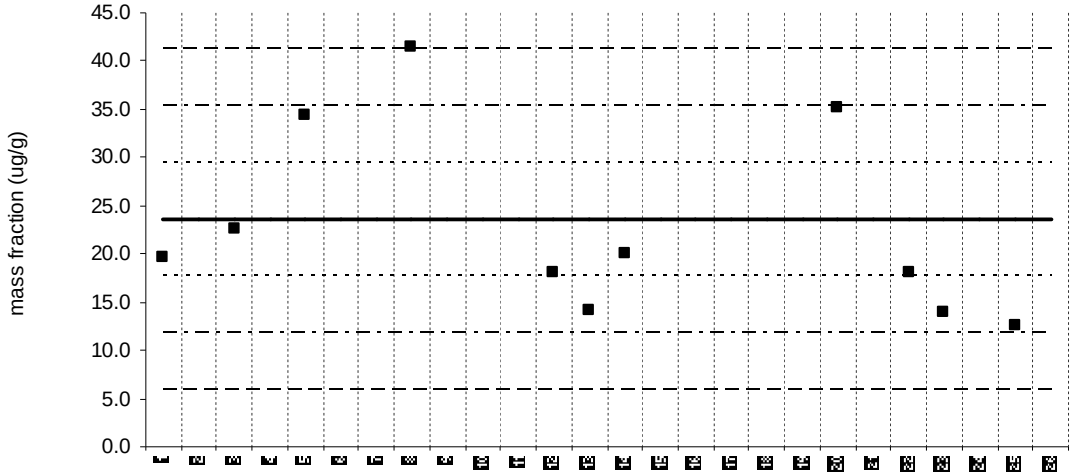
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

5a(H),14a(H),17a(H)-24-Ethylcholestane 20R — QA10OIL01

Assigned mean = 23.6 ug/g s = 9.9 ug/g 95% CI = 6.1 ug/g Assigned median = 19.9 ug/g

Reported Results: 13 Quantitative Results: 11



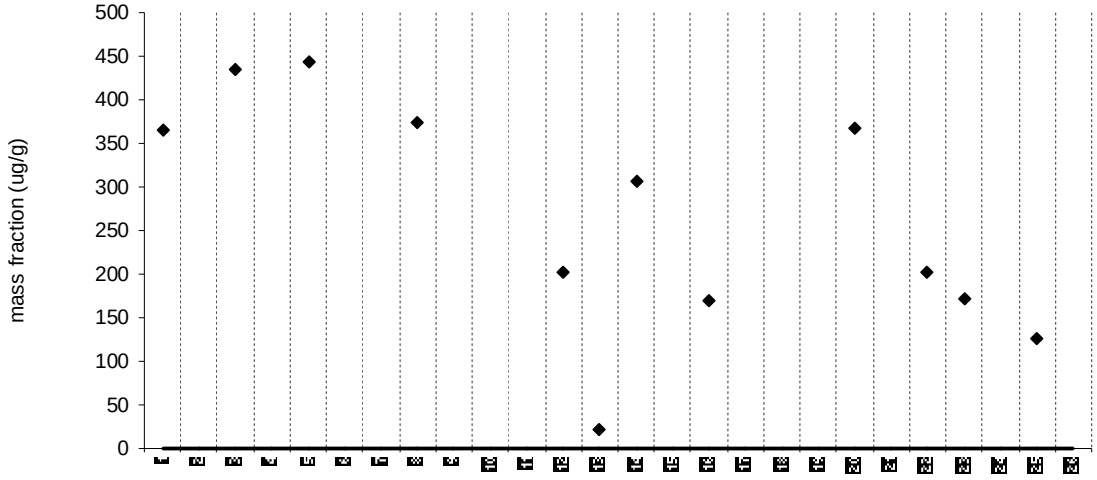
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

5a(H),14a(H),17a(H)-24-Ethylcholestane 20R — SRM 1582

Target Value = no target ug/g

Reported Results: 13 Quantitative Results: 12 Median of Reported Results: 255 ug/g



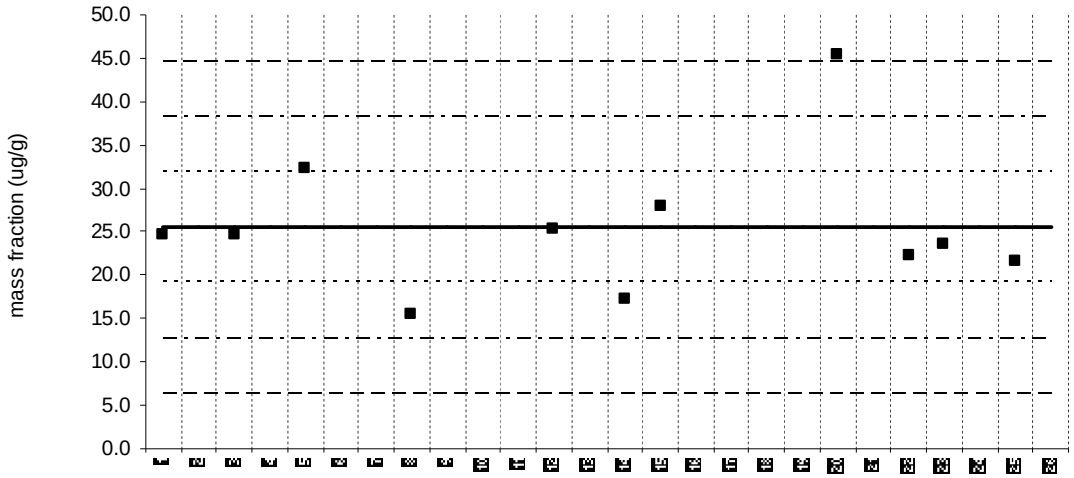
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

5a(H),14b(H),17b(H)-Cholestane 20R — QA10OIL01

Assigned mean = 25.5 ug/g s = 8.1 ug/g 95% CI = 4.8 ug/g Assigned median = 24.6 ug/g

Reported Results: 13 Quantitative Results: 11

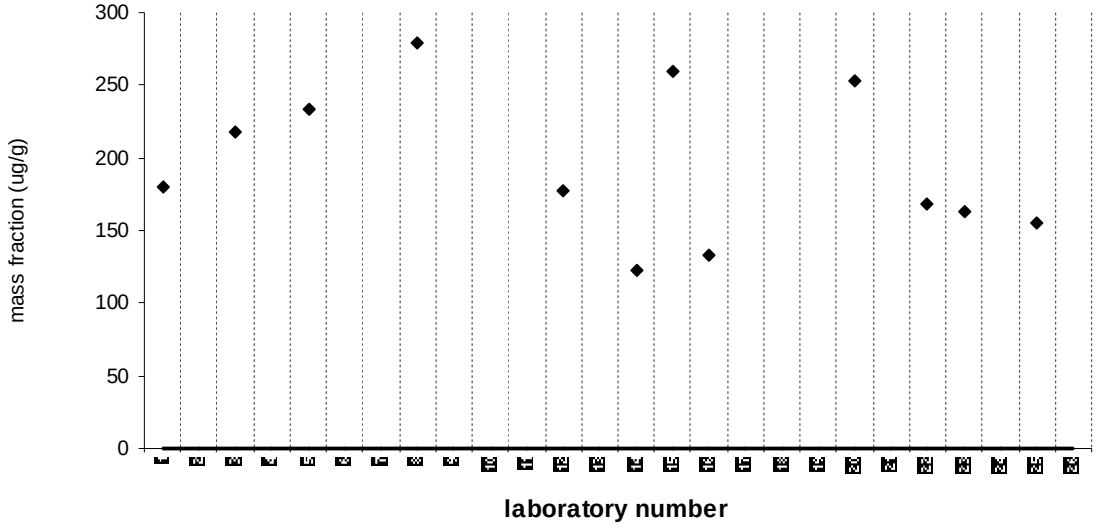


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

5a(H),14b(H),17b(H)-Cholestane 20R — SRM 1582

Target Value = no target ug/g

Reported Results: 12 Quantitative Results: 12 Median of Reported Results: 179 ug/g

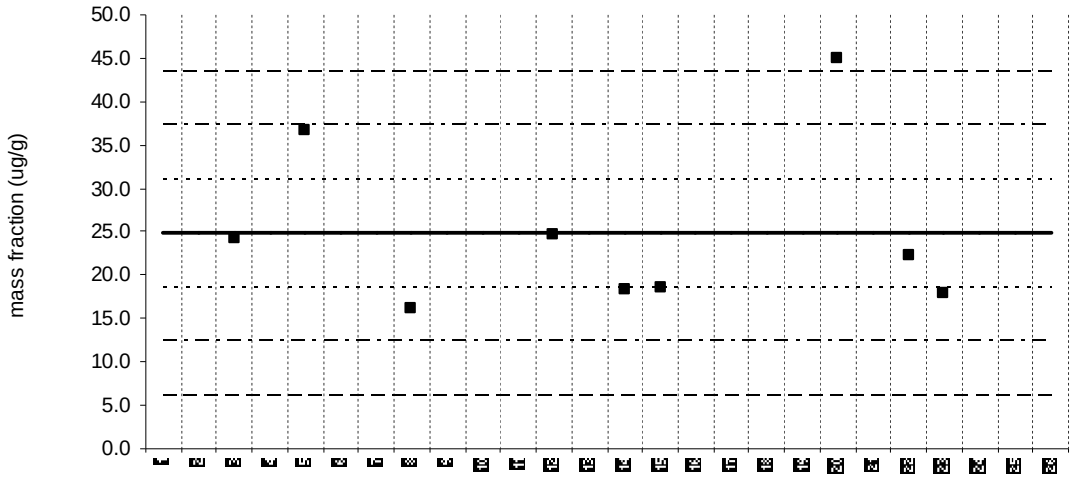


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

5a(H),14b(H),17b(H)-Cholestane 20S — QA10OIL01

Assigned mean = 24.9 ug/g s = 9.7 ug/g 95% CI = 6.4 ug/g Assigned median = 22.3 ug/g

Reported Results: 11 Quantitative Results: 9



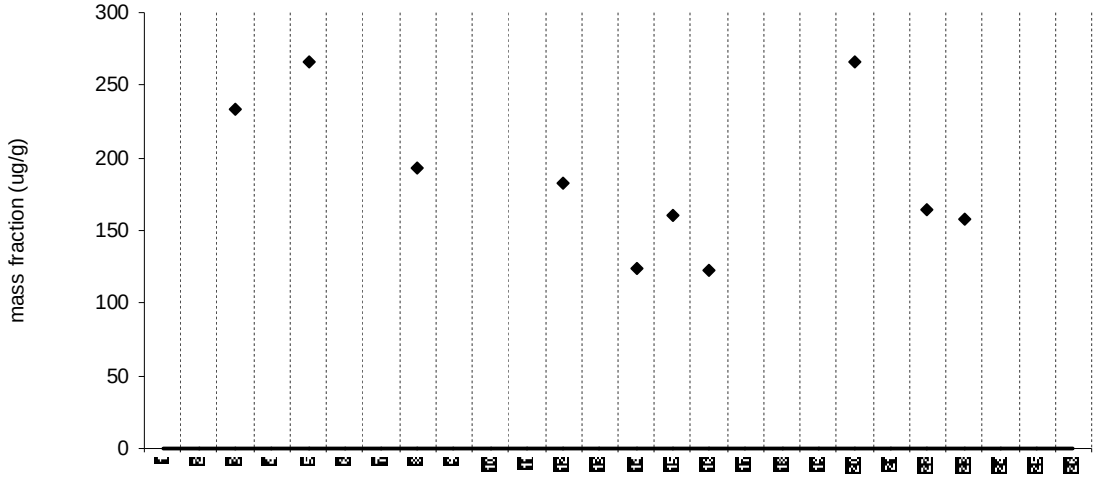
laboratory number

Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

5a(H),14b(H),17b(H)-Cholestane 20S — SRM 1582

Target Value = no target ug/g

Reported Results: 10 Quantitative Results: 10 Median of Reported Results: 174 ug/g



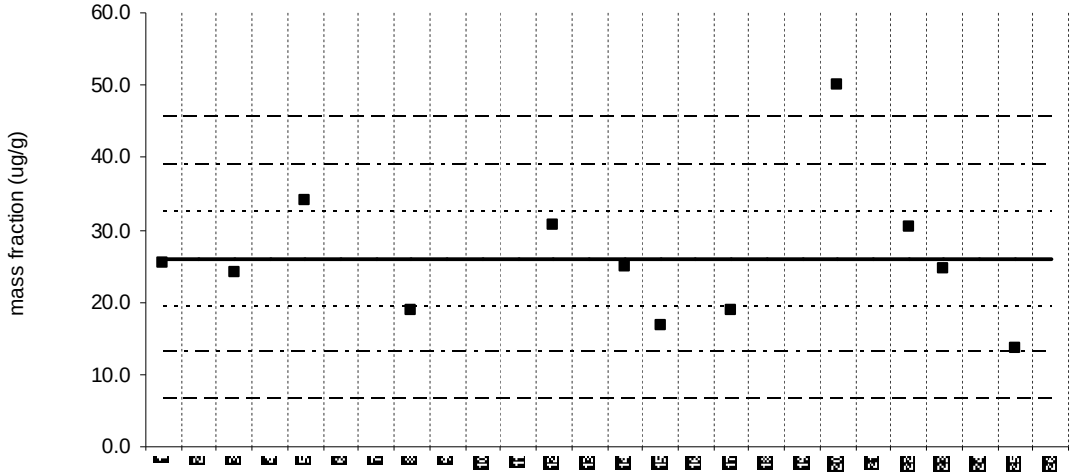
laboratory number

Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

5a(H),14b(H),17b(H)-24-Ethylcholestane 20R — QA10OIL01

Assigned mean = 26.0 ug/g s = 9.7 ug/g 95% CI = 5.5 ug/g Assigned median = 24.8 ug/g

Reported Results: 14 Quantitative Results: 12

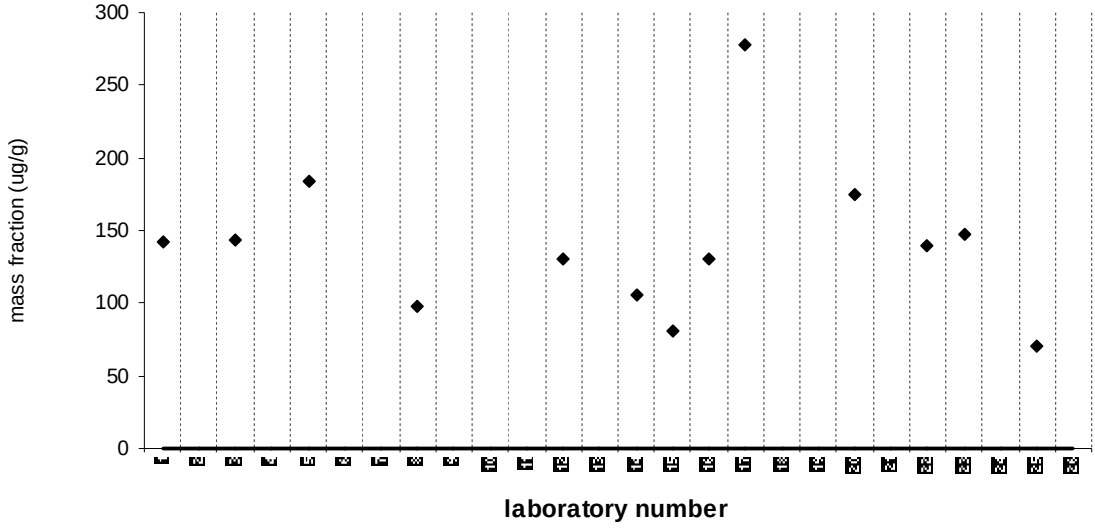


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

5a(H),14b(H),17b(H)-24-Ethylcholestane 20R — SRM 1582

Target Value = no target ug/g

Reported Results: 13 Quantitative Results: 13 Median of Reported Results: 139 ug/g

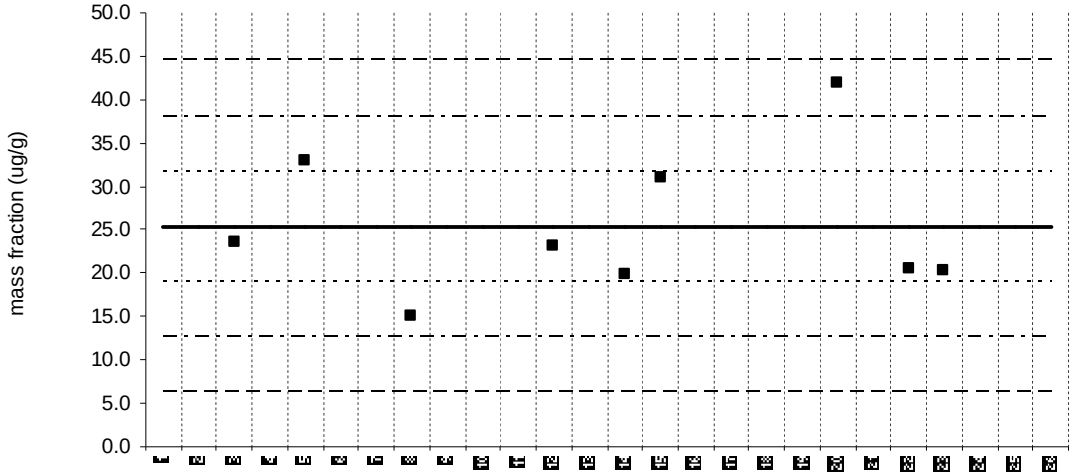


Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

5a(H),14b(H),17b(H)-24-Ethylcholestane 20S — QA10OIL01

Assigned mean = 25.4 ug/g s = 8.4 ug/g 95% CI = 5.5 ug/g Assigned median = 23.1 ug/g

Reported Results: 12 Quantitative Results: 9

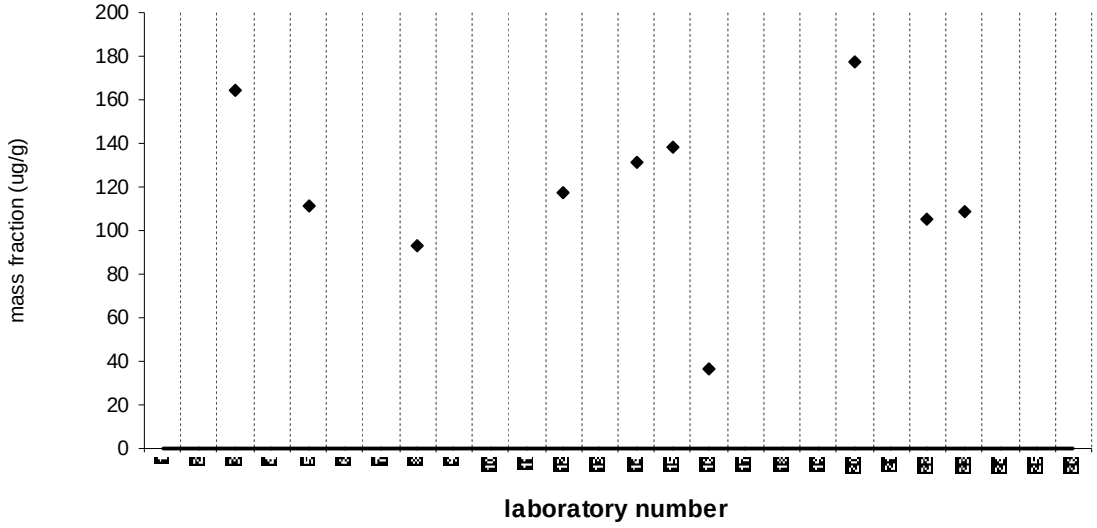


Solid line : exercise assigned value (EAV); dotted line: z=±1 (25% from EAV); dotted/dashed line: z=±2 (50% from EAV); dashed line: z=±3 (75% from EAV)

5a(H),14b(H),17b(H)-24-Ethylcholestane 20S — SRM 1582

Target Value = no target ug/g

Reported Results: 11 Quantitative Results: 10 Median of Reported Results: 115 ug/g



Solid line: value from Certificate of Analysis ; dotted line: 95% confidence limits; dashed line: 30% from 95% confidence limits

Appendix E
Participants in the Sediment Interlaboratory Study QA10OIL01 in Alphabetical Order by Organization

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