



Smoke Analysis Sub-Group

Technical Report

2021 Study for Select PAH in Mainstream Cigarette Smoke

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Author and Project Leader:

Rana Tayyarah, ITG Brands LLC, U.S.A.

Statistical Analysis:

Wendy Wagstaff, Labstat International Inc., Canada

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1. Summary

In 2021, the CORESTA Smoke Analysis Sub-Group (SA SG) launched project 294 to establish a CRM for analyzing select polycyclic aromatic hydrocarbons (PAH) in mainstream cigarette smoke. The project's first study discussed in this report was a proficiency study to aid the selection of candidate methods.

This study was conducted using 2R5F and 1R6F reference cigarettes and the CM9 monitor test piece smoked under ISO intense (ISO 3308) and non-intense (ISO 20778) regimes. Participating laboratories (8) were instructed to use their own method for smoking and analysis.

Method details were broadly similar among the participants. Most participants (6) used single quad gas chromatography with mass spectral detection (GC-MS). Two laboratories used triple quad GC-MS/MS. Results were used to determine z-scores for analytes, for which most laboratories reported quantifiable results and no outliers were detected. All z-scores were found to be within acceptable limits. A review of the methods to narrow candidates focused on the maximum number of required analytes, relatively low method LOQs, and the practicality of method variables.

Based on these results, the next step recommendation is to conduct a collaborative study with one or two candidate methods from this study based on the criteria discussed herein.

2. Introduction

The overall objective of Project 294 is to develop a CORESTA Recommended Method (CRM) for determining polycyclic aromatic hydrocarbons (PAH) in cigarette mainstream smoke. The overall approach for the project is to conduct a series of studies as needed to establish one candidate method for CRM development.

The purpose of this study was to conduct a study in which participants followed the testing protocol using their own analytical methodology.

Reference and monitor samples across a range of nominal ISO 3308 tar levels using an intense and non-intense regime to evaluate methodology across a broad analyte and matrix level. Laboratories reported method details, basic smoking measures, and the specified PAH compounds.

Statistical evaluations were made in general conformance with ISO 5725-2 recommendations. Included in this report are descriptive statistics, raw data, and z-scores.

3. Organisation

3.1 Participants

The laboratories that participated in the study are listed in alphabetical order in Table 1. To ensure anonymity of the results, each laboratory was given a unique code that was used for reporting of the data and was shared with each laboratory separately. Laboratory codes were different from the order of participating laboratories in Table 1.

Table 1. Participating laboratories

Testing Participants
China National Tobacco Corp. Beijing Cigarette Factory
China National Tobacco Quality Supervision and Test Center
Enthalpy Analytical
Japan Tobacco Inc.
JTI Ökolab
Liggett Group LLC
PMI Switzerland
Reemtsma Cig.fab. GmbH – Imperial Brands

3.2 Study Test Articles

The study test articles are noted in Table 2 below. The University of Kentucky reference products and monitor cigarette CM9 were used for the study as they represent a range of design features typical of the product category.

Table 2. Study Test Articles

Sample ID	Description
Sample A	Kentucky Reference 2R5F
Sample B	Kentucky Reference 1R6F
Sample C	CM9

3.3 Protocol

The Study Protocol is described briefly below and in full in Appendix A. Participating laboratories were asked to obtain their own supply of Kentucky Reference and CORESTA Monitor Test Pieces.

Participating laboratories were asked to smoke using ISO non-intense (ISO 3308) and intense (ISO 20778) regimes and report five replicates for each test article and each smoking regime. A replicate was defined as a single measurement rather than a certain number of cigarettes. Laboratories were asked to establish a composite sample prior to smoking if there was an expectation of a time delay between smoking under each regime. No other run order requirements were provided.

Reportable measures included puff count (PC), total particulate matter (TPM), and specified PAH compounds.

4. Data – Statistical Analysis

Raw data are presented in summarized data in Appendix B and Appendix C and graphs of the data are shown in Appendix D reported as $\mu\text{g}/\text{cigarette}$. All raw data can be found in Appendix F and Appendix G. Data are reported to two or more decimal places without regard to significant figures. Non-reported values are noted as “NR” with a reason code if available.

4.1 Z-Scores

The study was conducted in accordance with ISO/IEC 17043 and the calculations were done in general conformance with ISO 13528.

Z-scores are given in standard deviation units from the assigned value (“average”), and the assigned values and standard deviations for proficiency assessment were estimated using Algorithm A given in ISO 13528. The z-score is intended to indicate whether the laboratory results are within the normal range of other laboratories. It is expected that most of the z-scores should fall within the range of ± 2 . Values such that $2 \leq |z| < 3$ should be interpreted as a warning, and laboratories having values with $3 \leq |z|$ should be treated as an “action signal” to investigate laboratory performance. Individual z-scores are shown below in Table 3 and Table 4 for PAH analytes for which most laboratories reported quantifiable results.

Table 3. z-Score values for select PAH analytes – Non-Intense Regime

Smoking Condition Lab Number	Sample A (ISO3308)							
	3	4	5	6	7	8	9	11
Puff Count (per cig)	0.644	0.266	-0.259	-0.139	0.797	0.830	-1.148	-0.989
MS TPM (mg/cig)	-1.06	1.38	-0.274	0.357	0.213	-0.797	-0.085	0.267
Study 294 PAH Analytes								
Benzo[c]phenanthrene (B[c]P)	-0.304	1.45	-1.54	<LOQ	0.253			0.146
Benzo[a]anthracene (B[a]A)	0.141	1.26	-1.38	1.02	-0.571	-0.154	-0.163	-0.145
Chrysene (Chry)	1.42	-0.334	-0.644	-0.652	-0.853		1.64	-0.575
Benzo[b]fluoranthene (B[b]F)	1.11	0.309	-1.56	-0.123	-0.616	-0.515	1.39	
Benzo[k]fluoranthene (B[k]F)	1.44	-0.732	-0.666	0.018	-0.797	-0.917	1.58	0.073
Benzo[a]pyrene (B[a]P)	-0.205	1.18	-1.24	1.49	-0.694	-0.427	0.159	-0.257
Dibenzo[a,h]anthracene (dB[ah]A)	1.94	-0.551	-0.741	0.586	-0.715	-0.520		
Indeno[1,2,3-c,d]pyrene (I[cd]P)	1.45	-0.258	-0.764	0.387	-1.32	-0.537	1.53	-0.495
Smoking Condition Lab Number	Sample B (ISO3308)							
3	4	5	6	7	8	9	11	
Puff Count (per cig)	0.435	0.100	-1.47	0.084	0.821	0.687	0.435	-1.09
MS TPM (mg/cig)	0.152	0.549	-0.140	-0.521	0.337	-0.193	0.226	-0.410
Study 294 PAH Analytes								
Benzo[c]phenanthrene (B[c]P)	-0.485	1.35	-1.55	<LOQ	0.414			0.279
Benzo[a]anthracene (B[a]A)	-0.913	-0.076	-0.566	2.13	-0.452	0.334	-0.367	-0.087
Chrysene (Chry)	1.33	-0.280	-0.536	-0.715	-0.827		1.66	-0.627
Benzo[b]fluoranthene (B[b]F)	0.859	0.675	-1.78	-0.289	-0.353	-0.001	0.893	
Benzo[k]fluoranthene (B[k]F)	1.40	-0.816	-0.386	-0.460	-0.783	-0.799	1.43	0.418
Benzo[a]pyrene (B[a]P)	-0.726	1.29	-0.748	1.55	-0.857	-0.313	-0.646	0.456
Dibenzo[a,h]anthracene (dB[ah]A)	2.15	-0.445	-0.625	-0.133	-0.567	-0.383		
Indeno[1,2,3-c,d]pyrene (I[cd]P)	1.52	-0.035	-0.322	-0.384	-1.54	-0.229	1.50	-0.499
Smoking Condition Lab Number	Sample C (ISO3308)							
3	4	5	6	7	8	9	11	
Puff Count (per cig)	0.552	-0.337	-0.375	-0.923	0.742	1.36	0.552	-1.57
MS TPM (mg/cig)	1.12	-0.061	0.820	-0.839	0.192	-0.381	0.664	-1.51
Study 294 PAH Analytes								
Benzo[c]phenanthrene (B[c]P)	-0.396	1.73	-1.51	0.122	0.059			0.002
Benzo[a]anthracene (B[a]A)	-0.993	-0.589	0.735	1.14	-0.373	1.09	-0.693	-0.315
Chrysene (Chry)	1.45	-0.250	-0.499	-0.980	-0.885		1.55	-0.378
Benzo[b]fluoranthene (B[b]F)	1.22	0.369	-1.26	-0.812	-0.795	0.092	1.19	
Benzo[k]fluoranthene (B[k]F)	1.45	-0.725	-0.071	-0.538	-0.691	-0.597	1.45	-0.281
Benzo[a]pyrene (B[a]P)	-1.19	1.18	0.682	0.817	-0.606	0.006	-1.14	0.257
Dibenzo[a,h]anthracene (dB[ah]A)	2.18	-0.408	-0.539	-0.268	-0.618	-0.346		
Indeno[1,2,3-c,d]pyrene (I[cd]P)	1.64	-0.431	-0.348	-0.268	-1.31	-0.400	1.60	-0.480

Red text = data submitted from all participating labs; pink highlight = straggler;
grey highlight = not reported or not calculated

Table 4. z-Score values for select PAH analytes – Intense Regime

Smoking Condition Lab Number	Sample A (ISO20778)							
	3	4	5	6	7	8	9	11
Puff Count (per cig)	-0.426	-0.313	-0.404	-0.026	1.29	1.17	-0.546	-0.745
MS TPM (mg/cig)	0.754	-1.14	1.15	0.064	-0.581	0.989	0.156	-1.39
Study 294 PAH Analytes								
Benzo[c]phenanthrene (B[c]P)	-0.154	1.53	-1.41	<LOQ	0.193			-0.156
Benzo[a]anthracene (B[a]A)	0.021	1.02	0.369	0.532	-1.06	0.076	0.325	-1.28
Chrysene (Chry)	1.49	-0.424	-0.462	-0.765	-0.820		1.58	-0.604
Benzo[b]fluoranthene (B[b]F)	1.38	-0.174	-0.963	-0.236	-1.00	-0.078	1.07	
Benzo[k]fluoranthene (B[k]F)	1.48	-0.850	-0.538	-0.319	-0.822	-0.808	1.37	0.485
Benzo[a]pyrene (B[a]P)	0.343	0.948	0.013	0.905	-0.688	-0.905	0.397	-1.01
Dibenzo[a,h]anthracene (dB[ah]A)	2.16	-0.516	-0.552	-0.104	-0.563	-0.423		
Indeno[1,2,3-c,d]pyrene (I[cd]P)	1.60	-0.374	-0.279	-0.346	-1.27	-0.249	1.56	-0.645
Smoking Condition Lab Number	Sample B (ISO20778)							
	3	4	5	6	7	8	9	11
Puff Count (per cig)	0.046	0.706	-0.766	-0.378	1.47	0.670	-0.840	-0.907
MS TPM (mg/cig)	0.805	-0.924	1.31	-0.148	-0.149	0.647	-0.091	-1.44
Study 294 PAH Analytes								
Benzo[c]phenanthrene (B[c]P)	-0.259	1.60	-1.49	<LOQ	0.595			-0.221
Benzo[a]anthracene (B[a]A)	-0.686	1.07	0.200	0.692	0.000	0.149	-0.069	-1.36
Chrysene (Chry)	1.48	-0.328	-0.539	-0.832	-0.770		1.58	-0.591
Benzo[b]fluoranthene (B[b]F)	1.31	0.490	-1.18	-0.895	-0.408	-0.155	0.833	
Benzo[k]fluoranthene (B[k]F)	1.44	-0.799	-0.276	-0.539	-0.717	-0.852	1.30	0.438
Benzo[a]pyrene (B[a]P)	0.646	0.829	-0.173	0.086	-0.237	-1.32	0.628	-0.462
Dibenzo[a,h]anthracene (dB[ah]A)	2.19	-0.456	-0.543	-0.289	-0.486	-0.416		
Indeno[1,2,3-c,d]pyrene (I[cd]P)	1.62	-0.241	-0.261	-0.687	-1.22	-0.281	1.57	-0.500
Smoking Condition Lab Number	Sample C (ISO20778)							
	3	4	5	6	7	8	9	11
Puff Count (per cig)	0.168	0.588	-1.49	-0.482	1.45	0.460	-0.395	-0.300
MS TPM (mg/cig)	1.235	-0.761	0.803	-1.05	-0.063	0.832	0.321	-1.317
Study 294 PAH Analytes								
Benzo[c]phenanthrene (B[c]P)	-0.783	1.52	-1.47	0.340	0.474			-0.087
Benzo[a]anthracene (B[a]A)	-0.799	0.001	0.079	1.55	0.094	0.874	-0.831	-0.971
Chrysene (Chry)	1.46	-0.242	-0.452	-0.750	-0.705		1.55	-0.859
Benzo[b]fluoranthene (B[b]F)	1.15	0.123	-1.40	0.605	-1.09	-0.108	0.718	
Benzo[k]fluoranthene (B[k]F)	1.40	-0.706	-0.334	-0.367	-0.688	-0.698	1.28	0.110
Benzo[a]pyrene (B[a]P)	-0.762	1.06	0.498	0.280	-0.431	-0.145	-0.780	0.275
Dibenzo[a,h]anthracene (dB[ah]A)	2.18	-0.463	-0.603	-0.223	-0.515	-0.373		
Indeno[1,2,3-c,d]pyrene (I[cd]P)	1.66	-0.489	-0.435	-0.197	-1.21	-0.400	1.60	-0.529

Red text = data submitted from all participating labs; pink highlight = straggler;
grey highlight = not reported or not calculated

5. Discussion

Laboratories were instructed to use their own method for the study so that we would be able to compare results and choose candidate methods for a follow up collaborative study (CS). A review of the labs' methods shows that the methods were largely similar. Laboratories used linear or rotary 20 port smoking machines to smoke 5-20 cigarettes (non-intense) or 3-10 cigarettes (intense) using glass fiber filter pads for trapping. Pads were extracted with 30 minutes of shaking using either hexane, cyclohexane, or methanol. Solid phase extraction (SPE) was used for sample clean up before analysis by GC-MS (6 labs) or GC-MS/MS (2 labs). Typically, labs used a PAH specific analytical column and a splitless injection. Injection temperatures, oven ramping, and source temperatures were similar. Interestingly, the methodology employed is very similar to CRM 91 for PAH determination in tobacco and tobacco products samples.

The primary differences of note for the methods are that included analytes varied and that the method limits of quantitation (LOQ) varied often by ten-fold or more. In some cases, an analyte was included for a method but was reported as <LOQ and not included in the comparison. See Appendix E for a comparison of method details, including reported non-intense LOQ values.

As noted in Section 4 above, for analytes which could be compared, the z-scores were within acceptable limits for all methods. Thus, it is likely that missing analytes could be included in many of the reported methods. Our objective in this study is to choose one or two methods for evaluation in a collaborative study. A review of included analytes and general applicability followed determination of z-scores. As shown below in Table 5, labs 4, 5, and 7 have the highest number of required analytes included and have among the lowest LOQs. As discussed above, other method variables are largely similar. Thus, next steps will be to determine if any of these methods may be selected and installed as-is for a CS or if method refinements may be warranted prior to a CS.

Table 5. Comparison of reportable analytes by method

2	3	4	5	6	7	8	9	11
Method type	GC-MS	GC-MS	GC-MS	GC-MS	GC-MS/MS	GC-MS	GC-MS	GC-MS/MS
Project 294 Analytes	LOQ	LOQ	LOQ	LOQ	LOQ	LOQ	LOQ	LOQ
B[c]P	1.08	0.03	0.03-0.05	3.20	0.015	NA	NA	0.2
B[a]A	1.04	0.02	0.03-0.05	0.10	0.030	0.047	0.0014	1
Chry	1.28	0.02	0.03-0.05	0.23	0.030	NA	0.0015	2
B[b]F	1.25	0.02	0.03-0.05	0.12	0.030	0.068	0.0013	NA
B[k]F	1.60	0.02	0.03-0.05	0.32	0.030	0.018	0.0013	0.2
B[j]A	NA	0.03	0.03-0.05	NA	B[+e]A	NA	NA	NA
B[a]P	1.09	0.03	0.03-0.05	0.12	0.100	0.054	0.0022	0.5
dB[ah]A	1.36	0.03	0.03-0.05	0.12	0.120	0.008	NA	NA
I[cd]P	1.47	0.03	0.03-0.05	0.10	0.120	0.021	0.002	0.4
dB[al]P	1.68	0.19	0.03-0.05	0.35	1.000	0.008	NA	0.2
dB[ae]P	1.19	0.19	0.03-0.05	0.27	1.000	0.008	NA	0.1
dB[ai]P	1.22	0.27	0.03-0.05	0.31	1.000	0.007	NA	0.4
dB[ah]P	1.67	0.27	0.03-0.05	0.30	1.000	0.005	NA	0.4
C[cd]P	NA	0.02	0.03-0.05	NA	0.030	NA	NA	2
5-MC	NA	0.02	0.03-0.05	NA	0.030	NA	NA	NA
B-Fur	NA	NA	NA	NA	0.040	NA	NA	NA
Naph	NA	0.11	NA	NA	0.015	NA	NA	NA

6. Conclusions

Through this study, CORESTA was able to establish that participating laboratories' methodologies were consistent enough to allow for a narrowing of methods towards one candidate to support Project 294 in establishing a method for the determination of select PAH.

The scope of the study included 8 data sets for laboratories testing 3 cigarette samples across a range of typical blend platforms and a range of TPM values of approximately 2 mg – 50 mg (ISO 3308, ISO 20778) and using two types of smoking machine designs and two smoking regimes. The PAH tested across this sample set covered a wide range of the analytes of interest.

Participating laboratories used largely similar methodology and all had acceptable z-scores for the study.

Next steps for Project 294 are planned to focus on a selection of one or two candidate methods for evaluation in a collaborative study to determine repeatability and robustness estimates.

Appendix A: Study Protocol



Project Title:	Project 294 PAH Study 1 - Proficiency Testing Study
Type of Document:	Protocol
Date:	February 11, 2021
Written by:	Rana Tayyarah

1. Objective

The objective of this study is to conduct a proficiency study to aid selection of candidate testing methods for development of a CRM for polyaromatic hydrocarbons (PAH) in mainstream cigarette smoke.

2. Time Schedule

Date	Activity
February 2021	Launch - Study Coordinator to distribute protocol and template
May 7, 2021	Testing - Laboratories to secure own supply of cigarettes and submit results prior to this date
June 7, 2021	Data Analysis and Accuracy review
July 9, 2021	Workstream review and next steps decisions
Aug 20, 2021	Final report submitted to Scientific Commission

3. Methods

3.1 Test Products

Sample	Description	Lot/Batch	Number of Cigarettes to procure
Sample A	Kentucky Reference 2R5F	Not specified	1 carton
Sample B	Kentucky Reference 1R6F	Small Batch (see website)	1 carton
Sample C	CM9	Not specified	1 carton

Samples will be procured directly by the testing labs from commercial suppliers. Laboratories may use their own supply if lot/batch matched and if stored in accordance with vendor specifications.

Each laboratory shall dispose of retained samples in accordance with their own internal practices for cigarette disposal.

3.2 Study Control

NA

3.3 Sampling

A composite of all packs should be prepared for conditioning according to ISO 8243:2006. If a substantial period of time is expected to occur between the times when the test pieces are smoked with the different smoking regimes, then two separate composite samples should be prepared, one for each smoking regime.

3.4 Testing Atmosphere

Samples shall be tested after completion of equilibrium testing according to internal laboratory practices. The composite samples should be conditioned in accordance with standard procedures and recorded and recorded for every smoking run.

3.5 Sample Handling

All samples shall be stored under the laboratory conditions that will be used for testing and remain in their original packaging prior to testing. Or, if from a laboratory's own supplies, they should be stored according to internal practices if compliant with vendor specifications.

Glass fiber filter pads to be used for smoke collection shall be stored under conditions equivalent to the testing atmosphere for a minimum of 12 hours before use.

3.6 Filter Ventilation Zone Blocking (Intense Smoking)

The blocking of the filter ventilation zone will be achieved by means consistent with the ISO requirement.

3.7 Replicates and Run Order

For purposes of this study, a replicate is a single measurement ('pad') regardless of the number of cigarettes needed for the test.

The analysis of five (5) replicates per sample shall be reported.

Sample run order shall be organized by replicate number rather than sample number. In other words, all first replicates for all samples shall be collected and analysed together, all second replicates for all samples shall be collected and analysed together, etc.

If the capacity of the collection apparatus is sufficient for testing more than one replicate set, more than one replicate may be tested together. For example, for a 20-port linear machine all replicates may be smoked at the same time.

If fewer collection ports than the number of samples are available, replicates shall be collected sequentially.

There are no timing requirements for spacing of smoking runs. Run # and collection and testing dates shall be reported in the data template.

3.8 Smoking Parameters

Smoking Regime	Reference	Description
1	ISO 3308	Non-Intense
2	ISO 20778	Intense

3.9 Extraction and Analysis

Each laboratory shall follow its own procedures for extraction and analysis. Method details shall be reported using the template provided.

3.10 Analytes and Measures

Report results for puff count (/cig), Total particulate matter (TPM) (mg/cig), conditioned weight^[1] (mg/cig), and the analytes listed below (ng/cig) using the data template provided.

Analyte ^[2]	CAS	Abbreviation ^[3]
Benzo[c]phenanthrene	195-19-7	B[c]P
Benzo[a]anthracene	56-55-3	B[a]A
Chrysene	218-01-9	Chry
Benzo[b]fluoranthene	205-99-2	B[b]F
Benzo[k]fluoranthene	207-08-9	B[k]F
Benzo[j]aceanthrylene	202-33-5	B[j]A
Benzo[a]pyrene	50-32-8	B[a]P
Dibenzo[a,h]anthracene	53-70-3	dB[ah]A
Indeno[1,2,3-c,d]pyrene	193-39-5	I[cd]P
Dibenzo[a,l]pyrene	191-30-0	dB[al]P
Dibenzo[a,e]pyrene	192-65-4	dB[ae]P
Dibenzo[a,i]pyrene	189-55-99	dB[ai]P
Dibenzo[a,h]pyrene	189-64-0	dB[ah]P
Cyclopenta[c,d]pyrene	27208-37-3	C[cd]P
5-Methylchrysene	3697-24-3	5-MC
Benzo(b)furan	271-89-6	B-Fur
Naphthalene	91-20-3	Naph

3.11 Repeat Analysis

If a defective product is encountered, that product shall be removed from the test pool.

Number of failed replicates (repeat analysis events) is requested for reporting in the data template.

4. Data Submission

The attached template shall be used for data submission. Please supply data in the requested format without creating new cells or rows in the spreadsheet.

Results shall be reported back to Rana Tayyarah and Jana Jeffery on or before May 7, 2021.

^[1] For cigarettes without vent-blocking tape applied

^[2] Different laboratories group PAHs slightly differently, if your method does not include an analyte here note NA in the data template

^[3] Abbreviations used here are for the convenience of this study; these are not 'official' abbreviations for the compounds

5. Data Analysis

The data will be analysed statistically in accordance with appropriate ISO guidelines by the study statistical coordinator.

6. Reference Documents

Data reporting Template	Excel spreadsheet provided (file attached to protocol)
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Appendix B: Summarized Data – Non-Intense

Lab-Sample		Cond.Wt (mg/cig)	PC/cig	MS TPM mg/cig	B[c]P ng/cig	B[a]A ng/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	I[cd]P ng/cig	dB[al]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig
3-A	avg	818.56	8.14	2.25	0.58	3.79	11.41	2.10	2.19	--	2.01	1.18	1.89	--	0.39	--	--	--	--	--	--
	stdev	7.67	0.13	0.13	0.06	0.23	0.52	0.09	0.21	--	0.14	0.08	0.18	--	0.02	--	--	--	--	--	--
	%RSD	0.9	1.6	5.9	9.7	6.2	4.6	4.5	9.5	--	6.9	6.4	9.5	--	4.3	--	--	--	--	--	--
4-A	avg	827.15	8.03	2.79	1.13	4.22	5.62	1.81	0.67	0.49	2.43	0.24	1.00	--	--	--	--	2.11	--	--	36.77
	stdev	4.49	0.09	0.14	0.07	0.25	0.34	0.13	0.10	0.06	0.16	0.02	0.07	--	--	--	--	0.13	--	--	3.21
	%RSD	0.5	1.2	4.9	6.2	5.9	6.1	7.3	14.7	12.4	6.4	7.9	6.8	--	--	--	--	6.2	--	--	8.7
5-A	avg	--	7.87	2.43	0.19	3.20	4.60	1.14	0.71	0.15	1.70	0.17	0.74	--	0.12	--	--	0.85	0.43	--	--
	stdev	--	0.26	0.15	0.03	0.15	0.30	0.11	0.14	0.02	0.12	0.02	0.03	--	0.01	--	--	0.09	0.11	--	--
	%RSD	--	3.3	6.2	14.6	4.8	6.5	10.0	19.5	14.8	7.0	11.6	3.7	--	8.1	--	--	10.8	24.5	--	--
6-A	avg	840.82	7.90	2.57	--	4.13	4.57	1.66	1.19	--	2.52	0.67	1.34	--	--	--	--	--	--	--	--
	stdev	9.12	0.29	0.07	--	0.36	0.47	0.10	0.07	--	0.28	0.04	0.12	--	--	--	--	--	--	--	--
	%RSD	1.1	3.7	2.6	--	8.6	10.3	5.9	5.5	--	10.9	6.2	9.2	--	--	--	--	--	--	--	--
7-A	avg	827.66	8.19	2.54	0.75	3.51	3.90	1.48	0.62	--	1.86	0.18	0.45	--	--	--	--	1.29	0.62	--	17.81
	stdev	5.07	0.06	0.18	0.05	0.14	0.15	0.04	0.03	--	0.06	0.01	0.01	--	--	--	--	0.13	0.02	--	2.55
	%RSD	0.6	0.8	7.2	6.0	4.0	3.8	2.5	5.6	--	3.3	3.1	2.9	--	--	--	--	10.1	2.7	--	14.3
8-A	avg	829.70	8.20	2.31	--	3.67	--	1.51	0.54	--	1.94	0.25	0.85	--	0.10	0.05	0.05	--	--	--	--
	stdev	8.37	0.43	0.31	--	0.32	--	0.12	0.04	--	0.18	0.03	0.07	--	0.01	0.00	0.00	--	--	--	--
	%RSD	1.0	5.3	13.3	--	8.8	--	7.8	8.1	--	9.4	11.8	8.2	--	14.1	8.7	3.7	--	--	--	--
9-A	avg	810.56	7.60	2.47	--	3.67	12.13	2.20	2.29	--	2.12	--	1.94	--	--	--	--	--	--	--	--
	stdev	20.19	0.15	0.03	--	0.32	0.47	0.09	0.20	--	0.14	--	0.18	--	--	--	--	--	--	--	--
	%RSD	2.5	2.0	1.4	--	8.6	3.8	4.2	8.9	--	6.5	--	9.1	--	--	--	--	--	--	--	--
11-A	avg	826.62	7.65	2.55	0.72	3.68	4.82	--	1.23	--	2.00	--	0.88	--	--	--	--	--	--	--	--
	stdev	6.65	0.14	0.20	0.08	0.22	0.52	--	0.59	--	0.15	--	0.07	--	--	--	--	--	--	--	--
	%RSD	0.8	1.9	8.0	10.6	6.0	10.9	--	48.2	--	7.4	--	8.4	--	--	--	--	--	--	--	--
3-B	avg	885.38	7.66	10.22	1.53	10.30	32.23	5.82	4.77	--	6.10	3.74	5.10	--	0.72	0.62	0.71	--	--	--	--
	stdev	7.19	0.11	0.20	0.11	0.62	1.84	0.42	0.44	--	0.27	0.35	0.37	--	0.07	0.05	0.05	--	--	--	--

Lab-Sample		Cond.Wt (mg/cig)	PC/cig	MS TPM mg/cig	B[c]P ng/cig	B[a]A ng/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	I[cd]P ng/cig	dB[al]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig
	%RSD	0.8	1.5	2.0	7.0	6.0	5.7	7.2	9.2	--	4.4	9.4	7.3	--	10.0	8.5	7.0	--	--	--	--
4-B	avg	897.99	7.58	10.37	3.28	11.49	17.49	5.69	2.01	1.46	7.85	0.75	3.22	--	0.28	--	--	6.58	--	--	490.39
	stdev	4.41	0.11	0.23	0.13	0.58	0.20	0.20	0.17	0.13	0.26	0.05	0.12	--	0.03	--	--	0.76	--	--	72.38
	%RSD	0.5	1.5	2.2	4.1	5.1	1.1	3.4	8.5	9.1	3.3	6.9	3.8	--	9.8	--	--	11.6	--	--	14.8
5-B	avg	--	7.20	10.11	0.50	10.79	15.15	3.97	2.55	0.65	6.09	0.55	2.88	--	0.27	0.14	0.18	3.58	1.55	--	--
	stdev	--	0.18	0.69	0.05	0.61	1.93	0.27	0.29	0.10	0.39	0.06	0.21	--	0.03	0.02	0.04	0.28	0.14	--	--
	%RSD	--	2.5	6.9	10.5	5.6	12.7	6.9	11.6	14.6	6.5	11.4	7.3	--	9.4	17.6	24.9	7.9	9.0	--	--
6-B	avg	894.50	7.58	9.97	--	14.61	13.50	5.02	2.46	--	8.07	1.11	2.80	--	--	--	--	--	--	--	--
	stdev	3.84	0.16	0.40	--	1.22	2.50	0.53	0.20	--	0.44	0.11	0.09	--	--	--	--	--	--	--	--
	%RSD	0.4	2.1	4.1	--	8.3	18.5	10.5	8.2	--	5.4	9.8	3.1	--	--	--	--	--	--	--	--
7-B	avg	889.36	7.75	10.29	2.38	10.95	12.48	4.97	2.05	--	5.99	0.61	1.40	--	--	--	--	4.29	1.97	--	229.65
	stdev	5.38	0.12	0.36	0.11	0.39	0.60	0.14	0.09	--	0.28	0.01	0.04	--	--	--	--	0.19	0.10	--	19.82
	%RSD	0.6	1.6	3.5	4.6	3.6	4.8	2.8	4.2	--	4.6	1.3	3.2	--	--	--	--	4.5	5.2	--	8.6
8-B	avg	895.38	7.72	10.09	--	12.07	--	5.22	2.03	--	6.46	0.82	2.99	--	0.30	0.14	0.14	--	--	--	--
	stdev	8.80	0.28	0.52	--	0.86	--	0.33	0.16	--	0.42	0.08	0.21	--	0.03	0.02	0.02	--	--	--	--
	%RSD	1.0	3.6	5.1	--	7.1	--	6.4	7.7	--	6.5	9.2	6.9	--	9.4	13.6	13.0	--	--	--	--
9-B	avg	894.84	7.66	10.25	--	11.07	35.23	5.84	4.82	--	6.17	--	5.08	--	--	--	0.85	--	--	--	--
	stdev	11.88	0.11	0.11	--	0.71	0.80	0.41	0.43	--	0.27	--	0.37	--	--	--	0.05	--	--	--	--
	%RSD	1.3	1.5	1.1	--	6.4	2.3	7.0	8.9	--	4.3	--	7.2	--	--	--	5.7	--	--	--	--
11-B	avg	897.50	7.30	10.01	2.26	11.47	14.31	--	3.55	--	7.13	--	2.66	--	0.32	--	--	--	--	--	--
	stdev	4.67	0.12	0.27	0.23	0.44	4.64	--	1.44	--	0.56	--	0.45	--	0.21	--	--	--	--	--	--
	%RSD	0.5	1.7	2.7	10.2	3.8	32.4	--	40.5	--	7.9	--	17.1	--	66.3	--	--	--	--	--	--
3-C	avg	935.82	7.92	18.07	2.59	13.53	41.24	8.18	7.12	--	7.76	5.22	8.76	0.63	1.23	1.16	1.34	--	--	--	--
	stdev	5.20	0.04	0.29	0.25	0.41	1.75	0.28	0.36	--	0.44	0.27	0.20	0.06	0.09	0.10	0.10	--	--	--	--
	%RSD	0.6	0.6	1.6	9.6	3.0	4.2	3.4	5.1	--	5.6	5.1	2.3	9.7	7.6	8.6	7.7	--	--	--	--
4-C	avg	936.78	7.69	17.30	5.64	14.22	23.73	7.31	2.43	1.60	10.20	1.03	3.84	--	0.33	0.32	--	8.63	--	--	1220.04
	stdev	4.95	0.12	0.54	0.46	1.08	0.62	0.24	0.14	0.26	0.28	0.04	0.12	--	0.05	--	--	0.69	--	--	36.05
	%RSD	0.5	1.5	3.1	8.2	7.6	2.6	3.3	5.8	16.2	2.8	4.4	3.2	--	16.1	--	--	8.0	--	--	3.0

Lab-Sample		Cond.Wt (mg/cig)	PC/cig	MS TPM mg/cig	B[c]P ng/cig	B[a]A ng/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	I[cd]P ng/cig	dB[al]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig
5-C	avg	--	7.68	17.88	0.99	16.49	21.16	5.63	3.84	1.08	9.69	0.82	4.04	--	0.34	0.16	0.26	5.58	2.84	--	--
	stdev	--	0.10	0.49	0.10	0.29	1.09	0.72	0.17	0.12	0.45	0.09	0.28	--	0.01	0.02	0.06	0.26	0.37	--	--
	%RSD	--	1.3	2.7	10.3	1.8	5.2	12.8	4.5	11.2	4.6	10.6	7.0	--	3.6	14.5	21.2	4.6	12.9	--	--
6-C	avg	946.37	7.53	16.79	3.54	17.18	16.19	6.10	2.83	--	9.83	1.26	4.23	--	--	--	--	--	--	--	--
	stdev	4.00	0.14	0.30	0.30	0.30	0.50	0.62	0.42	--	0.99	0.08	0.20	--	--	--	--	--	--	--	--
	%RSD	0.4	1.9	1.8	8.5	1.7	3.1	10.1	14.7	--	10.1	6.5	4.6	--	--	--	--	--	--	--	--
7-C	avg	933.45	7.97	17.46	3.24	14.59	17.17	6.11	2.50	--	8.36	0.69	1.75	--	--	--	--	5.34	2.79	--	607.42
	stdev	3.45	0.12	0.23	0.31	0.06	0.29	0.11	0.05	--	0.16	0.01	0.03	--	--	--	--	0.29	0.09	--	145.57
	%RSD	0.4	1.5	1.3	9.5	0.4	1.7	1.8	2.1	--	1.9	0.8	1.7	--	--	--	--	5.4	3.2	--	24.0
8-C	avg	941.87	8.13	17.09	--	17.09	--	7.02	2.71	--	8.99	1.13	3.92	--	0.38	0.20	0.22	--	--	--	--
	stdev	8.67	0.19	0.35	--	0.53	--	0.14	0.09	--	0.27	0.06	0.07	--	0.02	0.01	0.02	--	--	--	--
	%RSD	0.9	2.4	2.0	--	3.1	--	1.9	3.2	--	3.0	5.3	1.9	--	5.1	3.8	7.7	--	--	--	--
9-C	avg	930.74	7.92	17.77	--	14.04	42.28	8.16	7.12	--	7.81	--	8.67	--	--	--	1.46	--	--	--	--
	stdev	6.85	0.04	0.32	--	0.25	0.98	0.27	0.35	--	0.43	--	0.19	--	--	--	0.10	--	--	--	--
	%RSD	0.7	0.6	1.8	--	1.8	2.3	3.3	5.0	--	5.5	--	2.2	--	--	--	6.8	--	--	--	--
11-C	avg	933.32	7.36	16.35	3.16	14.69	22.41	--	5.51	--	9.25	--	3.73	--	0.35	--	--	--	--	--	--
	stdev	6.55	0.07	0.50	0.67	2.85	3.19	--	1.91	--	1.04	--	0.51	--	0.13	--	--	--	--	--	--
	%RSD	0.7	1.0	3.0	21.0	19.4	14.3	--	34.6	--	11.2	--	13.7	--	36.8	--	--	--	--	--	--

Where:

-- Is not calculated due to not applicable, not reported, not quantifiable values as designated in Appendix F

Appendix C: Summarized Data – Intense

Lab-Sample		Cond.Wt(mg/cig)	PC /cig	MS TPM mg/cig	B[c]P ng/cig	B[a]A ng/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	I[cd]P ng/cig	dB[al]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig)	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig
3-A	avg	811.20	7.32	33.86	2.72	16.50	49.51	9.14	8.10	--	9.19	5.68	7.75	0.63	1.48	0.75	1.94	--	--	--	--
	stdev	8.05	0.22	1.01	0.20	0.42	0.74	0.34	0.15	--	0.62	0.44	0.68	0.04	0.09	0.07	0.14	--	--	--	--
	%RSD	1.0	3.0	3.0	7.5	2.5	1.5	3.8	1.9	--	6.8	7.8	8.8	6.2	6.2	9.6	7.2	--	--	--	--
4-A	avg	820.61	7.35	25.83	5.00	17.96	21.08	7.56	2.58	2.42	9.62	0.87	3.90	--	--	--	--	--	--	--	--
	stdev	12.68	0.21	1.32	0.65	0.79	0.77	0.31	0.21	0.07	0.36	0.04	0.26	--	--	--	--	--	--	--	--
	%RSD	1.5	2.8	5.1	13.0	4.4	3.7	4.1	8.2	2.7	3.7	4.5	6.6	--	--	--	--	--	--	--	--
5-A	avg	--	7.33	35.52	1.01	17.01	20.52	6.76	3.32	1.30	8.96	0.80	4.08	--	0.38	0.16	0.22	--	--	--	--
	stdev	--	0.09	3.73	0.07	0.65	0.90	0.56	0.20	0.11	0.43	0.05	0.21	--	0.02	0.00	0.04	--	--	--	--
	%RSD	--	1.2	10.5	6.6	3.8	4.4	8.3	5.9	8.7	4.8	6.2	5.3	--	5.0	0.3	17.4	--	--	--	--
6-A	avg	--	7.44	30.94	--	17.24	16.03	7.50	3.84	--	9.59	1.61	3.95	--	--	--	--	--	--	--	--
	stdev	--	0.14	2.70	--	1.31	1.02	1.11	0.48	--	0.49	0.21	0.66	--	--	--	--	--	--	--	--
	%RSD	--	1.9	8.7	--	7.6	6.3	14.8	12.5	--	5.2	13.3	16.6	--	--	--	--	--	--	--	--
7-A	avg	826.60	7.83	28.21	3.19	14.92	15.21	6.72	2.65	--	8.47	0.79	2.14	--	--	--	--	--	--	--	--
	stdev	15.13	0.40	0.80	0.31	0.95	0.58	0.52	0.27	--	0.30	0.04	0.08	--	--	--	--	--	--	--	--
	%RSD	1.8	5.1	2.8	9.7	6.4	3.8	7.8	10.3	--	3.6	4.5	3.9	--	--	--	--	--	--	--	--
8-A	avg	835.01	7.80	34.85	--	16.58	--	7.66	2.68	--	8.32	1.04	4.14	--	0.50	0.23	0.23	--	--	--	--
	stdev	9.73	0.20	1.91	--	0.57	--	0.28	0.10	--	0.25	0.08	0.14	--	0.02	0.01	0.02	--	--	--	--
	%RSD	1.2	2.6	5.5	--	3.4	--	3.6	3.8	--	3.0	7.3	3.3	--	3.2	4.5	7.6	--	--	--	--
9-A	avg	833.38	7.28	31.33	--	16.94	50.89	8.82	7.83	--	9.23	--	7.68	0.67	1.49	0.79	2.04	--	--	--	--
	stdev	19.02	0.14	1.35	--	0.49	0.87	0.33	0.14	--	0.62	--	0.67	0.04	0.09	0.07	0.14	--	--	--	--
	%RSD	2.3	1.9	4.3	--	2.9	1.7	3.7	1.8	--	6.7	--	8.7	5.6	6.0	8.8	6.7	--	--	--	--
11-A	avg	825.52	7.22	24.79	2.71	14.59	18.41	--	5.74	--	8.24	--	3.37	--	0.36	--	--	--	--	--	--
	stdev	6.54	0.24	0.33	0.53	2.19	3.39	--	2.62	--	0.82	--	0.46	--	0.14	--	--	--	--	--	--
	%RSD	0.8	3.3	1.3	19.6	15.0	18.4	--	45.6	--	9.9	--	13.6	--	39.0	--	--	--	--	--	--
3-B	avg	890.26	8.84	45.50	4.00	23.89	72.74	12.95	10.43	--	15.83	10.33	12.34	0.74	2.21	0.81	2.02	--	--	--	--
	stdev	11.39	0.05	1.17	0.12	0.88	2.91	0.61	0.65	--	0.61	0.12	1.14	0.07	0.13	0.07	0.17	--	--	--	--

Lab-Sample		Cond.Wt(mg/cig)	PC /cig	MS TPM mg/cig	B[c]P ng/cig	B[a]A ng/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	I[cd]P ng/cig	dB[al]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig)	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig
	%RSD	1.3	0.6	2.6	3.0	3.7	4.0	4.7	6.2	--	3.8	1.2	9.2	9.4	5.8	9.0	8.2	--	--	--	--
4-B	avg	900.44	9.08	37.67	7.84	27.64	35.77	12.08	4.13	3.64	16.10	1.47	6.48	--	0.64	--	--	--	--	--	--
	stdev	7.19	0.31	1.33	0.52	2.07	0.67	0.26	0.37	0.17	0.38	0.05	0.14	--	--	--	--	--	--	--	--
	%RSD	0.8	3.4	3.5	6.7	7.5	1.9	2.1	8.8	4.7	2.3	3.6	2.2	--	--	--	--	--	--	--	--
5-B	avg	--	8.55	47.77	1.46	25.78	31.46	10.31	5.60	1.94	14.58	1.18	6.42	--	0.54	0.25	0.46	--	--	--	--
	stdev	--	0.05	6.06	0.12	1.57	2.01	0.85	0.48	0.25	1.21	0.10	0.43	--	0.03	0.04	0.10	--	--	--	--
	%RSD	--	0.6	12.7	8.2	6.1	6.4	8.2	8.6	12.7	8.3	8.6	6.8	--	6.3	17.2	21.1	--	--	--	--
6-B	avg	--	8.69	41.19	5.41	26.83	25.49	10.61	4.86	--	14.97	2.03	5.08	--	--	--	--	--	--	--	--
	stdev	--	0.30	2.20	0.01	2.09	1.55	0.56	0.97	--	1.04	0.19	0.24	--	--	--	--	--	--	--	--
	%RSD	--	3.5	5.4	0.1	7.8	6.1	5.3	19.9	--	7.0	9.6	4.8	--	--	--	--	--	--	--	--
7-B	avg	896.00	9.35	41.18	5.77	25.35	26.76	11.13	4.36	--	14.48	1.37	3.40	--	--	--	--	--	--	--	--
	stdev	9.30	0.09	1.36	0.41	1.25	1.24	0.70	0.38	--	0.97	0.08	0.10	--	--	--	--	--	--	--	--
	%RSD	1.0	1.0	3.3	7.2	4.9	4.6	6.3	8.7	--	6.7	5.7	3.0	--	--	--	--	--	--	--	--
8-B	avg	897.02	9.07	44.78	--	25.67	--	11.40	3.98	--	12.83	1.60	6.35	--	0.75	0.33	0.37	--	--	--	--
	stdev	12.63	0.37	1.81	--	0.89	--	0.41	0.19	--	0.37	0.11	0.20	--	0.05	0.02	0.02	--	--	--	--
	%RSD	1.4	4.1	4.0	--	3.5	--	3.6	4.8	--	2.9	6.6	3.2	--	7.0	7.0	5.1	--	--	--	--
9-B	avg	893.18	8.52	41.44	--	25.20	74.60	12.44	10.05	--	15.80	--	12.18	0.78	2.20	0.84	2.12	--	--	--	--
	stdev	19.78	0.19	1.39	--	0.64	1.39	0.58	0.62	--	0.60	--	1.11	0.07	0.12	0.07	0.16	--	--	--	--
	%RSD	2.2	2.3	3.4	--	2.5	1.9	4.6	6.1	--	3.8	--	9.2	8.7	5.7	8.4	7.6	--	--	--	--
11-B	avg	892.60	8.50	35.32	4.08	22.45	30.41	--	7.61	--	14.13	--	5.67	--	0.60	--	--	8.90	--	--	--
	stdev	3.74	0.16	0.73	0.85	2.66	5.01	--	3.66	--	2.81	--	0.84	--	0.12	--	--	0.83	--	--	--
	%RSD	0.4	1.9	2.1	20.9	11.8	16.5	--	48.1	--	19.9	--	14.8	--	19.9	--	--	9.4	--	--	--
3-C	avg	934.79	10.66	46.84	3.35	26.78	84.24	15.00	13.41	--	15.67	10.86	16.81	1.33	2.73	3.30	4.14	--	--	--	--
	stdev	13.37	0.13	1.47	0.17	1.22	3.18	0.85	1.34	--	0.93	0.48	0.91	0.12	0.25	0.18	0.39	--	--	--	--
	%RSD	1.4	1.3	3.1	5.2	4.6	3.8	5.6	10.0	--	5.9	4.4	5.4	8.9	9.2	5.4	9.3	--	--	--	--
4-C	avg	932.85	10.85	40.47	9.21	29.36	43.72	13.54	4.60	4.28	18.34	1.76	6.88	--	0.70	--	--	--	--	--	--
	stdev	6.99	0.23	2.07	0.45	0.71	1.68	0.38	0.59	0.15	0.46	0.20	0.26	--	--	--	--	--	--	--	--
	%RSD	0.7	2.1	5.1	4.8	2.4	3.9	2.8	12.8	3.4	2.5	11.2	3.8	--	--	--	--	--	--	--	--

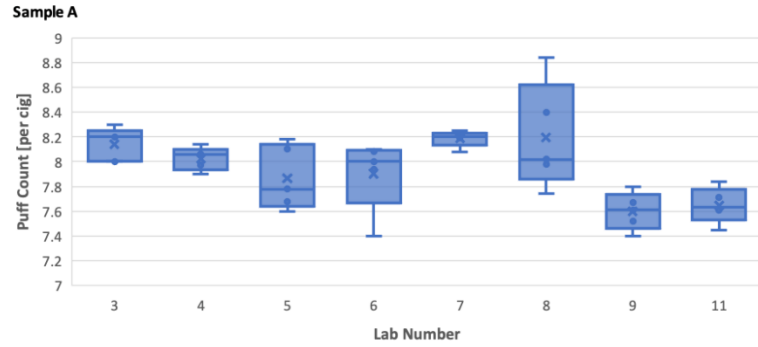
Lab-Sample		Cond.Wt(mg/cig)	PC /cig	MS TPM mg/cig	B[c]P ng/cig	B[a]A ng/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	I[cd]P ng/cig	dB[al]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig)	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig
5-C	avg	--	9.89	45.46	1.62	29.61	38.69	11.39	6.15	2.41	17.51	1.28	7.13	--	0.59	0.26	0.48	--	--	--	--
	stdev	--	0.29	1.04	0.14	1.22	2.32	1.08	0.24	0.18	0.58	0.12	0.17	--	0.01	0.07	0.07	--	--	--	--
	%RSD	--	2.9	2.3	8.4	4.1	6.0	9.5	3.9	7.3	3.3	9.5	2.4	--	2.5	25.8	14.8	--	--	--	--
6-C	avg	--	10.36	39.55	6.21	34.36	31.60	14.23	6.01	--	17.19	2.59	8.23	--	--	--	--	--	--	--	--
	stdev	--	0.29	2.77	0.53	1.06	2.38	0.09	0.57	--	1.19	0.31	0.96	--	--	--	--	--	--	--	--
	%RSD	--	2.8	7.0	8.6	3.1	7.5	0.7	9.4	--	6.9	11.9	11.6	--	--	--	--	--	--	--	--
7-C	avg	927.80	11.25	42.70	6.55	29.66	32.66	11.82	4.68	--	16.15	1.58	3.55	--	--	--	--	--	--	--	--
	stdev	10.85	0.42	1.49	0.44	1.61	1.68	0.91	0.33	--	0.97	0.09	0.06	--	--	--	--	--	--	--	--
	%RSD	1.2	3.8	3.5	6.8	5.4	5.2	7.7	7.1	--	6.0	5.6	1.7	--	--	--	--	--	--	--	--
8-C	avg	940.85	10.80	45.55	--	32.17	--	13.22	4.64	--	16.57	2.07	7.29	--	0.90	0.38	0.42	--	--	--	--
	stdev	8.29	0.17	0.34	--	0.81	--	0.28	0.18	--	0.54	0.12	0.11	--	0.06	0.03	0.03	--	--	--	--
	%RSD	0.9	1.5	0.7	--	2.5	--	2.1	3.9	--	3.3	5.8	1.5	--	6.9	7.5	6.3	--	--	--	--
9-C	avg	950.22	10.40	43.92	--	26.68	86.54	14.39	12.88	--	15.64	--	16.56	1.35	2.71	3.26	4.18	--	--	--	--
	stdev	14.17	0.23	0.60	--	0.78	2.26	0.80	1.27	--	0.92	--	0.89	0.11	0.24	0.17	0.37	--	--	--	--
	%RSD	1.5	2.3	1.4	--	2.9	2.6	5.6	9.9	--	5.9	--	5.4	8.5	8.9	5.3	8.9	--	--	--	--
11-C	avg	933.74	10.44	38.70	5.12	26.23	29.00	--	13.07	--	17.19	--	6.69	--	0.59	--	--	--	--	--	--
	stdev	13.18	0.37	0.39	1.50	4.68	10.96	--	1.69	--	2.86	--	0.80	--	0.21	--	--	--	--	--	--
	%RSD	1.4	3.5	1.0	29.3	17.9	37.8	--	12.9	--	16.6	--	11.9	--	36.5	--	--	--	--	--	--

Where:

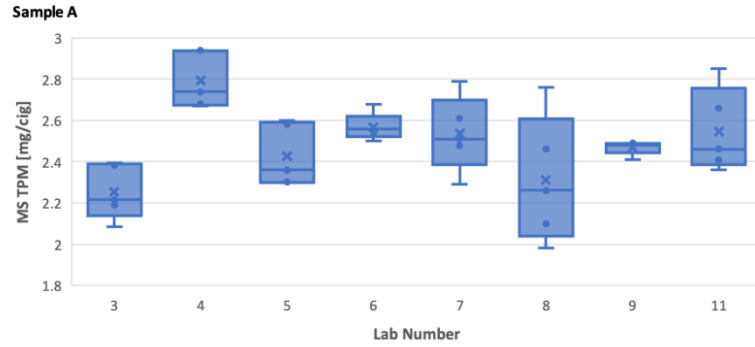
-- Is not calculated due to not applicable, not reported, not quantifiable values as designated in Appendix G

Appendix D: Data Graphs

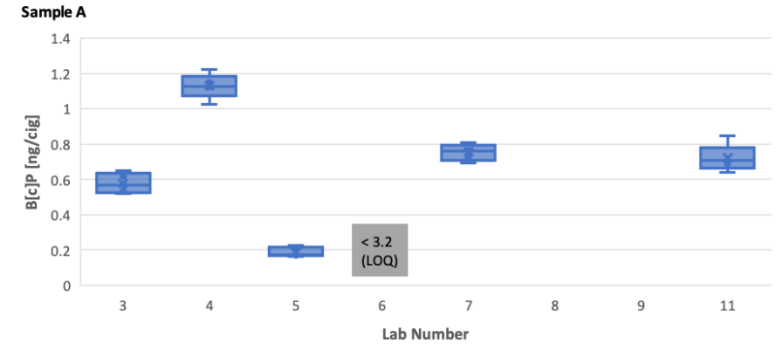
Puff Count (per cig)



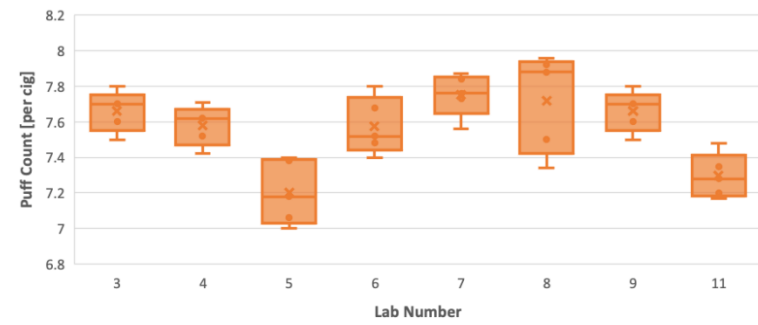
MS TPM (mg/cig)



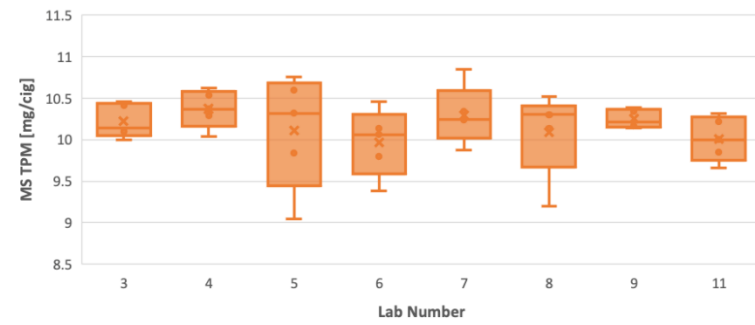
Benzo[c]phenanthrene (B[c]P) [ng/cig]



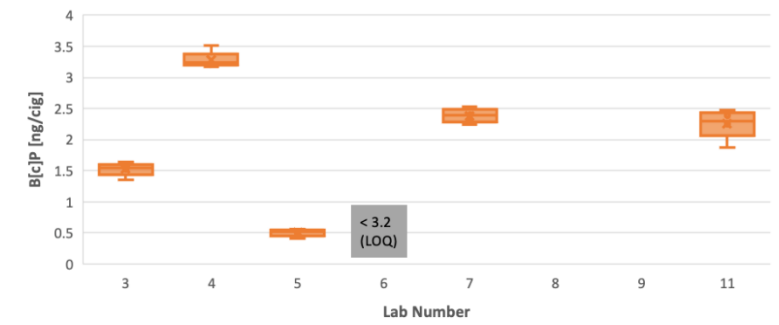
Sample B



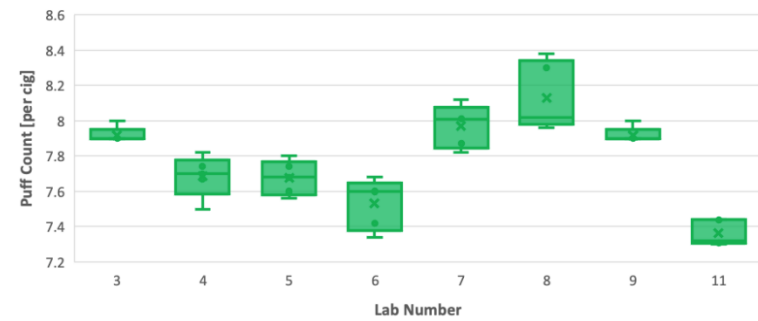
Sample B



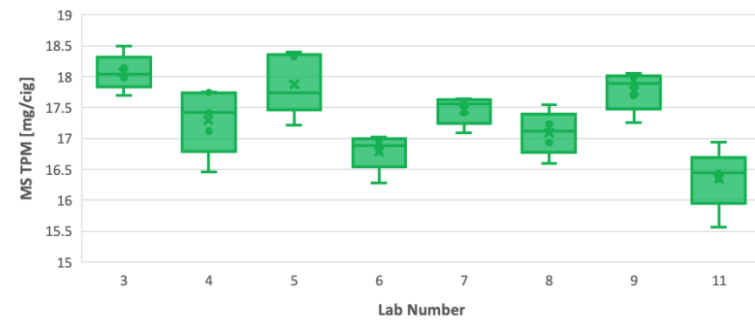
Sample B



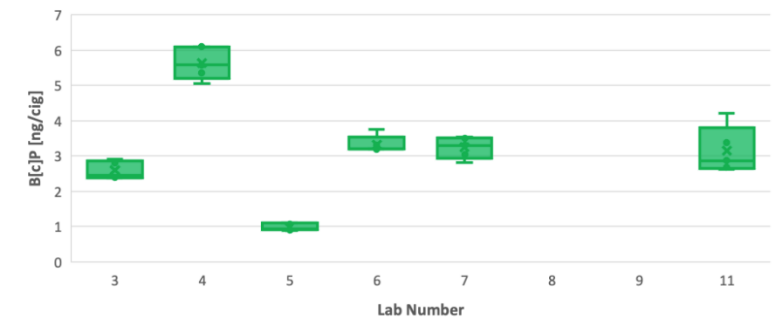
Sample C



Sample C



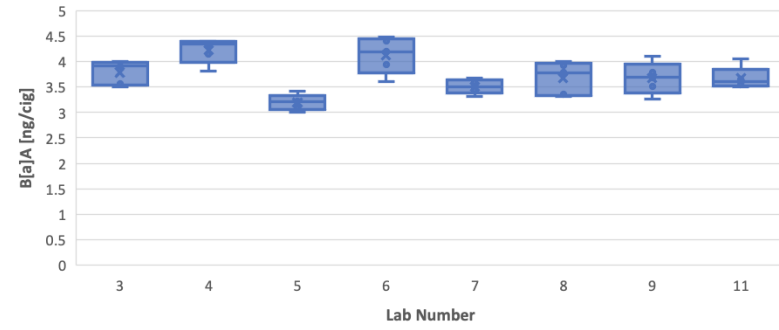
Sample C



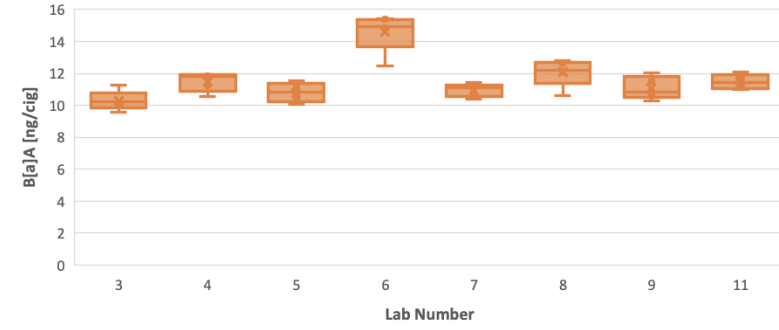
Where error boxes represent the range for replicates, the horizontal line represents the mean, and the error bars are one standard deviation

Benzo[a]anthracene (B[a]A) [ng/cig]

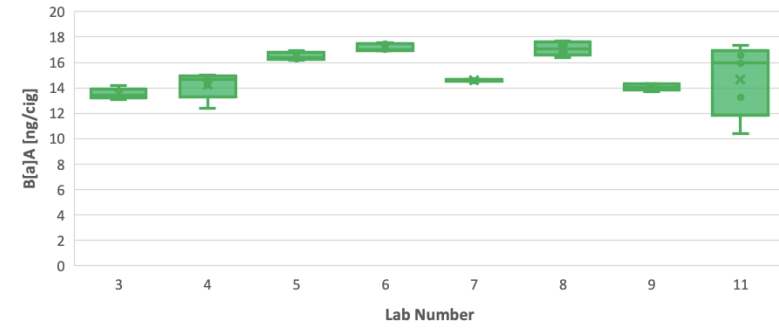
Sample A



Sample B

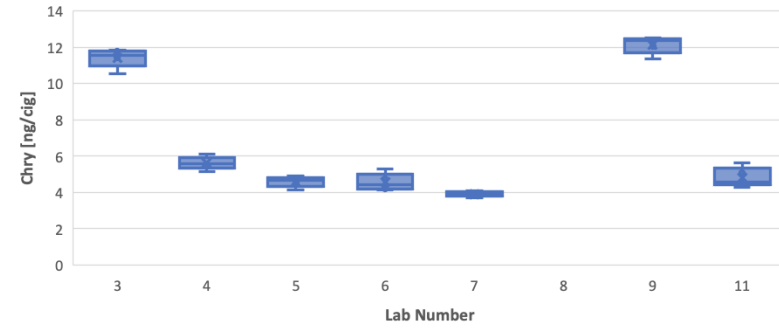


Sample C

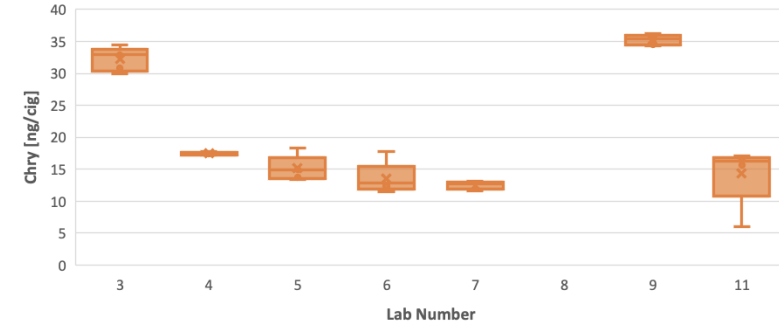


Chrysene (Chry) [ng/cig]

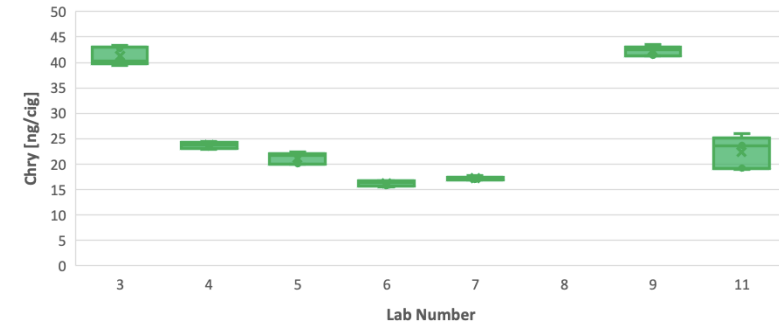
Sample A



Sample B

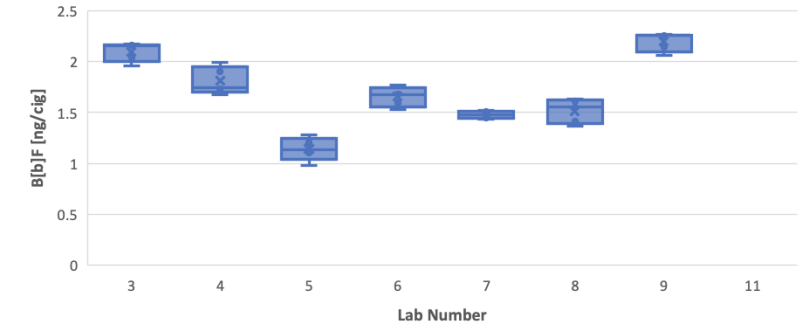


Sample C

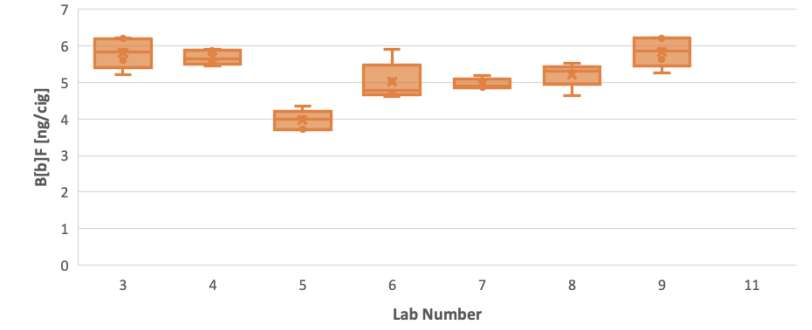


Benzo[b]fluoranthene (B[b]F) [ng/cig]

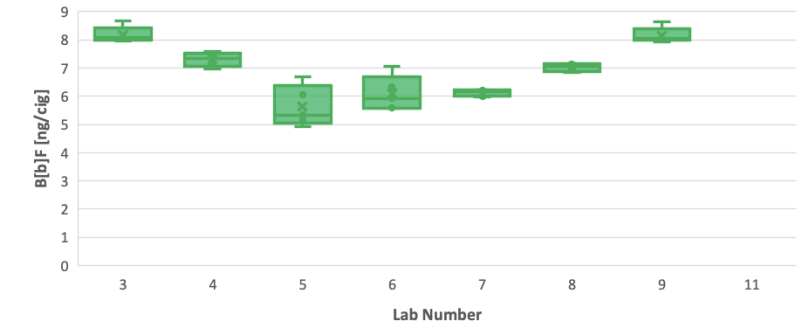
Sample A



Sample B



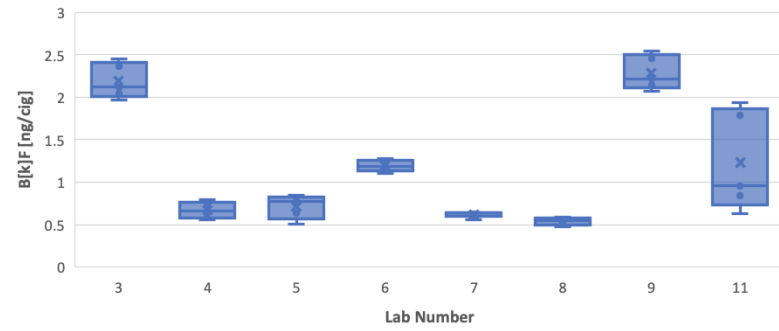
Sample C



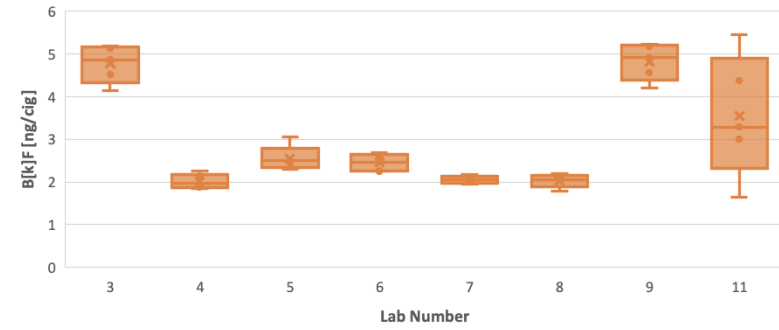
Where error boxes represent the range for replicates, the horizontal line represents the mean, and the error bars are one standard deviation

Benzo[k]fluoranthene (B[k]F) [ng/cig]

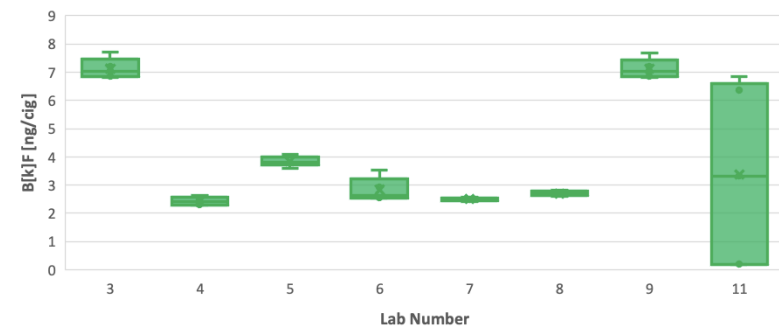
Sample A



Sample B

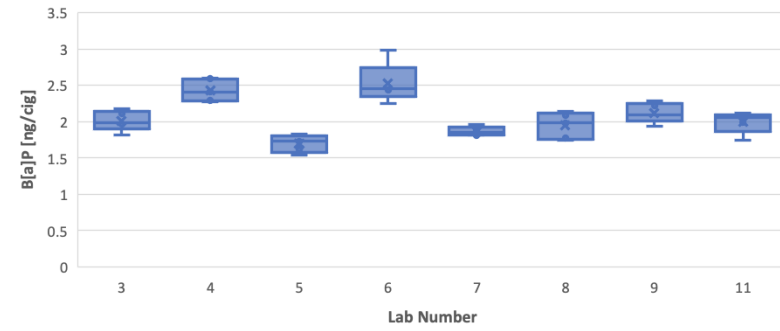


Sample C

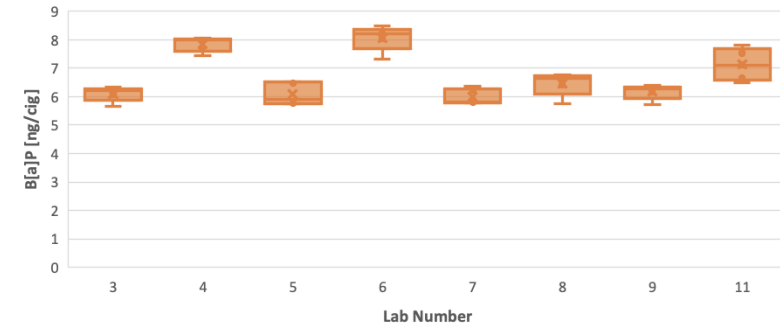


Benzo[a]pyrene (B[a]P) [ng/cig]

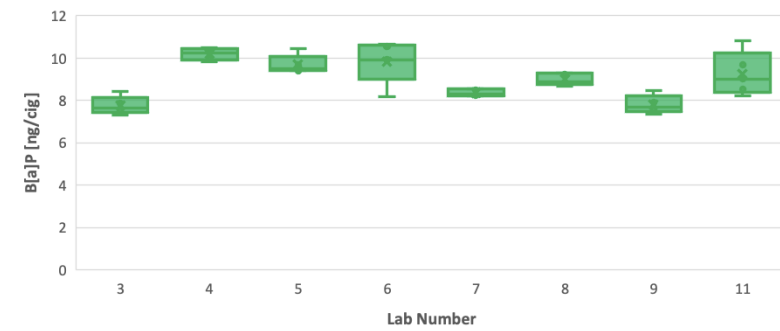
Sample A



Sample B

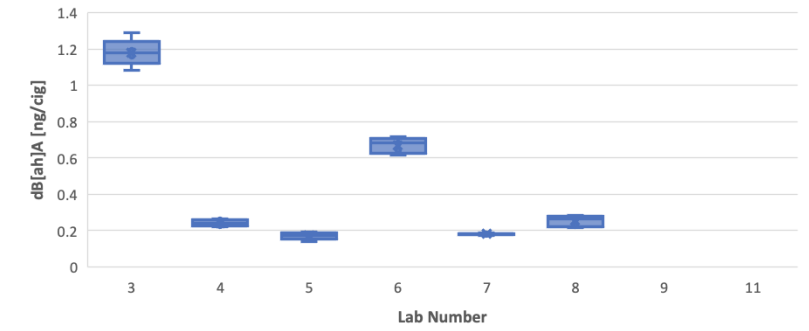


Sample C

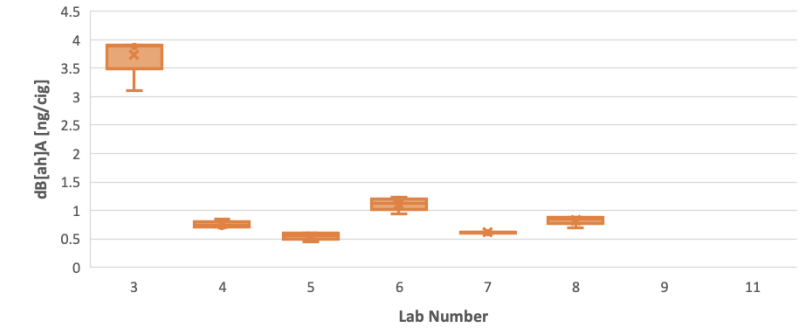


Dibenzo[a,h]anthracene (dB[ah]A) [ng/cig]

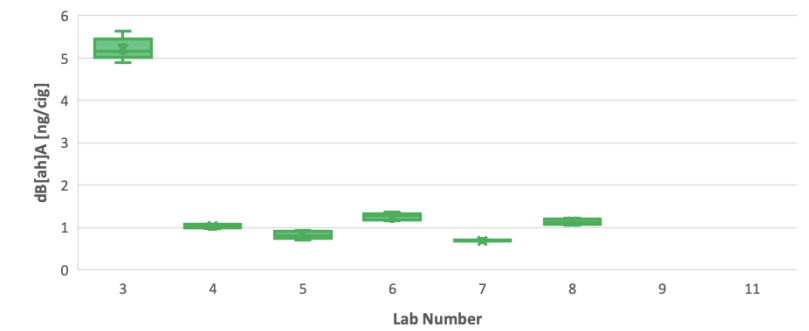
Sample A



Sample B



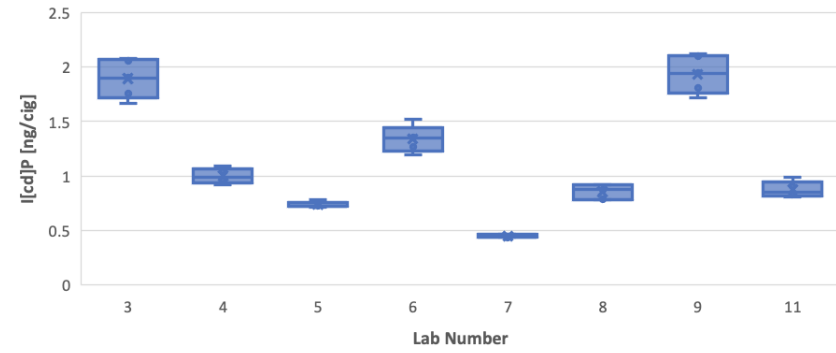
Sample C



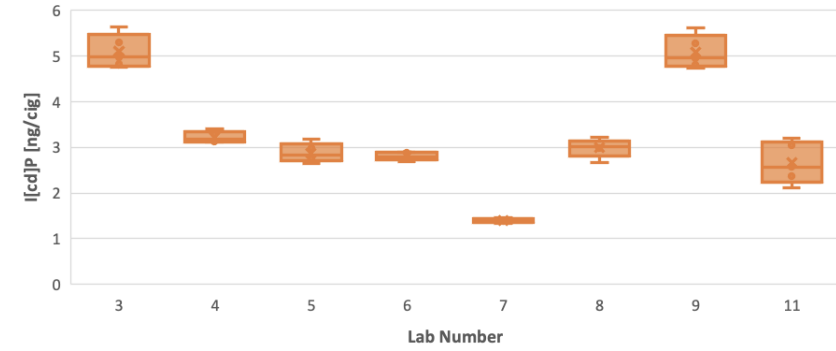
Where error boxes represent the range for replicates, the horizontal line represents the mean, and the error bars are one standard deviation

Indeno[1,2,3-c,d]pyrene (I[cd]P) [ng/cig]

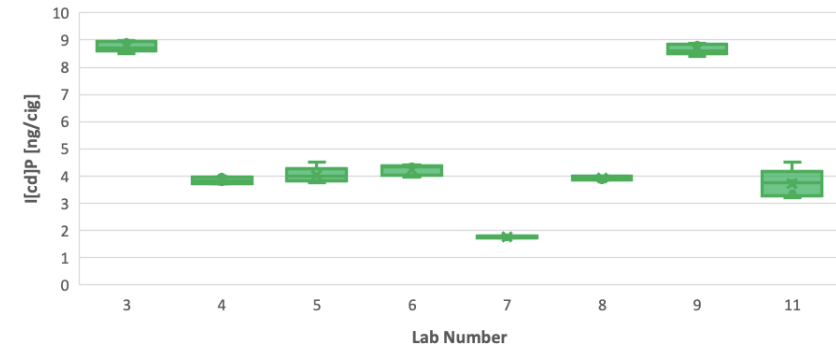
Sample A



Sample B



Sample C



Where error boxes represent the range for replicates, the horizontal line represents the mean, and the error bars are one standard deviation

Appendix E: Method Details – Grouped by Sub-type

Smoking				
Lab	Smoking Machine Style	Make	# Cigarettes Non-Intense	# Cigarettes Intense
3	Linear	Cerulean SM450	20	8
4	Rotary	Borgwaldt RM-20H	9-10	3
5	Linear	Cerulean SM450	5	3
6	Linear	Cerulean SM450	5	3
7	Rotary	Borgwaldt RM-20H	10	3
8	Linear	Cerulean SM450	5	4
9	Rotary	Borgwaldt RM-20	20	10
11	Rotary	Borgwaldt RM-20D	10	5

Trapping & Extraction						
Lab	Filter Pad, Diameter	Solvent	Extraction	SPE type and method	Additional Filtration	Other
3	CFP ^[4] , 44 mm	60 mL cyclohexane	ultrasonic 30 min	Agilent Bond Elut SI, 500 mg 3 ml		
4	C FP, 44 mm	20 mL cyclohexane (ambient)	Sonication, 10min; wrist-action shaker, 20min	NH2 cartridge, 1 g	Filter Paper; 5A decompressed, before SPE	
5	CFP, 44 mm	20 mL MeOH	orbital shaker, 30min	Cyclohexyl SPE cartridges (1g, 6 mL), Agilent Bond Elut CH, P/N 12256005	Silica SPE column (500 mg, 3 mL), Phenomenex Strata SI-1 P/N: 8B-S012-HBJ	add water before SPE; elute in hexane
6	CFP, 44 mm	20 mL MeOH	orbital shaker, 30min	two step SPE method (1st) C-18 (500 mg/6 mL) and (2nd) EPH (500 mg/3 mL)		
7	CFP, 44 mm	20 mL MeOH	hand shake	Isolute C18; 1 g / 6 ml		
8	CFP, 44 mm	15mL Hexane + 100uL of internal standard solution	30 +/- 10 minutes at approximately 250rpm	<p>The remaining solution is recovered with isooctane and cleaned-up by Solid Phase Extraction (SPE), using an aminopropyl cartridge previously conditioned with a hexane: diethyl ether 70:30 solution and successively with hexane. The solution is eluted through the SPE cartridge with a hexane:diethyl ether 70:30 solution and then evaporated at 60 °C.</p> <p>The remaining solution is recovered with 1-propanol and cleaned-up by a second SPE, using an octadecyl cartridge previously conditioned with acetonitrile, methanol and finally with a water:methanol solution 60:40. The solution is suspended with water and eluted through the SPE cartridge with a acetonitrile and then evaporated at 70°C. After addition of isooctane and analyte protectant solution, the remaining solution is transferred into a glass vial and analyzed by GC-MS</p>		evaporated at 60 °C for 5-10 minutes.
9	CFP, 92 mm	40 mL cyclohexane	ultrasonic extracting for 30 min	Agilent Bond Elut SI, 500 mg 3 ml	NA	
11	CFP, 92 mm	40 mL MeOH	orbital shaker, 30 min	Bond Elut-CH (500 ng, 3 mL)		

^[4] CFP – Cambridge filter pad; i.e. glass fiber filter pad

Analysis							
Lab	Instrument Description	Column	Carrier Gas	Injection Temp, conditions	Oven Temp	Source Temp	Additional Details
3	PE Clarus 680-SQ 8 T	DB-EUPAH(20m* 0.18 mm*0.14 µm)	He	320 °C, glass wool liner, splitless, 1µL inj	180 °C, 3 °C/min to 300 °C, 15 °C/min to 320 °C (10 min)	300 °C	
4	Agilent GC-MS, Splitless	DB-17 ms (30 m x 0.25 mm, 0.25 µm)	He	300 °C, glass wool liner, splitless, 1uL inj	60 °C (1min), 15 °C/min to 150 °C(0.5min), 5 °C/min to 320 °C (18.5 min)	IS; 300 °C, QP;180 °C	extracts were stored 4C prior to analysis
5	Agilent GC/MS	DB Select PAH, 30 m x 0.25 mm x 0.15 µm	He	280 °C, Ultra inert glass wool, splitless	90 °C (0.7min), 65 °C/min to 180 °C, 3 °C/min to 230 °C (7 min), 28 °C/min to 280 °C (10 min), 14°C/min to 340 °C (5 min)	Source and Transfer line 280 °C	NA
6	Agilent GC/MS-SIM, Split/splitless	SGE BPX-50 (30 m x 0,25 mm x 0.25 µm)	He	325 °C, glass wool liner, spitless, 1 uL inj	80 °C (0min), 15 °C/min to 335 °C (15 min)	330 °C	
7	Agilent GC/MS Triple Quad MMI	Agilent Select PAH	He	325 °C, 4 mm Double taper deactivated liner, splitless, 1 µL inj	60 °C (1min), 40 °C/min to 180 °C, 3 °C/min to 230 °C, 1.5 °C/min to 280 °C (10 min), 6 °C/min to 298 °C, 16 °C/min to 350 °C (9.75 min)	280 °C	extracts were stored between + 2 °C and + 10 °C prior to analysis and are stable for 7 days
8	GC-MS Shimadzu QP2010 Plus	DB-17MS (30 m x 0,25 mm x 0,15 µm)	He	320 °C, deactivated liner needle onto wool, splitless, 1 uL inj	70 °C (2min), 40 °C/min to 210 °C, 2.5 °C/min to 270 °C, 3.0°C/min to 325 °C (10 min)	Ion source: 300 °C	NA
9	Agilent GC-MS, 7890-5975, Split/splitless	DB-35MS(30 m*0.25 mm*0.25 µm)	He	320°C, glass wool liner, splitless, 1 µL inj	150 °C, 2 min; 5 °C/min to 300 °C, 2 min; 20 °C/min to 320 °C (10 min)	300 °C	
11	Thermo GC-MSMS splitless with surge	Select PAH 30 m x 0,25 mm x 0,15 µm	He	300 °C, glass wool liner, splitless, 1 µL Inj.	60 °C, 60 °C/min to 100 °C (4 min) 60 °C/min to 220 °C (0 min) 1,5 °C/min to 240 °C (0 min) 2,5 °C/min to 290 °C (0 min) 20 °C/min to 325 °C (10.5 min)	320 °C	extracts were stored 4-8 °C prior to analysis

ISO 3308 LOQ (ng/cig)								
Lab	3	4	5	6	7	8	9	11
Project 294 Analytes	LOQ	LOQ	LOQ	LOQ	LOQ	LOQ	LOQ	LOQ
B[c]P	1.08	0.03	0.03-0.05	3.20	0.015	NA	NA	0.2
B[a]A	1.04	0.02	0.03-0.05	0.10	0.030	0.047	0.0014	1
Chry	1.28	0.02	0.03-0.05	0.23	0.030	NA	0.0015	2
B[b]F	1.25	0.02	0.03-0.05	0.12	0.030	0.068	0.0013	NA
B[k]F	1.60	0.02	0.03-0.05	0.32	0.030	0.018	0.0013	0.2
B[j]A	NA	0.03	0.03-0.05	NA	NA	NA	NA	NA
B[a]P	1.09	0.03	0.03-0.05	0.12	0.100	0.054	0.0022	0.5
dB[ah]A	1.36	0.03	0.03-0.05	0.12	0.120	0.008	NA	NA
I[cd]P	1.47	0.03	0.03-0.05	0.10	0.120	0.021	0.002	0.4
dB[al]P	1.68	0.19	0.03-0.05	0.35	1.000	0.008	NA	0.2
dB[ae]P	1.19	0.19	0.03-0.05	0.27	1.000	0.008	NA	0.1
dB[ai]P	1.22	0.27	0.03-0.05	0.31	1.000	0.007	NA	0.4
dB[ah]P	1.67	0.27	0.03-0.05	0.30	1.000	0.005	NA	0.4
C[cd]P	NA	0.02	0.03-0.05	NA	0.030	NA	NA	2
5-MC	NA	0.02	0.03-0.05	NA	0.030	NA	NA	NA
B-Fur	NA	NA	NA	NA	0.040	NA	NA	NA
Naph	NA	0.11	NA	NA	0.015	NA	NA	NA
Other PAH Analytes								
Benzo[j]fluoranthene	1.34	NA	NA	NA	0.120	0.015	NA	NA
Benzo[g,h,i]perylene	1.55	NA	NA	NA	0.015	NA	0.0014	NA
Pyrene	NA	NA	NA	NA	0.150	NA	NA	NA
Benzo[j+e]aceanthrylene	NA	NA	NA	NA	NA	NA	NA	NA

LOQ = Limit of quantitation

Appendix F: Raw Data – Non-Intense (ISO 3308)

Lab Sample	Rep	Ci gs	Cond. Wt mg/cig	PC /cig	MS TPM mg/cig	B[c]P ng/cig	B[a]A ng/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	l[cd]P ng/cig	dB[a]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig	Repeats	Comments	
3-A	1	20	812.30	8.0	2.395	0.620	4.010	11.810	2.160	2.450	NA	2.110	1.180	2.060	<1.68 (LOQ)	0.400	<1.22 (LOQ)	<1.67 (LOQ)	NR1	NR1	NR1	NR1	5	Other 1 =Benzo [j] fluoranthene Other 2 = Benzo [g,h,i] perylene	
3-A	2	20	825.70	8.2	2.085	0.530	3.500	11.540	2.040	2.370	NA	1.970	1.190	1.900	<1.68 (LOQ)	0.380	<1.22 (LOQ)	<1.67 (LOQ)	NR1	NR1	NR1	NR1			
3-A	3	20	813.39	8.2	2.215	0.520	3.570	10.520	1.960	1.970	NA	1.820	1.080	1.670	<1.68 (LOQ)	0.360	<1.22 (LOQ)	<1.67 (LOQ)	NR1	NR1	NR1	NR1			
3-A	4	20	828.10	8.0	2.190	0.570	3.950	11.440	2.160	2.120	NA	2.180	1.290	2.080	<1.68 (LOQ)	0.400	<1.22 (LOQ)	<1.67 (LOQ)	NR1	NR1	NR1	NR1			
3-A	5	20	813.30	8.3	2.385	0.650	3.910	11.750	2.170	2.050	NA	1.980	1.160	1.760	<1.68 (LOQ)	0.390	<1.22 (LOQ)	<1.67 (LOQ)	NR1	NR1	NR1	NR1			
4-A	1	9	825.03	8.1	2.940	1.148	4.401	6.095	1.990	0.798	0.547	2.592	0.265	1.047	<0.06 (LOD)	<0.19 (LOQ)	<0.08 (LOD)	<0.09 (LOD)	2.169	<0.01 (LOD)	NA	38.813	NA	NA	
4-A	2	9	824.30	8.1	2.680	1.027	3.817	5.158	1.727	0.659	0.426	2.267	0.220	0.988	<0.06 (LOD)	<0.19 (LOQ)	<0.08 (LOD)	<0.09 (LOD)	1.928	<0.01 (LOD)	NA	31.615		NA	
4-A	3	10	829.73	8.1	2.940	1.122	4.343	5.750	1.906	0.729	0.426	2.588	0.259	1.089	<0.06 (LOD)	<0.19 (LOQ)	<0.27 (LOQ)	<0.09 (LOD)	2.022	<0.01 (LOD)	NA	39.986		NA	
4-A	4	10	833.74	7.9	2.670	1.221	4.404	5.578	1.677	0.562	0.485	2.295	0.228	0.916	<0.06 (LOD)	<0.06 (LOD)	<0.27 (LOQ)	<0.09 (LOD)	2.153	<0.01 (LOD)	NA	36.794		NA	
4-A	5	9	822.93	8.0	2.740	1.126	4.142	5.514	1.748	0.587	0.547	2.410	0.241	0.963	<0.06 (LOD)	<0.06 (LOD)	<0.08 (LOD)	<0.09 (LOD)	2.258	<0.01 (LOD)	NA	36.626		NA	
5-A	1	5	NR1	8.2	2.600	0.212	3.411	4.928	1.283	0.778	0.137	1.823	0.176	0.784	<0.1 (LOD)	0.118	<0.1 (LOD)	<0.1 (LOD)	0.936	0.607	NA	NA	NA	NA	
5-A	2	5	NR1	8.1	2.580	0.173	3.092	4.666	1.137	0.845	0.157	1.785	0.183	0.732	<0.1 (LOD)	0.126	<0.1 (LOD)	<0.1 (LOD)	0.938	0.443	NA	NA		NA	
5-A	3	5	NR1	7.7	2.360	0.224	3.219	4.711	1.203	0.802	0.124	1.728	0.140	0.725	<0.1 (LOD)	0.100	<0.1 (LOD)	<0.1 (LOD)	0.847	0.383	NA	NA		NA	
5-A	4	5	NR1	7.6	2.300	0.172	3.012	4.121	0.979	0.508	0.181	1.538	0.165	0.725	<0.1 (LOD)	0.115	<0.1 (LOD)	<0.1 (LOD)	0.746	0.335	NA	NA		NA	
5-A	5	5	NR1	7.8	2.300	0.162	3.245	4.549	1.106	0.635	0.162	1.617	0.191	0.716	<0.1 (LOD)	0.117	<0.1 (LOD)	<0.1 (LOD)	0.762	0.386	NA	NA		NA	
6-A	1	5	837.42	8.1	2.560	<3.2 (LOQ)	3.614	4.218	1.676	1.232	NA	2.439	0.682	1.351	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA	NA	NA	
6-A	2	5	838.58	8.0	2.500	<3.2 (LOQ)	3.942	4.139	1.592	1.169	NA	2.493	0.615	1.266	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA		NA	
6-A	3	5	845.92	8.1	2.680	<3.2 (LOQ)	4.483	4.733	1.768	1.276	NA	2.988	0.640	1.193	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA		NA	
6-A	4	5	853.12	7.9	2.540	<3.2 (LOQ)	4.407	5.303	1.715	1.185	NA	2.449	0.699	1.524	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA		NA	

Lab Sample	Rep	Ci gs	Cond. Wt mg/cig	PC /cig	MSTPM mg/cig	B[c]P ng/cig	B[a]A ng/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	l[cd]P ng/cig	dB[a]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig	Repeats	Comments
6-A	5	5	829.04	7.4	2.560	<3.2 (LOQ)	4.200	4.444	1.525	1.103	NA	2.248	0.715	1.355	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA		NA
7-A	1	10	827.91	8.3	2.790	0.762	3.500	3.878	1.449	0.560	See Other3	1.812	0.172	0.462	<0.333 (LOD)	<0.333 (LOD)	<0.333 (LOD)	<0.333 (LOD)	1.194	0.617	<0.013 (LOD)	22.059	NA	Other1 = pyrene Other 2 = Benzo [g,h,i] perylene Other 3 = B[j+e]A
7-A	2	10	830.58	8.2	2.610	0.780	3.601	3.966	1.437	0.642	See Other3	1.858	0.183	0.462	<0.333 (LOD)	<0.333 (LOD)	<0.333 (LOD)	<0.333 (LOD)	1.214	0.623	<0.013 (LOD)	16.445		
7-A	3	10	820.50	8.2	2.510	0.807	3.683	4.094	1.510	0.643	See Other3	1.961	0.187	0.436	<0.333 (LOD)	<0.333 (LOD)	<0.333 (LOD)	<0.333 (LOD)	1.247	0.615	<0.013 (LOD)	18.315		
7-A	4	10	833.83	8.1	2.290	0.724	3.320	3.684	1.521	0.626	See Other3	1.810	0.180	0.440	<0.333 (LOD)	<0.333 (LOD)	<0.333 (LOD)	<0.333 (LOD)	1.516	0.638	<0.013 (LOD)	16.306		
7-A	5	10	825.47	8.2	2.480	0.693	3.450	3.900	1.477	0.636	See Other3	1.881	0.181	0.438	<0.333 (LOD)	<0.333 (LOD)	<0.333 (LOD)	<0.333 (LOD)	1.275	0.592	<0.013 (LOD)	15.946		
8-A	1	5	826.52	8.4	2.100	NA	3.313	NA	1.367	0.476	NA	1.741	0.218	0.779	NR2	0.077	<0.04 (LOQ)	<0.04 (LOQ)	NA	NA	NA	NR1	NA	Other 1 = Benzo [j] fluoranthene
8-A	2	5	819.24	7.7	2.260	NA	3.783	NA	1.552	0.542	NA	1.981	0.264	0.873	NR2	0.102	0.050	0.046	NA	NA	NA	NR1		
8-A	3	5	838.76	8.8	2.460	NA	3.919	NA	1.611	0.591	NA	2.086	0.284	0.924	NR2	0.102	0.052	0.047	NA	NA	NA	NR1		
8-A	4	5	826.16	8.0	2.760	NA	4.003	NA	1.629	0.561	NA	2.146	0.278	0.916	NR2	0.115	<0.04 (LOQ)	0.046	NA	NA	NA	NR1		
8-A	5	5	837.84	8.0	1.980	NA	3.351	NA	1.415	0.518	NA	1.772	0.227	0.783	NR2	0.096	0.058	0.050	NA	NA	NA	NR1		
9-A	1	20	777.70	7.6	2.490	NA	4.110	12.340	2.257	2.541	NA	2.219	NA	2.099	NA	NA	NA	<0.019 (LOD)	NR1	NR1	NR1	NR1	5	Other 1 = Benzo [g,h,i] perylene
9-A	2	20	815.50	7.7	2.480	NA	3.260	12.510	2.139	2.463	NA	2.080	NA	1.942	NA	NA	NA	<0.019 (LOD)	NR1	NR1	NR1	NR1		
9-A	3	20	832.50	7.4	2.410	NA	3.510	11.360	2.061	2.071	NA	1.932	NA	1.717	NA	NA	NA	<0.019 (LOD)	NR1	NR1	NR1	NR1		
9-A	4	20	817.20	7.8	2.490	NA	3.780	12.050	2.257	2.218	NA	2.288	NA	2.118	NA	NA	NA	<0.019 (LOD)	NR1	NR1	NR1	NR1		
9-A	5	20	809.90	7.5	2.480	NA	3.690	12.410	2.267	2.149	NA	2.090	NA	1.805	NA	NA	NA	<0.019 (LOD)	NR1	NR1	NR1	NR1		
11-A	1	10	835.40	7.8	2.660	0.845	4.058	5.613	NA	1.943	NA	2.058	NA	0.827	<0.2 (LOQ)	<0.1 (LOQ)	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA
11-A	2	10	828.10	7.7	2.460	0.715	3.545	4.572	NA	1.788	NA	1.747	NA	0.809	<0.2 (LOQ)	<0.1 (LOQ)	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA
11-A	3	10	823.00	7.6	2.410	0.692	3.654	5.065	NA	0.845	NA	2.121	NA	0.908	<0.2 (LOQ)	<0.1 (LOQ)	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA
11-A	4	10	828.90	7.6	2.360	0.706	3.513	4.275	NA	0.958	NA	1.988	NA	0.990	<0.2 (LOQ)	<0.1 (LOQ)	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA
11-A	5	10	817.70	7.5	2.850	0.639	3.613	4.588	NA	0.625	NA	2.068	NA	0.852	<0.2 (LOQ)	<0.1 (LOQ)	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA

Lab Sample	Rep	Ci gs	Cond. Wt mg/cig	PC /cig	MS TPM mg/cig	B[c]P ng/cig	B[a]A ng/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	I[cd]P ng/cig	dB[a]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig	Repeats	Comments
3-B	1	20	894.50	7.7	10.460	1.640	11.280	34.458	5.220	4.520	NA	6.330	3.890	5.650	<1.68 (LOQ)	0.650	0.600	0.720	NR1	NR1	NR1	NR1	5	NA
3-B	2	20	889.60	7.8	10.410	1.350	10.300	33.060	6.210	5.140	NA	5.650	3.110	5.300	<1.68 (LOQ)	0.750	0.640	0.630	NR1	NR1	NR1	NR1		NA
3-B	3	20	884.30	7.7	10.140	1.550	10.230	32.920	6.200	5.190	NA	6.220	3.900	4.980	<1.68 (LOQ)	0.780	0.540	0.700	NR1	NR1	NR1	NR1		NA
3-B	4	20	875.40	7.5	10.000	1.560	10.110	29.890	5.610	4.150	NA	6.090	3.880	4.750	<1.68 (LOQ)	0.640	0.640	0.760	NR1	NR1	NR1	NR1		NA
3-B	5	20	883.10	7.6	10.100	1.530	9.580	30.830	5.850	4.870	NA	6.230	3.900	4.820	<1.68 (LOQ)	0.790	0.680	0.740	NR1	NR1	NR1	NR1		NA
4-B	1	10	899.51	7.5	10.540	3.211	11.898	17.596	5.868	2.247	1.383	8.015	0.759	3.400	<0.06 (LOD)	0.283	<0.27 (LOQ)	<0.30 (LOQ)	7.051	<0.01 (LOD)	NA	432.630	NA	NA
4-B	2	10	895.48	7.6	10.040	3.246	11.910	17.564	5.464	1.969	1.304	7.443	0.738	3.115	<0.06 (LOD)	0.288	<0.27 (LOQ)	<0.30 (LOQ)	5.544	<0.01 (LOD)	NA	401.842		NA
4-B	3	10	897.50	7.7	10.620	3.240	11.822	17.397	5.914	2.120	1.421	8.056	0.840	3.299	<0.06 (LOD)	0.314	<0.27 (LOQ)	<0.30 (LOQ)	6.001	<0.01 (LOD)	NA	501.727		NA
4-B	4	10	904.55	7.6	10.370	3.513	11.218	17.715	5.643	1.879	1.593	7.989	0.720	3.132	<0.06 (LOD)	0.259	<0.27 (LOQ)	<0.30 (LOQ)	6.969	<0.01 (LOD)	NA	574.304		NA
4-B	5	10	892.91	7.4	10.290	3.176	10.580	17.199	5.558	1.836	1.605	7.724	0.708	3.175	<0.06 (LOD)	0.243	<0.27 (LOQ)	<0.30 (LOQ)	7.327	<0.01 (LOD)	NA	541.454		NA
5-B	1	5	NR1	7.1	9.040	0.418	10.042	13.765	3.703	2.500	0.550	5.743	0.448	2.647	<0.1 (LOD)	0.234	0.128	0.254	3.338	1.543	NA	NA	NA	NA
5-B	2	5	NR1	7.4	10.760	0.559	11.196	14.934	4.079	3.046	0.694	6.536	0.590	2.976	<0.1 (LOD)	0.300	<0.1 (LOD)	0.157	4.007	1.700	NA	NA		NA
5-B	3	5	NR1	7.2	9.840	0.496	10.822	18.282	4.007	2.353	0.654	5.908	0.551	2.823	<0.1 (LOD)	0.270	<0.1 (LOD)	0.171	3.357	1.408	NA	NA		NA
5-B	4	5	NR1	7.4	10.600	0.516	11.536	15.358	4.355	2.531	0.787	6.484	0.607	3.185	<0.1 (LOD)	0.278	0.169	0.145	3.708	1.673	NA	NA		NA
5-B	5	5	NR1	7.0	10.320	0.526	10.360	13.398	3.716	2.305	0.574	5.755	0.533	2.750	<0.1 (LOD)	0.254	0.124	0.158	3.466	1.413	NA	NA		NA
6-B	1	5	894.50	7.8	10.460	<3.2 (LOQ)	15.377	12.819	5.039	2.688	NA	8.267	0.947	2.891	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA	NA	NA
6-B	2	5	891.42	7.4	10.140	<3.2 (LOQ)	15.402	12.369	4.617	2.256	NA	8.045	1.130	2.686	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA		NA
6-B	3	5	900.68	7.5	9.380	<3.2 (LOQ)	12.476	13.001	4.728	2.254	NA	8.217	1.071	2.886	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA		NA
6-B	4	5	891.16	7.5	9.800	<3.2 (LOQ)	14.940	11.481	4.774	2.462	NA	7.332	1.186	2.790	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA		NA
6-B	5	5	894.72	7.7	10.060	<3.2 (LOQ)	14.840	17.844	5.921	2.619	NA	8.476	1.224	2.755	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA		NA
7-B	1	10	889.34	7.9	10.340	2.525	11.441	12.794	5.195	2.179	See Other3	6.219	0.619	1.420	<0.333 (LOD)	<1.00 (LOQ)	<0.333 (LOD)	<1.00 (LOQ)	4.168	1.974	<0.013 (LOD)	202.846	NA	NA

Lab Sample	Rep	Ci gs	Cond. Wt mg/cig	PC /cig	MS TPM mg/cig	B[c]P ng/cig	B[a]A ng/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	l[cd]P ng/cig	dB[a]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig	Repeats	Comments	
7-B	2	10	896.16	7.7	10.160	2.397	11.093	12.764	4.869	1.951	See Other3	5.810	0.609	1.394	<0.333 (LOD)	<0.333 (LOD)	<0.333 (LOD)	<1.00 (LOQ)	4.244	1.833	<0.013 (LOD)	235.377		NA	
7-B	3	10	881.32	7.8	10.850	2.445	11.078	13.117	5.006	2.049	See Other3	6.359	0.623	1.462	<0.333 (LOD)	<1.00 (LOQ)	<1.00 (LOQ)	<1.00 (LOQ)	4.289	2.110	<0.013 (LOD)	257.556		NA	
7-B	4	10	891.41	7.6	9.870	2.309	10.749	11.630	4.917	2.075	See Other3	5.775	0.604	1.342	<0.333 (LOD)	<0.333 (LOD)	<1.00 (LOQ)	<1.00 (LOQ)	4.611	2.005	<0.013 (LOD)	229.284		NA	
7-B	5	10	888.56	7.8	10.240	2.248	10.402	12.090	4.869	2.003	See Other3	5.791	0.608	1.383	<0.333 (LOD)	<0.333 (LOD)	<0.333 (LOD)	<1.00 (LOQ)	4.120	1.925	<0.013 (LOD)	223.169		NA	
8-B	1	5	906.14	8.0	10.140	NA	12.189	NA	5.315	2.118	NA	6.782	0.838	2.983	NR2	0.280	0.153	0.140	NA	NA	NA	NR1	NA	Other 1 = Benzo[j] fluoranthene	
8-B	2	5	895.28	7.9	10.300	NA	12.105	NA	5.307	2.019	NA	6.412	0.847	3.071	NR2	0.303	0.164	0.162	NA	NA	NA	NR1			
8-B	3	5	888.18	7.9	10.520	NA	12.804	NA	5.277	2.053	NA	6.659	0.861	3.010	NR2	0.284	0.129	0.162	NA	NA	NA	NR1			
8-B	4	5	901.92	7.5	10.300	NA	12.613	NA	5.534	2.189	NA	6.707	0.881	3.223	NR2	0.348	0.151	0.133	NA	NA	NA	NR1			
8-B	5	5	885.40	7.3	9.200	NA	10.620	NA	4.651	1.777	NA	5.748	0.691	2.658	NR2	0.283	0.116	0.119	NA	NA	NA	NR1			
9-B	1	20	880.00	7.7	10.390	NA	12.050	35.360	5.256	4.570	NA	6.397	NA	5.617	NA	NA	NA	0.858	NR1	NR1	NR1	NR1	5	Other 1 = Benzo [g,h,i] perylene	
9-B	2	20	884.00	7.8	10.340	NA	11.540	36.240	6.226	5.177	NA	5.724	NA	5.274	NA	NA	NA	0.771	NR1	NR1	NR1	NR1			
9-B	3	20	903.60	7.7	10.140	NA	10.690	34.580	6.216	5.226	NA	6.288	NA	4.960	NA	NA	NA	0.839	NR1	NR1	NR1	NR1			
9-B	4	20	905.20	7.5	10.210	NA	10.820	35.690	5.638	4.207	NA	6.159	NA	4.735	NA	NA	NA	0.897	NR1	NR1	NR1	NR1			
9-B	5	20	901.40	7.6	10.170	NA	10.270	34.280	5.873	4.913	NA	6.298	NA	4.804	NA	NA	NA	0.878	NR1	NR1	NR1	NR1			
11-B	1	10	902.50	7.2	10.220	2.250	12.064	17.095	NA	5.448	NA	6.502	NA	2.573	<0.2 (LOQ)	0.249	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA	NA
11-B	2	10	893.90	7.4	9.660	2.470	11.435	16.220	NA	4.374	NA	6.659	NA	2.122	<0.2 (LOQ)	0.188	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA	NA
11-B	3	10	901.40	7.5	10.000	2.393	10.998	15.604	NA	3.002	NA	7.818	NA	3.048	<0.2 (LOQ)	0.674	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA	NA
11-B	4	10	898.00	7.3	9.850	2.293	11.731	16.561	NA	3.290	NA	7.538	NA	3.202	<0.2 (LOQ)	0.324	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA	NA
11-B	5	10	891.70	7.2	10.320	1.874	11.125	6.074	NA	1.646	NA	7.114	NA	2.367	<0.2 (LOQ)	0.150	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA	NA
3-C	1	20	932.00	7.9	18.150	2.920	13.580	43.440	8.160	6.850	NA	8.440	5.150	8.710	0.580	1.250	1.110	1.480	NR1	NR1	NR1	NR1	5	NA	
3-C	2	20	936.80	7.9	18.040	2.450	13.340	40.330	8.080	7.200	NA	7.290	4.900	8.490	0.550	1.120	1.020	1.320	NR1	NR1	NR1	NR1		NA	

Lab Sample	Rep	Ci gs	Cond. Wt mg/cig	PC /cig	MS TPM mg/cig	B[c]P ng/cig	B[a]A ng/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	l[cd]P ng/cig	dB[a]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig	Repeats	Comments
3-C	3	20	931.20	8.0	17.980	2.390	13.100	40.240	7.950	7.040	NA	7.640	5.270	8.970	0.670	1.160	1.210	1.390	NR1	NR1	NR1	NR1		NA
3-C	4	20	934.90	7.9	18.490	2.400	14.190	42.750	8.660	7.700	NA	7.540	5.160	8.940	0.690	1.350	1.180	1.320	NR1	NR1	NR1	NR1		NA
3-C	5	20	944.20	7.9	17.700	2.800	13.450	39.420	8.050	6.810	NA	7.870	5.630	8.700	0.660	1.290	1.280	1.200	NR1	NR1	NR1	NR1		NA
4-C	1	10	937.33	7.7	17.420	5.358	14.865	23.323	7.172	2.500	1.651	9.987	1.011	3.755	<0.19 (LOQ)	0.277	<0.27 (LOQ)	<0.30 (LOQ)	7.735	<0.01 (LOD)	NA	1194.950	NA	NA
4-C	2	10	937.77	7.7	17.740	5.583	14.227	24.179	7.456	2.632	1.473	10.492	1.068	3.968	<0.19 (LOQ)	0.325	<0.27 (LOQ)	<0.30 (LOQ)	8.462	<0.01 (LOD)	NA	1243.830		NA
4-C	3	10	931.30	7.7	17.120	5.051	15.025	23.803	7.350	2.323	1.903	10.259	1.078	3.973	<0.19 (LOQ)	0.417	0.323	<0.30 (LOQ)	8.388	<0.01 (LOD)	NA	1242.270		NA
4-C	4	10	933.34	7.5	16.460	6.102	12.361	22.914	6.973	2.279	1.225	9.841	0.967	3.707	<0.06 (LOD)	0.300	<0.27 (LOQ)	<0.30 (LOQ)	8.976	<0.01 (LOD)	NA	1169.010		NA
4-C	5	10	944.18	7.8	17.750	6.105	14.634	24.429	7.599	2.420	1.729	10.445	1.023	3.811	<0.06 (LOD)	0.345	<0.27 (LOQ)	<0.30 (LOQ)	9.568	<0.01 (LOD)	NA	1250.130		NA
5-C	1	5	NR1	7.7	18.400	1.117	16.900	22.402	6.678	4.082	1.209	10.468	0.937	4.498	<0.1 (LOD)	0.358	0.149	0.292	5.969	2.811	NA	NA	NA	NA
5-C	2	5	NR1	7.7	17.740	0.910	16.309	20.061	6.067	3.804	1.037	9.500	0.797	4.008	<0.1 (LOD)	0.348	0.135	0.339	5.351	3.138	NA	NA		NA
5-C	3	5	NR1	7.8	17.220	0.940	16.671	21.733	5.155	3.599	1.103	9.411	0.773	3.878	<0.1 (LOD)	0.332	0.181	0.256	5.361	2.219	NA	NA		NA
5-C	4	5	NR1	7.6	18.320	0.897	16.373	21.629	5.328	3.891	1.141	9.665	0.868	4.071	<0.1 (LOD)	0.340	0.140	0.204	5.670	2.969	NA	NA		NA
5-C	5	5	NR1	7.6	17.700	1.077	16.175	19.956	4.939	3.825	0.891	9.411	0.712	3.748	<0.1 (LOD)	0.328	0.183	0.216	5.532	3.052	NA	NA		NA
6-C	1	5	943.56	7.4	16.880	<3.2 (LOQ)	16.913	16.387	5.927	2.538	NA	10.636	1.166	4.345	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA	NA	NA
6-C	2	5	951.30	7.3	16.280	3.751	16.949	15.522	5.574	2.549	NA	8.181	1.301	3.969	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA		NA
6-C	3	5	948.08	7.6	16.800	3.324	17.475	16.494	6.328	2.924	NA	9.847	1.180	4.413	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA		NA
6-C	4	5	947.72	7.6	17.020	<3.2 (LOQ)	17.036	15.810	7.056	3.527	NA	9.922	1.276	4.077	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA		NA
6-C	5	5	941.18	7.7	16.960	<3.2 (LOQ)	17.531	16.726	5.599	2.629	NA	10.568	1.360	4.350	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR/NA	NR/NA	NR/NA	NR/NA		NA
7-C	1	10	935.59	7.9	17.410	3.507	14.528	17.105	6.158	2.493	See Other3	8.506	0.695	1.752	<1.00 (LOQ)	<1.00 (LOQ)	<1.00 (LOQ)	<1.00 (LOQ)	5.145	2.754	<0.013 (LOD)	525.262	NA	NA
7-C	2	10	932.13	8.0	17.560	3.544	14.540	17.199	6.214	2.508	See Other3	8.294	0.689	1.799	<1.00 (LOQ)	<1.00 (LOQ)	<1.00 (LOQ)	<1.00 (LOQ)	5.399	2.727	<0.013 (LOD)	519.673		NA
7-C	3	10	934.35	7.8	17.090	3.301	14.621	16.936	5.980	2.421	See Other3	8.554	0.689	1.764	<1.00 (LOQ)	<1.00 (LOQ)	<1.00 (LOQ)	<1.00 (LOQ)	5.805	2.805	<0.013 (LOD)	510.273		NA

Lab Sample	Rep	Ci gs	Cond. Wt mg/cig	PC /cig	MS TPM mg/cig	B[c]P ng/cig	B[a]A ng/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	I[cd]P ng/cig	dB[a]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig	Repeats	Comments
7-C	4	10	936.99	8.1	17.620	2.821	14.684	16.942	6.208	2.558	See Other3	8.256	0.679	1.719	<1.00 (LOQ)	<1.00 (LOQ)	<1.00 (LOQ)	<1.00 (LOQ)	5.072	2.738	<0.013 (LOD)	628.673		NA
7-C	5	10	928.17	8.0	17.640	3.052	14.585	17.652	6.009	2.537	See Other3	8.205	0.689	1.735	<1.00 (LOQ)	<1.00 (LOQ)	<1.00 (LOQ)	<1.00 (LOQ)	5.273	2.945	<0.013 (LOD)	853.235		NA
8-C	1	5	940.46	8.0	17.540	NA	16.802	NA	7.131	2.769	NA	8.875	1.063	3.981	NR2	0.367	0.196	0.220	NA	NA	NA	NR1	NA	Other 1 = Benzo [j] fluoranthene
8-C	2	5	941.74	8.0	16.940	NA	16.387	NA	6.935	2.599	NA	8.693	1.108	3.848	NR2	0.389	0.196	0.245	NA	NA	NA	NR1		
8-C	3	5	951.70	8.4	16.600	NA	17.046	NA	7.161	2.701	NA	9.249	1.217	3.844	NR2	0.375	0.205	0.206	NA	NA	NA	NR1		
8-C	4	5	928.58	8.0	17.120	NA	17.683	NA	7.057	2.647	NA	8.849	1.160	3.916	NR2	0.376	0.214	0.204	NA	NA	NA	NR1		
8-C	5	5	946.88	8.3	17.240	NA	17.524	NA	6.840	2.814	NA	9.305	1.103	4.000	NR2	0.417	0.206	0.210	NA	NA	NA	NR1		
9-C	1	20	921.50	7.9	17.690	NA	14.250	42.580	8.137	6.853	NA	8.486	NA	8.616	NA	NA	NA	1.596	NR1	NR1	NR1	NR1	5	Other 1 = Benzo [g,h,i] perylene
9-C	2	20	928.60	7.9	17.260	NA	13.690	41.360	8.058	7.196	NA	7.347	NA	8.400	NA	NA	NA	1.440	NR1	NR1	NR1	NR1		
9-C	3	20	932.30	8.0	17.980	NA	14.020	43.610	7.931	7.039	NA	7.694	NA	8.871	NA	NA	NA	1.508	NR1	NR1	NR1	NR1		
9-C	4	20	940.50	7.9	18.050	NA	13.940	41.250	8.627	7.686	NA	7.595	NA	8.841	NA	NA	NA	1.440	NR1	NR1	NR1	NR1		
9-C	5	20	930.80	7.9	17.890	NA	14.320	42.590	8.029	6.814	NA	7.921	NA	8.606	NA	NA	NA	1.324	NR1	NR1	NR1	NR1		
11-C	1	10	930.70	7.3	16.340	2.879	16.526	24.414	NA	6.355	NA	8.208	NA	3.352	<0.2 (LOQ)	0.273	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA
11-C	2	10	940.80	7.4	16.450	3.388	15.960	19.133	NA	6.851	NA	9.024	NA	3.189	<0.2 (LOQ)	0.205	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA
11-C	3	10	931.90	7.3	15.560	4.227	17.312	23.631	NA	3.326	NA	10.806	NA	4.500	<0.2 (LOQ)	0.491	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA
11-C	4	10	924.50	7.3	16.440	2.695	13.268	25.940	NA	<0.2 (LOQ)	NA	8.526	NA	3.851	<0.2 (LOQ)	0.483	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA
11-C	5	10	938.70	7.4	16.940	2.626	10.388	18.928	NA	<0.2 (LOQ)	NA	9.703	NA	3.748	<0.2 (LOQ)	0.304	<0.4 (LOQ)	<0.4 (LOQ)	<2 (LOQ)	NA	NA	NA	NA	NA

Where NA = not applicable; NR1 = not reported, optional for lab's method; NR2 =not reported, technical error; LOD = limit of detection; LOQ = limit of quantitation

Appendix G: Raw Data – Intense (ISO 20778)

Lab Sample	Rep	Cigs	Cond. Wt mg/cig	PC per cig	MS TPM mg/cig	B[c]Pn g/cig	B[a]An g/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	[cd]P ng/cig	dB[a]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig	Repeats	Comments
3-A	1	8	799.80	7.4	33.880	2.500	16.270	49.170	9.120	8.180	NA	8.840	5.640	7.240	0.610	1.490	0.720	1.890	NR1	NR1	NR1	NR1	5	Other 1 = Benzo [j] fluoranthene
3-A	2	8	815.50	7.2	33.900	2.710	17.040	48.980	9.710	8.320	NA	10.200	5.040	6.830	0.600	1.490	0.760	2.180	NR1	NR1	NR1	NR1		Other 2 = Benzo [g,h,i] perylene
3-A	3	8	813.80	7.0	35.200	2.890	16.850	48.790	8.900	8.040	NA	9.240	6.170	8.170	0.690	1.520	0.680	1.840	NR1	NR1	NR1	NR1		NA
3-A	4	8	806.60	7.5	32.350	2.530	16.200	50.380	8.840	7.950	NA	8.550	5.520	8.400	0.660	1.320	0.730	1.850	NR1	NR1	NR1	NR1		NA
3-A	5	8	820.30	7.5	33.980	2.950	16.130	50.240	9.140	7.990	NA	9.140	6.010	8.130	0.610	1.560	0.870	1.920	NR1	NR1	NR1	NR1		NA
4-A	1	3	810.30	7.2	25.170	4.981	18.338	21.216	7.964	2.413	2.500	9.914	0.915	4.250	<0.06 (LOD)	<0.19 (LOQ)	<0.08 (LOD)	<0.09 (LOD)	NR1	NR1	NR1	NR1	NA	NA
4-A	2	3	826.03	7.6	26.730	3.906	16.637	20.774	7.666	2.343	2.375	9.709	0.845	3.986	<0.06 (LOD)	<0.19 (LOQ)	<0.08 (LOD)	<0.09 (LOD)	NR1	NR1	NR1	NR1		NA
4-A	3	3	839.40	7.5	27.370	5.566	18.563	22.357	7.681	2.862	2.365	9.927	0.865	3.920	<0.06 (LOD)	<0.19 (LOQ)	<0.08 (LOD)	<0.09 (LOD)	NR1	NR1	NR1	NR1		NA
4-A	4	3	819.03	7.2	25.900	5.151	17.846	20.525	7.233	2.697	2.381	9.076	0.821	3.553	<0.06 (LOD)	<0.19 (LOQ)	<0.08 (LOD)	<0.09 (LOD)	NR1	NR1	NR1	NR1		NA
4-A	5	3	808.30	7.3	24.000	5.388	18.414	20.512	7.263	2.599	2.484	9.468	0.901	3.786	<0.06 (LOD)	<0.19 (LOQ)	<0.08 (LOD)	<0.09 (LOD)	NR1	NR1	NR1	NR1		NA
5-A	1	3	NR1	7.4	38.167	1.031	16.908	19.968	6.882	3.377	1.273	9.062	0.824	4.143	<0.1 (LOD)	0.406	0.161	0.242	NR1	NR1	NR1	NR1	NA	NA
5-A	2	3	NR1	7.3	40.700	1.080	17.997	21.781	7.530	3.630	1.460	9.648	0.830	4.359	<0.1 (LOD)	0.401	0.161	0.175	NR1	NR1	NR1	NR1		NA
5-A	3	3	NR1	7.2	32.200	0.902	17.016	19.832	6.432	3.154	1.151	8.889	0.766	4.128	<0.1 (LOD)	0.359	<0.1 (LOD)	<0.1 (LOD)	NR1	NR1	NR1	NR1		NA
5-A	4	3	NR1	7.3	32.700	0.994	16.190	19.851	6.047	3.155	1.280	8.548	0.741	3.768	<0.1 (LOD)	0.373	<0.1 (LOD)	<0.1 (LOD)	NR1	NR1	NR1	NR1		NA
5-A	5	3	NR1	7.4	33.833	1.036	16.921	21.188	6.912	3.293	1.346	8.666	0.863	4.027	<0.1 (LOD)	0.386	<0.1 (LOD)	0.240	NR1	NR1	NR1	NR1		NA
6-A	1	3	NR1	7.7	31.100	<3.2 (LOQ)	16.411	15.612	6.989	3.843	NA	8.946	1.442	3.351	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR1	NR1	NR1	NR1	NA	NA
6-A	2	3	NR1	7.4	27.767	<3.2 (LOQ)	16.419	14.857	5.789	3.107	NA	9.342	1.689	3.398	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR1	NR1	NR1	NR1		NA
6-A	3	3	NR1	7.4	32.433	<3.2 (LOQ)	16.554	15.509	8.082	4.449	NA	10.168	1.371	3.716	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR1	NR1	NR1	NR1		NA
6-A	4	3	NR1	7.3	34.500	<3.2 (LOQ)	19.486	16.827	8.495	3.866	NA	9.990	1.632	4.757	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR1	NR1	NR1	NR1		NA
6-A	5	3	NR1	7.4	28.900	<3.2 (LOQ)	17.352	17.323	8.141	3.923	NA	9.499	1.913	4.543	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR1	NR1	NR1	NR1		NA
7-A	1	3	816.00	8.2	27.070	3.113	14.655	14.527	6.390	2.557	See Other3	8.322	0.766	2.150	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	NR1	NR1	NR1	NR1	NA	

Lab Sample	Rep	Cigs	Cond. Wt mg/cig	PC per cig	MS TPM mg/cig	B[c]Pn g/cig	B[a]An g/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	l[cd]P ng/cig	dB[a]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig	Repeats	Comments
7-A	2	3	808.00	7.4	28.500	3.308	16.33 3	15.924	7.465	2.931	See Other3	8.976	0.814	2.184	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	NR1	NR1	NR1	NR1		Other 1 = pyrene
7-A	3	3	847.00	8.1	29.230	3.653	15.30 6	15.631	7.040	2.947	See Other3	8.500	0.817	2.039	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	NR1	NR1	NR1	NR1		Other2 = Benzo [g,h,i] perylene
7-A	4	3	832.00	8.1	28.370	2.994	13.81 6	15.209	6.522	2.351	See Other3	8.351	0.796	2.253	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	NR1	NR1	NR1	NR1		Other 3 = B[j+e]A
7-A	5	3	830.00	7.4	27.870	2.864	14.47 4	14.763	6.187	2.461	See Other3	8.203	0.734	2.090	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	NR1	NR1	NR1	NR1		
8-A	1	4	820.90	7.9	33.350	NA	16.81 1	NA	7.501	2.601	NA	8.217	1.020	4.177	NR2	0.512	0.221	0.243	NR1	NR1	NR1	NR1	NA	Other 1 = Benzo [j] fluoranthe ne
8-A	2	4	829.38	7.5	36.150	NA	15.78 7	NA	7.344	2.731	NA	7.980	0.925	4.075	NR2	0.481	0.243	0.208	NR1	NR1	NR1	NR1		NA
8-A	3	4	844.48	7.8	32.325	NA	16.44 6	NA	7.773	2.744	NA	8.367	1.078	4.196	NR2	0.512	0.229	0.238	NR1	NR1	NR1	NR1		NA
8-A	4	4	841.75	8.0	36.750	NA	17.35 1	NA	8.064	2.792	NA	8.660	1.129	4.316	NR2	0.488	0.217	0.214	NR1	NR1	NR1	NR1		NA
8-A	5	4	838.55	7.9	35.700	NA	16.49 7	NA	7.613	2.551	NA	8.366	1.033	3.951	NR2	0.516	0.222	0.246	NR1	NR1	NR1	NR1		NA
9-A	1	10	844.70	7.4	29.330	NA	17.53 0	50.360	8.804	7.911	NA	8.882	NA	7.175	0.652	1.505	0.758	1.993	NR1	NR1	NR1	NR1	5	Other 1 = Benzo [g,h,i] perylene
9-A	2	10	850.00	7.4	30.900	NA	16.94 0	49.840	9.365	8.044	NA	10.228	NA	6.773	0.642	1.505	0.797	2.275	NR1	NR1	NR1	NR1		
9-A	3	10	809.60	7.3	31.300	NA	17.31 0	51.310	8.595	7.778	NA	9.278	NA	8.087	0.729	1.534	0.720	1.945	NR1	NR1	NR1	NR1		
9-A	4	10	846.60	7.2	32.740	NA	16.58 0	52.100	8.538	7.693	NA	8.595	NA	8.312	0.700	1.340	0.768	1.955	NR1	NR1	NR1	NR1		
9-A	5	10	816.00	7.1	32.380	NA	16.35 0	50.840	8.823	7.731	NA	9.179	NA	8.047	0.652	1.573	0.904	2.022	NR1	NR1	NR1	NR1		
11-A	1	5	815.80	7.0	25.180	2.838	15.29 7	21.143	NA	7.494	NA	8.245	NA	3.348	<0.4 (LOQ)	0.261	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA	NA	NA
11-A	2	5	831.00	7.2	24.280	3.173	15.09 6	20.443	NA	8.084	NA	7.950	NA	3.215	<0.4 (LOQ)	0.220	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA		NA
11-A	3	5	827.20	7.1	24.760	2.987	14.54 6	16.971	NA	7.033	NA	8.818	NA	3.671	<0.4 (LOQ)	0.532	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA		NA
11-A	4	5	831.30	7.2	24.920	2.771	16.98 8	20.422	NA	4.174	NA	9.151	NA	3.908	<0.4 (LOQ)	0.487	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA		NA
11-A	5	5	822.30	7.6	24.820	1.801	11.03 6	13.091	NA	1.903	NA	7.045	NA	2.710	<0.4 (LOQ)	0.300	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA		NA
3-B	1	8	884.70	8.9	45.750	3.920	24.87 0	74.360	13.770	11.040	NA	15.040	10.350	13.890	0.730	2.380	0.700	2.210	NR1	NR1	NR1	NR1	5	NA
3-B	2	8	906.30	8.8	47.390	4.090	24.53 0	75.080	13.070	10.660	NA	15.780	10.350	12.550	0.670	2.120	0.800	1.970	NR1	NR1	NR1	NR1		NA

Lab Sample	Rep	Cigs	Cond. Wt mg/cig	PC per cig	MS TPM mg/cig	B[c]Pn g/cig	B[a]An g/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	l[cd]P ng/cig	dB[a]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig	Repeats	Comments
3-B	3	8	876.20	8.9	44.950	3.930	23.95 0	74.230	12.880	10.390	NA	15.470	10.120	12.300	0.770	2.210	0.840	1.940	NR1	NR1	NR1	NR1		NA
3-B	4	8	888.40	8.8	44.360	4.170	22.65 0	72.090	12.950	10.730	NA	16.330	10.410	10.690	0.700	2.050	0.800	1.820	NR1	NR1	NR1	NR1		NA
3-B	5	8	895.70	8.8	45.050	3.910	23.43 0	67.940	12.070	9.350	NA	16.510	10.410	12.280	0.850	2.270	0.900	2.180	NR1	NR1	NR1	NR1		NA
4-B	1	3	887.87	8.8	37.170	7.672	27.33 1	36.574	12.489	3.672	3.783	16.480	1.554	6.644	<0.06 (LOD)	<0.19 (LOQ)	<0.27 (LOQ)	<0.09 (LOD)	NR1	NR1	NR1	NR1		NA
4-B	2	3	905.83	9.0	37.600	8.277	29.67 9	36.092	12.056	4.026	3.581	15.897	1.466	6.586	<0.06 (LOD)	<0.19 (LOQ)	<0.27 (LOQ)	<0.30 (LOQ)	NR1	NR1	NR1	NR1		NA
4-B	3	3	902.43	8.8	36.430	7.204	25.45 4	34.769	11.982	4.682	3.518	15.551	1.413	6.276	<0.06 (LOD)	<0.19 (LOQ)	<0.27 (LOQ)	<0.09 (LOD)	NR1	NR1	NR1	NR1		NA
4-B	4	3	904.13	9.5	37.230	7.567	25.87 7	35.561	12.070	4.203	3.470	16.332	1.446	6.474	<0.06 (LOD)	<0.19 (LOQ)	<0.27 (LOQ)	<0.30 (LOQ)	NR1	NR1	NR1	NR1		NA
4-B	5	3	901.93	9.2	39.930	8.470	29.87 2	35.847	11.791	4.074	3.866	16.264	1.458	6.434	<0.06 (LOD)	0.635	<0.27 (LOQ)	<0.30 (LOQ)	NR1	NR1	NR1	NR1		NA
5-B	1	3	NR1	8.5	52.833	1.548	26.85 0	32.128	10.934	5.962	2.087	15.287	1.107	6.538	<0.1 (LOD)	0.538	0.289	0.549	NR1	NR1	NR1	NR1		NA
5-B	2	3	NR1	8.6	50.800	1.363	25.64 0	32.578	10.676	5.659	2.134	14.843	1.247	6.595	<0.1 (LOD)	0.524	0.286	0.347	NR1	NR1	NR1	NR1		NA
5-B	3	3	NR1	8.5	50.400	1.587	27.53 8	31.769	11.017	6.078	2.092	15.947	1.313	6.938	<0.1 (LOD)	0.596	0.217	0.475	NR1	NR1	NR1	NR1		NA
5-B	4	3	NR1	8.6	37.533	1.309	23.43 8	27.936	8.996	4.853	1.557	12.817	1.065	5.778	<0.1 (LOD)	0.538	0.194	0.368	NR1	NR1	NR1	NR1		NA
5-B	5	3	NR1	8.6	47.267	1.480	25.43 4	32.871	9.939	5.470	1.824	13.991	1.162	6.247	<0.1 (LOD)	0.505	0.240	0.547	NR1	NR1	NR1	NR1		NA
6-B	1	3	NR1	9.0	38.567	5.411	27.68 8	27.240	9.685	3.130	NA	15.482	2.162	4.857	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.30 (LOQ)	NR1	NR1	NR1	NR1		NA
6-B	2	3	NR1	8.8	43.833	5.403	29.85 0	26.161	11.113	5.305	NA	16.000	1.760	5.157	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.30 (LOQ)	NR1	NR1	NR1	NR1		NA
6-B	3	3	NR1	8.6	42.867	<3.2 (LOQ)	26.87 3	24.798	10.537	5.255	NA	15.473	2.255	5.438	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.30 (LOQ)	NR1	NR1	NR1	NR1		NA
6-B	4	3	NR1	8.2	39.533	<3.2 (LOQ)	24.76 5	23.195	10.738	5.325	NA	14.541	2.030	4.848	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.30 (LOQ)	NR1	NR1	NR1	NR1		NA
6-B	5	3	NR1	8.8	41.133	<3.2 (LOQ)	24.98 5	26.051	10.987	5.301	NA	13.364	1.926	5.095	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.30 (LOQ)	NR1	NR1	NR1	NR1		NA
7-B	1	3	888.00	9.4	40.900	6.288	25.48 4	26.500	11.312	4.924	See Other3	14.501	1.378	3.563	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<3.33 (LOQ)	NR1	NR1	NR1	NR1		
7-B	2	3	898.00	9.4	40.530	5.908	23.98 8	25.560	10.662	4.169	See Other3	13.701	1.261	3.367	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<3.33 (LOQ)	NR1	NR1	NR1	NR1		
7-B	3	3	909.00	9.4	39.400	5.139	24.17 5	25.641	10.256	3.893	See Other3	13.372	1.324	3.301	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<3.33 (LOQ)	NR1	NR1	NR1	NR1		
7-B	4	3	899.00	9.4	42.470	5.731	26.35 8	28.271	12.088	4.395	See Other3	15.107	1.419	3.433	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<3.33 (LOQ)	NR1	NR1	NR1	NR1		
7-B	5	3	886.00	9.2	42.600	5.772	26.75 2	27.818	11.323	4.424	See Other3	15.715	1.459	3.337	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<3.33 (LOQ)	NR1	NR1	NR1	NR1		
8-B	1	4	902.48	9.6	43.450	NA	25.64 2	NA	11.488	4.037	NA	12.820	1.650	6.372	NR2	0.734	0.370	0.390	NR1	NR1	NR1	NR1	NA	NA

Lab Sample	Rep	Cigs	Cond. Wt mg/cig	PC per cig	MS TPM mg/cig	B[c]Pn g/cig	B[a]An g/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	l[cd]P ng/cig	dB[a]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig	Repeats	Comments	
8-B	2	4	884.15	9.0	44.025	NA	25.35 2	NA	10.889	3.919	NA	12.621	1.513	6.234	NR2	0.689	0.322	0.361	NR1	NR1	NR1	NR1		NA	
8-B	3	4	890.38	9.2	43.750	NA	25.95 1	NA	11.470	3.996	NA	12.949	1.673	6.524	NR2	0.791	0.347	0.367	NR1	NR1	NR1	NR1		NA	
8-B	4	4	916.30	8.6	44.800	NA	24.48 0	NA	11.146	3.716	NA	12.389	1.468	6.081	NR2	0.712	0.318	0.339	NR1	NR1	NR1	NR1		NA	
8-B	5	4	891.80	9.0	47.900	NA	26.93 1	NA	11.984	4.242	NA	13.378	1.709	6.565	NR2	0.812	0.316	0.375	NR1	NR1	NR1	NR1		NA	
9-B	1	10	914.90	8.3	39.090	NA	25.63 0	76.390	13.222	10.628	NA	15.020	NA	13.692	0.768	2.369	0.739	2.304	NR1	NR1	NR1	NR1	5	Other 1 = Benzo [g,h,i] perylene	
9-B	2	10	895.90	8.4	41.360	NA	24.89 0	73.580	12.557	10.267	NA	15.752	NA	12.379	0.710	2.116	0.836	2.071	NR1	NR1	NR1	NR1			
9-B	3	10	908.70	8.6	42.150	NA	26.01 0	75.420	12.376	10.011	NA	15.445	NA	12.134	0.807	2.204	0.875	2.042	NR1	NR1	NR1	NR1			
9-B	4	10	868.40	8.5	42.640	NA	24.36 0	74.690	12.443	10.334	NA	16.297	NA	10.556	0.739	2.049	0.836	1.925	NR1	NR1	NR1	NR1			
9-B	5	10	878.00	8.8	41.980	NA	25.13 0	72.920	11.607	9.023	NA	16.475	NA	12.114	0.885	2.262	0.933	2.275	NR1	NR1	NR1	NR1			
11-B	1	5	887.70	8.5	35.580	3.274	21.60 5	30.944	NA	12.501	NA	12.608	NA	5.487	<0.4 (LOQ)	0.534	<0.8 (LOQ)	<0.8 (LOQ)	9.492	NA	NA	NA	NA	NA	
11-B	2	5	898.00	8.8	36.420	3.808	22.16 5	33.955	NA	9.436	NA	13.541	NA	5.556	<0.4 (LOQ)	0.491	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA			NA
11-B	3	5	892.80	8.4	34.620	5.054	22.68 6	29.044	NA	6.012	NA	14.215	NA	6.194	<0.4 (LOQ)	0.788	<0.8 (LOQ)	<0.8 (LOQ)	8.314	NA	NA	NA			NA
11-B	4	5	893.40	8.5	35.260	4.918	26.57 9	35.454	NA	7.372	NA	18.814	NA	6.657	<0.4 (LOQ)	0.642	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA			NA
11-B	5	5	891.10	8.4	34.720	3.357	19.22 8	22.640	NA	2.740	NA	11.497	NA	4.437	<0.4 (LOQ)	0.541	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA			NA
3-C	1	8	933.70	10.9	47.830	3.600	28.57 0	88.090	16.370	15.380	NA	15.890	11.310	17.290	1.280	2.820	3.110	4.150	NR1	NR1	NR1	NR1	5	NA	
3-C	2	8	948.35	10.6	48.130	3.180	26.12 0	80.550	14.040	12.210	NA	16.040	11.010	17.020	1.250	2.780	3.170	4.560	NR1	NR1	NR1	NR1			NA
3-C	3	8	925.50	10.6	45.540	3.460	26.29 0	83.670	14.830	14.170	NA	14.690	11.190	15.870	1.210	2.520	3.310	3.590	NR1	NR1	NR1	NR1			NA
3-C	4	8	948.00	10.6	47.730	3.220	25.49 0	86.860	14.940	12.770	NA	14.800	10.680	15.910	1.410	2.460	3.570	3.980	NR1	NR1	NR1	NR1			NA
3-C	5	8	918.40	10.6	44.960	3.310	27.43 0	82.040	14.800	12.500	NA	16.910	10.120	17.970	1.490	3.080	3.330	4.440	NR1	NR1	NR1	NR1			NA
4-C	1	3	942.70	11.0	40.030	8.456	28.95 3	42.564	13.890	3.841	4.279	17.895	1.873	6.912	<0.06 (LOD)	<0.19 (LOQ)	<0.27 (LOQ)	<0.30 (LOQ)	NR1	NR1	NR1	NR1	NA	NA	
4-C	2	3	936.17	11.1	43.930	9.505	30.34 3	46.363	13.757	4.815	4.535	19.038	1.935	7.296	<0.06 (LOD)	<0.19 (LOQ)	<0.27 (LOQ)	<0.30 (LOQ)	NR1	NR1	NR1	NR1			NA
4-C	3	3	925.70	10.5	39.170	9.227	28.67 4	42.848	13.759	5.450	4.172	18.143	1.535	6.655	<0.06 (LOD)	0.701	<0.27 (LOQ)	<0.30 (LOQ)	NR1	NR1	NR1	NR1			NA
4-C	4	3	932.83	10.9	40.570	9.299	29.85 1	44.442	13.336	4.485	4.190	18.542	1.910	6.867	<0.06 (LOD)	<0.19 (LOQ)	<0.27 (LOQ)	<0.30 (LOQ)	NR1	NR1	NR1	NR1			NA

Lab Sample	Rep	Cigs	Cond. Wt mg/cig	PC per cig	MS TPM mg/cig	B[c]Pn g/cig	B[a]An g/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	I[cd]P ng/cig	dB[a]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig	Repeats	Comments	
4-C	5	3	926.83	10.8	38.670	9.570	28.96 ₈	42.399	12.972	4.420	4.238	18.083	1.559	6.667	<0.06 (LOD)	<0.19 (LOQ)	<0.27 (LOQ)	<0.30 (LOQ)	NR1	NR1	NR1	NR1		NA	
5-C	1	3	NR1	10.2	45.600	1.462	31.19 ₇	40.324	11.005	6.229	2.547	17.093	1.297	7.089	<0.1 (LOD)	0.588	0.218	0.407	NR1	NR1	NR1	NR1	NA	NA	
5-C	2	3	NR1	9.5	46.033	1.822	27.98 ₉	36.911	10.876	6.232	2.133	16.987	1.345	7.026	<0.1 (LOD)	0.562	0.333	0.505	NR1	NR1	NR1	NR1		NA	
5-C	3	3	NR1	10.2	43.633	1.666	28.89 ₈	37.165	10.849	5.743	2.510	17.623	1.412	6.946	<0.1 (LOD)	0.596	0.305	0.441	NR1	NR1	NR1	NR1		NA	
5-C	4	3	NR1	9.9	46.033	1.592	29.94 ₃	41.976	13.326	6.375	2.528	18.454	1.247	7.391	<0.1 (LOD)	0.599	0.269	0.587	NR1	NR1	NR1	NR1		NA	
5-C	5	3	NR1	9.7	46.000	1.548	30.02 ₀	37.092	10.904	6.186	2.334	17.402	1.089	7.188	<0.1 (LOD)	0.589	0.167	0.448	NR1	NR1	NR1	NR1		NA	
6-C	1	3	NR1	10.4	40.633	5.603	35.57 ₉	32.201	14.250	6.089	NA	17.689	2.310	8.512	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR1	NR1	NR1	NR1	NA	NA	
6-C	2	3	NR1	10.2	39.800	6.820	32.79 ₅	28.085	14.276	6.473	NA	15.854	2.467	6.870	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR1	NR1	NR1	NR1		NA	
6-C	3	3	NR1	10.0	38.600	5.698	34.54 ₂	31.707	14.060	5.718	NA	15.976	2.543	7.647	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR1	NR1	NR1	NR1		NA	
6-C	4	3	NR1	10.8	35.600	6.423	34.95 ₃	34.725	14.266	5.205	NA	18.395	3.113	9.042	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR1	NR1	NR1	NR1		NA	
6-C	5	3	NR1	10.5	43.133	6.496	33.91 ₀	31.291	14.276	6.589	NA	18.051	2.506	9.093	<0.10 (LOD)	<0.08 (LOD)	<0.094 (LOD)	<0.091 (LOD)	NR1	NR1	NR1	NR1		NA	
7-C	1	3	918.00	10.6	40.900	6.103	27.91 ₅	30.422	10.451	4.210	See Other3	15.141	1.496	3.480	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<3.33 (LOQ)	NR1	NR1	NR1	NR1	NA		
7-C	2	3	917.00	11.0	42.060	6.539	28.35 ₈	31.439	11.498	4.717	See Other3	15.419	1.520	3.510	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<3.33 (LOQ)	NR1	NR1	NR1	NR1		NA	
7-C	3	3	933.00	11.7	44.230	6.150	29.35 ₉	33.275	12.078	4.683	See Other3	15.847	1.543	3.618	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<3.33 (LOQ)	NR1	NR1	NR1	NR1		NA	
7-C	4	3	943.00	11.5	44.270	6.792	31.45 ₂	34.517	12.869	5.140	See Other3	17.146	1.696	3.611	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<3.33 (LOQ)	NR1	NR1	NR1	NR1		NA	
7-C	5	3	928.00	11.4	42.030	7.160	31.19 ₉	33.656	12.215	4.637	See Other3	17.202	1.654	3.533	<1.11 (LOD)	<1.11 (LOD)	<1.11 (LOD)	<3.33 (LOQ)	NR1	NR1	NR1	NR1		NA	
8-C	1	4	950.98	10.7	45.700	NA	32.09 ₇	NA	12.965	4.665	NA	15.815	2.261	7.366	NR2	0.891	0.359	0.408	NR1	NR1	NR1	NR1	NA	NA	
8-C	2	4	928.70	11.0	45.550	NA	31.44 ₃	NA	13.310	4.931	NA	17.002	1.960	7.169	NR2	0.930	0.365	0.377	NR1	NR1	NR1	NR1		NA	NA
8-C	3	4	941.50	11.0	45.800	NA	32.03 ₅	NA	13.014	4.557	NA	17.158	2.027	7.173	NR2	0.826	0.352	0.434	NR1	NR1	NR1	NR1		NA	NA
8-C	4	4	944.98	10.8	44.975	NA	33.54 ₃	NA	13.657	4.570	NA	16.567	2.111	7.396	NR2	0.987	0.406	0.430	NR1	NR1	NR1	NR1		NA	NA
8-C	5	4	938.10	10.6	45.750	NA	31.74 ₆	NA	13.133	4.459	NA	16.310	1.991	7.364	NR2	0.865	0.413	0.442	NR1	NR1	NR1	NR1		NA	NA
9-C	1	10	970.80	10.6	43.090	NA	27.69 ₀	90.260	15.692	14.751	NA	15.861	NA	17.024	1.302	2.795	3.077	4.186	NR1	NR1	NR1	NR1	5	Other 1 = Benzo [g,h,i] perylene	
9-C	2	10	934.20	10.5	44.170	NA	27.31 ₀	85.420	13.478	11.740	NA	16.010	NA	16.760	1.273	2.757	3.135	4.583	NR1	NR1	NR1	NR1			

Lab Sample	Rep	Cigs	Cond. Wt mg/cig	PC per cig	MS TPM mg/cig	B[c]Pn g/cig	B[a]An g/cig	Chry ng/cig	B[b]F ng/cig	B[k]F ng/cig	B[j]A ng/cig	B[a]P ng/cig	dB[ah]A ng/cig	l[cd]P ng/cig	dB[a]P ng/cig	dB[ae]P ng/cig	dB[ai]P ng/cig	dB[ah]P ng/cig	C[cd]P ng/cig	5-MC ng/cig	B-Fur ng/cig	Naph ng/cig	Repeats	Comments
9-C	3	10	957.50	10.6	43.520	NA	26.14 0	86.370	14.229	13.602	NA	14.673	NA	15.633	1.234	2.504	3.271	3.642	NR1	NR1	NR1	NR1		
9-C	4	10	944.20	10.2	44.560	NA	26.37 0	84.260	14.333	12.272	NA	14.782	NA	15.672	1.428	2.446	3.523	4.021	NR1	NR1	NR1	NR1		
9-C	5	10	944.40	10.1	44.280	NA	25.87 0	86.390	14.200	12.015	NA	16.871	NA	17.691	1.505	3.048	3.290	4.467	NR1	NR1	NR1	NR1		
11-C	1	5	921.30	10.1	38.860	4.645	28.26 1	41.124	NA	14.343	NA	16.352	NA	6.206	<0.4 (LOQ)	0.370	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA	NA	NA
11-C	2	5	937.00	10.6	38.340	7.422	33.02 8	19.055	NA	13.721	NA	18.256	NA	6.285	<0.4 (LOQ)	0.564	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA		NA
11-C	3	5	942.10	10.4	38.300	4.316	24.43 2	15.832	NA	11.152	NA	19.557	NA	7.025	<0.4 (LOQ)	0.941	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA		NA
11-C	4	5	949.30	11.0	39.240	5.697	24.86 6	35.349	NA	<0.4 (LOQ)	NA	19.184	NA	7.944	<0.4 (LOQ)	0.586	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA		NA
11-C	5	5	919.00	10.1	38.760	3.533	20.54 2	33.619	NA	<0.4 (LOQ)	NA	12.577	NA	6.012	<0.4 (LOQ)	0.479	<0.8 (LOQ)	<0.8 (LOQ)	<4 (LOQ)	NA	NA	NA		NA

Where NA = not applicable; NR1 = not reported, optional for lab's method; NR2 =not reported, technical error; LOD = limit of detection; LOQ = limit of quantitation