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ENVIRONMENT

Subject:
Proposed Bioavailability Inputs, Protective Concentration Levels, and Final Bioavailability Report for the Former Laredo Air Force Base Shot Gun Range, Laredo (Webb County), Texas; Formerly Used Defense (FUDs) Project No. K06TX0213, TCEQ Facility ID No. T1612
Customer No. CN600918916/Regulated Entity No. RN104642863

Date:
October 11, 2017

Contact:
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Our ref:
04285081.0000.00020

Dear Ms. Wehner:

On behalf of the U.S. Army Corps of Engineers (USACE), Arcadis U.S., Inc. (Arcadis) has revised the Bioavailability Report for the above referenced site in accordance with the Texas Commission on Environmental Quality (TCEQ) comment letter dated June 6, 2017. Based on findings from the bioavailability assessments completed for the Former Laredo and Foster Air Force Base sites, this letter also presents site-specific relative bioavailability factors (RBAFs) and dermal absorption fractions (ABS.d) intended to be used as site-specific dermal and oral inputs for Texas Risk Reduction Program (TRRP) Tier 2 Protective Concentration Levels (PCLs) based on direct contact ($^{Tot}Soil_{Comb}$) for chemicals of concern (COCs) in residential soil. The Tier 2 residential values will be used to screen soil within the forthcoming Remedial Investigation (RI) report.

Proposed Tier 2 PCL Inputs

Proposed Tier 2 $^{Tot}Soil_{Comb}$ PCLs for the polycyclic aromatic hydrocarbon (PAH) COCs in residential soil were calculated using site-specific RBAFs and ABS.ds in accordance with requirements under TRRP (30 TAC §350.74(j)(1). The Tier 2 PCLs also incorporate the U.S. Environmental Protection Agency's (EPA) current toxicity factors for benzo(a)pyrene, including the cancer slope factor, which were updated in January 2017. The toxicity values for the remaining six PAHs are based on the updated carcinogenic toxicity values for benzo(a)pyrene and U.S. EPA's published relative potency factors. The site-specific RBAFs, ABS.ds and

Tier 2 $^{Tot}Soil_{Comb}$ PCLs (rounded to two significant figures) for PAHs in soils characterized at the Former Laredo Air Force Base Shot Gun Range are as follows:

Relative Bioavailability Factors, Dermal Absorption Fractions, and Resulting Tier 2 $^{Tot}Soil_{Comb}$ PCLs for Evaluating Residential Soil at the Former Laredo Air Force Base Shot Gun Range

PAH COC	RBAF (unitless)	ABS.d (unitless)	$^{Tot}Soil_{Comb}$ PCLs (mg/kg)
Benzo(a)pyrene	0.2	0.007	19
Benz(a)anthracene	0.23	0.007	170
Benzo(b)fluoranthene	0.2	0.011	190
Benzo(k)fluoranthene	0.2	0.0035	2,100
Chrysene	0.28	0.0027	15,000
Dibenz(a,h)anthracene	0.2	0.0057	17
Indeno(1,2,3-cd)pyrene	0.2	0.011	200

As shown, RBAFs range from 0.2 to 0.28, ABS.d values range from 0.007 to 0.011, and the resulting Tier 2 $^{Tot}Soil_{Comb}$ Tier 2 PCLs for the seven PAHs in residential soil range from 17 mg/kg to 15,000 mg/kg. The proposed Tier 2 $^{Tot}Soil_{Comb}$ PCL for benzo(a)pyrene is 19 mg/kg based on the carcinogenic endpoint. Also attached to this letter submittal are detailed responses to Laredo-specific comments conveyed to the U.S. Army Corp of Engineers by TCEQ (dated June 6, 2017) on behalf of the U.S. EPA's OSTRI Technical Review Workgroup Bioavailability Committee (TRW BAC), dated May 22, 2017. Additionally, the final report incorporates comments from TCEQ and the TRW BAC received on September 29 and October 4, 2017. In addition, the Tier 2 PCLs and calculator are provided in Tables 1 and 2 (and as a modifiable excel spreadsheet).

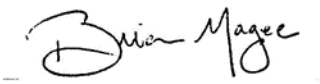
Proposed Path Forward

Following TCEQ approval of the Final Bioavailability Report and the Tier 2 PCL inputs presented in this cover letter, the USACE will finalize the RI report using the Tier 2 PCLs to screen soil samples collected from the Former Laredo Air Force Base site. The RBAFs and ABS.d values used to calculate Tier 2 PCLs will also be used to characterize risks in the quantitative risk assessment that will be presented as a component of the RI report. The RI report is anticipated to be presented to TCEQ in early 2018. The USACE will request TCEQ attendance of the public meeting with the site residents following TCEQ review and comment of the RI report.

On behalf of the USACE, Arcadis requests TCEQ review and approve the specific RBAF and ABS.d values proposed as inputs for site-specific Tier 2 PCLs so the RI report may be completed. If you have any questions regarding this submittal, please feel free contact me at 978-322-4519.

Sincerely,

Arcadis U.S., Inc.



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Enclosures:
1. Final PAH Bioavailability Pilot Study Report for the Former Laredo Air Force Base
2. Detailed Responses to Comments Received from U.S. EPA's OSTRI Technical Review Workgroup Bioavailability Committee (TRW BAC) Concerning the Laredo AFB PAH Bioavailability Study, Dated May 22, 2017
3. Response to Comments Received from TCEQ (September 29 and October 4, 2017) and Observations Received from the TRW BAC (September 29, 2017)

Tables:

Table 1. Tier 2 30 Acre Residential $^{Tot}Soil_{Comb}$ PCLs for PAHs

Table 2. Tier 2 30 Acre Residential $^{Tot}Soil_{Comb}$ PCL Calculation for Benzo(a)pyrene

Attachments:
A. Electronic submittal of Tier 2 PCL calculators and Entire October 11, 2017 Submittal

ENCLOSURE 1

Final PAH Bioavailability Pilot Study Report for the Former Laredo Air Force Base

U.S. Army Corps of Engineers
Fort Worth District

FINAL

PAH Bioavailability Pilot Study Report

Former Laredo Air Force Base Shot Gun Range
Laredo, Texas
Contract No. W912DR-13-D-0019
Task Order No. DY01

October 2017

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Project Toxicologist

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PAH Bioavailability
Pilot Study Report

Former Laredo Air Force Base
Shot Gun Range
Laredo, Texas
Contract No. W912PP-10-D-0022
Task Order No. DY01

Prepared for:
U.S. Army Corps of Engineers –
Fort Worth District

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October 11, 2017

ARCADIS prepared this document at the direction of the U.S. Army Corps of Engineers (USACE) Fort Worth District. This document should be used only with District. This document is based, in part, on information provided in other documents and is subject to the limitations and qualifications presented in the referenced documents.

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B Ricerca Animal Testing Report

C AXYS Diet Analytical Reports

D AXYS Urine Analytical Reports

E RBAF and PCL Calculations

F Revised Technical Memorandum, Details of Regression Analyses to Determine RBAFs for Use at Laredo AFB

Acronyms and Abbreviations

µm	micron
µmol/day	micromoles per day
°C	degrees Celsius
mg	milligram
mg/kg	milligram per kilogram
mg/L	milligram per liter
mL	milliliter
ng/cm^2	nanogram per square centimeter
ng/L	nanogram per liter
pg/cm^2	picogram per square centimeter
ppm	parts per million
$ABS_{.d}$	dermal absorption factor
AFB	Air Force Base
BaP	benzo(a)pyrene
CEC	cation exchange capacity
COC	chemical of concern
ESLR	experimental soil loading rate
FSLR	field soil loading rate
FUE	fractional urinary excretion
GI	gastrointestinal
HPLC	high-performance liquid chromatography
LLOD	lower limit of detection

PAH	polycyclic aromatic hydrocarbon
PCL	Protective Concentration Level
RBAF	Relative Bioavailability Factor
RBEL	Risk-Based Exposure Limit
RI	Remedial Investigation
ROW	right-of-way
RPF	relative potency factor
RSD	relative standard deviation
RSL	Regional Screening Level
SGR	Shot Gun Range
TAC	Texas Administrative Code
TCDD	2,3,7,8-tetrachlorodibenzodioxin
TCEQ	Texas Commission on Environmental Quality
TRRP	Texas Risk Reduction Program
UCL	upper confidence limit
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

1. Introduction

1.1 Purpose

This report documents the results of the Bioavailability Pilot Study for polycyclic aromatic hydrocarbons (PAHs) in clay target fragments from soil at the Former Laredo Air Force Base (AFB) Shot Gun Range (SGR). The data collected as part of this pilot study inform the development of a site-specific relative bioavailability factor (RBAF) for use in calculation of protective concentration levels (PCLs) for PAHs in soil under the Texas Risk Reduction Program (TRRP: 30 TAC §350.74(j)(1)(C)). The PAH Bioavailability Pilot Study was completed under United States Army Corps of Engineers (USACE) Contract Number W912PP-10-D-0022 (Task Order Number DY01) for the SGR Remedial Investigation Planning per the requirements of the contract task order.

The Bioavailability Pilot Study at the Former Laredo AFB is being conducted concurrent with studies at the Former Foster AFB in Victoria, Texas. Because the source of PAHs is the same at these two sites, testing results for both investigations will be compared to support bioavailability conclusions and PCL calculations. A detailed summary of the PAH Bioavailability Study for the Former Foster AFB is provided in this report as part of the development of RBAFs and dermal absorption factors for PAHs in soil at the Former Laredo AFB.

1.2 Background

The Former Laredo Air Force Base SGR (the Site) is located on the northeast side of Laredo, Texas and is bordered by McPherson Road to the west, Hibiscus Lane to the north, East Hillside Road to the south, and Daugherty Avenue to the east. Bioavailability sampling took place in the City of Laredo right-of-way along North Bartlett Avenue, just north of East Hillside Road.

The Site was formerly owned and operated by the United States Air Force as a gunnery training school from 1942 to 1947. Aerial photographs indicate that two of the World War II shot gun ranges along East Hillside Road appear to have been active during the reactivation of Laredo AFB in 1952 and into the early 1960s. The former SGR was redeveloped for residential and commercial land use. The former SGR is situated on a 52.1-acre area, which has a current primary land use as a residential neighborhood.

A focused site inspection was conducted at the Site in 2010 to assess the presence of chemicals of concern (COCs) in soil from prior land use as a gunnery training school and evaluate the potential exposure of residents to those COCs. The conceptual site model defined the exposure medium as the adherable soil fraction (particles 250 microns [µm] or less in diameter). During the focused site inspection, target PAHs were found in the exposure medium at concentrations above their respective risk-based screening levels (i.e., Texas Commission on Environmental Quality [TCEQ] Tier 1 residential $^{Tot}Soil_{Comb}$ PCLs). The target PAHs identified in soil at the Former Laredo AFB include the following seven potentially carcinogenic PAHs:

- Benz(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- Dibenzo(a,h)anthracene
- Indeno(1,2,3-cd)pyrene

Consequently, a potential exposure risk has been identified based on exceedance of residential Tier 1 PCLs and, under the Comprehensive Environmental Response, Compensation, and Liability Act process, the Site is proceeding to the Remedial Investigation (RI) phase.

Historically, the USACE has assumed that PAHs in clay target fragments were not bioavailable based on information published by the Interstate Technology and Regulatory Council (ITRC 2003). Under the TRRP, the TCEQ only allows for bioavailability adjustments using site-specific information rather than information published in literature sources. This pilot study presents results of bioavailability testing on soil samples from the former Laredo AFB that were analyzed to generate site-specific data to be applied to Tier 2 PCL calculations that account for the bioavailability of PAHs in the coal tar pitch/limestone matrix of the clay target fragments. This same investigation approach is currently being performed at the Former Foster AFB site in Victoria, Texas. The PAH bioavailability data developed from the Former Foster AFB are used to support the PCL calculations for the Former Laredo AFB because the source of PAHs (the coal tar/limestone matrix of the clay target fragments) is the same for both sites.

1.3 Report Organization

The PAH pilot study for the Former Laredo AFB was completed in four stages. This report is configured to describe the components of the study as follows:

Section 1 - Introduction

Section 2 - Sample Collection and Test Article Preparation. Bulk soil samples were collected from surface soil at areas exhibiting high densities of clay target fragments within the city rights-of-way (ROWs) at the Site as a source of soil test articles to be used in bioavailability testing. Sieving and mixing procedures were employed to prepare soil test articles from the bulk soil samples. Soil test articles were used to prepare diets with known concentrations of PAHs for oral administration to test animals. Finally, soil test articles were analyzed to confirm highly uniform, reproducible concentrations of PAHs for preparing soil-based diet mixtures that could be used to accurately estimate doses of PAHs delivered to animal dosing groups. Extracts of a subsample of the soil test article were prepared and combined into the soil extract test article, which was analyzed to determine the concentrations of PAHs for preparation of extract-based diets.

Section 3 – *In vivo* Testing. Soil and soil extract test articles were used to develop test diets that can produce reliable estimates of doses to test animals. Diets were prepared with 10 percent comprising the soil test article. Extract-based diets were prepared by matching the dose prepared for the 10 percent soil test article diet. A positive control diet was prepared using reagent-grade benzo(a)pyrene (BaP) at a concentration of 0.6 milligram per kilogram of diet (mg/kg). Fourteen-day animal testing was performed using female B6F3C1 mice at four animals per dose group. Measurements of body weight, feed consumption, urine production, and general animal health were recorded daily. Pooled urine samples from each dose group were collected daily.

Section 4 - Urine Sample Analysis. Analytical methodologies to measure the concentrations of PAH metabolites in urine samples from exposed animals were developed as part of this investigation. Urine samples were analyzed for 3-hydroxy-BaP (3OH-BaP), 9-hydroxy-BaP (9OH-BaP), 3-hydroxy-benz(a)anthracene (3OH-BaA), and 3-hydroxy-chrysene (3OH-Chry).

Section 5 - RBAF and PCL Calculation. The relative concentrations of urinary PAH metabolites between the test group exposed to PAHs in soil-based diets and the test group exposed to PAHs in the extract-based diet were used to calculate the site-

specific RBAF for PAHs. A summary of the PAH Bioavailability Study for the Former Foster AFB is presented to support the development of RBAFs for the Former Laredo AFB site. The site-specific RBAF was then placed in the equation for calculating the residential, direct-contact PCLs ($^{Tot}Soil_{Comb}$) for PAHs under TRRP.

2. Sample Collection and Test Article Preparation

2.1 Soil Sample Collection

Three bulk soil samples were collected from the Site on October 23, 2014 for use in bioavailability testing to establish site-specific RBAFs under TRRP. Samples were collected in 5-gallon buckets from the City of Laredo ROW adjacent to Bartlett Avenue (see Figure 1) from the 0 to 0.5-foot (0 to 6-inch) depth interval. Two of the three soil samples were collected from areas impacted with varying densities of visible target fragments. A single bucket of clean soil was collected from an unimpacted area. The samples were placed in sealable 5-gallon containers, sealed, and labeled for transport to the analytical laboratory.

For this study, sample nomenclature is as follows:

1) Bulk soil sample refers to the 5-gallon field soil sample before sieving, mixing, or analysis.
2) Sieved soil sample refers the soil sample that has been sieved with No. 10 (2mm) mesh, mixed, sieved with No. 60 (250 µm) mesh, and re-mixed.
3) Soil test article refers to a 0.25 mm (250 µm) sieved soil sample that has been tested for PAH concentrations and approved for use in diet preparation.
4) Soil extract test article refers to the methylene chloride extracts of the soil test article that have been combined, tested for PAH concentrations, and approved for diet preparation.

2.2 Soil Sample Sieving and Analysis

The goals of the soil sieving, mixing, and analysis process were to characterize the concentration of PAHs in the surface soil media and prepare an adherable soil fraction (≤250 µm) sample with known, reproducible concentrations of PAHs that will serve as the source for preparing the soil and soil extract test articles for the bioavailability study. Soil subsamples were initially collected from each bucket, sieved with a No. 10 mesh to remove debris, and analyzed for PAHs in December 2014. A summary of the analytical results for these sieved soil samples is presented below.

Table 1 – Screening Level PAH Concentrations in Sieved Soil Samples (No. 10 Mesh - ≤2.0 millimeters) from Bulk Soil Samples (mg/kg)

COC	Bucket 1	Bucket 2	Bucket 3 (clean)
Benz(a)anthracene	0.77	1.5	<0.1
Benzo(a)pyrene	1.1	2.1	<0.15
Benzo(b)fluoranthene	1.2	2.5	<0.12
Benzo(k)fluoranthene	0.66	1.2	<0.15
Chrysene	0.99	2.0	<0.17
Dibenz(a,h)anthracene	<0.15	0.33	<0.15
Indeno(1,2,3-cd)pyrene	0.83	1.5	<0.14

The associated laboratory report is presented in Appendix A. The results for initial screening of PAH concentrations indicated that PAH concentrations were highest in the sieved soil sample in Bucket 2. and the “clean” soil bulk sample exhibited non-detectable concentrations of PAHs. Consequently, Bucket 2 was selected to prepare soil test articles.

The sieved soil sample from Bucket 2 was allowed to air-dry for 12 days until clays were determined to be dry enough for passing through a No. 60 mesh sieve (≤250 µm). The sieved soil sample was coned, quartered, and mixed as is typical for the “cone and quarter” mixing technique. The mixed sample was then sieved to 250 µm, then re-mixed to create the soil test article. Three soil subsamples were collected from the sieved soil article and analyzed for PAHs. The analysis of the triplicate subsamples yielded a relative standard deviation (RSD) greater than 20 percent. The sieved soil sample was re-mixed by tumbling for 2 hours, then three new subsamples were collected randomly from the sieved soil sample. PAH concentrations were re-analyzed in January 2015, confirming that the sieved sample could be used as the soil test article as summarized below. The re-analysis also demonstrates that the test articles were homogenous.

The laboratory report for the soil test article is presented in Appendix A. With RSDs at or below 20 percent for each of the seven carcinogenic PAHs, the soil test article was approved for use in diet preparation for the *in vivo* testing.

Table 2 – Analytical Results for Triplicate Soil Test Article (mg/kg)

COC	1st Replicate	2nd Replicate	3rd Replicate	Average	St. Dev.	RSD
Benz(a)anthracene	1.2	1.1	1.2	1.17	0.047	4%
Benzo(a)pyrene	1.6	1.2	1.5	1.43	0.17	12%
Benzo(b)fluoranthene	2.0	1.7	2.0	1.9	0.141	7%
Benzo(k)fluoranthene	1.2	0.83	1.0	1.01	0.151	15%
Chrysene	1.7	1.5	1.7	1.63	0.094	6%
Dibenz(a,h)anthracene	0.52	0.35	0.34	0.4	0.083	20%
Indeno(1,2,3-cd)pyrene	1.0	0.76	0.97	0.94	0.107	12%

2.3 Test Article Extract Preparation

The soil test article was divided into two subsamples. One was maintained as a soil test article to be delivered to Ricerca Bioscience, LLC (Ricerca) for preparation of the soil test article-based diet. The second subsample was bulk Soxhlet extracted with methylene chloride using the standard United States Environmental Protection Agency method SW3541. Eleven extracts were prepared from 11 30-gram aliquots of soil test article. Each extract was concentrated to a final volume of 10 milliliter (mL). As a result, 330 grams of soil were extracted in 110 mL methylene chloride. The extracts were combined, analyzed for PAHs, and served as the soil extract test articles for dosing extract-based feed. The analytical results for the extracts are presented below in milligrams per liter (mg/L):

Table 3 – Analytical Results for Triplicate Extract Test Article (mg/L)

COC	1st Replicate	2nd Replicate	3rd Replicate	Average	St. Dev.	RSD
Benz(a)anthracene	3.7	4.2	3.9	3.9	0.205	5%
Benzo(a)pyrene	4.2	4.8	4.4	4.5	0.249	6%
Benzo(b)fluoranthene	5.4	5.9	5.7	5.7	0.205	4%
Benzo(k)fluoranthene	2.4	3.2	3.2	2.9	0.377	13%
Chrysene	4.9	5.4	5.0	5.1	0.216	4%
Dibenz(a,h)anthracene	0.6	1.1	0.6	0.8	0.236	31%
Indeno(1,2,3-cd)pyrene	3.4	4.1	3.8	3.8	0.287	8%

Analytical results for extract triplicate analyses indicated that six of seven COCs exhibited RSDs below 20%. Only dibenz(a,h)anthracene exhibited an RSD of 31 percent. Concentrations of dibenzo(a,h)anthracene were generally below the method reporting limits and did not represent a risk driver for exposure to PAHs in clay target fragments. As a result, extracts were accepted for preparation of test diets. A summary of the extraction efficiency is presented below.

Table 4 – Summary of Extraction Efficiencies for PAHs from Soil Test Article

COC	Conc. PAHs in Soil Test Article (mg/kg)	Mass PAHs in 330 grams of Soil Test Article (mg)	Conc. PAHs in Extract Test Article (mg/L)	Mass PAHs in 110 milliliters of Extract Test Article (mg)	Ratio Extract Mass/ Soil Mass (Unitless)
Benz(a)anthracene	1.17	0.39	3.9	0.43	1.12
Benzo(a)pyrene	1.43	0.47	4.5	0.49	1.04
Benzo(b)fluoranthene	1.9	0.63	5.7	0.62	0.99
Benzo(k)fluoranthene	1.01	0.33	2.9	0.32	0.97
Chrysene	1.63	0.54	5.1	0.56	1.04
Dibenz(a,h)anthracene	0.4	0.13	0.8	0.08	0.63
Indeno(1,2,3-cd)pyrene	0.94	0.30	3.8	0.41	1.38

The ratio of total mass of each PAH in the soil extract test article to the total mass of PAHs in soil was typically around 1, indicating a high level of recovery of PAHs in the extract compared to the original mass of PAHs present in the soil test article. The ratio for dibenz(a,h)anthracene was slightly low at 63 percent, and slightly high for indeno(1,2,3-cd)pyrene at 138 percent. In general, the extracts are highly representative of the soil test articles. Soil and extract test articles were sent to Ricerca for diet preparation and *in vivo* testing.

3. *In Vivo* Testing

This section describes the preparation of test diets, the *in vivo* bioavailability study for PAHs for the soil and soil extract test articles from the Pilot Study sample collection, and the preparation tasks. Ricerca prepared the diet and performed the *in vivo* testing. As described in the Investigation Plan (Malcolm Pirnie 2014), *in vivo* testing was performed using B6F3C1 mice with four mice per test group. Mice were housed in metabolism cages to allow for collection of 24-hour pooled urine samples, separating food and fecal matter from urine collection vessels to minimize the potential for cross-contamination of PAH metabolites from fecal matter with urine. Appendix B provides the Pilot Study Report prepared by Ricerca summarizing the *in vivo* portion of the study.

3.1 Dose Medium Preparation

The dietary matrix for the bioavailability study used soil and soil extract test articles (sieved, adherable soil sample and extract) mixed into NIH 31 meal rodent diet. The Investigation Plan (Malcolm Pirnie 2014) recommended the use of NIH 31 meal because this diet was used by Beland and Culp (1998). Ricerca prepared four diets for testing:

Diet #1 – Negative Control Diet – based on 10 percent of the diet by mass made up of “clean” soil sieved and prepared in the same manner as the soil test article. The analytical results for PAHs of the clean soil sample were non-detect at sample detection limits ranging from 0.1 mg/kg for benz(a)anthracene to 0.17 mg/kg for chrysene.

Diet #2 – BaP Positive Control Diet – based on spiking diet with 0.67 mg/kg reagent-grade BaP in 107 mL methylene chloride, mixed, and solvent blown down with nitrogen.

Diet #3 – Soil Test Article Diet – based on 10 percent of diet by mass made up of soil test article assuming 1.5 mg/kg BaP in soil test article for a final concentration of 0.15 mg/kg BaP in diet.

Diet #4 – Soil Extract Test Article Diet – based on addition of extract test article to match the 0.15 mg/kg BaP concentration prepared for Diet #3.

Three subsamples of each diet mixture were collected from the top, middle, and bottom of the diet-specific storage bins. The diet samples in triplicate were shipped to AXYS Analytical for analysis of the concentrations of PAHs in each diet mixture. Laboratory reports for diet analyses are presented in Appendix C. A summary of the analytical results for the diet samples is presented below.

Table 5 – Analytical Results for Triplicate Diet Samples (mg/kg)

COC	1st Replicate	2nd Replicate	3rd Replicate	Average	St. Dev.	RSD
Diet #1 – Negative Control						
Benz(a)anthracene	0.0045	0.0062	0.0033	0.0047	0.0012	26%
Benzo(a)pyrene	0.0064	0.0086	0.0031	0.006	0.0022	37%
Benzo(b)fluoranthene	0.0065	0.0104	0.00321	0.0067	0.00294	44%
Benzo(k)fluoranthene	0.00517	0.00731	0.00221	0.0049	0.0021	43%
Chrysene	0.0062	0.0079	0.0039	0.006	0.0016	27%
Dibenz(a,h)anthracene	0.00143	0.00172	0.00053	0.00123	0.0005	41%
Indeno(1,2,3-cd)pyrene	0.00735	0.00854	0.00357	0.00649	0.0021	33%
Diet #2 – BaP Positive Control						
Benzo(a)pyrene	0.637	0.648	0.648	0.644	0.0052	1%
Diet #3 – Soil Test Article						
Benz(a)anthracene	0.123	0.196	0.174	0.164	0.031	19%
Benzo(a)pyrene	0.135	0.156	0.196	0.162	0.025	16%
Benzo(b)fluoranthene	0.169	0.186	0.231	0.195	0.026	13%
Benzo(k)fluoranthene	0.13	0.158	0.176	0.155	0.019	12%
Chrysene	0.155	0.163	0.216	0.178	0.048	15%
Dibenz(a,h)anthracene	0.0244	0.0253	0.0331	0.0276	0.0036	14%
Indeno(1,2,3-cd)pyrene	0.124	0.135	0.165	0.141	0.017	12%
Diet #4 – Soil Extract Test Article						
Benz(a)anthracene	0.124	0.129	0.127	0.127	0.0021	2%
Benzo(a)pyrene	0.156	0.155	0.155	0.155	0.0005	0%
Benzo(b)fluoranthene	0.171	0.187	0.177	0.178	0.0066	3%
Benzo(k)fluoranthene	0.148	0.153	0.146	0.149	0.0029	2%
Chrysene	0.156	0.168	0.162	0.162	0.0049	3%
Dibenz(a,h)anthracene	0.0263	0.0272	0.0258	0.0264	0.00058	2%
Indeno(1,2,3-cd)pyrene	0.125	0.132	0.128	0.128	0.0028	2%

The diet analyses indicate that the negative control diets exhibit RSDs greater than the 20 percent threshold. These samples exhibit PAH concentrations between 3 and 10 micrograms per kilogram, equating to approximately 0.1 mg/kg for total PAHs in soil. These levels are at background levels and will not be detectable as metabolites in urine. The exceedances of the threshold RSD for the clean negative control, therefore, will not affect interpretation of bioavailability testing results.

All other diets exhibited RSDs below the threshold 20 percent, with RSDs for the soil test article diet samples ranging from 12 to 19 percent and the extract test article diet samples ranging from 0 to 4 percent. Samples of the extract diet and BaP positive control diet exhibited the lowest RSDs, indicating very high certainty defining dose in these samples. The RSDs for the soil test article diet samples indicated a higher potential for variability in the doses administered to test animals.

3.2 *In Vivo* Testing

The Pilot Study required four dose groups based on the four diet preparations presented above. Each dose group was housed in one metabolism cage with four mice per cage for a total number of 16 mice included in the Pilot Study. Ricerca acclimated mice to experimental conditions 42 days prior to administering test diets. Mice were monitored daily for body weight, weight gain (loss), food consumption (grams of diet), urine production (mL urine per cage), and general health. Tabulated data are presented in the Ricerca Pilot Study Report in Appendix B. Animals were transferred to test diets on day 0, and urine was first collected on day 1. Mice were exposed to test diets for a total of 14 days.

On each day, 24-hour pooled urine samples were collected from each test group cage. Urine samples were frozen at -20 degrees Celsius (°C) until being shipped to AXYS Analytical following completion of the 14-day dosing period. Clinical inspection of mice indicated that exposure to PAHs in test diets did not result in observable adverse effects to overall animal health. Mice were euthanized following completion of the study. All urine samples were delivered to AXYS Analytical, where samples were stored at -20°C until analysis.

4. Urine Analyses

The final selection of target PAHs was largely determined by the availability of standards for the analysis of PAH metabolites in urine. Based on the results of the pilot test for the Former Foster AFB, target PAHs for the Laredo AFB Pilot Study include BaP, benz(a)anthracene, and chrysene. This selection is based on a scientific literature review that indicated the following PAHs and PAH metabolites have been analyzed in urine by one or more researchers: 1-OH-pyrene; 1-, 2-, 3-, 4-, and 9-OH-phenanthrene; 2-, 3- and 9-OH-fluorene; 1-, 2-, and 3-OH-benzo(c)phenanthrene; 3-OH-fluoranthene; 1-, 3- and 9-OH-benz(a)anthracene; 1-, 2-, 3-, 4-, and 6-OH-chrysene; 3- and 9-OH-BaP; and parent PAHs. Availability of laboratory standards make 3- and 9-OH-BaP, 3OH-Chry, and 3OH-BaA the principal metabolites of interest.

Based on the precedents set by previous studies of PAH bioavailability, and the ease with which mouse urine can be collected and pooled from multiple animals, urinary metabolites were selected as the dosimetric. Analytical method development for measuring the concentrations of PAH metabolites in urine was optimized by the addition of an antioxidant to the urine sample prior to extraction. Urinary metabolites for PAHs typically represent less than 1 percent of the administered dose. As a result, the units for measuring PAH metabolites are expressed in nanograms per liter (ng/L). The presence of the antioxidant prevented the loss of PAH metabolites, principally 3OH-BaP. The results of PAH metabolite analyses of urine samples are presented in Appendix D.

The method development for analysis of PAH metabolites in urine targeted a detection limit of 25 ng/L. Matrix interferences in mouse urine have increased reporting limits by approximately one order of magnitude. The increased reporting limits, specifically for 3OH-BaA and 3OH-Chry, indicate that concentrations of individual PAHs must be above 2 mg/kg in soil to provide sufficient parent compound to detect metabolites in urine. The analysis of BaP is slightly more sensitive, with consistent detections of metabolites in the urine for soil samples with a BaP concentration of approximately 1.5 mg/kg.

Table 6 – PAH Metabolites in Urine Samples (ng/L)

COC	Diet #1 Negative Control	Diet #2 BaP Positive Control	Diet #3 Soil Test Article	Diet #4 Extract Test Article
Day 7 Urine Samples				
3OH-Benzo(a)pyrene	< 68	7,440	453	954
9OH-Benzo(a)pyrene	649	3,260	545	715
3OH-Benz(a)anthracene	< 777	< 801	< 745	< 257
3OH-Chrysene	< 900	< 936	< 894	767
Day 14 Urine Samples				
3OH-Benzo(a)pyrene	< 40	4,190	183	1,030
9OH-Benzo(a)pyrene	169	1,650	140	786
3OH-Benz(a)anthracene	< 858	< 260	< 348	< 750
3OH-Chrysene	< 1,120	< 335	< 429	< 877

As previously stated, the pilot study for evaluating bioavailability of PAHs in soil from the Former Laredo AFB is being conducted concurrent with investigations at the Former Foster AFB skeet range site. Data from the pilot and main PAH bioavailability studies at the Former Foster AFB site and this pilot study all indicate that the percent of the original dose represented by the 3-hydroxy metabolite for benz(a)anthracene is consistently an order of magnitude below those reported for the metabolites for BaP. Benz(a)anthracene, therefore, is a relatively poor compound for evaluating bioavailability by the 3-hydroxy metabolite.

The urinary results for PAH metabolites indicate that detectable levels of metabolites are present for BaP at both the 7-day and 14-day time points and for chrysene at the 7-day time point. These data are used to develop site-specific RBAFs.

5. RBAF and PCL Calculations

The data analysis for the pilot study includes calculation of RBAFs. To calculate the RBAFs, the ratio between doses of parent PAHs ingested by mice was compared to corresponding masses of PAH metabolites in urine for PAHs dosed in the soil matrix. This same comparison was made for the doses and masses in the extract (solvent) matrix. The RBAF is a ratio of these two values. Once calculated, the PAH-specific RBAFs are used to calculate site-specific PCLs. Each of these calculations is summarized below.

5.1 RBAF Calculations

RBAFs were developed for target metabolites analyzed in urine. RBAFs are calculated for BaP based on both 3OH-BaP and 9OH-BaP metabolites for both the 7-day and 14-day sample sets. An RBAF was also calculated for chrysene for the 7-day sample set. No RBAF could be calculated for benz(a)anthracene from the Laredo pilot study data due to low concentrations associated with this metabolite. These RBAFs will be applied to remaining target PAHs as surrogates based on similar chemical and physical parameters.

For each diet test group, the average dose of BaP was calculated from the concentration of BaP in the diet and the amount of diet consumed. The average daily dose was converted in terms of micromoles per day (µmol/day) based on the chemical-specific molecular weight. Fractional urinary excretion (FUE) was calculated as:

$$FUE = \frac{\text{(Mass of BaP metabolites in the 24-hr pooled urine sample at day X)}}{\text{(Mass of BaP consumed 24 hours prior to urine collection on day X)}}$$

The FUE was calculated for the animals dosed with the soil test article diet (Diet #3) and for those dosed with extract test article diet (Diet #4). These were designated FUE_{soil} and $FUE_{extract}$.

Relative Bioavailability Factor (RBAF) was defined as the ratio of the two FUE metrics.

$$RBAF = (FUE_{soil}) / (FUE_{extract})$$

The RBAF calculations are summarized in Table 7.

Table 7 – RBAF Calculation Summary Using Laredo Pilot Study Data

COC	Dose (µmol/day)		Urine (µmol/day)		FUE_{Soil}	$FUE_{extract}$	RBAF
	Soil	Extract	Soil	Extract			
Day 7 Urine Samples							
3OH-BaP	0.01	0.0094	0.000018	0.000065	0.184	0.688	0.27
9OH-BaP	0.01	0.0094	0.000022	0.000049	0.222	0.516	0.43
3OH-Chry	0.012	0.0109	0.000038	0.000057	0.312	0.526	0.59
Day 14 Urine Samples							
3OH-BaP	0.0094	0.0086	0.000012	0.000055	0.125	0.637	0.20
9OH-BaP	0.0094	0.0086	0.000009	0.000042	0.096	0.486	0.20

As previously stated, the pilot study for PAHs in soil at the Former Laredo AFB SGR was performed concurrent with the PAH Bioavailability Study for the former Foster AFB. The Foster AFB dataset is much more robust because four soil samples were tested with two sets of four animals per cage. Accordingly, the RBAFs from the Foster study are proposed for use to derive the Laredo PCLs. In addition, Appendix F provides a state-of-the-science regression analysis of the BaP data from both sites to show that the BaP RBAF from the Foster study is a conservative estimate, and that Laredo RBAFs are reliably predicted by the Foster oral bioavailability data set.

5.2 Former Foster AFB Bioavailability Study

The methodology for evaluating relative bioavailability of PAHs in soil was developed and piloted at the Former Foster AFB Skeet Range site. Once pilot tested, a site-specific pilot study was developed for the Laredo AFB SGR as presented in this report. This section summarizes the components of the Foster AFB bioavailability study including sample collection, test article and diet preparation, animal care, dosing and urine collection, urine analysis, RBAF calculations, and *in vitro* dermal testing. The section concludes with an evaluation of surrogate RBAFs for untested PAHs and a discussion of the comparability of results for the Foster AFB site to conditions at the Laredo AFB Site.

5.2.1 Sample Collection, Test Article Preparation, Diet Formulation, and Analysis

Ten bulk soil samples were collected from the Foster AFB Site on November 24, 2014 for use in bioavailability testing to establish site-specific RBAFs and dermal absorption factors under TRRP. Bulk soil samples were collected in 5-gallon buckets and consisted of two samples each from five locations (GS-1 through GS-5). The samples

were collected from the 0 to 0.5-foot (0 to 6-inch) depth interval. Sample locations were selected to provide a range of potential PAH concentrations from approximately 0.1 part per million (ppm) for individual PAHs to greater than 100 ppm. The samples were projected to provide a range of several orders-of-magnitude to evaluate the relationship between FUE and dose from soils affected to varying degrees by a common PAH source (i.e., skeet target fragments). The samples were placed in sealable 5-gallon containers, sealed, and labeled for transport to the analytical laboratory.

Bulk soil samples were air-dried for 3 weeks prior to sieving. Soil samples were first sieved using a No. 10 mesh (2 mm) screen, then mixed and sieved with No. 60 mesh (0.25 mm) screen. Sieved soil samples were analyzed during the last week of January and first week of February 2015. The triplicate subsamples from sieved samples GS-1, GS-3, and GS-4 achieved the project-specific 20% RSD goal. Multiple consecutive sieving events were required to reduce the variability of sieved soil samples GS-2 and GS-5. The triplicate subsamples from sieved soil samples GS-2 exhibited the highest concentrations of PAHs (generally greater than 100 ppm for individual compounds), while GS-5 triplicate subsamples exhibited the lowest concentrations of PAHs (generally below 0.1 ppm). Analysis of triplicate samples did not achieve the targeted 20% RSD for GS-2.

The soil test articles were each divided into two aliquots. One was maintained as the soil test article, and the second was bulk Soxhlet extracted with methylene chloride. Analytical results for extract triplicate analyses indicated that extracts for GS-1, GS-2, and GS-4 exhibited all six PAHs with RSDs below the 20% goal. Extracts for GS-3 and GS-5 each exhibited six of seven PAHs with RSDs below 20%. Soil and extract test articles were sent to Ricerca Biosciences for diet preparation and *in vivo* testing.

The dietary matrix for the bioavailability study used soil and extract test articles (sieved, adherable soil sample and extract) mixed into NIH 31 meal rodent diet based on the diet used by Beland and Culp (1998). Ricerca prepared 12 diets with soil diets targeted at 5% by mass of diet and extract diets targeted by duplicating corresponding concentrations in soil diets:

Diet #1 – Clean Soil (5% by mass)
Diet #2 – Reagent-grade BaP Spike
Diet #3 – GS-1 Soil (5% by mass)
Diet #4 – GS-2 Soil (5% by mass)
Diet #5 – GS-3 Soil (5% by mass)
Diet #6 – GS-4 Soil (5% by mass)
Diet #7 – GS-5 Soil (5% by mass)
Diet #8 – GS-1 Extract (BaP – 0.225 ppm)
Diet #9 – GS-2 Extract (BaP – 9.2 ppm)
Diet #10- GS-3 Extract (BaP – 1.5 ppm)
Diet #11- GS-4 Extract (BaP – 0.03 ppm)
Diet #12- GS-5 Extract (BaP – 0.006 ppm)

Soil test articles GS-4 and GS-5 exhibited concentrations of PAH metabolites in urine samples associated with soil diets generally below reporting limits. Thus, the evaluation of relative bioavailability of PAHs in soil is limited to soil samples GS-1, GS-2, and GS-3. Table 8 provides a summary of the analytical results for diets associated with soil and extract test articles from these soil samples. Analytical results of triplicate diet samples demonstrate highly reproducible concentrations of PAHs, providing a high level of confidence in dosing to test animals in the *in vivo* portion of the study.

Table 8 – Analytical Results for Target PAHs in Triplicate Diet Samples from the Former Foster AFB Bioavailability Study (mg/kg)

COC	1st Replicate	2nd Replicate	3rd Replicate	Average	St. Dev.	RSD
Diet #2 – BaP Positive Control						
Benzo(a)pyrene	21	22	22	22	0.351	1.6%
Diet #3 – GS-1 Soil Test Article						
Benz(a)anthracene	0.328	0.254	0.321	0.301	0.041	14%
Benzo(a)pyrene	0.424	0.328	0.418	0.390	0.054	14%
Benzo(b)fluoranthene	0.388	0.310	0.401	0.366	0.049	13%
Benzo(k)fluoranthene	0.349	0.271	0.358	0.326	0.048	15%
Chrysene	0.365	0.286	0.358	0.336	0.044	13%
Dibenz(a,h)anthracene	0.074	0.062	0.073	0.069	0.007	10%
Indeno(1,2,3-cd)pyrene	0.350	0.274	0.344	0.323	0.042	13%
Diet #4 – GS-2 Soil Test Article						
Benz(a)anthracene	17	17	17	17	0.265	1.6%
Benzo(a)pyrene	20	19	19	19	0.586	3.1%
Benzo(b)fluoranthene	20	20	19	19	0.656	3.4%
Benzo(k)fluoranthene	18	17	17	18	0.462	2.6%
Chrysene	19	19	18	19	0.557	3.0%
Dibenz(a,h)anthracene	3.9	3.3	3.2	3.5	0.404	12%
Indeno(1,2,3-cd)pyrene	16	16	16	16	0.404	2.5%
Diet #5 – GS-3 Soil Test Article						
Benz(a)anthracene	1.9	2.3	1.9	2.0	0.232	11%
Benzo(a)pyrene	2.4	2.9	2.3	2.5	0.276	11%
Benzo(b)fluoranthene	2.4	2.8	2.3	2.5	0.284	11%
Benzo(k)fluoranthene	2.1	2.3	1.9	2.1	0.185	8.8%
Chrysene	2.2	2.6	2.2	2.3	0.272	12%
Dibenz(a,h)anthracene	0.43	0.49	0.41	0.44	0.046	10%
Indeno(1,2,3-cd)pyrene	1.9	2.2	1.8	1.9	0.212	11%

COC	1st Replicate	2nd Replicate	3rd Replicate	Average	St. Dev.	RSD
Diet #8 GS-1 Extract						
Benz(a)anthracene	0.254	0.241	0.239	0.245	0.008	3.3%
Benzo(a)pyrene	0.329	0.310	0.311	0.317	0.011	3.4%
Benzo(b)fluoranthene	0.297	0.287	0.277	0.287	0.010	3.5%
Benzo(k)fluoranthene	0.287	0.271	0.281	0.280	0.008	2.9%
Chrysene	0.280	0.268	0.269	0.272	0.007	2.4%
Dibenz(a,h)anthracene	0.061	0.058	0.059	0.059	0.002	2.9%
Indeno(1,2,3-cd)pyrene	0.274	0.257	0.260	0.264	0.009	3.4%
Diet #9 GS-2 Extract						
Benz(a)anthracene	9.8	9.8	9.6	9.7	0.101	1.0%
Benzo(a)pyrene	11	10	10	10	0.522	5.0%
Benzo(b)fluoranthene	11	10	11	11	0.551	5.1%
Benzo(k)fluoranthene	10	10	9.7	9.9	0.230	2.3%
Chrysene	11	11	10	11	0.252	2.4%
Dibenz(a,h)anthracene	2.0	1.9	1.9	1.9	0.080	4.1%
Indeno(1,2,3-cd)pyrene	9.3	8.6	8.6	8.8	0.381	4.3%
Diet #10 GS-3 Extract						
Benz(a)anthracene	1.8	1.8	1.9	1.8	0.035	1.9%
Benzo(a)pyrene	2.2	2.2	2.3	2.3	0.036	1.6%
Benzo(b)fluoranthene	2.2	2.2	2.3	2.2	0.058	2.6%
Benzo(k)fluoranthene	2.0	1.9	2.0	1.9	0.032	1.7%
Chrysene	2.1	2.0	2.1	2.1	0.046	2.2%
Dibenz(a,h)anthracene	0.39	0.39	0.40	0.39	0.009	2.4%
Indeno(1,2,3-cd)pyrene	1.7	1.7	1.7	1.7	0.026	1.6%

5.2.2 *In Vivo* Oral Bioavailability Testing, Urine Sample Analysis, and RBAF Calculation

The Former Foster AFB Bioavailability Study required 12 dose groups based on the 12 diet preparations presented above. Each dose group included two metabolism cages with four mice per cage for a total number of 96 animals. Mice were monitored daily for body weight, weight gain (loss), food consumption (grams of diet), urine production (mL urine per cage), and general health. Mice were exposed to test diets for a total of 14 days. In-life monitoring data for test animals are summarized in Table 9.

Table 9 – Main Study In-life Monitoring Average Body Weight, Food Consumption, and Urine Production for Test Animals on Days 7 and 14 from the Former Foster AFB Bioavailability Study

	Diet #1 Control	Diet #3 GS-1 Soil	Diet #4 GS-2 Soil	Diet #5 GS-3 Soil	Diet #6 GS-4 Soil	Diet #7 GS-5 Soil
Day 7						
Body Weight (g)	23.5	22.95	23.15	23.28	23.11	23.08
Food Intake* (g/day)	3.5 / 3.5	3.2 / 3.9	3.4 / 3.4	3.4 / 3.6	3.5 / 3.8	3.6 / 3.6
Urine Prod.** (mL/day)	20 / 4.6	3.4 / 4.0	4.8 / 5.5	3.5 / 9.6	5.1 / 4.0	5.1 / 5.2
Day 14						
Body Weight (g)	24.63	24.23	24.04	24.00	23.81	24.08
Food Intake* (g/day)	3.4 / 3.6	3.5 / 3.6	3.5 / 4.0	3.3 / 3.3	3.2 / 3.6	3.3 / 3.6
Urine Prod.** (mL/day)	7.3 / 4.5	5.8 / 6.5	3.9 / 8.0	4.3 / 4.6	5.5 / 7.0	5.4 / 3.8
	Diet #8 GS-1 Extract	**Diet #9 GS-2 Extract**	**Diet #10 GS-3 Extract**	**Diet #11 GS-4 Extract**	**Diet #12 GS-5 Extract**	**Diet #2 BaP-Spike 25 ppm**
Day 7						
Body Weight (g)	23.30	23.18	23.05	23.68	23.84	23.19
Food Intake* (g/day)	3.3 / 3.2	3.4 / 3.2	3.5 / 3.1	2.8 / 3.6	3.5 / 3.6	3.7 / 3.2
Urine Prod.** (mL/day)	5.7 / 5.9	4.0 / 5.0	5.4 / 3.6	4.5 / 5.0	6.0 / 5.0	5.0 / 5.5
Day 14						
Body Weight (g)	24.53	23.98	23.95	24.44	24.58	24.35
Food Intake* (g/day)	3.3 / 3.4	3.1 / 2.9	3.3 / 3.2	3.2 / 3.1	3.5 / 3.3	3.3 / 3.3
Urine Prod.** (mL/day)	7.0 / 7.7	4.5 / 4.5	6.0 / 5.3	3.8 / 3.8	4.8 / 4.8	1.8 / 4.5

* Food intake rate based on the Averages for Days 6/7/8 and Days 13/14/15
Food Intake Cage 1 / Food Intake Cage 2
** Urine production based on pooled urine for four mice in Cage 1 / Cage 2

Body weight and food consumption data demonstrated that all dosing groups maintained weight gain and diet consumption similar to controls, indicating that the 5 percent diet composition achieved the goal of avoiding animal health concerns that might impact data interpretation. Urine data show a high degree of variability, ranging from 1.8 mL to 20 mL per cage with most production between 4 and 6 mL per day. On each day, 24-hour pooled urine samples were collected from each test group cage. Urine samples were frozen at -20 °C until being shipped to AXYS Analytical following completion of the 14-day dosing period. Clinical inspection of mice indicated that exposure to PAHs in test diets did not result in observable adverse effects to overall animal health.

The final selection of target PAHs was largely determined by the availability of standards for the analysis of PAH metabolites in urine. Based on the results of the analytical method developed in the Pilot Study, target PAHs included BaP, benz(a)anthracene, and chrysene. Availability of laboratory standards and analytical performance data identified 3OH-BaP, 9-OH-BaP, 3OH-Chry, and 3OH-BaA as the metabolites in mouse urine used to evaluate the relative bioavailability of PAHs. Based on the precedents set by previous studies of PAH bioavailability, and the ease with which mouse urine can be collected and pooled from multiple animals, urinary metabolites were selected as the dose metric. The presence of the antioxidant prevented

the oxidative loss of PAH metabolites, principally 3OH-BaP. The results of PAH metabolite analyses in urine samples are summarized in Table 10 with data for two cages represented by Cage 1/Cage 2.

Table 10 – PAH Metabolites in Urine Samples (µg/L) from the Former Foster AFB Bioavailability Study

COC	Diet #1 Negative Control	Diet #2 BaP Control	Diet #3 GS-1 Soil	Diet #4 GS-2 Soil	Diet #5 GS-3 Soil	Diet #6 GS-4 Soil
Day 7 Urine Samples						
3OH-Benzo(a)pyrene	0.032U/0.046U	**349 / 335**	**1.62 / 1.61**	**53.5 / 47.5**	**8.69 / 6.14**	**0.451 / 0.558**
9OH-Benzo(a)pyrene	**0.11 / 0.213**	**137 / 176**	**0.973 / 0.9**	**32 / 26.7**	**4.24 / 2.63**	**0.302 / 0.25**
3OH-Benz(a)anthracene	0.32U / 1.25U	NA	1.1U/1.6U	**2.18 / 2.79**	1.2U / 0.88U	1.08U / 0.7U
3OH-Chrysene	0.41U / 1.67U	NA	1.6U/ 2.07U	**42.5 / 42.4**	**8.13 / 5.42**	1.35U / 0.9U
Day 14 Urine Samples						
3OH-Benzo(a)pyrene	0.073U/0.32U	**1,080 / 596**	**1.82 / 2.43**	**129 / 88.1**	**16.6 / 13.3**	**0.393 / 0.382**
9OH-Benzo(a)pyrene	**0.457**/ 0.087U	**261 / 96.8**	**0.219 / 1.11**	**69.9 / 11.5**	**4.21 / 3.87**	0.07U / **0.061**
3OH-Benz(a)anthracene	0.93U / 2.17U	NA	0.55U/0.71U	**3.78 / 2.25**	1.2U / 1.22U	0.98U / 1.68U
3OH-Chrysene	1.21U /3.19U	NA	**0.85 / 0.84**	**50.8 / 30.1**	**11 / 8.19**	1.3U / 2.14U
COC	**Diet #7 GS-5 Soil**	**Diet #8 GS-1 Extract**	**Diet #9 GS-2 Extract**	**Diet #10 GS-3 Extract**	**Diet #11 GS-4 Extract**	**Diet #12 GS-5 Extract**
Day 7 Urine Samples						
3OH-Benzo(a)pyrene	0.34U / **0.146**	**4.38 / 4.92**	**488 / 413**	**39.7 / 53.1**	**0.966 / 0.893**	**0.202 / 0.2**
9OH-Benzo(a)pyrene	0.088U / **0.623**	**2.61 / 2.06**	**161 / 127**	**14.1 / 18.1**	**0.791 / 0.699**	**0.703 / 0.981**
3OH-Benz(a)anthracene	0.84U /1.6U	1.72U / 2.26U	**12.4 / 9.17**	**1.33 / 2.07**	1.52U/ 1.55U	1.99U / 2.4U
3OH-Chrysene	1.18U /3.23U	**2.82** / 2.86U	**81.9 / 69**	**23 / 29.4**	2.61U/ 2.21U	3.17U / 4.31U
Day 14 Urine Samples						
3OH-Benzo(a)pyrene	0.21U / 0.18U	**5.23 / 3.75**	**535 / 548**	**20.4 / 58.1**	**0.993 / 0.846**	0.16U / **0.154**
9OH-Benzo(a)pyrene	**0.085 / 0.073**	**2.29 / 1.75**	**226 / 107**	**6.7 / 20.5**	**0.928 / 0.262**	**0.654 / 0.411**
3OH-Benz(a)anthracene	1.0U /0.304U	0.88U / 0.44U	**9.76 / 10.1**	0.96U /2.1U	0.49U/ 1.55U	1.19U / 1.12U
3OH-Chrysene	1.3U /0.388U	**2.51 / 1.68**	**94.5 / 99.4**	**10.1 / 28.8**	0.62U/ 2.32U	1.87U / 1.65U

Bold values represent detected concentrations.

As previously stated, the Pilot Study for evaluating bioavailability of PAHs in soil from the Former Laredo AFB was conducted concurrent with investigations at the Former Foster AFB Skeet Range site. Data from these studies demonstrate that the 3-hydroxy metabolite for benz(a)anthracene is consistently an order of magnitude below those reported for the hydroxy metabolites of BaP. Benz(a)anthracene, therefore, is a poor compound for evaluating bioavailability by analysis of the 3-hydroxy metabolite. The urinary results for PAH

metabolites indicate that detectable levels of metabolites are present for chrysene at the 7-day and 14-day time points in GS-1, GS-2, and GS-3 Foster AFB soils. These data are used to develop site-specific RBAFs.

The RBAF calculations associated with soils from the Former Foster AFB are summarized in Table 11. RBAFs are presented for soil/extract test groups for GS-1, GS-2, and G-3. The concentrations of individual PAHs in these samples range from approximately 5 ppm each to approximately 400 ppm. The RBAF calculation summaries presented below are based on the Day-14 results of data average between Cage 1 and Cage 2 for each test group.

Table 11 – RBAF Calculation Summary based on Day-14 Average Mass of PAH Orally Dosed and Average Mass of PAH Metabolites Excreted in Urine from the Former Foster AFB Bioavailability Study

	Dose (µmol/day)		Urine (µmol/day)		FUE_{Soil}	$FUE_{extract}$	RBAF
	Soil	Extract	Soil	Extract			
3OH-BaP							
GS-1	0.022	0.017	0.000041	0.00014	0.0019	0.0082	0.23
GS-2	0.96	0.53	0.0024	0.0092	0.0025	0.017	0.14
GS-3	0.14	0.12	0.00024	0.001	0.0017	0.0088	0.20
9OH-BaP							
GS-1	0.022	0.017	0.000013	0.000064	0.0006	0.0037	0.16
GS-2	0.96	0.53	0.00075	0.0028	0.00078	0.0053	0.15
GS-3	0.14	0.12	0.000073	0.00036	0.00047	0.003	0.16
3OH-Chry							
GS-2	1.03	0.60	0.00094	0.0018	0.00091	0.003	0.30
GS-3	0.15	0.12	0.00017	0.00057	0.0012	0.0047	0.25
3OH-BaA							
GS-2	0.92	0.55	0.00007	0.00019	0.000076	0.00034	0.23

The Day-14 RBAFs for BaP based on 3OH-BaP and 9OH-BaP metabolites range from 0.15 to 0.23. The RBAFs for chrysene, based on the Day-14 urine samples, range from 0.25 to 0.3. Finally, the Day-14 RBAF for benz(a)anthracene, limited to one measurement based on the GS-2 test group, is 0.23. The Day-7 RBAF for pulverized target fragments was 0.28 for 3OH-BaP and 0.27 for 9OH-BaP. The Foster PAH Bioavailability Study supports the application of RBAFs as follows:

BaP – 0.20
Benz(a)anthracene – 0.23
Chrysene – 0.28

The RBAF for BaP is conservative as described in the memorandum entitled Determination of Conservative Estimate for the Relative Bioavailability Factor for Benzo(a)pyrene for use at the former Laredo Air Force Base, Memorandum to Mr. Joseph Haney, TCEQ, June 23, 2017 (see Appendix F). In this memorandum, the 95% upper confidence limits (UCL) on the RBAF for BaP is calculated using a regression approach in combination with a Monte Carlo simulation that incorporates all of the available data from the Laredo Pilot and Foster Main Bioavailability studies and is the state-of-the-science method in the field of bioavailability. The RBAFs from these regression analyses are lower than the 0.20 RBAF for BaP proposed here based on point estimates of RBAFs using the Foster Main study data.

5.2.3 *In Vitro* Dermal Testing and Dermal Absorption Factor Calculation

The *in vitro* dermal investigation employed in this study has been fully validated against *in vivo* methods and is routinely accepted by regulators (Federal Register 64 [110] 6/9/99; OECD Guideline for the Testing of Chemicals: Method 428 [adopted April 13, 2004]). The test uses Franz Diffusion Cells and fresh-frozen human split-skin samples to model the absorption of PAHs from clay target fragments and soil for systemic distribution and for local site of action in the skin itself. The Franz Cell has two chambers that can be separated by a membrane, in this case excised fresh-frozen human skin. Soil test articles were loaded onto the surface of skin in the donor chamber. The solution chamber is filled with a receptor fluid that is in contact with the systemic surface of the split-thickness skin sample. The receptor fluid is a saline solution that contains polyoxyethanol as a receiving agent for the lipophilic PAHs. The testing system allows for periodic collection of receptor fluid to monitor diffusion of PAHs across the skin from the test article in the donor chamber. The dermal penetration testing program was performed by Charles River Laboratories.

Seven test groups were included in the dermal investigation, with four test article groups and three control groups:

1. GS-1 Soil Test Article
2. GS-2 Soil Test Article
3. GS-3 Soil Test Article
4. Pulverized Clay Target Fragments (sieved to 0.25 mm)
5. Clean Soil Test Article Spike with 25 ppm BaP
6. Corn Oil Spiked with 1 mg/mL BaP
7. [C14]-Testosterone in 1% Ethanol Solution

Each test group has five Franz Cells, each with an excised fresh-frozen human skin sample from five different donors. The five donors were both male and female subjects ranging in ages from 23 to 65 years. Skin samples were obtained from a local hospital as the result of elective surgeries. All of the skin samples were obtained from either the abdominal area or breasts. Split-thickness samples in the donor chambers

were loaded with 10 milligrams of test articles per square centimeter (mg/cm^2). The 10 mg/cm^2 loading rate is consistent with a monolayer for soil at a particle size of 0.05 to 0.25 mm (USEPA 2004, App.C). Test articles were applied to skin for 24 hours, then washed off. Collection of receptor fluid samples continued an additional 48 hours for a total monitoring period of 72 hours for evaluation of PAH flux across the skin barrier. Data collection was terminated at 72 hours, after which, skin samples were stripped five times with tape to remove the stratum corneum from each skin sample. Samples of stratum corneum (tape), dermis, and receptor fluid were extracted and analyzed for PAHs to determine the mass of PAHs in each medium.

Tape, skin, and receptor fluid were extracted and analyzed by high-performance liquid chromatography (HPLC) with fluorescence detection. Only six of the seven target PAHs are included in the dermal testing program. Indeno(1,2,3-cd)pyrene was not included in the suite of PAHs because it was not sensitive to florescence detection. Evaluation of dermal absorption is based on the individual masses of PAHs in dermis at 72 hours and the sum of masses in receptor fluid samples collected intermittently from 0 to 72 hours.

The absorbed dose is presented as the summed mass of PAHs in the dermis and receptor fluid samples in units of nanograms (ng) per cm^2. The masses of PAHs in receptor fluid represent the cumulative concentrations in receptor fluid samples collected over the 72-hour period. Testing of the tape strips provides the concentrations of PAHs bound up in or adhered to the stratum corneum and unavailable for systemic absorption. The analytical results for PAHs in tape, dermis, and receptor fluid samples for PAHs are summarized in Table 12. Five of the six target PAHs are represented. Dibenz(a,h)anthracene was detected in only one of the samples collected for receptor fluids, skin, and tape samples near the reporting limit at 0.01 ng/cm^2 and is not shown in Table 12.

Doses of BaP, benz(a)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene in/on the stratum corneum, dermis, and receptor fluid were closely related to their respective concentrations in the soil and fragment test articles. Concentrations of these PAHs in soil test articles are in the range of 3 to 5 ppm for GS-1, 25 to 30 ppm for GS-3, 200 to 300 ppm for GS-2, and 3,500 to 4,500 ppm for target fragments. The corresponding doses in/on stratum corneum, dermis, and receptor fluid correspond with these concentration ranges for the soil test articles, indicating a linear relationship between dermally absorbed doses of these four PAHs and soil concentrations. Chrysene was only detected in the receiving fluid near the reporting limit. The chromatographs for chrysene indicated peak interference, which may account for low responses.

Table 12 – Summary of PAH Doses in Stratum Corneum, Dermis, and Receptor Fluid over 72 Hours (ng/cm^2) from the Former Foster AFB Bioavailability Study

Benzo(a)pyrene						
	Stratum Corneum		**Dermis**		**Receptor Fluid**	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
GS-1	0.54	0.48	0.35	0.06	1.09	1.47
GS-2	21.5	15.6	10.9	2.85	11.4	6.71
GS-3	2.31	2.45	1.74	0.88	2.60	1.84
Target Frag	312	178	291	210	76	52
BaP Spike	3.15	2.79	13.0	10.1	8.35	4.97
BaP Corn Oil	130	105	141	91	51	15.1
Benz(a)anthracene						
	Stratum Corneum		**Dermis**		**Receptor Fluid**	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
GS-1	0.41	0.19	0.32	0.00	0.82	0.86
GS-2	15.0	11.4	5.43	1.62	11.8	6.70
GS-3	1.60	2.03	0.98	0.36	2.38	1.98
Target Frag	211	124	188	135	120	79
Benzo(b)fluoranthene						
	Stratum Corneum		**Dermis**		**Receptor Fluid**	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
GS-1	1.65	0.14	1.59	0.00	2.74	1.58
GS-2	31.5	22.8	15.6	4.44	17.8	10.3
GS-3	3.83	3.53	3.04	1.75	4.53	2.81
Target Frag	417	241	405	271	111	74
Benzo(k)fluoranthene						
	Stratum Corneum		**Dermis**		**Receptor Fluid**	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
GS-1	0.39	0.16	0.32	0.00	0.69	0.63
GS-2	10.6	7.67	5.22	1.41	4.59	2.67
GS-3	1.26	1.25	0.90	0.51	1.01	0.61
Target Frag	141	80	137	95	34.1	23.1
Chrysene						
	Stratum Corneum		**Dermis**		**Receptor Fluid**	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
GS-1	1.59	0.00	1.59	0.00	2.03	0.02
GS-2	1.59	0.00	1.59	0.00	2.36	0.24
GS-3	1.59	0.00	1.59	0.00	2.07	0.04
Target Frag	1.59	0.00	1.59	0.00	5.35	2.47

The flux of PAHs across the skin barrier is the metric used to calculate the dermal absorption factor (ABS_{d}). Flux introduces a time component into the dose and is expressed in units of ng/cm^2/hr. Table 13 provides a summary of flux rates and detection frequencies (lower limit of detection [LLOD]) for BaP, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene.

Table 13 – Average Flux Rates for PAHs from Soil Test Articles, Fragments, and Controls from the Former Foster AFB Bioavailability Study

	24 Hour Average Flux Rate to Receptor Fluids									
	Benz(a) anthracene		Benzo(a) pyrene		Benzo(b) fluoranthene		Benzo(k) fluoranthene		Chrysene	
	ng/cm²/h	% > LLOQ	ng/cm²/h	% > LLOQ	ng/cm²/h	% > LLOQ	ng/cm²/h	% > LLOQ	ng/cm²/h	% > LLOQ
GS-1	0.003	3	0.003	3	0.036	7	0.001	0	0.00	0
GS-3	0.028	20	0.018	10	0.013	0	0.003	0	0.00	0
GS-2	0.1	33	0.062	27	0.1	13	0.021	17	0.031	3
Target Frag	1.5	53	0.14	27	0.97	40	0.26	40	0.93	47
BaP Spike	-	-	0.56	40	-	-	-	-	-	-
BaP Oil	-	-	0.43	47	-	-	-	-	-	-

As demonstrated in Table 13, the average flux estimates for PAHs associated with soil test article GS-1 are based on limited numbers of detected sample results, with only 3 percent of samples exhibiting detectable concentrations for benzo(a)anthracene and benzo(a)pyrene, and only 7 percent detection frequency reported for benzo(b)fluoranthene. Both benzo(k)fluoranthene and chrysene exhibited no detectable sample results. As a result, the dermal absorption test group for soil test article GS-1 is likely to overestimate potential flux.

Dermal absorption is based on flux to the receptor fluid and the mass of PAH quantified in the skin samples at the termination of the experiment, which introduces a temporal component to the calculation (ng/cm²/hr). The calculation of $ABS_{.d}$ is based on the following:

1) Calculation of Experimental Absorption Factor (ABS_{Exp}; picograms per centimeter [pg/cm²])

$$ABS_{Exp} = (FR_{RF} \times ET) + ABS_S$$

where:

FR_{RF} = Flux Rate to receptor fluid (pg/cm²/hr)
ET = Experiment Time (hr)
ABS_S = Skin Absorption (pg/cm²)

2) Calculation of Adjusted Absorption Factor (ABS_{Adj}; pg/cm^2)

$$ABS_{Adj} = ABS_{Exp} \times \left(\frac{FSLR}{ESLR}\right)$$

where:

FSLR = Field Soil Loading Rate (0.2 mg/cm^2)

ESLR = Experimental Soil Loading Rate at monolayer (10 mg/cm^2)

3) Calculation of $ABS_{.d}$ (unitless)

$$ABS_{.d} = \frac{ABS_{Adj}}{(C \times FSLR \times CF)}$$

where:

C = Concentration of PAH in Test Article (ng/mg)

CF = Conversion Factor (pg/ng)

The calculated $ABS_{.d}$s are shown in Table 14 and do not include the PAHs retained in or on the stratum corneum. The PAHs bound in or on the surface of the stratum corneum are assumed to be unavailable for penetration to the dermis and the systemic compartment because the skin sloughs at a high frequency. PAHs remaining in skin samples after tape-stripping were classified as a dedicated dose and included in the calculation of $ABS_{.d}$. Additionally, flux rates were determined based on the 72-hour cumulative absorption profile of PAHs to the receptor fluid. The relative changes in the $ABS_{.d}$ values are proportional to the relative differences in the soil concentrations used in the calculations. The concentration of PAHs for 80 to 100% of the time points in GS-1 were below the lower limit of quantitation.

Table 14 – $ABS_{.d}$ Calculation Summary based on Cumulative 72-Hour Receptor Fluid Results and Dermis Concentrations at 72 Hours from the Former Foster AFB Bioavailability Study

	Average Flux Rate to Receptor Fluid		**Average $ABS_{.d}$ Based on Receptor Fluid**	**Average $ABS_{.d}$ Based on Receptor Fluid and Dermis**
	ng/cm^2/h	**% > LLOQ**	**%**	**%**
Benzo(a)pyrene				
GS-1	0.011	10	0.35	1.3
GS-3	0.03	38	0.16	0.83
GS-2	0.16	56	0.10	0.58
BaP Spike	0.12	56	1.11	8.5

	Average Flux Rate to Receptor Fluid		Average $ABS_{.d}$ Based on Receptor Fluid	Average $ABS_{.d}$ Based on Receptor Fluid and Dermis
	ng/cm²/h	**% > LLOQ**	**%**	**%**
Target Frag	1.1	63	0.06	0.86
BaP Oil	0.71	68	0.17	1.9
Benz(a)anthracene				
GS-1	0.010	18	0.38	1.4
GS-3	0.03	46	0.18	0.81
GS-2	0.2	60	0.12	0.52
Target Frag	1.7	71	0.11	0.85
Benzo(b)fluoranthene				
GS-1	0.026	8	0.84	3.6
GS-3	0.05	24	0.26	1.38
GS-2	0.2	46	0.15	0.85
Target Frag	1.6	63	0.08	1.05
Benzo(k)fluoranthene				
GS-1	0.005	4	0.18	0.8
GS-3	0.01	28	0.07	0.42
GS-2	0.063	48	0.04	0.28
Target Frag	0.5	63	0.08	1.22
Chrysene				
GS-1	0.000	0	0.00	1.2
GS-3	0.02	8	0.10	0.46
GS-2	0.024	16	0.02	0.07
Target Frag	0.1	45	0.00	0.01
Dibenzo(a,h)anthracene				
GS-1	0.003	0	0.74	5.7
GS-3	0.003	0	0.13	0.98
GS-2	0.003	0	0.02	0.15
Target Frag	0.0	0	0.00	0.01

The recommended $ABS_{.d}$ values for the target PAHs are based on the average of the GS-2 and GS-3 $ABS_{.d}$ (receptor fluid plus dermis) values for the data set as follows:

Benz(a)pyrene – 0.007
Benz(a)anthracene – 0.007
Benzo(b)fluoranthene – 0.011
Benzo(k)flouranthene – 0.0035
Chrysene - 0.0027
Dibenz(a,h)anthracene – 0.0057
Indeno(1,2,3-cd)pyrene – 0.011 [based on benzo(b)fluoranthene]

5.2.4 Surrogates RBAF for PAHs

Gastrointestinal (GI) absorption of carcinogenic PAHs is principally influenced by the lipophilic nature of these compounds, where the desorption of PAHs from the source materials and solvation by GI fluids (including bile salts) are important prerequisites for intestinal absorption and oral bioavailability (Ruby et al. 2016). GI absorption of PAHs is closely related to mechanisms for digestion of oils and fats including lipolysis and bile production (Rahman et al. 1986). Absorption of carcinogenic PAHs, along with fats and oils, occurs in the small intestines through the formation and uptake of micelles in the presence of bile salts. Multiple investigations of fed and fasted states in both *in vitro* and *in vivo* models demonstrate that the solubility of PAHs is enhanced by the presence of mixed intestinal lipids under fed conditions.

Large amounts of research have been performed on the uptake of dioxins in food animals and have concluded that uptake of dioxins is related to soil characteristics and chemical properties, principally lipophilicity, water solubility, molecular weight, and chlorination (McLachlan 1997 and Roeder et al. 1998). Laurent et al. (2002) performed similar research on PAHs, as well as dioxins, evaluating the portal absorption of radio-labeled 2,3,7,8-tetrachlorodibenzodioxin (TCDD), BaP, and phenanthrene. The authors concluded that phenanthrene, with a three-ring structure and log octanol-water partitioning coefficient (K_{ow}) of 4.5, has a different mechanism of absorption compared with the more lipophilic BaP and TCDD. The authors show that, for lipophilic compounds such as TCDD and BaP, K_{ow} and water solubility are important factors in GI absorption with lower rates of absorption of these radio-labeled compounds from milk as K_{ow} increases.

Where the lipophilic compounds are associated with environmental media like soil, or in a solid state such as in a target fragment or coal tar, higher K_{ow} would also indicate a greater competition for chemicals such as high molecular-weight PAHs in the solid phase compared to the aqueous phase, where inclusion into micelles would occur.

Table 15 provides a summary of the chemical and physical properties of the seven PAHs of concern at the Laredo AFB SGR.

Table 15 - Chemical and Physical Properties of PAHs[1]

COC	Number Aromatic Rings	Molecular Weight	Log K_{ow}	Water Solubility (µg/L)
Benz(a)anthracene	4	228	5.76	9.4
Chrysene	4	228	5.81	2.0
Benzo(b)fluoranthene	5	252	5.78	1.5
Benzo(k)fluoranthene	5	252	6.11	0.8
Benzo(a)pyrene	5	252	6.13	1.62
Indeno(1,2,3-cd)pyrene	6	276	6.7	0.19
Dibenz(a,h)anthracene	5	278	6.75	2.49

1. Data are from United States Environmental Protection Agency (USEPA) Regional Screening Level (RSL) tables (2017a)

Based on physical structure (number of aromatic rings and molecular weight) and chemical properties (Log K_{ow} and water solubility), BaP is an appropriate surrogate for benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene. BaP has the same molecular weight as benzo(b)fluoranthene and benzo(k)fluoranthene. BaP has a five-ring structure, as do benzo(b)fluoranthene, benzo(k)fluoranthene, and dibenz(a,h)anthracene. Indeno(1,2,3-cd)pyrene has a six-ring structure. Benz(a)anthracene and chrysene have four-ring structures. The molecular weights of dibenz(a,h)anthracene (278 g/mole) and indeno(1,2,3-cd)pyrene (276 g/mole) are higher than BaP (252 g/mole), but much higher than the molecular weights of benz(a)anthracene (228 g/mole) and chrysene (228 g/mole). The log K_{ow} and solubility values for benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene are also quite similar to those of BaP.

The influence of chemical and physical characteristics of the PAHs on absorption through biological membranes is confirmed by the RBA data presented in the Laredo Pilot Study and the Foster PAH Bioavailability Study. In all cases, RBAFs calculated for detectable concentrations of PAH metabolites for benz(a)anthracene and chrysene are higher than the calculated RBAFs for 3OH-BaP and 9OH-BaP. These data are consistent with the results reported by Laurent et al. (2002), where lower molecular weight PAHs that are more soluble would be expected to have higher absorption rates.

There is much literature published on the toxicity and carcinogenicity of PAHs in humans. The PAHs subject to this investigation are limited to the seven PAHs defined currently by the USEPA as potentially carcinogenic. BaP is the most studied of the

PAHs and, therefore, serves as the basis for evaluation of cancer potency for all potentially carcinogenic PAHs. BaP, benz(a)anthracene, and chrysene were the subjects of the bioavailability studies at the Former Laredo AFB and Former Foster AFB sites. BaP has been recommended as a surrogate for benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene based on similar structure, water solubility, K_{ow}, and molecular weight. The recent draft review of relative potency factors (RPFs) for carcinogenic PAHs published by the USEPA provides updates the assumptions concerning the carcinogenicity of these four PAHs compared to BaP (USEPA 2010). Table 16 provides a summary of the current (USEPA 2017b) and proposed RPFs for the four PAHs, which provides the basis of comparison of relative toxicity (carcinogenicity).

Table 16 – Relative Potency Factors (RPFs) for Select PAHs

PAH	Current RPF	Proposed RPF
Benzo(b)fluoranthene	0.1	0.8
Benzo(k)fluoranthene	0.01	0.03
Dibenz(a,h)anthracene	1	10
Indeno(1,2,3-cd)pyrene	0.1	0.07

Comparison of the current and proposed RPFs shows that benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene are less potent carcinogens compared to BaP, while dibenzo(a,h)anthracene has similar or greater potency compared to BaP. Benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene have relative potencies between 10 and 100 times lower than BaP; therefore, the use of BaP as a surrogate for these two PAHs is unlikely to introduce a large uncertainty into conclusions of the overall risk assessment for either the Former Laredo AFB or the Former Foster AFB sites.

Cancer potencies of benzo(b)fluoranthene and dibenz(a,h)anthracene are comparable to or greater than BaP. The relative toxicities of benzo(b)fluoranthene and dibenz(a,h)anthracene compared to BaP are also related to their relative concentrations in the coal tar/limestone matrix of the clay target fragments. Table 17 presents a summary of PAH concentrations in samples of clay target fragments from the Laredo and Foster sites.

Table 17 – PAH Concentrations (mg/kg) in Clay Target Fragment Samples from Former Laredo AFB and Former Foster AFB Bioavailability Studies

	Laredo Pilot Study	Foster Main Study	Foster Pilot Study
Benzo(a)pyrene	1,500	4,430	1,233
Benz(a)anthracene	1,360	2,850	1,067
Benzo(b)fluoranthene	1,330	3,930	1,533
Benzo(k)fluoranthene	705	1,960	395
Chrysene	1,610	3,720	1,200
Dibenz(a,h)anthracene	230	696	203
Indeno(1,2,3-cd)pyrene	835	2,810	946

The concentrations of dibenz(a,h)anthracene in clay target fragments are consistently less than half the concentrations of BaP. Although dibenzo(a,h)anthracene is a more potent carcinogen, the lower concentrations of dibenz(a,h)anthracene counteracts its similar or higher cancer potency compared to BaP. Benzo(b)fluoranthene is present at slightly lower concentrations compared to BaP in target fragments and exhibits a lower cancer potency than BaP. The application of BaP as a surrogate for estimating the relative bioavailability of benzo(b)fluoranthene and dibenz(a,h)anthracene in clay target fragments introduces a moderate risk of either underestimating or overestimating potential risk from incidental ingestion of soil from the Former Laredo AFB and Former Foster AFB sites. As with all extrapolations in the environmental field, there is unavoidable uncertainty with the present state of knowledge.

5.2.5 Applicability to Laredo AFB PAH Bioavailability

Soil characteristics were also evaluated at the two sites with respect to using data from the Former Foster AFB Skeet Range to interpret results for the Former Laredo AFB SGR. It has been long established that soil characteristics can affect the GI absorption of PAHs. A good summary of the interactions of soil and PAHs is presented by Ruby et al. (2016). The primary soil characteristics affecting the bioaccessibility and bioavailability of PAHs from impacted soil are organic carbon and porosity. Lipophilic PAHs bind to organic matter in soil, making them less accessible and/or available for GI absorption (Luthy et al. 1997). Over time, PAHs can also diffuse into micropores and nanopores in soil particles, further reducing their availability. Soil samples were

collected from both the Former Laredo SGR and Former Foster Skeet Range Sites and analyzed for soil characteristics to determine whether PAHs in soil may be expected to exhibit similar bioavailability. Soil samples were analyzed for total organic carbon and clay content/cation exchange capacity (CEC) as a proxy for micropore/nanopore content. Table 18 provides a summary of soil characteristic results along with some literature values used to evaluate extractability of PAHs from soil.

Table 18 – Soil Characteristics for Former Laredo SGR versus Former Foster Skeet Range Site

Characteristic	Laredo Samples	Foster Samples	Literature Range*
Total Organic Carbon	0.32% to 1.3%	0.82% to 2.2 %	0.07% to 11% < 1.0% (low effect) > 2.0% (high effect)
CEC (meq/100g)	31.6 meq/100g to 36.9 meq/100g	38.0 meq/100g to 46.1 meq/100g	> 30 meq/100g
Clay Content	0 % to 7 %	8.2% to 26%	19% to 66% < 40% (low effect) > 40% (high effect)
Soil Classification	Sandy Loam – 33% Silt Loam – 67%	Sandy Loam – 50% Sandy Clay Loam – 50%	Not Applicable

* - Ranges of soil characteristics derived from Chung and Alexander (2002) and Luo et al. (2012).

The soil samples from the Former Laredo SGR generally exhibited lower organic carbon concentrations and clay content (i.e., lower micro/nanoporosity) than those collected from the Former Foster Skeet Range Site. The data from both sites indicate that organic carbon concentrations and clay content are below levels likely to influence the extractability of PAHs from soil. As a result, the bioavailability of PAHs at the two sites is unlikely to differ due to site-specific soil characteristics.

Researchers have identified black carbon as the most important fraction of the soil organic matter for the adsorption of PAHs, with binding more than 1,000 times stronger compared to PAH adsorption to detritus and humic substances (Jonker and Koelman 2002). Black carbon is defined as residual by-products from incomplete combustion including soot and charcoal. Recent research on the extractability and bioavailability of PAHs in clay target fragments from trap and skeet range sites has

demonstrated that the coal tar/limestone matrix of the fragments reduces the bioavailability of PAHs in a manner similar to that of carbon black (Xia et al. 2016).

These authors evaluated a variety of sources of PAHs and soil types. They found significantly reduced extractability and dermal absorption of PAHs from clay target fragments regardless of the soil type. Because clay target fragments serve as the source of PAHs to soil at both the Former Foster AFB and Laredo AFB sites, both sites will exhibit similar relative bioavailability for PAHs in soil.

5.3 PCL Calculation

PCLs were calculated based on the equations, factors, and assumptions presented in the TRRP rule (30 Texas Administrative Code [TAC] §350, Subchapter D). The critical PCLs for PAHs in soil at the Former Laredo AFB are based on direct contact by residential receptors, which is evaluated using the $^{Tot}Soil_{Comb}$ PCL. The $^{Tot}Soil_{Comb}$ PCL calculations for PAHs have three Risk-based Exposure Limit (RBEL) pathways including:

1) Dermal contact with carcinogenic COCs ($^{Soil}RBEL_{Derm\text{-}c}$) as described in 30 TAC §350.74(c).

$$^{Soil}RBEL_{Derm-c} = \frac{(RL \times ATc \times 365\ days/yr)}{(SF_d \times MF \times 10^{-6}\ kg/mg \times EF.res \times DF.adj \times ABS.d)}$$

where:

RL – Risk Level - 10^{-5}
ATc - Averaging Time – carcinogens - 70 years
SF_d - Dermal Cancer Potency Slope Factor - chemical specific $(mg/kg\text{-}day)^{-1}$
MF - Modifying Factor – 1 for PAHs
EF.res - Exposure Frequency – resident – 350 days
DF.adj - Dermal Adjustment Factor – 352 (mg-yr/kg-event)
$ABS_{.d}$ – Based on results from the Foster AFB Bioavailability Study

$$DF.adj = \frac{(SA_{0-6})(AF_{0-6})(ED_{0-6})}{(BW_{0-6})} + \frac{(SA_{6-18})(AF_{6-18})(ED_{6-18})}{(BW_{6-18})} + \frac{(SA_{18-30})(AF_{18-30})(ED_{18-30})}{(BW_{18-30})}$$

where:

$BW_{0\text{-}6}$ – Body Weight – child 0-6 years - 15 kg
$BW_{6\text{-}18}$ – Body Weight – adolescent 6-18 years - 45 kg

$BW_{18\text{-}30}$ – Body Weight – adult 18-30 years - 70 kg
$ED_{0\text{-}6}$ - Exposure Duration – child 0-6 - 6 years
$ED_{6\text{-}18}$ - Exposure Duration – adolescent 6-18 - 12 years
$ED_{6\text{-}18}$ - Exposure Duration – adult 18-30 - 12 years
$SA_{0\text{-}6}$ - Skin Surface Area – child 0-6 years – 2,200 cm^2
$SA_{6\text{-}18}$ - Skin Surface Area – adolescent 6-18 years – 3,500 cm^2
$SA_{18\text{-}30}$ - Skin Surface Area – adult 18-30 years – 4,800 cm^2
$AF_{0\text{-}6}$ - Soil-to-Skin Adherence Factor – child 0-6 years – 0.2 mg/cm^2-event
$AF_{0\text{-}6}$ - Soil-to-Skin Adherence Factor – child 0-6 years – 0.1 mg/cm^2-event
$AF_{0\text{-}6}$ - Soil-to-Skin Adherence Factor – child 0-6 years – 0.1 mg/cm^2-event

$$^{Soil}Soil_{Derm} = {}^{Soil}RBEL_{Derm-c}$$

2) Ingestion of carcinogenic COCs in soil ($^{Soil}RBEL_{Ing\text{-}c}$) as described in 30 TAC §350.74(d).

$$^{Soil}RBEL_{Ing-c} = \frac{(RL \times ATc \times 365\ days/yr)}{(SF_o \times MF \times 10^{-6}\ kg/mg \times EF.res \times IRsoil.AgeAdj.res \times RBAF)}$$

where:
RL - Risk Level - 10^{-5}
ATc - Averaging Time – carcinogens - 70 years
SF_d - Dermal Cancer Potency Slope Factor - chemical specific $(mg/kg\text{-}day)^{-1}$
MF - Modifying Factor – 1 for PAHs
EF.res - Exposure Frequency – resident – 350 days
IRsoil.AgeAdj.res - Age-adjusted Soil Ingestion Rate – 120 (mg-yr/kg-day)
RBAF - Relative Bioavailability Factor - Based on Results from the Laredo and Foster AFB Bioavailability Studies

$$^{Soil}Soil_{Ing} = {}^{Soil}RBEL_{Ing-c}$$

3) Inhalation of carcinogenic COCs from air ($^{Air}RBEL_{Inh\text{-}VP}$) as described in 30 TAC §350.74(d).

$$^{Air}RBEL_{Inh-vp} = \frac{(RL \times ATc \times 365\ days/yr)}{(URF \times 10^6\ \mu g/mg \times ED.w \times EF.w\ )}$$

where:
URF - Unit Risk Factor – chemical-specific ($\mu g/m^3$)

The PCL for the inhalation of COC vapors or adsorbed to fugitive dusts is calculated based on the PCL calculations described in 30 TAC §350.75(b)(1).

$$^{Air}Soil_{Inh-VP} = \frac{^{Air}RBEL_{Inh-VP}}{VF_{SS} + PEF}$$

Where:

VF_{SS}	- Volatilization Factor – chemical specific ($\frac{mg/m^3-air}{mg/kg-soil}$)
PEF	- Particulate Emission Factor – 2.09 x 10^{-9} ($\frac{mg/m^3-air}{mg/kg-soil}$)

4) Ingestion of carcinogenic COCs in below-ground vegetables ($^{Vg\text{-}bg}RBEL_{Ing\text{-}c}$) in 30 TAC §350.74(e).

$$^{Veg}Soil_{Ing-Org} = \frac{(^{BgVeg}RBEL_{Ing})\,(Ks_{Veg})}{(RCF)(VG_{Bg})}$$

Where:

Ks_{Veg}	- Soil-water Partition Coefficient (mL/g)
VG_{Bg}	- Below Ground Vegetable Correction Factor - 0.01 (unitless)
RCF	- Ratio of Concentration in Roots to Concentration in Soil Pore Water (mg/kg)(µg/L)

The RBELs can be re-calculated using site-specific RBAF as described in 30 TAC §350.74(j)(1)(C) and dermal absorption factors ($ABS_{.d}$) as described in 30 TAC §350.74(j)(1)(B). The $^{Tot}Soil_{Comb}$ PCL is calculated using the equation presented in 30 TAC §350.75(b)(1):

$$^{Tot}Soil_{Comb} = \frac{1}{\left(\frac{1}{^{Soil}Soil_{Ing}}\right) + \left(\frac{1}{^{Soil}Soil_{Derm}}\right) + \left(\frac{1}{^{Air}Soil_{Inh-VP}}\right) + \left(\frac{1}{^{Veg}Soil_{Ing-Org}}\right)}$$

Based on the equations, factors, and assumptions presented in the TRRP rule, site-specific PCLs can be calculated by adjusting the RBAF for PAHs (as previously described) and $ABS_{.d}$ values to determine the potential impact of applying site-specific dermal absorption values. A summary of potential site-specific $^{Tot}Soil_{Comb}$ PCLs for PAHs at the Former Laredo AFB is presented below (rounded to two significant figures).

PCL selection for PAHs is drivssen by BaP with Tier 2 $^{Tot}Soil_{Comb}$ PCLs ranging from 4.1 mg/kg (based on Tier 1 default parameters) to 19 mg/kg (based on the site-specific RBAFs and $ABS_{.d}$ values). The Main Study for the Former Foster AFB includes assessment of dermal absorption and oral bioavailability. The TCEQ default assumption for dermal absorption is based on a study by Wester et al. (1990), which used soil samples freshly spiked with reagent-grade PAHs in solvent rather than an environmental source material. The coal tar pitch/limestone matrix of the clay target fragments is not as available for dermal absorption as BaP freshly spiked in soil, as shown in Table 19 (rounded to two significant figures).

Table 19 – Summary of $^{Tot}Soil_{Comb}$ PCLs for Use in Evaluating PAHs at the Former Laredo AFB (mg/kg)

COC	Slope Factor $(mg/kg/d)^{-1}$	RBAF (unitlesss)	ABS.d (unitless)	$^{Tot}Soil_{Comb}$ PCLs
Benz(a)anthracene	0.1	0.23	0.007	170
Benzo(a)pyrene	1	0.2	0.007	19
Benzo(b)fluoranthene	0.1	0.2	0.011	190
Benzo(k)fluoranthene	0.01	0.2	0.0035	2,100
Chrysene	0.001	0.28	0.0027	15,200
Dibenz(a,h)anthracene	1	0.2	0.0057	17
Indeno(1,2,3-cd)pyrene	0.1	0.2	0.011	200

6. Conclusions

Based on the results of the PAH Bioavailability Pilot Study for the Former Laredo AFB Site, in coordination with results of PAH bioavailability studies at the Former Foster AFB, the following conclusions have been made:

- Reproducible soil test articles can be reliably prepared from bulk soil samples through soil sample sieving and homogenization procedures developed in these studies.
- Diets prepared from soil test articles and extracts can be reliably prepared, controlling the dose of environmental contaminants delivered to test animals to evaluate bioavailability using procedures developed in this study.
- An analytical methodology to quantify the concentrations of urinary PAH metabolites has sufficient sensitivity to evaluate soil samples impacted with PAHs down to approximately 1 mg/kg based on BaP concentrations.
- RBAFs based on FUE calculations have provided consistent results between samples and studies.
- Conservative RBAFs for PAHs at the Former Laredo AFB based on the Foster main bioavailability study are: 1) 0.2 for BaP, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene; 2) 0.23 for benz(a)anthracene; and 3) 0.28 for chrysene.
- The PCL for BaP increases by a factor of 2X above the published Tier 1 PCL based solely on application of the site-specific RBAF.
- The PCL for BaP increases by a factor of 5X above the published Tier 1 PCL based on both the site-specific RBAF and the $ABS_{.d}$ value.
- Reading across from the results from the PAH Bioavailability main study for the Former Foster AFB is recommended to decrease the uncertainty in the RBAFs for PAHs because of the greater number of samples and animals per sample and to provide site-specific $ABS_{.d}$ information.
- When all available data from the Laredo AFB and the Foster AFB bioavailability studies are combined and evaluated using a regression analysis consistent with the state-of-the-science in bioavailability studies, it is confirmed that the RBAFs used in the PCL calculations are conservative. In fact, the regression analyses provide 95% UCLs on the RBAF for BaP that range from 0.09 to 0.20 compared to the point estimate of 0.20 used to derive the PCL.

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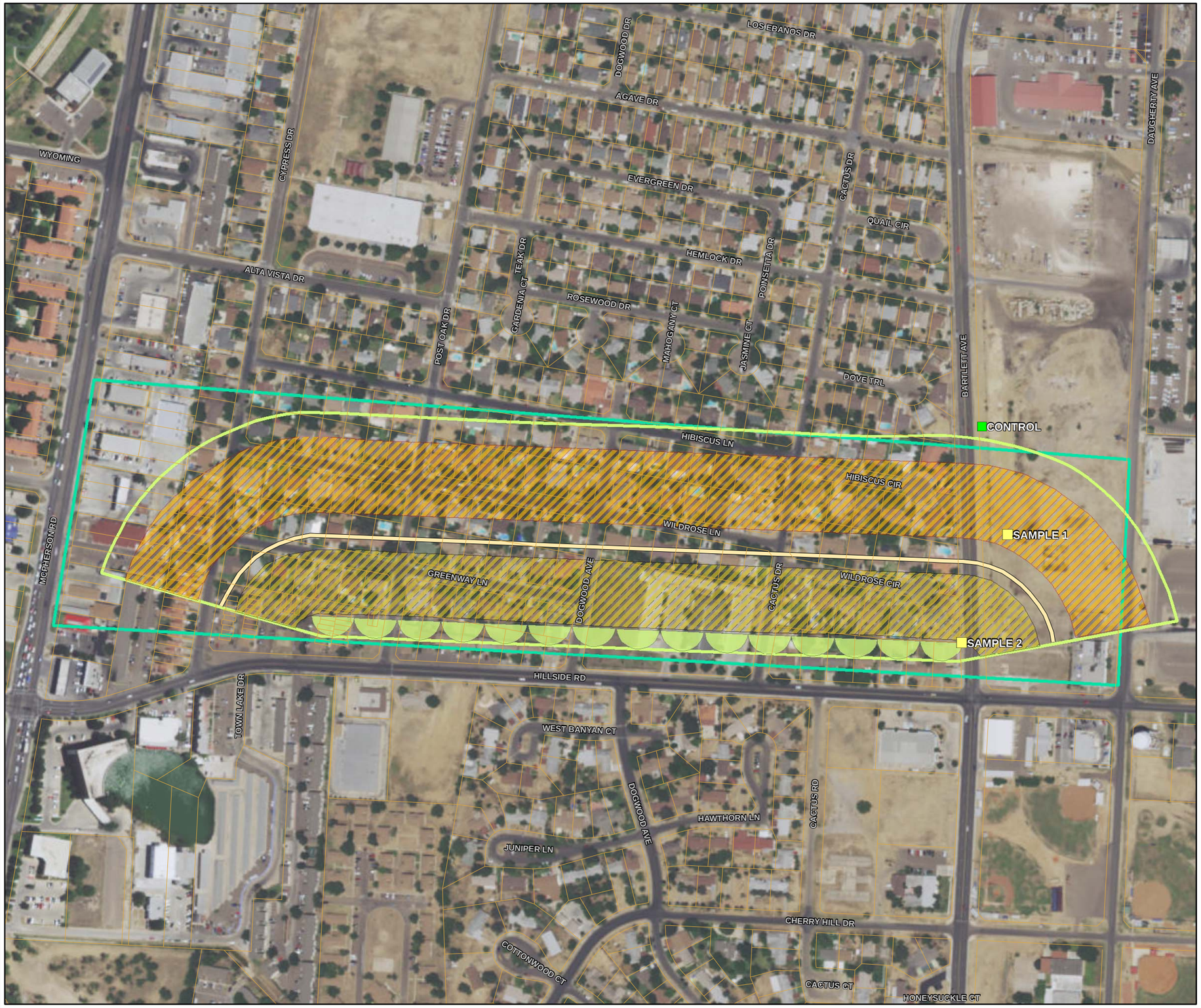

LEGEND:

- CLEAN SAMPLE LOCATION
- IMPACTED SAMPLE LOCATION
- PARCEL BOUNDARY
- MAXIMUM TARGET FRAGMENT LINE (300')
- HIGH PROBABILITY TARGET FRAGMENT AREA (85' TO 280')
- HIGH PROBABILITY SHOT AREA (375' TO 800')
- SHOT GUN TRAP
- SHOT FALL AREA
- SHOT GUN RANGE BOUNDARY

0 300 600 Feet

GRAPHIC SCALE

NOTES:

1. IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. PARCEL BOUNDARY AND ROAD DATA OBTAINED FROM THE CITY OF LAREDO GIS DEPARTMENT. http://www.ci.laredo.tx.us.

SHOTGUN RANGE
FORMER LAREDO AIR FORCE BASE
LAREDO, TEXAS

BIOAVAILABILITY STUDY

SITE MAP

FIGURE
1

City: syr Div/Group:sed Created By: J.Rapp Last Saved By: jrapp
Laredo AFB (04285076.0000. 00400)
Q:\FormerLaredoAFB\BioavailabilityStudy\mxd\SampleLocations_SiteMap.mxd 9/14/2015 11:24:01 PM

Appendix A

ALS Soil Analytical Reports

ALS Group USA, Corp Date: 17-Dec-14

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity
Work Order: HS14120575

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS14120575-01	LAFB-BSS-0-0.5 01	Soil		23-Oct-2014 17:26	24-Oct-2014 13:30	☐
HS14120575-02	LAFB-BSS-0-0.5 02	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS14120575-03	LAFB-BSS-0-0.5 CONTROL	Soil		23-Oct-2014 17:15	24-Oct-2014 13:30	☐

ALS Group USA, Corp Date: 17-Dec-14

Client:	ARCADIS U.S., Inc.	**ANALYTICAL REPORT**	
Project:	Former Laredo AFB Bioavailablity	WorkOrder:HS14120575	
Sample ID:	LAFB-BSS-0-0.5 01	Lab ID:HS14120575-01	
Collection Date:	23-Oct-2014 17:26	Matrix:Soil	

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 16-Dec-2014		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	10	16-Dec-2014 20:34
Acenaphthylene	U	H	0.11	1.7	mg/Kg	10	16-Dec-2014 20:34
Anthracene	U	H	0.12	1.7	mg/Kg	10	16-Dec-2014 20:34
Benz(a)anthracene	**0.77**	JH	**0.10**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:34
Benzo(a)pyrene	**1.1**	JH	**0.12**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:34
Benzo(b)fluoranthene	**1.2**	JH	**0.12**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:34
Benzo(g,h,i)perylene	**0.89**	JH	**0.11**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:34
Benzo(k)fluoranthene	**0.66**	JH	**0.15**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:34
Chrysene	**0.99**	JH	**0.17**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:34
Dibenz(a,h)anthracene	U	H	0.15	1.7	mg/Kg	10	16-Dec-2014 20:34
Fluoranthene	**1.1**	JH	**0.14**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:34
Fluorene	U	H	0.17	1.7	mg/Kg	10	16-Dec-2014 20:34
Indeno(1,2,3-cd)pyrene	**0.83**	JH	**0.14**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:34
Naphthalene	U	H	0.13	1.7	mg/Kg	10	16-Dec-2014 20:34
Phenanthrene	**0.41**	JH	**0.14**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:34
Pyrene	**1.0**	JH	**0.43**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:34
Surr: 2-Fluorobiphenyl	*72.7*			*43-125*	*%REC*	*10*	*16-Dec-2014 20:34*
Surr: 4-Terphenyl-d14	*80.3*			*32-125*	*%REC*	*10*	*16-Dec-2014 20:34*
Surr: Nitrobenzene-d5	*72.0*			*37-125*	*%REC*	*10*	*16-Dec-2014 20:34*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

PRELIMINARY

ALS Group USA, Corp Date: 17-Dec-14

Client:	ARCADIS U.S., Inc.	**ANALYTICAL REPORT**	
Project:	Former Laredo AFB Bioavailablity	WorkOrder:HS14120575	
Sample ID:	LAFB-BSS-0-0.5 02	Lab ID:HS14120575-02	
Collection Date:	23-Oct-2014 17:37	Matrix:Soil	

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 16-Dec-2014		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	10	16-Dec-2014 20:56
Acenaphthylene	U	H	0.11	1.7	mg/Kg	10	16-Dec-2014 20:56
Anthracene	U	H	0.12	1.7	mg/Kg	10	16-Dec-2014 20:56
Benz(a)anthracene	**1.5**	JH	**0.10**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:56
Benzo(a)pyrene	**2.1**	H	**0.12**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:56
Benzo(b)fluoranthene	**2.5**	H	**0.12**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:56
Benzo(g,h,i)perylene	**1.6**	JH	**0.11**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:56
Benzo(k)fluoranthene	**1.2**	JH	**0.15**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:56
Chrysene	**2.0**	H	**0.17**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:56
Dibenz(a,h)anthracene	**0.33**	JH	**0.15**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:56
Fluoranthene	**2.7**	H	**0.14**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:56
Fluorene	U	H	0.17	1.7	mg/Kg	10	16-Dec-2014 20:56
Indeno(1,2,3-cd)pyrene	**1.5**	JH	**0.14**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:56
Naphthalene	U	H	0.13	1.7	mg/Kg	10	16-Dec-2014 20:56
Phenanthrene	**1.1**	JH	**0.14**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:56
Pyrene	**2.3**	H	**0.43**	**1.7**	**mg/Kg**	10	16-Dec-2014 20:56
Surr: 2-Fluorobiphenyl	*66.0*			*43-125*	*%REC*	*10*	*16-Dec-2014 20:56*
Surr: 4-Terphenyl-d14	*69.5*			*32-125*	*%REC*	*10*	*16-Dec-2014 20:56*
Surr: Nitrobenzene-d5	*62.5*			*37-125*	*%REC*	*10*	*16-Dec-2014 20:56*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

PRELIMINARY

ALS Group USA, Corp Date: 17-Dec-14

Client:	ARCADIS U.S., Inc.	**ANALYTICAL REPORT**	
Project:	Former Laredo AFB Bioavailablity	WorkOrder:HS14120575	
Sample ID:	LAFB-BSS-0-0.5 CONTROL	Lab ID:HS14120575-03	
Collection Date:	23-Oct-2014 17:15	Matrix:Soil	

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 16-Dec-2014		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	10	16-Dec-2014 21:18
Acenaphthylene	U	H	0.11	1.7	mg/Kg	10	16-Dec-2014 21:18
Anthracene	U	H	0.12	1.7	mg/Kg	10	16-Dec-2014 21:18
Benz(a)anthracene	U	H	0.10	1.7	mg/Kg	10	16-Dec-2014 21:18
Benzo(a)pyrene	U	H	0.12	1.7	mg/Kg	10	16-Dec-2014 21:18
Benzo(b)fluoranthene	U	H	0.12	1.7	mg/Kg	10	16-Dec-2014 21:18
Benzo(g,h,i)perylene	U	H	0.11	1.7	mg/Kg	10	16-Dec-2014 21:18
Benzo(k)fluoranthene	U	H	0.15	1.7	mg/Kg	10	16-Dec-2014 21:18
Chrysene	U	H	0.17	1.7	mg/Kg	10	16-Dec-2014 21:18
Dibenz(a,h)anthracene	U	H	0.15	1.7	mg/Kg	10	16-Dec-2014 21:18
Fluoranthene	U	H	0.14	1.7	mg/Kg	10	16-Dec-2014 21:18
Fluorene	U	H	0.17	1.7	mg/Kg	10	16-Dec-2014 21:18
Indeno(1,2,3-cd)pyrene	U	H	0.14	1.7	mg/Kg	10	16-Dec-2014 21:18
Naphthalene	U	H	0.13	1.7	mg/Kg	10	16-Dec-2014 21:18
Phenanthrene	U	H	0.14	1.7	mg/Kg	10	16-Dec-2014 21:18
Pyrene	U	H	0.43	1.7	mg/Kg	10	16-Dec-2014 21:18
Surr: 2-Fluorobiphenyl	*70.0*			*43-125*	*%REC*	*10*	*16-Dec-2014 21:18*
Surr: 4-Terphenyl-d14	*73.9*			*32-125*	*%REC*	*10*	*16-Dec-2014 21:18*
Surr: Nitrobenzene-d5	*67.0*			*37-125*	*%REC*	*10*	*16-Dec-2014 21:18*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

PRELIMINARY

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January 22, 2015

Glenn Hoeger
ARCADIS U.S., Inc.
401 East Main Street, Suite 400
El Paso, TX 79901

Work Order: **HS15010520**

Laboratory Results for: **Former Laredo AFB Bioavailablity D14-0256**

Dear Glenn,

ALS Environmental received 3 sample(s) on Oct 24, 2014 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: Jumoke.Lawal

Dane J. Wacasey

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
Work Order: HS15010520

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS15010520-01	LAFB-BSS-0-0.5 02 (a)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010520-02	LAFB-BSS-0-0.5 02 (b)	Soil		23-Oct-2014 05:37	24-Oct-2014 13:30	☐
HS15010520-03	LAFB-BSS-0-0.5 02 (c)	Soil		23-Oct-2014 05:37	24-Oct-2014 13:30	☐

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
Work Order: HS15010520

CASE NARRATIVE

GCMS Semivolatiles by Method SW8270

Batch ID: 89781

Sample ID: **LAFB-BSS-0-0.5 02 (a) (HS15010520-01)**
Sample ID: **LAFB-BSS-0-0.5 02 (b) (HS15010520-02)**
Sample ID: **LAFB-BSS-0-0.5 02 (c) (HS15010520-03)**

- Sample was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

Client:	ARCADIS U.S., Inc.	**ANALYTICAL REPORT**
Project:	Former Laredo AFB Bioavailablity D14-0256	WorkOrder:HS15010520
Sample ID:	LAFB-BSS-0-0.5 02 (a)	Lab ID:HS15010520-01
Collection Date:	23-Oct-2014 17:37	Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 21-Jan-2015		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	1	21-Jan-2015 16:24
Acenaphthylene	U	H	0.11	1.7	mg/Kg	1	21-Jan-2015 16:24
Anthracene	U	H	0.12	1.7	mg/Kg	1	21-Jan-2015 16:24
Benz(a)anthracene	**1.2**	JH	**0.10**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:24
Benzo(a)pyrene	**1.6**	JH	**0.12**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:24
Benzo(b)fluoranthene	**2.0**	H	**0.12**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:24
Benzo(g,h,i)perylene	**1.3**	JH	**0.11**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:24
Benzo(k)fluoranthene	**1.2**	JH	**0.15**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:24
Chrysene	**1.7**	JH	**0.17**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:24
Dibenz(a,h)anthracene	**0.52**	JH	**0.15**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:24
Fluoranthene	**2.3**	H	**0.14**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:24
Fluorene	U	H	0.17	1.7	mg/Kg	1	21-Jan-2015 16:24
Indeno(1,2,3-cd)pyrene	**1.0**	JH	**0.14**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:24
Naphthalene	U	H	0.13	1.7	mg/Kg	1	21-Jan-2015 16:24
Phenanthrene	**0.83**	JH	**0.14**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:24
Pyrene	**1.8**	H	**0.43**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:24
Surr: 2-Fluorobiphenyl	*89.7*			*43-125*	*%REC*	*1*	*21-Jan-2015 16:24*
Surr: 4-Terphenyl-d14	*77.6*			*32-125*	*%REC*	*1*	*21-Jan-2015 16:24*
Surr: Nitrobenzene-d5	*76.6*			*37-125*	*%REC*	*1*	*21-Jan-2015 16:24*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client:	ARCADIS U.S., Inc.	**ANALYTICAL REPORT**
Project:	Former Laredo AFB Bioavailablity D14-0256	WorkOrder:HS15010520
Sample ID:	LAFB-BSS-0-0.5 02 (b)	Lab ID:HS15010520-02
Collection Date:	23-Oct-2014 05:37	Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 21-Jan-2015		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	1	21-Jan-2015 16:46
Acenaphthylene	U	H	0.11	1.7	mg/Kg	1	21-Jan-2015 16:46
Anthracene	U	H	0.12	1.7	mg/Kg	1	21-Jan-2015 16:46
Benz(a)anthracene	**1.1**	JH	**0.10**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:46
Benzo(a)pyrene	**1.2**	JH	**0.12**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:46
Benzo(b)fluoranthene	**1.7**	H	**0.12**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:46
Benzo(g,h,i)perylene	**1.1**	JH	**0.11**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:46
Benzo(k)fluoranthene	**0.83**	JH	**0.15**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:46
Chrysene	**1.5**	JH	**0.17**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:46
Dibenz(a,h)anthracene	**0.35**	JH	**0.15**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:46
Fluoranthene	**1.9**	H	**0.14**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:46
Fluorene	U	H	0.17	1.7	mg/Kg	1	21-Jan-2015 16:46
Indeno(1,2,3-cd)pyrene	**0.76**	JH	**0.14**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:46
Naphthalene	U	H	0.13	1.7	mg/Kg	1	21-Jan-2015 16:46
Phenanthrene	**0.78**	JH	**0.14**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:46
Pyrene	**1.4**	JH	**0.43**	**1.7**	**mg/Kg**	1	21-Jan-2015 16:46
Surr: 2-Fluorobiphenyl	*75.4*			*43-125*	*%REC*	*1*	*21-Jan-2015 16:46*
Surr: 4-Terphenyl-d14	*63.5*			*32-125*	*%REC*	*1*	*21-Jan-2015 16:46*
Surr: Nitrobenzene-d5	*68.5*			*37-125*	*%REC*	*1*	*21-Jan-2015 16:46*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client:	ARCADIS U.S., Inc.	**ANALYTICAL REPORT**
Project:	Former Laredo AFB Bioavailablity D14-0256	WorkOrder:HS15010520
Sample ID:	LAFB-BSS-0-0.5 02 (c)	Lab ID:HS15010520-03
Collection Date:	23-Oct-2014 05:37	Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 21-Jan-2015		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	1	21-Jan-2015 17:09
Acenaphthylene	U	H	0.11	1.7	mg/Kg	1	21-Jan-2015 17:09
Anthracene	U	H	0.12	1.7	mg/Kg	1	21-Jan-2015 17:09
Benz(a)anthracene	**1.2**	JH	**0.10**	**1.7**	**mg/Kg**	1	21-Jan-2015 17:09
Benzo(a)pyrene	**1.5**	JH	**0.12**	**1.7**	**mg/Kg**	1	21-Jan-2015 17:09
Benzo(b)fluoranthene	**2.0**	H	**0.12**	**1.7**	**mg/Kg**	1	21-Jan-2015 17:09
Benzo(g,h,i)perylene	**1.2**	JH	**0.11**	**1.7**	**mg/Kg**	1	21-Jan-2015 17:09
Benzo(k)fluoranthene	**1.0**	JH	**0.15**	**1.7**	**mg/Kg**	1	21-Jan-2015 17:09
Chrysene	**1.7**	H	**0.17**	**1.7**	**mg/Kg**	1	21-Jan-2015 17:09
Dibenz(a,h)anthracene	**0.34**	JH	**0.15**	**1.7**	**mg/Kg**	1	21-Jan-2015 17:09
Fluoranthene	**2.2**	H	**0.14**	**1.7**	**mg/Kg**	1	21-Jan-2015 17:09
Fluorene	U	H	0.17	1.7	mg/Kg	1	21-Jan-2015 17:09
Indeno(1,2,3-cd)pyrene	**0.97**	JH	**0.14**	**1.7**	**mg/Kg**	1	21-Jan-2015 17:09
Naphthalene	U	H	0.13	1.7	mg/Kg	1	21-Jan-2015 17:09
Phenanthrene	**0.82**	JH	**0.14**	**1.7**	**mg/Kg**	1	21-Jan-2015 17:09
Pyrene	**1.8**	H	**0.43**	**1.7**	**mg/Kg**	1	21-Jan-2015 17:09
Surr: 2-Fluorobiphenyl	*87.4*			*43-125*	*%REC*	*1*	*21-Jan-2015 17:09*
Surr: 4-Terphenyl-d14	*78.5*			*32-125*	*%REC*	*1*	*21-Jan-2015 17:09*
Surr: Nitrobenzene-d5	*84.7*			*37-125*	*%REC*	*1*	*21-Jan-2015 17:09*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010520

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID 89781	**Test Name :** PAHS - 8270D			**Matrix:** Soil		
HS15010520-01	LAFB-BSS-0-0.5 02 (a)	23 Oct 2014 17:37		21 Jan 2015 08:27	21 Jan 2015 16:24	1
HS15010520-02	LAFB-BSS-0-0.5 02 (b)	23 Oct 2014 05:37		21 Jan 2015 08:27	21 Jan 2015 16:46	1
HS15010520-03	LAFB-BSS-0-0.5 02 (c)	23 Oct 2014 05:37		21 Jan 2015 08:27	21 Jan 2015 17:09	1

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010520

QC BATCH REPORT

Batch ID: 89781 **Instrument: SV-3** **Method: SW8270**

MBLK Sample ID: **MBLK-89781** Units: **ug/Kg** Analysis Date: **21-Jan-2015 16:06**
Client ID: Run ID: **SV-3_248431** SeqNo: **3162003** PrepDate: **21-Jan-2015** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	U	170								
Acenaphthylene	U	170								
Anthracene	U	170								
Benz(a)anthracene	U	170								
Benzo(a)pyrene	U	170								
Benzo(b)fluoranthene	U	170								
Benzo(g,h,i)perylene	U	170								
Benzo(k)fluoranthene	U	170								
Chrysene	U	170								
Dibenz(a,h)anthracene	U	170								
Fluoranthene	U	170								
Fluorene	U	170								
Indeno(1,2,3-cd)pyrene	U	170								
Naphthalene	U	170								
Phenanthrene	U	170								
Pyrene	U	170								
Surr: 2-Fluorobiphenyl	*2452*	*170*	*3333*	*0*	*73.6*	*43 - 125*				
Surr: 4-Terphenyl-d14	*2443*	*170*	*3333*	*0*	*73.3*	*32 - 125*				
Surr: Nitrobenzene-d5	*2593*	*170*	*3333*	*0*	*77.8*	*37 - 125*				

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010520

QC BATCH REPORT

Batch ID: 89781 **Instrument: SV-3** **Method: SW8270**

LCS Sample ID: **LCS-89781** Units: **ug/Kg** Analysis Date: **21-Jan-2015 22:49**
Client ID: Run ID: **SV-3_248431** SeqNo: **3162228** PrepDate: **21-Jan-2015** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	1351	170	1667	0	81.1	55 - 120				
Acenaphthylene	1399	170	1667	0	83.9	55 - 120				
Anthracene	1387	170	1667	0	83.2	55 - 120				
Benz(a)anthracene	1278	170	1667	0	76.7	55 - 125				
Benzo(a)pyrene	1121	170	1667	0	67.3	55 - 120				
Benzo(b)fluoranthene	1154	170	1667	0	69.2	55 - 125				
Benzo(g,h,i)perylene	1025	170	1667	0	61.5	55 - 120				
Benzo(k)fluoranthene	1104	170	1667	0	66.2	55 - 130				
Chrysene	1240	170	1667	0	74.4	55 - 125				
Dibenz(a,h)anthracene	1058	170	1667	0	63.5	55 - 120				
Fluoranthene	1376	170	1667	0	82.5	55 - 125				
Fluorene	1456	170	1667	0	87.3	55 - 120				
Indeno(1,2,3-cd)pyrene	1121	170	1667	0	67.3	55 - 125				
Naphthalene	1298	170	1667	0	77.8	55 - 120				
Phenanthrene	1363	170	1667	0	81.8	55 - 120				
Pyrene	1351	170	1667	0	81.0	55 - 125				
Surr: 2-Fluorobiphenyl	*2638*	*170*	*3333*	*0*	*79.1*	*43 - 125*				
Surr: 4-Terphenyl-d14	*2642*	*170*	*3333*	*0*	*79.3*	*32 - 125*				
Surr: Nitrobenzene-d5	*2529*	*170*	*3333*	*0*	*75.9*	*37 - 125*				

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010520

QC BATCH REPORT

Batch ID: 89781 **Instrument: SV-3** **Method: SW8270**

MS Sample ID: **HS15010435-01MS** Units: **ug/Kg** Analysis Date: **21-Jan-2015 16:29**
Client ID: Run ID: **SV-3_248431** SeqNo: **3162213** PrepDate: **21-Jan-2015** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	1400	170	1661	0	84.3	55 - 120				
Acenaphthylene	1435	170	1661	0	86.3	55 - 120				
Anthracene	1410	170	1661	0	84.9	55 - 120				
Benz(a)anthracene	1319	170	1661	0	79.4	55 - 125				
Benzo(a)pyrene	1175	170	1661	0	70.7	55 - 120				
Benzo(b)fluoranthene	1192	170	1661	0	71.7	55 - 125				
Benzo(g,h,i)perylene	1173	170	1661	0	70.6	55 - 120				
Benzo(k)fluoranthene	1065	170	1661	0	64.1	55 - 130				
Chrysene	1240	170	1661	0	74.6	55 - 125				
Dibenz(a,h)anthracene	1171	170	1661	0	70.5	55 - 120				
Fluoranthene	1396	170	1661	0	84.0	55 - 125				
Fluorene	1450	170	1661	0	87.3	55 - 120				
Indeno(1,2,3-cd)pyrene	1487	170	1661	0	89.5	55 - 125				
Naphthalene	1351	170	1661	0	81.3	55 - 120				
Phenanthrene	1401	170	1661	0	84.3	55 - 120				
Pyrene	1320	170	1661	0	79.5	55 - 125				
Surr: 2-Fluorobiphenyl	*2613*	*170*	*3322*	*0*	*78.7*	*43 - 125*				
Surr: 4-Terphenyl-d14	*2482*	*170*	*3322*	*0*	*74.7*	*32 - 125*				
Surr: Nitrobenzene-d5	*2568*	*170*	*3322*	*0*	*77.3*	*37 - 125*				

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010520

QC BATCH REPORT

Batch ID: 89781 **Instrument: SV-3** **Method: SW8270**

MSD Sample ID: **HS15010435-01MSD** Units: **ug/Kg** Analysis Date: **21-Jan-2015 20:35**
Client ID: Run ID: **SV-3_248431** SeqNo: **3162214** PrepDate: **21-Jan-2015** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	1241	170	1665	0	74.5	55 - 120	1400	12.1	30	
Acenaphthylene	1272	170	1665	0	76.4	55 - 120	1435	12.1	30	
Anthracene	1281	170	1665	0	76.9	55 - 120	1410	9.56	30	
Benz(a)anthracene	1192	170	1665	0	71.6	55 - 125	1319	10.1	30	
Benzo(a)pyrene	1009	170	1665	0	60.6	55 - 120	1175	15.2	30	
Benzo(b)fluoranthene	1094	170	1665	0	65.7	55 - 125	1192	8.51	30	
Benzo(g,h,i)perylene	1041	170	1665	0	62.5	55 - 120	1173	11.9	30	
Benzo(k)fluoranthene	1016	170	1665	0	61.0	55 - 130	1065	4.65	30	
Chrysene	1153	170	1665	0	69.2	55 - 125	1240	7.29	30	
Dibenz(a,h)anthracene	1019	170	1665	0	61.2	55 - 120	1171	13.9	30	
Fluoranthene	1231	170	1665	0	73.9	55 - 125	1396	12.6	30	
Fluorene	1298	170	1665	0	77.9	55 - 120	1450	11.1	30	
Indeno(1,2,3-cd)pyrene	1108	170	1665	0	66.5	55 - 125	1487	29.2	30	
Naphthalene	1223	170	1665	0	73.4	55 - 120	1351	9.98	30	
Phenanthrene	1247	170	1665	0	74.9	55 - 120	1401	11.6	30	
Pyrene	1190	170	1665	0	71.5	55 - 125	1320	10.4	30	
Surr: 2-Fluorobiphenyl	*2394*	*170*	*3330*	*0*	*71.9*	*43 - 125*	*2613*	*8.76*	*30*	
Surr: 4-Terphenyl-d14	*2366*	*170*	*3330*	*0*	*71.0*	*32 - 125*	*2482*	*4.8*	*30*	
Surr: Nitrobenzene-d5	*2368*	*170*	*3330*	*0*	*71.1*	*37 - 125*	*2568*	*8.09*	*30*	

The following samples were anayzed in this batch: HS15010520-01 HS15010520-02 HS15010520-03

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: **HS15010520**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/Kg	Milligrams per Kilogram

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	AR - 2014	27-Mar-2015
California	2919	31-Jul-2015
Dept of Defense	L2231 Rev 3-20-2014	22-Dec-2015
Illinois	003403	09-May-2015
Kansas	E-10352 2014-2015	31-Jul-2015
Kentucky	KY 2014-2015	30-Apr-2015
Louisiana	03087 2014/2015	30-Jun-2015
North Carolina	624 - 2015	31-Dec-2015
North Dakota	R-193 2025	30-Apr-2015
Oklahoma	2014-128	31-Aug-2015
Texas	T104704231-14-14	30-Apr-2015

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
Work Order: HS15010520

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS15010520-01	LAFB-BSS-0-0.5 02 (a)	Login	1/20/2015 1:23:54 PM	DJW	28A
HS15010520-02	LAFB-BSS-0-0.5 02 (b)	Login	1/20/2015 1:23:54 PM	DJW	28A
HS15010520-03	LAFB-BSS-0-0.5 02 (c)	Login	1/20/2015 1:23:54 PM	DJW	28A

Sample Receipt Checklist

Client Name: ARCADIS-EL PASO
Work Order: HS15010520

Date/Time Received: **24-Oct-2014 13:30**
Received by: **DJW**

Checklist completed by: *Dane J. Wacasey* (eSignature) 24-Oct-2014 (Date)

Reviewed by: *Dane J. Wacasey* (eSignature) 20-Jan-2015 (Date)

Matrices: **Soil**

Carrier name: **Client**

	Yes	No	Not Present
Shipping container/cooler in good condition?	☑	☐	☐
Custody seals intact on shipping container/cooler?	☑	☐	☐
Custody seals intact on sample bottles?	☐	☐	☑
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☐	☑	
Container/Temp Blank temperature in compliance?	☐	☑	

Temperature(s)/Thermometer(s):	25.1C/25.1C	IR1
Cooler(s)/Kit(s):	5 gallon buckets	
Date/Time sample(s) sent to storage:		

	Yes	No	No VOA vials submitted / N/A
Water - VOA vials have zero headspace?	☐	☐	☑
Water - pH acceptable upon receipt?	☐	☐	☑
pH adjusted?	☐	☐	☑

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: 0 Regarding:

Comments:

Corrective Action:

ALS Environmental

Cincinnati, OH +1 513 733 5336 | Everett, WA +1 425 356 2600 | Fort Collins, CO +1 970 490 1511 | Holland, MI +1 616 399 6070 | Houston, TX +1 281 530 5656 | Middletown, PA +1 717 944 5541 | Spring City, PA +1 610 948 4903 | Salt Lake City, UT +1 801 266 7700 | South Charleston, WV +1 304 356 3168 | York, PA +1 717 505 5280

Chain of Custody Form

Page 1 of 1

COC ID: 22774

ALS Project Manager: Dave Wheeler

ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis
Purchase Order		Project Name	LAFB-SGR	PAH for bioavailability
Work Order		Project Number	04285076.0000	
Company Name	ARCADIS, Inc.	Bill To Company	ARCADIS, Inc	
Send Report To	Glenn Hoeger	Invoice Attn		
Address	2929 Briarpark Suite 300	Address		
City/State/Zip	Houston, TX 77042	City/State/Zip		
Phone	520-629-8282	Phone		
Fax		Fax		
e-Mail Address	glenn.hoeger@arcadis-us.com	e-Mail Address		

HS15010520

ARCADIS U.S., Inc.

Former Laredo AFB Bioavailablity D14-0256

No.	Sample Description	Date	Time	Matrix	Pres	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	LAFB-BSS-0-0.5 01	10/23/14	1726	Soil	NA	1											
2	LAFB-BSS-0-0.5 02	10/23/14	1737	Soil	NA	1	X										X
3	LAFB-BSS-0-0.5 CONTROL	10/23/14	1715	Soil	NA	1	X										
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Gracela Moore, Gracela Moore

Shipment Method: Drop-off

Required Turnaround Time (Check Box): ☐ STD 10 Wk Days ☑ 5 Wk Days ☐ 2 Wk Days ☐ 24 Hour ☒ Other

Results Due Date:

Relinquished by: Gracela E. Moore — Date: 10/24/14 — Time: 1330

Received by: [signature] ALS

Relinquished by: — Date: — Time:

Received by (Laboratory):

Notes:

Logged by (Laboratory): — Date: — Time:

Checked by (Laboratory):

Cooler ID: 5-3, 5-5 — Cooler Temp: 2.5 A, C

QC Package: (Check One Box Below)
☐ Level II Std QC
☐ Level III Std QC/Raw Date
☐ Level IV SW846/CLP
☐ Other
☐ TRRP Checklist
☐ TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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ALS Standard Operating Procedure

DOCUMENT TITLE:	AUTOMATED SOXHLET EXTRACTION FOR SOILS AND SOLIDS BY 3541, WASTE DILUTION BY 3580A AND ACID CLEANUP BY 3665A
REFERENCED METHOD:	SW3541
SOP ID:	HS-EXT002
REV. NUMBER:	10.3
EFFECTIVE DATE:	8/15/13

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AUTOMATED SOXHLET EXTRACTION FOR SOILS AND SOLIDS BY 3541, WASTE DILUTION BY 3580A AND ACID CLEANUP BY 3665A

SOPID:	HS-EXT002	Rev. Number:	10.3	Effective Date:	08/15/2013

Approved By: _____ Date: 8/13/13
Department Supervisor – Rajen Giga

Approved By: _____ Date: 08/13/13
Technical Director – Hoai Van

Approved By: _____ Date: 8-13-13
QA Manager – Theodore Yen

Approved By: _____ Date: 8/13/13
Laboratory Director – Chris Schepcoff

Archival Date:	_____	Doc Control ID#:	_____	Editor:	_____

QA 4/29/15

4-29-15

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AUTOMATED SOXHLET EXTRACTION FOR SOILS AND SOLIDS BY 3541, WASTE DILUTION BY 3580A AND ACID CLEANUP BY 3665A

1) Scope and Applicability

1.1 This method is a procedure for extracting nonvolatile and semivolatile organic compounds from solids as soils, sludges, and wastes. The soxhlet extraction process ensures intimate contact of the sample matrix with the extraction solvent. This SOP references SW-846 Method 3541.

1.2 This method is applicable to the isolation and concentration of water-insoluble and slightly water-soluble organics in preparation for a variety of chromatographic determinative methods (8081B, 8082A and 8270D).

1.3 This method is restricted to use by or under the supervision of trained analysts. Each analyst must demonstrate the ability to generate acceptable results with this method.

1.4 A solvent dilution is used for oily samples prior to clean-up and/or analysis by SW-846 Method 3580.

1.5 Include in this SOP is the prep for wipes for PCBs, Pesticides and Semivolatiles.

2) Summary of Procedure

2.1 The solid sample is mixed with anhydrous sodium sulfate, placed in an extraction thimble and extracted using an appropriate solvent (see Table 10.3) in an automated Soxhlet extractor.

2.2 The extract is then dried, concentrated (if necessary), and, as necessary, exchanged into a solvent compatible with the cleanup or determinative step being employed (see Table 10.3 and Section 12).

2.3 If the sample is oil, then weigh one gram of sample into a 10 mL Class A volumetric and make to volume with the appropriate solvent.

2.4 Wipes samples are extracted in its entity without any subsampling.

3) Definitions

3.1 Demonstration of Capability: The analysis of QC samples in series to verify the ability to produce data of acceptable precision and bias.

3.2 Exception Report: Appropriate comments reported with the associated sample batch that addresses sample anomalies such as demonstrated sample matrix effects.

3.3 Laboratory Control Sample (LCS): A sample matrix, free from the analytes of interest, spiked with known amounts of analytes or a material containing known and verified amounts of analytes.

3.4 Limit of Detection (LOD): an estimate of the minimum amount of a substance that an analytical process can reliably detect. The LOD is determined annually through the execution of a Method Detection Limit Study, and verified quarterly through the analysis of a Detectability Check Sample (DCS).

3.5 Limit of Quantitation (LOQ): The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of

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confidence. This defined concentration can be no lower than the concentration of the lowest calibration standard and can only be used if acceptable quality control criteria for this standard are met.

3.6 Matrix Spike (MS): A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

3.7 Matrix Spike Duplicate (MSD): A second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of recovery for each analyte.

3.8 Matrix: The substrate (e.g., water, soil, etc.) which may contain the analyte of interest.

3.9 Method Blank (MBLK): A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analysis.

3.10 Method Detection Limit (MDL) study: a procedure described in 40CFR Part 136, Appendix B, that describes how to produce an MDL, a reporting element of certain EPA methods. The MDL study is one approach to determine the LOD.

3.11 NCAR: Nonconformance Corrective Action Report (refer to SOP HSQS003, current revision).

3.12 Organic Free Water: Deionized (DI) reagent water meeting purity characteristics of Type I laboratory distilled water (daily resistance ≥17 megohms-cm). For additional purification, the DI water is passed through an activated carbon filter.

3.13 Preparation Batch: A defined set of one to 20 client samples of the same matrix, meeting the batch definition criteria, and prepared for analysis within 24 hours. The preparation batch must also contain the required determinative method defined batch QC samples (e.g. method blank, laboratory control samples, matrix spikes, duplicates, etc.).

3.14 Surrogate: An analyte added to a sample, which is unlikely to be found in any sample at significant concentration, and which is added directly to a sample aliquot in known amounts before any sample processing procedures are conducted. It is measured with the same procedures used to measure other sample components. The purpose of the surrogate analyte is to monitor method performance with each sample.

3.15 Surrogate Spike: A substance with properties that mimic the analyte of interest. It is unlikely to be found in environmental samples and is added to them for quality control purposes.

3.16 Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A **preparation batch** is composed of one (1) to twenty (20) environmental sample of the same quality systems matrix, meeting the above mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be twenty-four (24) hours. An **analytical batch** is composed of prepared environmental samples (extracts, digestates or concentrates) which are analyzed together as a group. An analytical batch

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can include prepared samples originating from various quality system matrices and can exceed twenty (20) samples.

4) Health and Safety Warnings

4.1 Lab Safety: Due to various hazards in the laboratory, safety glasses and laboratory coats or aprons must be worn at all times while in the laboratory. In addition, gloves and a face shield should be worn when dealing with toxic, caustic, and/or flammable chemicals.

4.2 Chemical Hygiene: The toxicity or carcinogenicity of each reagent used has not been precisely defined; however, each chemical used should be treated as a potential health hazard. Exposure to laboratory reagents should be reduced to the lowest possible level. The laboratory maintains a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets (MSDS) is available to all personnel involved in these analyses.

4.3 Waste Management: The principal wastes generated by this procedure are the method-required chemicals and standards. It is the laboratory's responsibility to comply with all federal, state, and local regulations governing waste management by minimizing and controlling all releases from fume hoods and bench operations. Compliance with all sewage discharge permits and regulations is required. Laboratory procedures in SOP HS-SAF-001, Waste Disposal Procedures, must be followed.

4.4 Pollution Prevention: The materials used in this method pose little threat to the environment when recycled and managed properly. The quantities of chemicals purchased should be based on the expected usage during its shelf life. Standards and reagents should be prepared in volumes consistent with laboratory use to minimize the volume of expired standards or reagents to be disposed.

5) Cautions

5.1 Routine preventative maintenance must be performed and documented to assure optimum instrument performance. Refer to the current revision of SOP HS-EQ004 for preventative maintenance schedules.

5.2 All glassware must be clean and rinsed thoroughly with the extraction solvent prior to transferring from one container to the next. For glassware cleaning procedures, refer to SOP HS-GEN003.

5.2.1 If a batch of samples having high concentrations of extractable material has been processed, it may be necessary to cycle a method blank through the affected units to ensure there is no unit contamination. Analyze the method blank to verify the system is free of impurities.

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5.3 Exposure to plastic materials is forbidden, as they are a source of phthalate (an analyte of concern) contamination. Gloves, tubing and other laboratory materials must be free of these materials.

5.4 Check the oil level in the auto-soxhlet oil bath with each use and adjust as necessary.

5.5 Closely monitor extract solvent volume reduction steps when a 0.5-ml volume is approached, so that extracts are not reduced to dryness. Extracts reduced to dryness must be re-extracted.

5.6 When transferring any solvent into vessels containing sample or sample extract, caution must be exercised in the transfer process to avoid sample or solvent cross-contamination. Do not allow the solvent transfer devices to enter the neck of the sample or sample extract vessel, as cross-contamination is always possible as a result of the practice.

6) Interferences

6.1 The decomposition of some analytes has been demonstrated under basic extraction conditions. Organochlorine pesticides may dechlorinate, phthalate esters may exchange, and phenols may react to form tannates.

6.2 Method interference may be caused by contaminants in solvents, reagents, glassware, and sample processing hardware. These contaminants lead to discrete artifacts or to elevated baselines in gas chromatograms. These materials must be routinely demonstrated to be free from interferences under the sample preparation and analysis conditions by analyzing instrument blanks and method blanks.

6.3 Interference's caused by phthalate esters can pose a major problem in pesticide analysis. Because common flexible plastics contain varying amounts of phthalates that are easily extracted during laboratory operations, cross-contamination of glassware frequently occurs when plastics are handled. Interferences from phthalates are minimized when the use of plastic materials is avoided.

6.4 Matrix interferences may be caused by contaminants that are co-extracted from the sample. The extent of matrix interferences will vary considerably from source to source, depending upon the nature of the site being sampled. The cleanup procedures in this method must be used to remove such interferences in order to achieve the MQL.

6.5 Both the extraction thimble and the O-Rings used to seal the thimble require a careful inspection throughout the procedure. Both can be a source of interference if leakage occurs.

7) Personnel Qualifications and Responsibilities

7.1 General Responsibilities - This method is restricted to use by or under the supervision of analysts experienced in the method.

7.2 Analyst - It is the responsibility of the analyst(s) to:

7.2.1 Each must read and understand this SOP and follow it as written. Any deviations or non-conformances must be documented and submitted to the QA Manager for approval.

7.2.2 Produce method compliant data that meets all quality requirements using this procedure and the Data Reduction, Review and Validation SOP (HS-QS-009).

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7.2.3 Complete the required initial demonstration of proficiency before performing this procedure without supervision.
7.2.4 Complete an ongoing demonstration of proficiency annually when continuing to perform the procedure.
7.2.5 The analysts must submit data for peer or supervisor review.

7.3 Section Supervisor - It is the responsibility of the section supervisor to:
7.3.1 Ensure that all analysts have the technical ability and have received adequate training required to perform this procedure.
7.3.2 Ensure analysts have completed the required initial demonstration of proficiency before performing this procedure without supervision.
7.3.3 Ensure analysts complete an ongoing demonstration of proficiency annually when continuing to perform the procedure.
7.3.4 Ensure analysts produce method compliant data that meet all quality requirements using this procedure and the Data Reduction, Review and Validation SOP.

7.4 Project Manager - It is the responsibility of the Project Manager to ensure that all method requirements for a client requesting this procedure are understood by the laboratory prior to initiating this procedure for a given set of samples.

7.5 QA Manager: The QA Manager is responsible for
7.5.1 Approving deviations and non-conformances
7.5.2 Ensuring that this procedure is compliant with method and regulatory requirements,
7.5.3 Ensuring that the analytical method and SOP are followed as written through internal method and system audits.

8) Sample Collection, Handling, and Preservation

Table 0.1 SEMIVOLATILE ORGANICS AND ORGANOCHLORING PESTICIDES/PCBS

SEMIVOLATILE ORGANICS AND ORGANOCHLORING PESTICIDES/PCBS			
Sample Matrix	Container	Preservative	Holding Time
Concentrated Waste Samples	125-mL widemouth glass with Teflon-lined lid	None	Extraction 14 days/Analysis 40 days
Solid / Soil Samples	250-mL widemouth glass container with Teflon-lined lid	Cool to 4 °C	Extraction 14 days/Analysis 40 days
PCB Concentrated Waste Samples	125-mL widemouth glass with Teflon-lined lid	None	Analysis 40 days (no Holding time for Extraction)
PCB Solid / Soil Samples	250-mL widemouth glass container with Teflon-lined lid	Cool to 4 °C	Analysis 40 days (no Holding time for Extraction) Note some agency or programs still uses 14 days to extract)

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9) Equipment and Supplies

9.1 Automated Soxhlet System/Soxtec System HT2 or equivalent: store and use apparatus in a hood.

9.2 Glass extraction cups

9.3 Magnetic Extraction Thimbles, 60-g capacity.

9.4 Coolflow CFT-33 or equivalent: a suitable refrigerated water re-circulator

9.5 Boiling chips – Solvent-extracted, approximately 10/40 mesh (Teflon™ or equivalent).

9.6 Vials – Glass, 2-ml capacity, with Teflon™ lined crimp top.

9.7 Vials – Glass, 12-ml and 40-ml (VOC) capacity, with Teflon™ lined screw top

9.8 Disposable Pasteur glass pipets.

9.9 Top Loading balance, capable of weighing to 0.01 g (for sample weight measurements).

9.10 Analytical Balance- capable of weighing to 0.0001 g (for standard preparation).

9.11 Glass Pyrex beakers, various sizes, 50, 125, 250-ml, etc.

9.12 Spatulas, disposable.

9.13 Spatulas, metal.

9.14 Syringes, various sizes – 100-1000-µL, 5.0- 10.0-mL etc. (calibrated Hamilton Gastight or equivalent, pre-certified accuracy of ±1%).

9.15 Volumetric flasks, various sizes, Class A.

9.16 Amber Glass bottles, various sizes (125-, 250-ml etc.) .

9.17 Table Top Centrifuge (~3000 rpm max) or equivalent.

9.18 Nitrogen Blow-down apparatus.

9.19 TurboVap® II (Caliper Life Sciences, Inc.) and blowdown tube.

9.20 Glasswool.

9.21 Certified weights.

10) Standards and Reagents

10.1 Note: Store purchased standards according to manufacturer specifications. Store standard solutions (remaining stock, composite, calibration and surrogate) below 6 °C in glass containers having Teflon™ lined lids. All purchased stock standard solutions must be replaced after reaching the manufacturer's expiration date assigned to the standard. All laboratory prepared standard solutions must be replaced after six months or sooner if routine QC indicates a problem. An assigned expiration date of a lab prepared standard cannot exceed the manufacturer's expiration date for any component used in the standard formulation.

10.2 HPLC, Pesticide, and other such high purity solvents shall be used for all tests.

Reagent grade inorganic chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall confirm to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available. Other grades may be used, provided that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination. Reagents should be stored in glass to prevent the leaching of contaminants from plastic containers.

10.2.1 Sodium sulfate (granular, anhydrous), Na_2SO_4. Purify by heating at 400 ˚C for four hours minimally. Cool the dry portions of Na_2SO_4 in a desiccator, then store cooled portions in a glass jar with a lid until ready for use.

10.2.2 Methylene Chloride, boiling point 40 ˚C.

10.2.3 Acetone, boiling point 56 ˚C.

10.2.4 Hexane, boiling point 69 ˚C

10.3 Soil/sediment and aqueous sludge samples are extracted using either of the following solvent systems:

Table 10.3 Method Extraction Solvent Systems

Determinative Method	Initial Extraction Solvent	Soxhlet Temp, ˚C	Exchange Solvent
Organochlorine Pesticides (8081)	Methylene chloride	140	Hexane
PCBs (8082)	Methylene chloride	140	Hexane
Semi-volatile Organics (8270)	Methylene chloride	140	None

10.4 Pesticide (SW8081A-608) Standard Solutions – typical examples:

10.4.1 Stock Pesticide Surrogate Mix, 200 µg/ml, Decachlorobiphenyl (DCB) and 2,4,5,6 Tetrachloro-meta-xylene (TMX), Restek # 32000 or equivalent.

10.4.2 Working Pesticide Surrogate Standard, 20 µg/L: In a 200-mL volumetric flask, add 200 µL Stock Pesticide Surrogate Mix (Section 10.4.1) to ~150 mL Acetone. Dilute to volume and mix. Transfer equal portions into two 125-mL amber glass bottles. Assign each bottle the same base tracking ID, with A and B as the fraction ID. Store this standard between 0-6 °C for up to 6 months.

10.4.3 Stock Pesticide Mix AB#2, 8-80 µg/ml (Restek # 32292 or equivalent):

10.4.3.1 This standard contains the following compounds:

Aldrin (8 µg/mL),
α-BHC (8 µg/mL),
β-BHC (8 µg/mL),
δ-BHC (8 µg/mL),
γ-BHC (Lindane – 8 µg/mL)
α-Chlordane (8 µg/mL),
γ-Chlordane (8 µg/mL),
4,4'-DDD (16 µg/mL),
4,4'-DDE (16 µg/mL),
4,4'-DDT (16 µg/mL),
Dieldrin (16 µg/mL),
Endosulfan I (8 µg/mL),
Endosulfan II (16 µg/mL),
Endosulfan sulfate (16 µg/mL),
Endrin (16 µg/mL),
Endrin aldehyde (16 µg/mL),
Endrin ketone (16 µg/mL),
Heptachlor (8 µg/mL),
Heptachlor epoxide (8 µg/mL),
Methoxychlor (80 µg/mL);

10.4.4 Working Pesticide LCS/MS Standard (AB#2), 0.25 – 2.5 µg/ml: In a 20-mL volumetric flask, add 625 µL Stock Pesticide Mix AB#2 (10.4.3) to ~18 mL

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Acetone. Dilute to volume and mix. Transfer this standard to a 40-mL VOA vial and store between 0-6 ºC for up to 6 months.

10.4.4.1 This standard may be prepared in two batches and combined for a total volume of 40 mL

10.4.4.2 Use this standard for preparation of LCS and MS pesticide spikes as described in table 10.2.

Table 10.4.4 Pesticide Spikes

	Compound Name	Intermediate Standard conc.	Soil Spike (30 g) conc.
	1.0 mL of spike solution added to 1.0 L water or 30 g sample.	µg/ml, ppm	µg/Kg, ppb
1	Aldrin	0.25	8.33
2	α-BHC	0.25	8.33
3	β-BHC	0.25	8.33
4	δ-BHC	0.25	8.33
5	γ-BHC (Lindane)	0.25	8.33
6	α-chlordane	0.25	8.33
7	γ-chlordane	0.25	8.33
8	4,4'-DDE	0.50	16.7
9	4,4'-DDD	0.50	16.7
10	4,4'-DDT	0.50	16.7
11	Dieldrin	0.50	16.7
12	Endosulfan I	0.25	8.33
13	Endosulfan II	0.50	16.7
14	Endosulfan Sulfate	0.50	16.7
15	Endrin	0.50	16.7
16	Endrin Aldehyde	0.50	16.7
17	Endrin Ketone	0.50	16.7
18	Hepatachlor	0.25	8.33
19	Heptachlor epoxide	0.25	8.33
20	Methoxychlor	2.5	83.3

10.4.5 Miscellaneous Pesticide Stock Solutions, individually @ 1000 µg/ml, e.g.: Mirex, cis-Nonachlor, trans-Nonachlor, Oxychlordane ,etc.

10.4.5.1 These Organochlorine Pesticide standards are prepared yielding a typical final concentration of 0.25 ppm when requested by the client.

10.5 Semivolatile (SW8270/EPA 625) Standard Solutions – typical example:

10.5.1 BN Surrogate, Restek, Inc., Cat# 31087, 5000 ppm.

10.5.2 Acid Surrogate, Restek, Inc., Cat# 31086, 10000 ppm

10.5.3 SW8270 - 625 SV Surrogate Standard Mix, @ 100 ppm: Into a 200-mL volumetric flask add 4 mL BN Surrogate (10.5.1), 2 mL Acid Surrogate (10.5.2), and ~190 mL Methanol. Bring to volume with Methanol. (Refer to Table 10.3). Transfer equal portions into two 125-mL amber glass bottles and assign each bottle the same base tracking ID, with A and B as fraction IDs Store this standard between 0-6 °C for up to 6 months.

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10.5.3.1 Use 1.0 mL of the solution for surrogate spikes.

Table 10.5.3 8270 SV Surrogate Standard Mix @ 100 ppm

Stock Name	Stock Conc., ppm	Amt Added, mL	Final volume, mL	Final Conc. ppm
BN Surr Restek 31086	5000	4.0	200.0	100
Acid Surr Restek 31087	10000	2.0		100

10.5.4 SV Second Source Stock Standards, 1000 or 2000 µg/ml.

10.5.4.1 These commercially purchased standards are used to prepare intermediate second source standards for use in QC samples. They are typically prepared from several multi-component mix standards. They are obtained from a different vendor than the calibration standard supplier. Where a different supplier is unavailable, the second source must be a different lot.

Table 10.5.4.1 Stock Mixes

8270 MegaMix, Restek, Inc., Cat # 31850, 1000 ppm in Methylene Chloride, 76 SVOCs (59 Base Neutrals, 17Acids);
8270 Cal Mix #1, Restek, Inc., Cat # 31618, 2000 ppm in Methylene Chloride, 19 Acid SVOCs;
8270 Appendix IX Mix #1, Restek, Inc., Cat # 31625, 2000 ppm in Methylene Chloride, 18 Base/Neutral SVOCs;
8270 Appendix IX Mix #2, Restek, Inc., Cat # 31806, 1000 ppm in Methylene Chloride, 32 SVOCs;
8270 Appendix IX OP Pesticides Mix, Restek, Inc., Cat # 32419, 2000 ppm in Methylene Chloride, 9 OP Pesticides;
605 Benzidines Mix (Benzidine, 3,3'-Dichlorobenzidine), Restek, Inc., Cat # 31030, 2000 ppm in methanol,
8270 Miscellaneous single components, either as 1000 ppm or 10000 ppm

10.5.4.2 LCS Components are to be designed to achieve a full List LCS Spike mix needed for the specific 8270 analyte list application. The following is an example of stock standards that may be used to prepare a LCS Full List Intermediate Spike Standard.

10.5.4.2 Typical LCS/MS Intermediate Full List Standard

Stock Name	Stock Conc., ppm	Amt Added, mL	Final Volume, mL	Final Conc. ppm
8270 Mega Mix # 31850 (59 BN, 17Acids)	1000	1.0	20.0 (Methylene Chloride)	50 (BN)
8270 Cal Mix #1, # 31618 (19 Acids)	2000	0.5		100 (Acids)
605 Benzidines Mix, # 31030	2000	0.5		100

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Stock Name	Stock Conc., ppm	Amt Added, mL	Final Volume, mL	Final Conc. ppm
Miscellaneous single components, 1000-ppm: [optional per project]	1000	1.0		50

Due to the complexity the analysis, additional intermediate standards may be needed based on specific analyte lists, co-elutions, or non-routine compounds.

10.5.5 Preparation of 8270 Low Level LCS Solution, 1000 or 2000 µg/ml, typical example: The following is an example of Stocks used to prepare an 8270 Low Level LCS Standard. The standard is prepared similarly to SW8270 LCS standard described in Section 10.5.4

10.5.5.1 8270 MegaMix, Restek, Inc., Cat # 31850, 1000 ppm in Methylene Chloride, 76 SVOCs (59 Base Neutrals, 17Acids);

10.5.5.2 Miscellaneous compounds, as 1000 ppm.

10.5.5.3 605 Benzidines Mix (Benzidine, 3,3'-Dichlorobenzidine), Restek Cat # 31030, 2000 ppm in methanol, different lot than ICAL source.

10.1.5 LCS/MS Intermediate Full List Standard

Stock Name	Stock Conc., ppm	Amt Added, mL	Final Volume, mL	Final Conc. ppm
8270 Mega Mix #31850 (59 BN, 17Acids)	1000	0.200	40.0 (Methylene Chloride)	5.0
605 Benzidines Mix, #31030	2000	0.100		5.0
Misc single components, 1000-ppm:	1000	0.200		5.0

10.5.6 SW8270 – Low Level SV Surrogate Standard Mix, @ 100 ppm: Into a 200-mL volumetric flask, add 0.200 mL BN Surrogate (10.5.1) and 0.100 mL Acid Surrogate (10.5.2) to ~190 mL Methanol. Bring to volume and mix. Ideally, transfer equal portions into two 125-mL amber glass bottles. Assign each bottle the same base tracking ID, with A and B as the fraction ID. Store this standard between 0-6 °C for up to 6 months.

10.5.6.1 Use 1.0 ml of the solution for surrogate spikes.

10.2 Low Level SV Surrogate Standard Mix @ 5.0 ppm

Stock Name	Stock Conc., ppm	Amt Added, ML	Final volume, mL	Final Conc. ppm
BN Surr Restek 31087	5000	0.200	200.0	5.0
Acid Surr Restek 31086	10000	0.100		5.0

10.6 PCB (SW8082 / EPA 608) Standard Solutions– typical example

10.6.1 Stock PCB LCS/MS Mix (Aroclor 1016/1260), 1000 µg/mL: Restek # 32039 or

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equivalent.

10.6.2 PCB LCS/MS Mix, 5.0 µg/mL (Aroclor 1016/1260): In a 100-mL volumetric flask, add 500 µL Stock PCB LCS/MS Mix (10.6.1) to ~98 mL pesticide grade acetone. Bring to volume and mix. Transfer to a 125-mL amber glass bottle and store between 0-6 ºC for up to 6 months.

10.6.3 Stock Toxaphene LCS Standard (for 8081A or 608), 4000 µg/mL: Absolute Standards # 17208 or equivalent.

10.6.4 Working Toxaphene LCS Standard, 2.5 µg/mL (ppm): In a 50-mL volumetric flask, add 31.25 µL Stock Toxaphene LCS Standard (10.6.3) to ~40 mL pesticide grade acetone. Bring to volume and mix. Transfer to a-125 mL amber glass bottle and store between 0-6 ºC for up to 6 months.

10.6.5 Stock Technical Chlordane LCS Standard (for 8081A or 608), 2000 µg/mL: Absolute Standards # 16208 or equivalent.

10.6.6 Technical Chlordane LCS Standard, 2.5 µg/mL (ppm): In a 50-mL volumetric flask, add 31.25 µL Stock Technical Chlordane LCS Standard (10.6.5) to ~40 mL pesticide grade acetone. Bring to volume and mix. Transfer to a 125-mL amber glass bottle and store between 0-6 ºC for up to 6 months.

NOTE: The routine analysis of Laboratory Control Samples for Toxaphene and Technical Chlordane is performed only by request from the client.

10.7 PCB Free Transformer Oil – available from Sigma Aldrich.

10.8 Reagent Storage - Transfer the mixtures to appropriate glass bottles or vials with Teflon™-lined caps and store below 6 ºC. Working standards should be prepared as needed from stocks. Purchased stock standards must be replaced upon reaching the manufacturer expiration date. Prepared intermediate standards should be replaced every 6 months or sooner if a component expires sooner.

10.9 Reagent Preparation Records: Record purchased Standards in the Chemical Inventory Logbook and record standards prepared in the Standard Preparation Logbook according to HS-QS001. Label standards appropriately so that they can be easily cross-referenced to other records (extraction prep logbooks, etc.). A 0.5- to 1.0-ml portion of each prepared spike standard should be submitted to the respective analytical group for an accuracy profile prior to using the spike standard.

11) Method Calibration

11.1 Perform support equipment calibration checks may be required for daily use.

11.1.1 Perform the daily balance calibration check according to HS-EQ001, current revision.

12) Sample Preparation/Analysis

12.1 Preliminary Sample Handling:

12.1.1 Allow samples to come to room temperature.

12.1.2 Decant and discard the following:

12.1.2.1 Excess water (sediment samples)

12.1.2.2 Foreign objects such as sticks, leaves, and rocks.

12.1.3 Inspect the sample for homogeneity and particle size characteristics. Mix as necessary to obtain a representative sample. This is best achieved by mixing the material in the sample container using a disposable spatula, or by

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transferring the entire sample to a mixing dish and after thorough mixing, withdrawing a portion of the mixed sample. Refer to HS-QS008 for details regarding proper subsampling techniques.

12.2 Particle Size Reduction: Samples with large particle sizes (does not pass through a 1-mm mesh sieve) require particle size reduction.

12.2.1 Dry samples may be ground to the desired particle size using a mortar and pestle. Introduce sufficient sample to yield a 20-g aliquot of ground sample. Care must be taken to decontaminate the mortar and pestle between samples. This is accomplished by washing the equipment with soap and water followed by acetone and hexane rinses.

12.2.2 Multiphase samples are separated into discreet phases. The different phases are then processed appropriately (Aqueous, Solid, or Oil Waste).

12.2.3 Gummy, fibrous, and oily samples can not be ground. Alternative particle size reduction can be accomplished by cutting, shredding or otherwise separating the material.

12.3 Soils and Sediments:

12.3.1 Weigh 30.00-g aliquot of sample, to the nearest 0.01 g, in a 125-mL beaker. Record this weight in the sample preparation logbook. This value will be entered in the LIMS prep batch.

12.3.2 Add sufficient anhydrous sodium sulfate (Na_2SO_4) and mix until the mixture is a free-flowing powder. This may require up to 30 g of sodium sulfate. Record the weight of the sodium sulfate used in the sample preparation logbook.

12.3.2.1 When drying sediments, or very wet soils, with sodium sulfate, obtaining a consistency of free flowing powder is critical to obtaining an effective extraction, ensuring maximum exposure of sample surface area.

12.3.2.2 If more than 30 g of sodium sulfate are required to adequately dry a sample, repeat this process with a 15 g sample aliquot.

12.3.2.3 Make note of the sample requiring the most anhydrous sodium sulfate.

12.3.2.4 Prepare batch QC samples using 30 g aliquots of Ottawa Sand and 1 mL of the appropriate spiking standard (NOTE: Use 0.5 mL of the spiking standard if 15 g of sample is used). Use the same amount of anhydrous sodium sulfate as noted in 12.3.2.3 in each QC Sample.

12.3.3 Prepare the magnetic glass extraction cup and thimble by rinsing first with the appropriate extraction solvent. Place sufficient glass wool in the extraction thimble cover the bottom of the thimble

12.3.4 Transfer the entire dried portion of soil/sediment to a labeled extraction cup. Spike each sample and QC sample with 1 mL of the appropriate surrogate spike.

12.4 Wipe Preparation

12.4.1 Prepare the magnetic glass extraction cup and thimble by rinsing first with the appropriate extraction solvent. Place sufficient glass wool in the extraction thimble cover the bottom of the thimble

12.4.2 Place entire wipe in thimble.

12.4.3 Add 15g anhydrous sodium sulfate (Na_2SO_4) to the thimble.

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12.4.4 Prepare blank using a blank wipe and LCD and LCSD. QC samples are prepared by spiking wipes with 1 mL of the Pest/PCB surrogate and I mL of the Pest or PCB Spiking Solution while wipes are in the thimble or Semi Surr and Semi Spiking Solution and before adding the solvent.

12.4.5 Continue to step 12.5.3, but rinse the original sample container and transfer solvent rinse to correspond sample thimble and proceed with remaining steps, 12.5.4-12.5.8.

12.4.6 Complete preparation login eLIMS by using 1 gram as the weight. eLIMS will us the 1 gram to calculate prep factors and report as ug/wipe. If area of the wipes are provided (generally 100 cm2) by the sampler or client, then final values may be reported as ug/100 cm2.

12.5 Automated Soxhlet Extraction:

12.5.1 Press power on the control unit to activate the system. Check the temperature settings to ensure that the soxhlet temperature will be maintained according to Table 10.1. Turn on the water re-circulator and adjust to maintain the cooling water at 9 – 15 °C.

12.5.2 Attach the magnetic glass soxhlet cups to condensers. Lower the knob to "Boiling" position. This allows the thimble to properly attach to the apparatus. Raise the knob to "Rinsing" position to raise the thimble.

12.5.3 Fill each extraction cup with 4 boiling chips and 50mL of the appropriate solvent (See section 10.1).

12.5.4 Lower the locking handle and insert cup into the locked position. Ensure a good seal between the cup and the soxhlet. Periodically check the seal through the remainder of the procedure to prevent solvent leakage.

12.5.5 Lower the knob to the "Boiling" position to lower the thimble into the solvent. Keep the samples in this position for 60 minutes.

12.5.6 After 60 minutes, raise the knob to the "Rinsing" position. Keep the samples in this position for an additional 60 minutes (Total time of extraction is 120 minutes). The condenser valves remain open during this time.

12.5.7 At the end of the rinse time, collect ~10 mL of solvent

12.5.8 Open the system and remove the cups. Quantitatively transfer the contents of each cup to a clean TurboVapII® glass tube.

12.6 TurboVapII® Concentration:

12.6.1 Table 21.2 provides the operating conditions and concentration times for the TurboVapII®.

12.6.2 Concentration will result in a final extract volume between 1.0 and 5mL. Following concentration the extracts are ready for solvent exchange, final nitrogen blow-down, transfer to capped vials, or further cleanup techniques.

12.7 Solvent Exchange (Pest/PCB extraction only):

12.7.1 Add 20 mL reagent grade hexane to each TurboVap tube. Return to the TurboVap and concentrate to approximately 1 – 5 mL. Bring the extract to 10 mL with hexane.

12.7.2 Transfer the sample to a 12-mL screw top glass vial.

12.8 Nitrogen Blow-Down technique:

12.8.1 Where sample extract volumes are more than 1mL after sample concentration, further nitrogen blow-down is required. The extract is transferred from the TurboVap condenser to a 2-mL glass vial. The vial is placed under a constant stream of nitrogen, which promotes further concentration of the extract, to a

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volume slightly less than 1 mL. The technician then re-adjusts the extract volume to 1.0 mL with the appropriate solvent.

12.9 Sulfuric Acid Clean-up Procedure for PCBs (SW3665A)

12.9.1 The following procedure is performed on all PCB sample and QC extracts.

12.9.2 Using a 10mL syringe, transfer 1 – 2 mL of the hexane extract to an 8-mL vial.

12.9.3 In a fume hood, carefully add 5 mL concentrated sulfuric acid.

12.9.3.1 CAUTION: Make sure that there is no exothermic reaction or gas evolution occurring before proceeding.

12.9.4 Cap the vial tightly and vortex for one minute. A vortex must be visible in the vial.

12.9.4.1 CAUTION: Stop vortexing immediately if the vial leaks. AVOID SKIN CONTACT, SULFURIC ACID BURNS.

12.9.5 Allow the phases to separate for at least 1 minute.

12.9.6 Examine the top (hexane) layer; it should not be highly colored nor should it have a visible emulsion or cloudiness. Separation can also be achieved by using a centrifuge for 1 minute on medium speed.

12.9.7 If clean separation is not achieved, or if the hexane layer is highly colored, remove the bottom layer (acid) and dispose of properly. Repeat section 12.8.3. Do not proceed until the extract is no longer colored. When repeating procedure more than once, all QC samples must undergo the same number of cleanup preformed on the samples, for example if one sample was to need 3 cleanup steps, the MB and LCS must each undergo 3 cleanups.

12.9.8 Remove the top layer (hexane) using a 10-mL syringe. If the volume removed is less than 3 mL, adjust the volume to 3 mL using hexane.

12.9.8.1 CAUTION: Care must be taken not to include acid when removing the hexane layer. Acid can cause serious damage to the analytical instrumentation.

12.9.9 The final hexane extract is separated into two 1.5-mL aliquots and transferred to separate 1-mL autosampler vials. This preserves a second aliquot for dilutions or re-analysis.

12.10 Waste Dilutions

12.10.1 In a clean 12 mL vial, using a 10 mL gastight syringe transfer 10 mL if methylene chloride and cap tightly. This vial will be used as the reference vial to bring all samples to mL.

12.10.2 Weight out 1 gram of sample in a clean 12 mL vials. For Method Blank and LCS use I gram of PCB free transformer oil.

12.10.2 For each batch a method blank, LCS, MS and MSD will be needed.

12.10.3 To all samples and QC samples, add 1mL of the appropriate surrogate solution.

12.10.4 For the LCS, MS and MSD add 1 mL of the appropriate spiking mixture.

12.10.5 Dilute all sample to a final volume of 10 mL using the vials in step 12.10.1 as the volume reference. Samples for semivolatile will be diluted in methylene chloride and samples pesticides and PCBs will be diluted with hexane. PCB batches must undergo acid cleanup in step 12.9, this includes the blank and LCS/LCSD.

13) Troubleshooting

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13.1 Good technique is important to obtain consistently acceptable LCS, MS, and MSD recoveries. Good housekeeping and thorough equipment and glassware cleaning are essential to preventing sample contamination. Refer to the Glassware Cleaning SOP for detailed procedures addressing equipment rinsing after extraction of high concentration samples.

14) Data Acquisition

14.1 Sample preparation information is logged into LIMS to establish a prep batch ID. The preparation information is used to calculate the pertinent analytical results.

15) Calculation, and Data Reduction Requirements

15.1 LIMS uses the extraction data (sample weight and extract final volume) entered by the extraction technician to perform calculations and reporting after analysis.

16) Quality Control, Acceptance Criteria and Corrective Action

16.1 Demonstration of Capability

- 16.1.1 Purpose: Verify the ability to produce data of acceptable precision and bias for a specific instrument type, matrix, method, and analyst.
- 16.1.2 Frequency: Initially during method development, and any time there is a significant change in instrument type, personnel, methodology, or matrix
- 16.1.3 Acceptance Criteria: Four consecutive LCS analysis meeting stated LCS criteria.
- 16.1.4 Corrective Action: Identify and correct the source of error. Reanalyze the demonstration.

16.2 Limit of Detection Determination and Verification:

- 16.2.1 Purpose: To qualitatively verify acceptable instrument sensitivity.
- 16.2.2 Frequency: Prior to sample analysis and verified quarterly. Verification must is performed on each instrument. The LOD is spiked at 2-3 times the detection limit for single compound analyses and 1-4 times the detection limit for multi-analyte standards.
- 16.2.3 Acceptance Criteria: The apparent signal to noise ratio at the LOD must be at least three and the results must meet all method requirements for analyte identification (e.g., ion abundance, second-column confirmation, or pattern recognition.) For data systems that do not provide a measure of noise, the signal produced by the verification sample must produce a result that is at least three standard deviations greater than the mean method blank concentrations.
- 16.2.4 Corrective Action: Repeat the Detection Limit Determination and LOD Verification at a higher concentration or perform and pass two consecutive LOD verifications at a higher concentration and set the LOD at the higher concentration

16.3 Limit of Quantitation Establishment and Verification:

- 16.3.1 Purpose: To quantitatively verify acceptable instrument reporting limits.
- 16.3.2 Frequency: Prior to sample analysis and verified quarterly.
- 16.3.3 Acceptance Criteria: Data must empirically demonstrate precision and bias at the LOQ.
- 16.3.4 Corrective Action: Identify and correct the source of error, reanalyze the LOQ.

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If failure persists re-evaluate the appropriateness of the LOQ.

16.4 Method Blank (MBLK)

16.4.1 Purpose: Assess background interference or contamination in the analytical system that may lead to high bias or false positive data.

16.4.2 Frequency: Analyze one MB with each batch of 20 or less field samples.

16.4.3 Acceptance Criteria: No analytes detected >1/2 RL and >1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). For common laboratory contaminants, no analytes detected >RL.

16.4.4 Corrective Action: Identify and correct the source of error, and re-prep and reanalyze the MBLK and all associated client samples.

16.5 Laboratory Control Standard (LCS):

16.5.1 Purpose: Evaluates the performance of the entire analytical system, including all preparation and analysis steps. The LCS assesses the ability of the laboratory/analyst to successfully recover the target analytes from a clean matrix. Contains all target analytes and surrogates.

16.5.2 Frequency: Once per preparation batch.

16.5.3 Acceptance Criteria: See Determinative SOP

16.5.4 Corrective Action: Identify and correct the source of error. Re-prepare and reanalyze the affected preparation batch for failed analytes.

16.6 Matrix Spike Sample (MS):

16.6.1 Purpose: Assesses the performance of the method on a particular matrix.

16.6.2 Frequency: Once per preparation batch.

16.6.3 Acceptance Criteria: See Determinative SOP

16.6.4 Corrective Action: If the spike results are outside the acceptance limits for recovery, first determine if the cause is a system error; if so, correct the problem and repeat the MS. If system error is not a factor, the data may only be reported if the associated LCS is acceptable. The sample MS results are flagged indicating matrix interference.

16.7 Matrix Spike Duplicate Sample (MSD):

16.7.1 Purpose: Assesses the performance of the method on a particular matrix. Also determines the precision of the analytical process for that matrix.

16.7.2 Frequency: Once per preparation batch.

16.7.3 Acceptance Criteria: See Determinative SOP

16.7.4 Corrective Action: If the spike results are outside the acceptance limits for recovery, first determine if the cause is a system error; if so, correct the problem and repeat the MS. If system error is not a factor, the data may only be reported if the associated LCS is acceptable. The sample MS results are flagged indicating matrix interference.

16.8 Surrogate Spike:

16.8.1 Purpose: Assess the ability of the method to successfully recover specific non-target analytes from an actual matrix; monitors recovery on a sample-specific basis.

16.8.2 Frequency: All field and QC samples

16.8.3 Acceptance Criteria: See Determinative SOP

16.8.4 Corrective Action: Identify and correct the source of error. Re-prepare and reanalyze all affected sample. If obvious chromatographic interference with the surrogate is present, it may not be necessary to reanalyze the sample.

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17) Data Records Management

17.1 All data is stored both electronically and hard copy for 10 years.

17.2 Document each sample prep batch in the appropriate Extractions Prep Logbook. Ensure that all applicable information is provided. If information requested in the logbook is not applicable, line through that section, or provide a "N/A". Ensure that no blank spaces are left in the prep batch log. To simplify standard and reagent tracking, please attempt to use single lots of solvent, reagent and standards.

17.3 Complete all pertinent sections in the respective logbooks. If not-applicable then line out the section. "Z" out or "X" out all large sections of the worksheet that are not used. This indicates that the section was left blank intentionally.

17.4 Make all corrections with single line through, date and initial. Make NO obliterations when manually recording data.

17.5 Logbooks are controlled. Never remove a page from a logbook. Completed logbooks are returned to the QA department when filled and no longer needed in the work area.

17.6 The effective date of this SOP is the date in header section or last signature date, whichever is most recent.

18) Contingencies for Handling Out of Control Data

18.1 When method required QC exceedances occur, in every case where sample data quality are affected, the source of the QC exceedance must be determined, corrected and sample reanalysis carried out when possible.

18.2 In all cases where batch QC fail to meet acceptance criteria, the QC in question and associated samples must be re-extracted and re-analyzed.

18.3 When affected sample analysis can not be repeated due to limitations (i.e. sample availability, or if reanalysis can only be performed after expiration of a sample hold time), the reporting of data associated with exceeded QC data must be appropriately flagged and narrated. This documentation is necessary to define for the data user the effect of the error has upon the data quality of the results reported (e.g. E flag data indicate the result to be only an estimate).

18.4 NCARs must be issued for QC system exceedances.

19) Method Performance

19.1 Control limits for method may be found in the analytical SOPs and the LIMS system.

20) Summary of Changes

Table 20.1 Summary of Changes

Revision Number	Effective Date	Document Editor	Description of Changes
10.3	08/15/2013	T. Yen	New SOP format and new signature page – Lab Director and QA Manager.
10.3 – Section 12.4	08/15/2013	T. Yen	Wipe Procedure inserted.

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10.3 – Section 12.10	08/15/2013	T. Yen	Waste Dilution 3580A.
10.3 – Section 17.2.	08/15/2013	T. Yen	To simplify standard tracking, analyst must attempt to use single lots in sequence or batch.
10.3 – Section 17.6	08/15/2013	T. Yen	SOP effective dates
10.2	08/15/2012	J. Cady	Minor revision. Format/font change.
10.1	09/30/2011	J. Cady	Minor document revision.
10.0	09/06/2010	R. Pierrot	Removed acetone as an extraction solvent. Revised solvents used to prepare spiking solutions to remove acetone (where applicable). Revised acid clean-up procedures.

21) References and Related Documents

21.1 Referenced Documents

21.1.1 U.S. Environmental Protection Agency, "Method 3500C (Revision 3, November 2000) Organic Extraction and Sample Preparation", Test Methods for Evaluating Solid Waste Physical/Chemical Methods, Update IV, November 27, 2000.

21.1.2 U.S. Environmental Protection Agency, "Method 3541, Automated Soxhlet Extraction", Test Methods for Evaluating Solid Waste Physical/Chemical Methods, Update III, June 13, 1997.

21.1.3 U.S. Environmental Protection Agency, "Method 3665A (Revision 1, December 1996), Sulfuric Acid Cleanup", Test Methods for Evaluating Solid Waste Physical/Chemical Methods.

21.1.4 U.S. Environmental Protection Agency, "Method 625, Semivolatile Organics in Water and Wastewater by GC/MS," 40 CFR Part 136, Appendix A.

21.1.5 TurboVap ® II Operator's Manual, Caliper Life Sciences, Inc.

22) Appendix

22.1 Refer to Determinative Methods (e.g. SOP MSSV-001, for SW8270) for spike levels. Table 21.1 indicates spike levels for a pesticide method, GCECD-001, by SW8081B.

Table 22.1 Pesticide LCS and MS/MSD Spike Levels

Analyte - Solid/Soils	Spike, µg/Kg	Analyte - Solid/Soils	Spike, µg/Kg
4,4'-DDD	16.7	Endosulfan sulfate	16.7
4,4'-DDE	16.7	Endrin	16.7
4,4'-DDT	16.7	Endrin aldehyde	16.7
Aldrin	8.33	Endrin ketone	16.7
Alpha-BHC	8.33	Gamma-BHC (Lindane)	16.7
Beta-BHC	8.33	Heptachlor	16.7
Delta-BHC	8.33	Heptachlor epoxide	16.7

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Analyte - Solid/Soils	Spike, µg/Kg	Analyte - Solid/Soils	Spike, µg/Kg
Dieldrin	16.7	Methoxychlor	83.3
Endosulfan I	8.33	Tetrachloro-m-xylene (Surr)	16.7
Endosulfan II	16.7	Decachlorobiphenyl (Surr)	16.7

Table 22.2 Typical TurboVap® II Instrument Set Points – Soil matrix

Table 21. 2 Typical TurboVap® II Instrument Set Points – Soil matrix				
Parameter Setting	Method	Method	Method	Method
Method	3541 / 8270_S	3541 / 8270 S_LL	3541 / Pest	3541 / PCB
Bath Temperature:	39 °C	39 °C	39 °C	39 °C
Pressure Set:	10.5 – 12 PSI	10.5 – 12 PSI	10.5 – 12 PSI	10.5 – 12 PSI
Sample Ext. Vol (Initial):	60 mL	60 mL	60 mL	60 mL
Conc. Time*, min:	40 Min	40 Min	40 Min	40 Min

*Concentration time may vary based on sample volume.

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Appendix B

Ricerca Animal Testing Report

Report

Study Title	Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice
Testing Facility	Ricerca Biosciences, LLC Drug Safety and Metabolism 7528 Auburn Road Concord OH 44077
Sponsor	Arcadis, Inc. 630 Plaza Drive, Suite 100 Highlands Ranch CO 80129
Study Number	033244
Sponsor Reference Number	04285076.0000
Ricerca Document Number	033244-1
Author	Roger Hawks, Ph.D., DABT
Compliance Status	Non-GLP
Study Completed	01-Dec-2015

Signatures

Study Title: Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Document Number: 033244-1

Testing Facility: Ricerca Biosciences, LLC
Drug Safety and Metabolism
7528 Auburn Road
Concord OH 44077

Study Director

Roger Hawks

Date: 1-Dec-2015

Roger Hawks, Ph.D., DABT
Ricerca Biosciences, LLC

Testing Facility Management

Conny Callis

Date: 1-Dec-2015

Drug Safety and Metabolism
Ricerca Biosciences, LLC

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Summary

The objective of this study was to provide urine samples to analyze for the presence of metabolites of specific high-molecular weight polycyclic aromatic hydrocarbons (PAHs) in urine following offering to mice feed containing PAH-contaminated soil and solvent extracts of PAH-contaminated soil.

Methods

Sixteen female B6C3F1 mice, 4 per group, were assigned to 4 groups as shown as shown in the table below. Each group was housed together in a metabolism cage to allow for daily collection of pooled urine. Animals were dosed as a dietary admixture with test articles mixed into their NIH-31 meal diet at the levels shown in the table below. The dose levels in ppm, shown in the table below, are calculated levels based on the measured benzo(a)pyrene (B[a]P) in each respective lot of test article used. Animals received these diets for 14 consecutive days. Cageside clinical observations were performed twice daily throughout the study. Individual animal body weights were taken daily during the dosing period, and food consumption per cage (divided by four to obtain an average food consumption per animal) was measured daily during the dosing period. The first day of administration was designated as Day 1 of the study. All animals were terminated without necropsy on Day 15.

Group Assignment and Dose Levels

Dose Group	Number of Animals (Female)	Test Article	Lot Number	Dose Level	
				Weight %	B(a)P
1	4	Sieved soil negative control	LAFB-BSS-0-0.5 CONTROL	10% (w/w) of diet	0 ppm
2	4	Benzo(a)pyrene (B(a)P) Positive control	SLBG9477V	Not Applicable	0.67 ppm
3	4	Sieved Soil	LAFB-BSS-0-0.5 02	10% (w/w) of diet	0.15 ppm
4	4	Extract of Sieved Soil	HS15010874-12, 13, 14	Not Applicable	0.15 ppm

Results and Discussion

Consumption of feed containing nominal concentrations of BaP, as well as several other polycyclic aromatic hydrocarbons (PAHs), had no detectable adverse effects on the animals.

Group 2 B(a)P diet analytical results did not have levels of BaP above method reporting limits confirming the integrity of the positive control diet formulation. Each diet was sampled in triplicate to ensure reducibility. The target concentration of BaP in the diet preparation was 0.67 ppm (mg/kg). BaP was reported at concentrations ranging from 0.637 ppm to 0.648 ppm with an average concentration of 0.644 ppm indicating a high degree of accuracy. The relative standard deviation was 1% indicating a high degree of confidence in diet preparation and the dose of BaP being delivered to test animal.

The Group 3 diets had a target concentration for BaP of 0.15 ppm. The reported values were similar to the target value ranging from 0.135 ppm to 0.196 ppm with an average of 0.162 ppm. At these relatively low-level concentrations in soil, the Group 3 diets are considered accurate with respect to predicting BaP dose to the test animal. The RSD for BaP concentrations the Group 3 diet samples was 19%, within the 20% requirements.

All of the three measured Group 4 values were similar to the target value of 0.15 ppm with reported concentrations ranging from 0.155 to 0.156 ppm with an RSD of 0.4%. The values obtained from the Groups 3 and 4 analytical data demonstrate a high degree of confidence in the methodology for producing test article-containing diets. The methodology is proven capable of producing diets containing very low levels of PAHs. A high level of confidence is placed on being able to accurately determine the doses of PAHs administered to test animals for the purpose of evaluating bioavailability.

Conclusion

The analytical results for samples of diet preparations demonstrate that the preparation methodology is capable of producing diet at the desired concentrations. The methodology for diet formulation of a spiked positive control group using reagent-grade BaP requires additional effort to ensure a consistent level of exposure to BaP for this testing group. Exposure of mice through the diet to nominal levels of BaP of 0.15 ppm did not have any detectable adverse effects on the animals.

Responsible Personnel

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Supervisory Personnel:

Manager:	Roger Hawks, Ph.D., DABT
Attending Veterinarian:	Lou Turchyn, D.V.M.

Introduction

Objective

The objective of this study was to provide urine samples to analyze for the presence of polycyclic aromatic hydrocarbons (PAHs) in urine following offering to mice feed containing PAH-contaminated soil and solvent extracts of PAH-contaminated soil.

Sponsor

Arcadis U.S., Inc.
630 Plaza Drive, Suite 100
Highlands Ranch, CO 80129

Schedule of Events

Study Initiation:	23-Feb-2015
Experimental Start:	09-Mar-2015
First Day of Dosing:	11-Mar-2015
Last Day of Dosing:	24-Mar-2015
Experimental Completion:	17-Jul-2015

Regulatory Compliance

This non-GLP study was performed according to the protocol and testing facility standard operating procedures.

Test Article and Positive Control

Identification	Test Articles - Sieved soil; sieved soil extracts in methylene chloride. Positive Control - Benzo(a)pyrene (BaP)
Lot Numbers/Sample IDs	LAFB-BSS-0-0.5 CONTROL: Clean Soil Sample (Group 1) SLBG9477V: BaP (Group 2) LAFB-BSS-0-0.5 02: Soil Test Article (Group 3) HS15010874-12, 13, 14: Soil Test Article Extract (Group 4) 135146: Methylene chloride (vehicle for Group 2)
Purity/Correction Factor	Test articles and positive control were used without a correction factor.
Bulk Stability	Information about bulk stability of either the test articles or positive control was not provided.
Storage Conditions	The positive control was stored at ambient room temperature. Test article was stored refrigerated, temperature range of 2-8 °C.
Characteristics	Information about the composition or other characteristics that define the test article or positive control articles, supplied by the Sponsor/manufacturer, is located in Appendix A. The extract results are shown in two documents: a document dated 05-Feb-2015 (which includes results dated 30-Jan-2015 and 02-Feb-2015) that shows the extract results in mg/kg, and a document dated 18-Feb-2015 that shows the extract results in µg/L.
Safety	An MSDS was provided for the BaP. Specific laboratory safety procedures were employed when working with the positive control and test articles. A memo detailing safety procedures associated with this study was generated, circulated, and placed in the study file.

Retention Sample	No retention sample was collected.
Accountability	Maintained according to testing facility SOPs
Disposition	The remaining test article was shipped to a representative of the United States Navy at: ATTN: Receiving Officer N66001 SPAWARSYSCEN Pacific 4297 Pacific HWY, BLDG 7 MF: Kara Sorensen 553-1340 San Diego, CA 92110. The positive control article purchased by Ricerca from a commercial supplier, the powdered B(a)P, was retained by Ricerca for possible future use on another study.

Vehicle Components

Identification	No vehicle was used for the sieved soil and extract. The BaP was mixed with methylene chloride and then mixed into the diet. The methylene chloride was subsequently evaporated with nitrogen.
Storage Conditions	Methylene chloride was stored ambient (see deviation in Appendix C).
Characteristics	Information about the composition or other characteristics that define the vehicle is located in Appendix A.
Safety	An MSDS was provided for methylene chloride.

Dose Formulation

Frequency of Preparation	All diets were prepared once prior to dosing, though were mixed twice: once with the initial preparation on 23-Feb-2015, and once on 02-Mar-2015. Re-mixing on 02-Mar-2015 was requested by the Sponsor in response to analytical results from the 23-Feb-2015 preparation that were often low, and often variable. Due to low

	BaP levels in the Group 2 diet, additional BaP was added to Group 2 on 10-March-2015. Difficulty at ALS Environmental required that additional diet samples be analyzed for PAHs by AXYS Analytical, LLC (AXYS). Analytical results for diet samples from AXYS reported concentrations of PAHs very close to their target concentrations and demonstrated very high precision among the samples collected in triplicate.
Procedures - General	Documented concentrations of BaP in soil and extract were used to calculate PAH concentration in diet preparation (i.e. – BaP concentration was the proxy for PAH concentration). All calculations used to prepared diets were provided to the Sponsor Contact for verification prior to diet preparation. Diet preparation only proceeded following approval of all calculations by Sponsor. Duration of mixing for each diet of each group was recorded and was a minimum of 15 minutes. Care was taken not to grind or otherwise crush soil test articles during mixing.
Procedures – Instructions for Each Group	***Sieved soil control test article (Group 1):*** The appropriate amount of test article was added directly to the plastic bag containing the appropriate amount of diet. The vessel containing the test article was “rinsed” three times with a small amount of diet to capture soil particles that adhered to the sides of the vessel, with the rinsate being added to the plastic bag (see deviation in Appendix C). ***Positive control test article (Group 2):*** Thirty milliliters of stock solution contain B(a)P was prepared. This stock solution was added to 20 grams of NIH-31 diet to prepare a stock diet. An appropriate amount of stock diet was added to NIH-31 to prepare positive control diet.

Sieved soil test article (Group 3):

The appropriate amount of test article was added directly to the plastic bag containing the appropriate amount of diet. The vessel containing the test article was "rinsed" three times with a small amount of diet to capture soil particles that adhered to the sides of the vessel, with the rinsate being added to the plastic bag (see deviation in Appendix C).

Extract test article (Group 4):

The extract test article was initially incorporated into diet by applying the total volume of extract in methylene chloride directly to small amount of rodent meal using a bowl and mixing spoon. The methylene chloride was allowed to evaporate from the diet under a hood.

The diet prepared as above was considered a "Stock diet".

An appropriate amount of this stock diet was mixed in a plastic bag with the remaining amount of meal for that batch to match the 10% (by weight) Soil Test Article diet concentration for BaP.

Storage Conditions

Test article and positive control diets were stored refrigerated at 2-8 °C.

Diet Formulation Analysis

Concentration and Homogeneity

The concentration was determined for each test diet prepared. Prior to analysis, these samples were stored under monitored refrigerated conditions with a temperature range of 2-8 °C. The initial set of duplicate samples were collected (approximately 30 g each sample) from the top, middle, and bottom of each test diet preparation.

One set of each of the initial duplicate concentration samples was shipped on ice packs to the Contributing Scientist, Dose Formulation Analysis.

02-Mar-2015 Re-Mix – Analytical results from the 23-Feb-2015 preparation were often low and variable. This issue was addressed by re-mixing these diets on 02-Mar-2015. All the initial back-up diet formulation analysis samples were added back to the diet for remixing (see deviation in Appendix C). Duplicate samples of the diet remix, including back-ups, were collected and sent for analysis. Analyses of remixed samples, except for Group 2, were considered acceptable. Group 2 analytical results were non-detectable.

10-Mar-2015 Addition of B(a)P to Group 2 – The low B(a)P levels in the Group 2 diet were addressed by adding Group 2 back-up diet formulation analysis samples back to the diet for remixing again (see deviation in Appendix C), and adding additional BaP from a freshly prepared stock diet and then mixing. The calculated final concentration of the Group 2 diet was 0.67 ppm.

All back-up samples were retained at a controlled temperature of 2-8 °C at the Testing Facility until they were discarded.

Stability

Stability testing was not performed.

General

Results from formulation analyses were included in the dose formulation report (Appendix B). All remaining dose formulations (i.e. – diet mixes) were properly discarded when the final dose formulation results were provided.

Shipping Address:

The initial set of dose formulation samples were sent to the following address:

Dane Wacasey
ALS Environmental
10450 Stancliff Rd, Suite 210
Houston, TX 77099 USA
phone: 281-530-5656
email: Dane.Wacasey@alsglobal.com

The diet remix set of dose formulation samples were sent to the following address:

Million Woodneh
AXYS Analytical Service, LTD.
2045 Mills Road, West, Sidney, BC
Canada V8L 5X2
phone: 250-655-5837
email: mwoodneh@axys.com

Test System

Humane Care of Animals

Treatment of the animals (including but not limited to all husbandry, housing, and feeding conditions) were conducted in accordance with the guidelines recommended in Guide for the Care and Use of Laboratory Animals (National Academy Press, Washington DC, 2011). Housing also conformed to the USDA Animal Welfare Act (9 CFR Parts 1, 2, and 3).

Species	*mus musculus*
Strain	B6C3F1
Source	Charles River Laboratories, Raleigh NC
History	The animals were experimentally naïve.
Age/Weight at Initiation of Dosing	Animals were 17.7 weeks of age and weighed 19.9–22.8 g (see deviation in Appendix C).
Number and Sex	16 females, plus 4 extra
Identification	An ear tag and matching cage card were used.
Justification	Mice are commonly used in safety evaluation studies that are accepted by appropriate regulatory agencies. The total number of animals used in this study was the minimum required to properly achieve study objectives. This determination was based on historically established conventions in the industry for this type of study.

Receipt and Acclimation	Animals were received from their source and acclimated to the facility and husbandry conditions according to Facility SOPs. Prior to release to study, health status of the animals was reviewed by a member of the veterinary staff. Data collected on animals prior to release to study were maintained as facility records.
Housing/ Sanitation	Upon receipt, animals were housed singly and in stainless steel wire bottom cages. Following randomization, animals were housed in Nalgene® metabolism cages, four per cage, each group in a single cage. Animal room and cage cleaning was performed according to testing facility SOPs.
Diet	Certified NIH-31 7017C diet as meal was available *ad libitum*. Analysis of diet was performed by the manufacturer and certified to be within specifications.
Water	Tap water filtered through a 0.22-µM PES filter was available *ad libitum* while mice were in their home cages. Water (prior to filtering) was supplied by the City of Painesville and was routinely analyzed to monitor chemical and bacterial levels and to determine priority pollutants.
Contaminants	Results of the food and water analyses were reviewed periodically by a staff veterinarian or designee. No contaminants were known to be present in the food or water that would interfere with the results of the study.

Environment	Temperature: 68 – 79 °F (20 – 26 °C) Humidity: 30 – 70% Light: An alternating 12-hour light/dark cycle was maintained, except during study-specific procedures. Addition or loss of time due to Daylight Savings time adjustments was not considered a deviation. Ventilation: The airflow was set for at least 10 air changes per hour with 100% fresh air (no air recirculation). The environmental conditions of the animal room were monitored and documented.
Environmental Enrichment/ Supplements	Species-specific enrichment was provided per facility SOPs.
Animal Care and Use Statement	The research described did not unnecessarily duplicate previous animal experiments and was conducted in the absence of acceptable non-animal alternatives to accomplish its objectives. The protocol and any amendments or procedures involving the care or use of animals in this study were reviewed and approved by Ricerca's Institutional Animal Care and Use Committee (IACUC) prior to the initiation of such procedures (i.e., prior to the start of the study for most protocol-specified procedures).

Study Design

Randomization	Animals considered healthy and acceptable for study were assigned to Study Groups using a computer-generated randomization procedure based on body weight. Control for siblings was not performed. Randomization into study groups occurred on Day -2. Animals not assigned to study groups were allocated into a spare group. Spare animals were released from study (euthanized) on Day 2.

Predose

Animals were acclimated to the study room for 42 days prior to initiation of dosing. On Day 3 animals were moved to a new room (see deviation in Appendix C).

Pre-dose data collected for selection of animals to be randomized to study were maintained in the study files and reported.

Treatment Groups and Dose Administration

The mice were assigned to groups as shown in the table below. The first day of administration were designated as Day 1 of the study.

Group Assignment and Dose Levels

Dose Group	Number of Animals (Female)	Test Article	Lot Number	Dose Level	
				Weight %	B(a)P
1	4	Sieved soil negative control	LAFB-BSS-0-0.5 CONTROL	10% (w/w) of diet	0 ppm
2	4	Benzo(a)pyrene (B(a)P) Positive control	SLBG9477V	Not Applicable	0.67 ppm
3	4	Sieved Soil	LAFB-BSS-0-0.5 02	10% (w/w) of diet	0.15 ppm
4	4	Extract of Sieved Soil	HS15010874-12, 13, 14	Not Applicable	0.15 ppm

Dose Administration

Dose Administration

Animals received the test or positive control article mixed in their diet for 14 consecutive days. All animals were terminated the day following completion of dosing.

Route of Administration

All administrations were given by the oral route as a diet admixture.

Justification of Route	This administration route was consistent with the route of exposure used in “Technical Report for Experiment No. 6722: Chronic Bioassay of Two Composite Samples From Selected Manufactured Gas Plant Waste Sites”, Beland and Culp, 1998.
Dose Level Details	Dosages for Groups 1, 3, and 4 were based on a 10% soil level in diet for the weight % aspect of the dose, and based on the BaP mass in parts per million (ppm) found in a 10% soil/diet mixture prepared using the test article (i.e.- soil) provided. Group 1 was a negative control group in which soil that was known to not contain detectable residues of BaP mixed with diet (animal feed) to 10% w/w. Group 2 was a positive control group in which diet was mixed with BaP such that the B(a)P level in the diet was targeted to be approximately 4.5 times the B(a)P level in the Group 3 diet. Group 3 was soil that was known to contain detectable residues of PAH mixed with diet to 10% w/w. Group 4 was solvent extracts of soil that was known to contain detectable residues of PAHs mixed with diet to achieve ppm levels of BaP that were equivalent to the BaP level in the Group 3 diet. Groups 2, 3, and 4 diets were therefore targeted to contain identical nominal ppm levels of BaP with the desired level of BaP in each diet matching that found in the Group 3 10% w/w diet).
Justification of Dose Levels	Dose levels were selected by the Study Director in agreement with the Sponsor and based on available data.
Justification of Frequency	The frequency of administration is conventional for studies of this type.

In-Life Observations and Measurements

Clinical Observations	Cage-side clinical observations were performed twice daily, once in the morning and once in the afternoon, at approximately the same time each day.
Detailed Clinical Observations	Detailed clinical observations were performed prior to randomization.
General	Animals that appeared to be in pain or distress were brought to the attention of the Study Director and/or a staff veterinarian.
Body Weights	Body weights were measured predose, as needed, to monitor animal body weights. Body weights were measured predose for the purposes of randomization, and daily for the remainder of the in-life period.
Food Consumption	Quantitatively, once predose, and daily for the remainder of the study. Food consumption per cage was divided by four obtain an average food consumption per animal.
Observations for Potential Fecal Contamination	Twice daily observations of the urine collection cups were performed. No fecal contamination of collected urine was recorded. Pictures were taken daily of pooled urine. These photographs are maintained in the study file but not reported.

Urine Collection

Sample Collection

Daily urine observations were made from each cage (i.e., urine volume and color photograph). Urine samples were stored frozen in a freezer set to maintain ≤-70 °C, in prelabeled urine collection vials, until shipment to the analytical lab after Day 14.

Samples were shipped on dry ice.

The volume of urine collected each day from each group/cage were recorded in Provantis and reported in Table 8.

Euthanasia/Necropsy

Scheduled Necropsy

Following collection of the final in-life samples, all surviving animals were euthanized by CO_2 overdose and their carcasses were appropriately discarded.

Statistical Analysis

When appropriate, numeric animal data were evaluated statistically. Data were considered to be parametric (continuous data, typically with normal distributions) and were evaluated by analysis of variance (ANOVA) with $p \leq 0.05$. If significance existed, pairwise comparisons of each dose group with the control group were made using a *post hoc* test, Dunnett ($p \leq 0.05$), to identify statistical differences between each dose level group and control values. Comparisons were made within common time points.

Statistical evaluation was not conducted for food consumption and urine volume data.

Data Collection

Animal data, such as observations, body weights, food consumption, and urine volume were collected and reported electronically using Provantis™, Version 8 (Instem LSS Ltd. Staffordshire, UK). Data not collected by Provantis were hand-recorded on paper or collected electronically by other means. Tables generated from Provantis were exported as Microsoft Word documents. Provantis was validated at Ricerca Biosciences.

Major Computer Systems/Software

The computer systems used on this study may have included, but were not limited to, the following systems. All version numbers of the applications, as well as validation or qualification status, are maintained by Ricerca Biosciences, LLC, and will be presented in appropriate sections of the final report.

Application Name	Version	Function
Siemens REMs Infocenter [V]	1.6	Archiving and reporting environmental records
Siemens REMs Insight [V]	3.9	Environmental data collection, monitoring and alarming of critical environments
Provantis [V]	8.4.2.0	In-life test system data and statistical evaluation
Microsoft Office	NA	Collection of word processing and spreadsheets used for report production
RATS	NA	In-house system used to schedule study activities
SAS [V]	9.1.3	Statistical analysis of data within Provantis system

[V] Validated

Records

Following completion of the study, the protocol, amendments, final report, and all hard copy data, generated at Ricerca Biosciences, LLC were shipped to the Sponsor.

Following completion of analysis and prior to completion of the final report, all remaining samples (including but not limited to biological and formulation samples) were properly discarded.

External test sites were responsible for archiving data produced at their own sites.

Results and Discussion

Dose Analysis

Dose Analysis: Appendix B

Approximate thirty gram top, middle and bottom diet samples were collected from each of the 4 diet test groups prepared on 23-Feb-2015. Samples were sent to ALS Environmental to perform analyses of PAH concentrations to confirm the calculated dose levels and consistency of diet preparation. The principal of interest was BaP. Initial results from ALS (not presented or discussed in this report) were highly variable and so, on 02-Mar-2015, the diets prepared 23-Feb-2015 were remixed for an additional 15 minutes. Additional BaP was added to the Group 2 diet on 10-Mar-2015 in order to correct for BaP levels which appeared low per the initial analytical results. Approximate 20-gram samples of these remixed diets were collected and sent to both ALS and AXYS for analyses.

The ALS results for the remixed diets are presented in Appendix B, but are not discussed here. The concentrations of B(a)P from the AXYS analysis (of the remixed diets) are presented below and presented in Appendix B.

Group	Replicate	Benzo(a)pyrene (ppm)	Average (ppm)	Target (ppm)
Group 1 (Sieved soil negative control)	Top	0.0064	0.006	0
	Middle	0.0086		
	Bottom	0.0031		
Group 2 (Benzo(a)pyrene [B(a)P] Positive control)	Top	0.637	0.644	0.67
	Middle	0.648		
	Bottom	0.648		
Group 3 (Sieved Soil)	Top	0.135	0.162	0.15
	Middle	0.156		
	Bottom	0.196		
Group 4 (Extract of Sieved Soil)	Top	0.155	0.155	0.15
	Middle	0.155		
	Bottom	0.156		

*Not detected above the method detection limit

Detectable levels of BaP were not desirable in Group 1; however, PAHs are ubiquitous in the environment and low-level detections are not unexpected. The range of BaP concentrations in the Group 1 samples were barely above detectable levels and well below the quantifiable limit of the assay.

Group 2 BaP diet demonstrated a high degree of accuracy and precision in the positive control diet formulation. Ricerca study 030947 had previously resulted in low levels of BaP in the positive control group. This study showed values of 6.6 ppm to 20 ppm vs a target value of 25 ppm. BaP powder in 030947 was mixed directly into diet while in this study the stock solution was made using BaP powder and the solution was mixed with diet in an attempt to obtain the appropriate dietary level. The diet BaP positive control preparation in this study was performed using a similar methodology for extract diet preparation. This approach was to dissolve BaP in methylene chloride to a similar extent that soil extracts were prepared, then apply the BaP solutions to the diet. This approach greatly increased the precision and accuracy of the positive control diet preparation.

The measured Group 3 and Group 4 BaP concentrations were very close to the target BAP concentration of 0.15 ppm. The analytical results demonstrated a high degree of precision based on RSD values ranging from 0.4 to 19%. All reported RSDs for diet preparations were below the target of 20% RSD.

Mortality

There were no unscheduled deaths on study.

Observations

Summary of Observations by Group: Table 1
Summary of Observations by Day: Table 2
Individual Observations: Table 9

A Group 1 animal was discovered missing from its cage on Day 9. This animal was found later in the day in a box of gloves on a cart within the animal room and was returned to its cage. Two animals in Groups 1 and 3, and all four animals in Group 4 were observed to have hair loss. One animal each in Group 3 and 4 was observed to have hair loss prior to initiation of offering the animals test diets. These instances of hair loss are not considered related to exposure to test article as hair loss is a common and expected finding in mice.

Observations for Potential Fecal Contamination

Potential Fecal Contamination: Table 3

Fecal pellets were not observed in the urine collection cups at any time on study. The urine within the collection cups was recorded to be brown in color in Group 4 on Day 2. This discoloration may be due to urine coming into contact with feces as it passed down the collection apparatus of the metabolism cage on its way to the urine collection cup.

Photographs of urine collection cups taken daily during the in-life phase of the study are maintained in the study file but are not reported here.

Body Weights

Mean Body Weights: Table 4
Mean Body Weight Gain: Table 5 and Table 6
Individual Body Weights: Table 10
Individual Body Weight Gain: Table 11

Group mean body weights and body weight gains in Groups 2, 3 and 4 were similar to Group 1 throughout the dosing period. Exposure to test article did not alter body weights or body weight gain.

Food Consumption

Mean Food Consumption: Table 7
Individual Food Consumption: Table 12

Group mean food consumption in Groups 2, 3 and 4 were similar to Group 1 throughout the dosing period. Exposure to test article did not alter food consumption.

Urine Volume

Urine Volume by Cage: Table 8

The volume of urine collected each day from each cage varied widely ranging from as low as 3.0 mL to as high as 34.6 mL.

Urine Analysis

Analytical data from urine collected on study will be reported separately and not included in this study report.

Conclusion

The analytical results for samples of diet preparations demonstrate that the preparation methodology is capable of producing doses of PAHs to mice through delivery in feed. The methodology for diet formulation of a spiked positive control group using reagent-grade BaP requires additional effort to ensure a consistent level of exposure to BaP for this testing group. Exposure of mice through the diet to nominal levels of BaP of 0.15 ppm did not have any detectable adverse effects on the animals.

Table 1: Summary of Observations by Group

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Day numbers relative to Start Date

Sex: Female

	Group 1	Group 2	Group 3	Group 4
Fur, Hair Loss				
Number of Observations	8	.	7	33
Number of Animals	2	.	2	4
Days from - to	12 15	.	-2 15	-2 15
Gen, Missing from Cage				
Number of Observations	1	.	.	.
Number of Animals	1	.	.	.
Days from - to	9 9	.	.	.

General Footnote: "Number of Observations" shows the number of days the finding was observed.

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

Fur = Fur; Gen = General

Table 2: Summary of Observations by Day

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil
and Soil Extracts in Mice

Day numbers relative to Start Date

Group	Sex	Clinical Sign	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	f	ANIMALS ALIVE	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
		Fur, Hair Loss	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	2	2
		Gen, Missing from Cage	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
2	f	ANIMALS ALIVE	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
		All Animals Normal	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
3	f	ANIMALS ALIVE	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
		Fur, Hair Loss	1	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	1
4	f	ANIMALS ALIVE	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
		Fur, Hair Loss	1	.	.	.	.	.	.	.	1	3	4	4	4	4	4	4	4

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

Fur = Fur; Gen = General

Table 3: Potential Fecal Contamination

	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Group 1	-	No	No	No	No	No	No	No	No	No	No	No	No	No
Group 2	-	No	No	No	No	No	No	No	No	No	No	No	No	No
Group 3	-	No	No	No	No	No	No	No	No	No	No	No	No	No
Group 4	-	No	No[1]	No	No	No	No	No	No	No	No	No	No	No

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Group 1	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	-
Group 2	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	-
Group 3	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	-
Group 4	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	-

[1]Urine discolored brown.

Table 4: Mean Body Weights

033244 - Pilot Study; Laredo AFB : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Bodyweight (g)

Sex: Female		Day(s) Relative to Start Date						
		-2	-1	1	2	3	4	5
Group 1 -	Mean	22.35	21.55	21.50	21.63	22.10	22.10	21.73
Negative	SD	0.73	0.94	1.17	1.15	1.25	0.99	1.03
Control	N	4	4	4	4	4	4	4
Group 2 -	Mean	22.30	21.80	21.43	21.55	21.80	22.18	22.00
B(a)P	SD	0.96	1.04	1.26	1.21	1.10	0.75	0.95
	N	4	4	4	4	4	4	4
Group 3 -	Mean	22.15	21.25	21.55	21.40	21.80	21.93	21.93
Sieved Soil	SD	0.72	0.65	0.82	0.95	0.86	0.88	0.86
	N	4	4	4	4	4	4	4
Group 4 -	Mean	22.33	21.10	21.28	21.53	21.98	22.23	22.25
Extract of	SD	1.19	0.84	0.95	1.33	1.44	1.27	1.40
Sieved Soil	N	4	4	4	4	4	4	4

Statistical Test: Anova & Dunnett's Test

Table 4: Mean Body Weights (continued)

033244 - Pilot Study; Laredo AFB : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Bodyweight (g)

Sex: Female		Day(s) Relative to Start Date						
		6	7	8	9	10	11	12
Group 1 -	Mean	21.95	22.08	22.20	20.88	22.45	22.45	22.60
Negative	SD	1.29	1.37	1.33	0.87	0.89	1.19	1.04
Control	N	4	4	4	4	4	4	4
Group 2 -	Mean	22.10	21.93	22.15	22.23	22.28	22.20	22.23
B(a)P	SD	0.82	0.98	0.81	0.94	1.06	1.01	1.17
	N	4	4	4	4	4	4	4
Group 3 -	Mean	21.93	21.90	21.88	22.03	22.13	21.90	22.15
Sieved Soil	SD	0.74	0.96	0.90	0.71	0.60	0.72	0.93
	N	4	4	4	4	4	4	4
Group 4 -	Mean	22.28	22.38	22.43	22.63	22.83	22.70	22.65
Extract of	SD	1.19	1.32	1.15	0.91	1.04	1.10	1.08
Sieved Soil	N	4	4	4	4	4	4	4

Statistical Test: Anova & Dunnett's Test

Table 4: Mean Body Weights (continued)

033244 - Pilot Study; Laredo AFB : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Bodyweight (g)

Sex: Female		Day(s) Relative to Start Date		
		13	14	15
Group 1 - Negative Control	Mean	22.55	22.75	22.90
	SD	1.22	1.11	1.12
	N	4	4	4
Group 2 - B(a)P	Mean	22.10	22.08	22.03
	SD	0.95	1.62	1.43
	N	4	4	4
Group 3 - Sieved Soil	Mean	21.95	21.78	22.18
	SD	0.51	0.33	0.74
	N	4	4	4
Group 4 - Extract of Sieved Soil	Mean	22.38	22.23	22.50
	SD	1.21	1.07	1.15
	N	4	4	4

Statistical Test: Anova & Dunnett's Test

Table 5: Mean Daily Body Weight Gain

033244 - Pilot Study; Laredo AFB : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Bodyweight Gain - grams

Sex: Female		Day(s) Relative to Start Date						
		1 → 2	2 → 3	3 → 4	4 → 5 a[1]	5 → 6	6 → 7	7 → 8
Group 1 -	Mean	0.13	0.48	0.00	-0.38	0.23	0.13	0.13
Negative	SD	0.15	0.29	0.34	0.10	0.26	0.10	0.25
Control	N	4	4	4	4	4	4	4
Group 2 -	Mean	0.13	0.25	0.38	-0.18	0.10	-0.18	0.23
B(a)P	SD	0.17	0.13	0.43	0.22	0.16	0.17	0.29
	N	4	4	4	4	4	4	4
Group 3 -	Mean	-0.15	0.40	0.13	0.00 d[2]	0.00	-0.03	-0.03
Sieved Soil	SD	0.13	0.42	0.26	0.12	0.38	0.25	0.21
	N	4	4	4	4	4	4	4
Group 4 -	Mean	0.25	0.45	0.25	0.03 d[2]	0.03	0.10	0.05
Extract of	SD	0.44	0.13	0.37	0.22	0.24	0.18	0.17
Sieved Soil	N	4	4	4	4	4	4	4

Statistical Test: Anova & Dunnett's Test

[1][a - Statistical Test: Analysis of Variance $p < 0.05$]

[2][d - Statistical Test: Dunnett 2 Sided $p < 0.05$]

Table 5: Mean Daily Body Weight Gain (continued)

033244 - Pilot Study; Laredo AFB : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Bodyweight Gain - grams

Sex: Female		Day(s) Relative to Start Date						
		8 → 9 aa[1]	9 → 10 a[2]	10 → 11	11 → 12	12 → 13	13 → 14	14 → 15
Group 1 -	Mean	-1.33	1.58	0.00	0.15	-0.05	0.20	0.15
Negative	SD	0.54	0.43	0.54	0.39	0.19	0.45	0.17
Control	N	4	4	4	4	4	4	4
Group 2 -	Mean	0.08 dd[3]	0.05 d[4]	-0.08	0.03	-0.13	-0.03	-0.05
B(a)P	SD	0.30	0.19	0.26	0.17	0.22	0.74	0.25
	N	4	4	4	4	4	4	4
Group 3 -	Mean	0.15 dd[3]	0.10 d[4]	-0.23	0.25	-0.20	-0.18	0.40
Sieved Soil	SD	0.42	1.12	1.08	0.26	0.49	0.47	0.58
	N	4	4	4	4	4	4	4
Group 4 -	Mean	0.20 dd[3]	0.20 d[4]	-0.13	-0.05	-0.28	-0.15	0.28
Extract of	SD	0.37	0.43	0.31	0.24	0.29	0.34	0.32
Sieved Soil	N	4	4	4	4	4	4	4

Statistical Test: Anova & Dunnett's Test

[1][aa - Statistical Test: Analysis of Variance $p < 0.01$]
[2][a - Statistical Test: Analysis of Variance $p < 0.05$]
[3][dd - Statistical Test: Dunnett 2 Sided $p < 0.01$]
[4][d - Statistical Test: Dunnett 2 Sided $p < 0.05$]

Table 6: Mean Cumulative Body Weight Gain

033244 - Pilot Study; Laredo AFB : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Bodyweight Gain - grams

Sex: Female		Day(s) Relative to Start Date
		1 → 15
Group 1 - Negative control	Mean	1.40
	SD	0.88
	N	4
Group 2 - B(a)P	Mean	0.60
	SD	0.83
	N	4
Group 3 - Sieved Soil	Mean	0.63
	SD	0.61
	N	4
Group 4 - Extract of Sieved Soil	Mean	1.23
	SD	0.26
	N	4

Statistical Test: Anova & Dunnett's Test

Table 7: Mean Food Consumption

033244 - Pilot Study; Laredo AFB : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Food Mean Consumption (g/animal/day)

Sex: Female		Day(s) Relative to Start Date						
		-2 → -1	-1 → 1	1 → 2	2 → 3	3 → 4	4 → 5	5 → 6
Group 1 -	Mean	2.93	3.80	4.65	4.55	4.28	4.08	4.20
Neg Control	N	4	4	4	4	4	4	4
Group 2 -	Mean	2.98	3.68	4.30	4.40	4.03	3.78	3.58
B(a)P	N	4	4	4	4	4	4	4
Group 3 -	Mean	2.95	4.48	4.98	4.75	3.85	4.43	4.03
Sieve Soil	N	4	4	4	4	4	4	4
Group 4 -	Mean	2.80	4.20	4.75	4.95	4.28	3.83	3.73
Extracts	N	4	4	4	4	4	4	4

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

[Comparative statistics were not conducted.]

Table 7: Mean Food Consumption (continued)

033244 - Pilot Study; Laredo AFB : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Food Mean Consumption (g/animal/day)

Sex: Female		Day(s) Relative to Start Date						
		6 → 7	7 → 8	8 → 9	9 → 10	10 → 11	11 → 12	12 → 13
Group 1 - Neg Control	Mean	4.03	4.08	3.53	4.40	4.05	4.33	4.20
	N	4	4	4	4	4	4	4
Group 2 - B(a)P	Mean	3.58	3.80	3.35	3.30	3.45	3.50	3.55
	N	4	4	4	4	4	4	4
Group 3 - Sieved Soil	Mean	3.93	3.85	3.83	3.85	3.83	3.95	3.78
	N	4	4	4	4	4	4	4
Group 4 - Extract	Mean	3.95	3.70	3.73	3.55	3.80	3.78	3.43
	N	4	4	4	4	4	4	4

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

[Comparative statistics were not conducted.]

Table 7: Mean Food Consumption (continued)

033244 - Pilot Study; Laredo AFB : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Food Mean Consumption (g/animal/day)

Sex: Female		Day(s) Relative to Start Date	
		13 → 14	14 → 15
Group 1 - Neg Control	Mean	4.10	3.88
	N	4	4
Group 2 - B(a)P	Mean	3.80	3.33
	N	4	4
Group 3 - Sieved Soil	Mean	3.53	3.83
	N	4	4
Group 4 - Extract	Mean	3.53	3.70
	N	4	4

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

[Comparative statistics were not conducted.]

Table 8: Urine Volume by Cage

033244 - Pilot Study; Laredo AFB : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Day(s) Relative to Start Date

Sex: Female		VOL (mL/Cage)	VOL (mL/Cage)	VOL (mL/Cage)	VOL (mL/Cage)	VOL (mL/Cage)	VOL (mL/Cage)	VOL (mL/Cage)
		2	3	4	5	6	7	8
Negative Control	Cage 1	7.50	5.60	6.60	6.00	11.20	9.60	24.20
	N	4	4	4	4	4	4	4
B(a)P	Cage 2	8.00	6.60	7.30	6.60	9.80	8.80	10.40
	N	4	4	4	4	4	4	4
Sieved Soil	Cage 3	9.00	7.70	9.30	9.80	9.50	9.40	10.90
	N	4	4	4	4	4	4	4
Extract of Sieved Soil	Cage 4	7.00	6.20	10.20	7.00	16.20	17.40	18.20
	N	4	4	4	4	4	4	4

[Comparative statistics were not conducted.]

Day 2 volume was measured to the nearest 0.5 mL; on all other days volumes were measured to the nearest 0.1 mL.

Table 8: Urine Volume (continued)

033244 - Pilot Study; Laredo AFB : Fourteen-Day Diet Mix of Soil
and Soil Extracts in Mice

Day(s) Relative to Start Date

Sex: Female		VOL (mL/Cage)	VOL (mL/Cage)	VOL (mL/Cage)	VOL (mL/Cage)	VOL (mL/Cage)	VOL (mL/Cage)	VOL (mL/Cage)
		9	10	11	12	13	14	15
Negative Control	Cage 1	9.00	3.00	10.40	13.40	24.80	7.90	21.40
	N	4	4	4	4	4	4	4
B(a)P	Cage 2	6.00	11.40	9.50	11.60	16.40	19.10	20.80
	N	4	4	4	4	4	4	4
Sieved Soil	Cage 3	23.60	9.00	10.20	11.40	21.10	17.20	11.40
	N	4	4	4	4	4	4	4
Extract of Sieved Soil	Cage 4	9.50	9.10	17.20	16.40	12.00	14.20	34.60
	N	4	4	4	4	4	4	4

[Comparative statistics were not conducted.]

Note: Volumes were measured to the nearest 0.1 mL.

Table 9: Individual Observations

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil
and Soil Extracts in Mice

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	-2 a.m.	-2 DCO	-2 p.m.	-1 a.m.	-1 p.m.	1 a.m.	1 p.m.	2 a.m.	2 p.m.	3 a.m.	3 p.m.	4 a.m.
1	f	298394	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Surrounding the nose/snout	.	.	.	.	.	.	.	.	.	.	.	.
		298395	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		298396	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Surrounding the nose/snout	.	.	.	.	.	.	.	.	.	.	.	.
			Gen, Missing from Cage		.	.	.	.	.	.	.	.	.	.	.	.
		298397	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X

Group	Sex	Animal	Clinical Sign	Site	4 p.m.	5 a.m.	5 p.m.	6 a.m.	6 p.m.	7 a.m.	7 p.m.	8 a.m.	8 p.m.	9 a.m.	9 p.m.	10 a.m.
1	f	298394	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Surrounding the nose/snout	.	.	.	.	.	.	.	.	.	.	.	.
		298395	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		298396	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Surrounding the nose/snout	.	.	.	.	.	.	.	.	.	.	.	.
			Gen, Missing from Cage		.	.	.	.	.	.	.	.	.	X	.	.
		298397	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X

Group	Sex	Animal	Clinical Sign	Site	10 p.m.	11 a.m.	11 p.m.	12 a.m.	12 p.m.	13 a.m.	13 p.m.	14 a.m.	14 p.m.	15 a.m.
1	f	298394	No Abnormalities Detected		X	X	X	.	.	.	.	.	.	.
			Fur, Hair Loss	Surrounding the nose/snout	.	.	.	X	X	X	X	X	X	X
		298395	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
		298396	No Abnormalities Detected		X	X	X	.	.	.	.	.	.	.
			Fur, Hair Loss	Surrounding the nose/snout	.	.	.	X	X	X	X	X	X	X
			Gen, Missing from Cage		.	.	.	.	.	.	.	.	.	.
		298397	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X

Severity Codes: X = Present

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

Fur = Fur; Gen = General

Table 9: Individual Observations (continued)

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil
and Soil Extracts in Mice

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	-2 a.m.	-2 DCO	-2 p.m.	-1 a.m.	-1 p.m.	1 a.m.	1 p.m.	2 a.m.	2 p.m.	3 a.m.	3 p.m.	4 a.m.
2	f	298398	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		298399	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		298400	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		298401	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X

Group	Sex	Animal	Clinical Sign	Site	4 p.m.	5 a.m.	5 p.m.	6 a.m.	6 p.m.	7 a.m.	7 p.m.	8 a.m.	8 p.m.	9 a.m.	9 p.m.	10 a.m.
2	f	298398	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		298399	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		298400	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		298401	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X

Group	Sex	Animal	Clinical Sign	Site	10 p.m.	11 a.m.	11 p.m.	12 a.m.	12 p.m.	13 a.m.	13 p.m.	14 a.m.	14 p.m.	15 a.m.
2	f	298398	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
		298399	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
		298400	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
		298401	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X

Severity Codes: X = Present

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

Fur = Fur; Gen = General

Table 9: Individual Observations (continued)

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil
and Soil Extracts in Mice

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	-2 a.m.	-2 DCO	-2 p.m.	-1 a.m.	-1 p.m.	1 a.m.	1 p.m.	2 a.m.	2 p.m.	3 a.m.	3 p.m.	4 a.m.
3	f	298402	No Abnormalities Detected		X	.	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Forelimb, right	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Hindlimb, right	.	X	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Pelvis, ventral middle	.	X	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Pelvis, ventral right	.	X	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Thorax, ventral right	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Abdomen, right	.	.	.	.	.	.	.	.	.	.	.	.
		298403	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Forelimb, right	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Hindlimb, right	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Thorax, ventral right	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Abdomen, right	.	.	.	.	.	.	.	.	.	.	.	.
		298404	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		298405	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X

Group	Sex	Animal	Clinical Sign	Site	4 p.m.	5 a.m.	5 p.m.	6 a.m.	6 p.m.	7 a.m.	7 p.m.	8 a.m.	8 p.m.	9 a.m.	9 p.m.	10 a.m.
3	f	298402	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Forelimb, right	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Hindlimb, right	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Pelvis, ventral middle	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Pelvis, ventral right	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Thorax, ventral right	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Abdomen, right	.	.	.	.	.	.	.	.	.	.	.	.
		298403	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	.
			Fur, Hair Loss	Forelimb, right	.	.	.	.	.	.	.	.	.	.	.	X
			Fur, Hair Loss	Hindlimb, right	.	.	.	.	.	.	.	.	.	.	.	X
			Fur, Hair Loss	Thorax, ventral right	.	.	.	.	.	.	.	.	.	.	.	X
			Fur, Hair Loss	Abdomen, right	.	.	.	.	.	.	.	.	.	.	.	X
		298404	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
		298405	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X

Severity Codes: X = Present

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

Fur = Fur; Gen = General

Table 9: Individual Observations (continued)

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil
and Soil Extracts in Mice

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	10 p.m.	11 a.m.	11 p.m.	12 a.m.	12 p.m.	13 a.m.	13 p.m.	14 a.m.	14 p.m.	15 a.m.
3	f	298402	No Abnormalities Detected		X	X	X	.	.	.	.	.	.	.
			Fur, Hair Loss	Forelimb, right	.	.	.	X	X	X	X	X	X	X
			Fur, Hair Loss	Hindlimb, right	.	.	.	X	X	X	X	X	X	X
			Fur, Hair Loss	Pelvis, ventral middle	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Pelvis, ventral right	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Thorax, ventral right	.	.	.	X	X	X	X	X	X	X
			Fur, Hair Loss	Abdomen, right	.	.	.	X	X	X	X	X	X	X
		298403	No Abnormalities Detected		.	.	.	X	X	X	X	X	X	X
			Fur, Hair Loss	Forelimb, right	X	X	X	.	.	.	.	.	.	.
			Fur, Hair Loss	Hindlimb, right	X	X	X	.	.	.	.	.	.	.
			Fur, Hair Loss	Thorax, ventral right	X	X	X	.	.	.	.	.	.	.
			Fur, Hair Loss	Abdomen, right	X	X	X	.	.	.	.	.	.	.
		298404	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X
		298405	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X

Severity Codes: X = Present

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

Fur = Fur; Gen = General

Table 9: Individual Observations (continued)

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil
and Soil Extracts in Mice

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	-2 a.m.	-2 DCO	-2 p.m.	-1 a.m.	-1 p.m.	1 a.m.	1 p.m.	2 a.m.	2 p.m.	3 a.m.	3 p.m.	4 a.m.
4	f	298406	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Thorax, dorsal middle	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Thorax, ventral middle	.	.	.	.	.	.	.	.	.	.	.	.
		298407	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Thorax, dorsal middle	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Abdomen, mid	.	.	.	.	.	.	.	.	.	.	.	.
		298408	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Surrounding the nose/snout	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Neck, dorsal middle	.	.	.	.	.	.	.	.	.	.	.	.
		298409	No Abnormalities Detected		X	.	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Forefoot, left	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Hindlimb, left	.	X	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Forefoot, right	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Ventral surface, entire	.	X	.	.	.	.	.	.	.	.	.	.

Group	Sex	Animal	Clinical Sign	Site	4 p.m.	5 a.m.	5 p.m.	6 a.m.	6 p.m.	7 a.m.	7 p.m.	8 a.m.	8 p.m.	9 a.m.	9 p.m.	10 a.m.
4	f	298406	No Abnormalities Detected		X	X	X	X	X	X	X	X	.	.	.	.
			Fur, Hair Loss	Thorax, dorsal middle	.	.	.	.	.	.	.	.	.	.	.	X
			Fur, Hair Loss	Thorax, ventral middle	.	.	.	.	.	.	.	.	X	X	X	.
		298407	No Abnormalities Detected		X	X	X	X	X	X	.	.	.	.	.	.
			Fur, Hair Loss	Thorax, dorsal middle	.	.	.	.	.	.	.	.	.	X	X	X
			Fur, Hair Loss	Abdomen, mid	.	.	.	.	.	.	X	X	X	.	.	.
		298408	No Abnormalities Detected		X	X	X	X	X	X	X	X	.	.	.	.
			Fur, Hair Loss	Surrounding the nose/snout	.	.	.	.	.	.	.	.	X	X	X	X
			Fur, Hair Loss	Neck, dorsal middle	.	.	.	.	.	.	.	.	X	X	X	X
		298409	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	.	.	.
			Fur, Hair Loss	Forefoot, left	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Hindlimb, left	.	.	.	.	.	.	.	.	.	.	.	X
			Fur, Hair Loss	Forefoot, right	.	.	.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Ventral surface, entire	.	.	.	.	.	.	.	.	.	X	X	X

Severity Codes: X = Present

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

Fur = Fur; Gen = General

Table 9: Individual Observations (continued)

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil
and Soil Extracts in Mice

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	10 p.m.	11 a.m.	11 p.m.	12 a.m.	12 p.m.	13 a.m.	13 p.m.	14 a.m.	14 p.m.	15 a.m.
4	f	298406	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Thorax, dorsal middle	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Thorax, ventral middle	.	.	.	.	.	.	.	.	.	.
		298407	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Thorax, dorsal middle	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Abdomen, mid	.	.	.	.	.	.	.	.	.	.
		298408	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Surrounding the nose/snout	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Neck, dorsal middle	X	X	X	X	X	X	X	X	X	X
		298409	No Abnormalities Detected		.	.	.	.	.	.	.	.	.	.
			Fur, Hair Loss	Forefoot, left	.	.	.	X	X	X	X	X	X	X
			Fur, Hair Loss	Hindlimb, left	X	X	X	X	X	X	X	X	X	X
			Fur, Hair Loss	Forefoot, right	.	.	.	X	X	X	X	X	X	X
			Fur, Hair Loss	Ventral surface, entire	X	X	X	X	X	X	X	X	X	X

Severity Codes: X = Present

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

Fur = Fur; Gen = General

Table 10: Individual Body Weights

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil
and Soil Extracts in Mice

Bodyweight (g)

Day numbers relative to Start Date

Group	Sex	Animal	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	f	298394	21.9	21.0	20.6	20.6	20.7	21.2	20.7	20.7	20.8	21.0	20.2	21.6	21.4	22.1	22.0	22.7	22.6
		298395	21.6	20.6	20.4	20.7	21.4	21.3	21.0	21.0	21.0	21.1	20.1	21.8	21.5	21.5	21.2	21.5	21.7
		298396	23.2	22.7	22.7	22.9	23.3	23.1	22.8	23.3	23.5	23.3	21.3	23.4	23.1	22.9	23.0	22.6	22.9
		298397	22.7	21.9	22.3	22.3	23.0	22.8	22.4	22.8	23.0	23.4	21.9	23.0	23.8	23.9	24.0	24.2	24.4
2	f	298398	21.2	20.6	19.9	20.0	20.4	21.1	20.7	21.0	20.6	21.0	21.0	20.8	20.7	20.5	20.7	19.7	19.9
		298399	22.5	22.0	22.0	22.3	22.4	22.7	22.6	22.5	22.5	22.8	22.8	23.0	22.8	22.9	22.7	22.5	22.5
		298400	22.0	21.5	21.0	21.2	21.5	22.2	21.9	22.0	21.8	22.2	22.0	22.2	22.5	22.5	22.3	22.8	22.8
		298401	23.5	23.1	22.8	22.7	22.9	22.7	22.8	22.9	22.8	22.6	23.1	23.1	22.8	23.0	22.7	23.3	22.9
3	f	298402	21.6	20.8	21.4	21.2	22.2	22.1	22.0	21.7	21.7	21.9	21.6	22.9	21.4	21.4	21.6	21.4	21.3
		298403	23.2	22.1	22.6	22.6	22.7	22.8	22.9	23.0	23.3	23.1	23.0	21.6	22.7	23.0	22.6	22.1	23.0
		298404	22.0	21.4	21.6	21.5	21.6	22.1	22.0	21.7	21.4	21.5	22.1	22.3	22.3	22.9	22.1	21.6	22.5
		298405	21.8	20.7	20.6	20.3	20.7	20.7	20.8	21.3	21.2	21.0	21.4	21.7	21.2	21.3	21.5	22.0	21.9
4	f	298406	22.3	21.6	21.3	21.7	22.1	21.9	22.0	22.2	22.4	22.5	22.5	22.7	22.3	22.4	22.5	22.4	22.4
		298407	21.7	20.9	21.1	20.9	21.4	22.0	22.2	22.2	22.1	22.2	22.8	22.4	22.7	22.3	21.8	22.1	22.1
		298408	21.3	20.0	20.2	20.2	20.5	21.0	20.7	20.9	20.9	21.1	21.5	21.9	21.6	21.7	21.2	20.9	21.4
		298409	24.0	21.9	22.5	23.3	23.9	24.0	24.1	23.8	24.1	23.9	23.7	24.3	24.2	24.2	24.0	23.5	24.1

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

Table 11: Individual Daily and Cumulative Body Weight Gain

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil and Soil Extracts in

Mice

Bodyweight Gain (g)

Day numbers relative to Start Date

Group	Sex	Animal	Base Weight Day 1	From: To:	1 2	2 3	3 4	4 5	5 6	6 7	7 8
1	f	298394	20.6		0.0	0.1	0.5	-0.5	0.0	0.1	0.2
		298395	20.4		0.3	0.7	-0.1	-0.3	0.0	0.0	0.1
		298396	22.7		0.2	0.4	-0.2	-0.3	0.5	0.2	-0.2
		298397	22.3		0.0	0.7	-0.2	-0.4	0.4	0.2	0.4
2	f	298398	19.9		0.1	0.4	0.7	-0.4	0.3	-0.4	0.4
		298399	22.0		0.3	0.1	0.3	-0.1	-0.1	0.0	0.3
		298400	21.0		0.2	0.3	0.7	-0.3	0.1	-0.2	0.4
		298401	22.8		-0.1	0.2	-0.2	0.1	0.1	-0.1	-0.2
3	f	298402	21.4		-0.2	1.0	-0.1	-0.1	-0.3	0.0	0.2
		298403	22.6		0.0	0.1	0.1	0.1	0.1	0.3	-0.2
		298404	21.6		-0.1	0.1	0.5	-0.1	-0.3	-0.3	0.1
		298405	20.6		-0.3	0.4	0.0	0.1	0.5	-0.1	-0.2
4	f	298406	21.3		0.4	0.4	-0.2	0.1	0.2	0.2	0.1
		298407	21.1		-0.2	0.5	0.6	0.2	0.0	-0.1	0.1
		298408	20.2		0.0	0.3	0.5	-0.3	0.2	0.0	0.2
		298409	22.5		0.8	0.6	0.1	0.1	-0.3	0.3	-0.2

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

Table 11: Individual Daily and Cumulative Body Weight Gain (continued)

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil
and Soil Extracts in Mice

Bodyweight Gain (g)

Day numbers relative to Start Date

Group	Sex	Animal	From: 8 To: 9	9 10	10 11	11 12	12 13	13 14	14 15	Abs Gain 1 15
1	f	298394	-0.8	1.4	-0.2	0.7	-0.1	0.7	-0.1	2.0
		298395	-1.0	1.7	-0.3	0.0	-0.3	0.3	0.2	1.3
		298396	-2.0	2.1	-0.3	-0.2	0.1	-0.4	0.3	0.2
		298397	-1.5	1.1	0.8	0.1	0.1	0.2	0.2	2.1
2	f	298398	0.0	-0.2	-0.1	-0.2	0.2	-1.0	0.2	-0.0
		298399	0.0	0.2	-0.2	0.1	-0.2	-0.2	0.0	0.5
		298400	-0.2	0.2	0.3	0.0	-0.2	0.5	0.0	1.8
		298401	0.5	0.0	-0.3	0.2	-0.3	0.6	-0.4	0.1
3	f	298402	-0.3	1.3	-1.5	0.0	0.2	-0.2	-0.1	-0.1
		298403	-0.1	-1.4	1.1	0.3	-0.4	-0.5	0.9	0.4
		298404	0.6	0.2	0.0	0.6	-0.8	-0.5	0.9	0.9
		298405	0.4	0.3	-0.5	0.1	0.2	0.5	-0.1	1.3
4	f	298406	0.0	0.2	-0.4	0.1	0.1	-0.1	0.0	1.1
		298407	0.6	-0.4	0.3	-0.4	-0.5	0.3	0.0	1.0
		298408	0.4	0.4	-0.3	0.1	-0.5	-0.3	0.5	1.2
		298409	-0.2	0.6	-0.1	0.0	-0.2	-0.5	0.6	1.6

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

Table 12: Individual Food Consumption

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Food Consumption (g/animal/day)

Day numbers relative to Start Date

Group	Sex	Animal	From: -2 To: -1	-1 1	1 2	2 3	3 4	4 5	5 6	6 7
1	f	298394	2.9	3.8	4.7	4.6	4.3	4.1	4.2	4.0
		298395	2.9	3.8	4.7	4.6	4.3	4.1	4.2	4.0
		298396	2.9	3.8	4.7	4.6	4.3	4.1	4.2	4.0
		298397	2.9	3.8	4.7	4.6	4.3	4.1	4.2	4.0
2	f	298398	3.0	3.7	4.3	4.4	4.0	3.8	3.6	3.6
		298399	3.0	3.7	4.3	4.4	4.0	3.8	3.6	3.6
		298400	3.0	3.7	4.3	4.4	4.0	3.8	3.6	3.6
		298401	3.0	3.7	4.3	4.4	4.0	3.8	3.6	3.6
3	f	298402	3.0	4.5	5.0	4.8	3.9	4.4	4.0	3.9
		298403	3.0	4.5	5.0	4.8	3.9	4.4	4.0	3.9
		298404	3.0	4.5	5.0	4.8	3.9	4.4	4.0	3.9
		298405	3.0	4.5	5.0	4.8	3.9	4.4	4.0	3.9
4	f	298406	2.8	4.2	4.8	5.0	4.3	3.8	3.7	4.0
		298407	2.8	4.2	4.8	5.0	4.3	3.8	3.7	4.0
		298408	2.8	4.2	4.8	5.0	4.3	3.8	3.7	4.0
		298409	2.8	4.2	4.8	5.0	4.3	3.8	3.7	4.0

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

Table 12: Individual Food Consumption (continued)

033244 - Pilot Study; Laredo AFB: Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Food Consumption (g/animal/day)

Day numbers relative to Start Date

Group	Sex	Animal	From: 7 To: 8	8 9	9 10	10 11	11 12	12 13	13 14	14 15
1	f	298394	4.1	3.5	4.4	4.1	4.3	4.2	4.1	3.9
		298395	4.1	3.5	4.4	4.1	4.3	4.2	4.1	3.9
		298396	4.1	3.5	4.4	4.1	4.3	4.2	4.1	3.9
		298397	4.1	3.5	4.4	4.1	4.3	4.2	4.1	3.9
2	f	298398	3.8	3.4	3.3	3.5	3.5	3.6	3.8	3.3
		298399	3.8	3.4	3.3	3.5	3.5	3.6	3.8	3.3
		298400	3.8	3.4	3.3	3.5	3.5	3.6	3.8	3.3
		298401	3.8	3.4	3.3	3.5	3.5	3.6	3.8	3.3
3	f	298402	3.9	3.8	3.9	3.8	4.0	3.8	3.5	3.8
		298403	3.9	3.8	3.9	3.8	4.0	3.8	3.5	3.8
		298404	3.9	3.8	3.9	3.8	4.0	3.8	3.5	3.8
		298405	3.9	3.8	3.9	3.8	4.0	3.8	3.5	3.8
4	f	298406	3.7	3.7	3.6	3.8	3.8	3.4	3.5	3.7
		298407	3.7	3.7	3.6	3.8	3.8	3.4	3.5	3.7
		298408	3.7	3.7	3.6	3.8	3.8	3.4	3.5	3.7
		298409	3.7	3.7	3.6	3.8	3.8	3.4	3.5	3.7

Group 1 - Negative Control Group 2 - B(a)P Group 3 - Sieved Soil Group 4 – Extract of Sieved Soil

APPENDIX A

Test Article/Vehicle Information

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February 05, 2015

Glenn Hoeger
ARCADIS U.S., Inc.
401 East Main Street, Suite 400
El Paso, TX 79901

Work Order: **HS15010874**

Laboratory Results for: **Former Laredo AFB Bioavailablity D14-0256**

Dear Glenn,

ALS Environmental received 17 sample(s) on Oct 24, 2014 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: Jumoke.Lawal
Dane J. Wacasey

ALS Group USA, Corp Date: 12-Feb-15

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
Work Order: HS15010874

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS15010874-01	LAFB-BSS-0-0.5 02 (extract 1)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-02	LAFB-BSS-0-0.5 02 (extract 2)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-03	LAFB-BSS-0-0.5 02 (extract 3)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-04	LAFB-BSS-0-0.5 02 (extract 4)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-05	LAFB-BSS-0-0.5 02 (extract 5)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-06	LAFB-BSS-0-0.5 02 (extract 6)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-07	LAFB-BSS-0-0.5 02 (extract 7)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-08	LAFB-BSS-0-0.5 02 (extract 8)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-09	LAFB-BSS-0-0.5 02 (extract 9)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-10	LAFB-BSS-0-0.5 02 (extract 10)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-11	LAFB-BSS-0-0.5 02 (extract 11)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-12	LAFB-BSS-0-0.5 02 (Extr.Comp1of3)	Extract		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-13	LAFB-BSS-0-0.5 02 (Extr.Comp2of3)	Extract		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-14	LAFB-BSS-0-0.5 02 (Extr.Comp3of3)	Extract		26-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-16	LAFB-BSS-0-0.5 CONTROL	Soil		23-Oct-2014 17:15	24-Oct-2014 13:30	☐
HS15010874-17	LAFB-BSS-0-0.5 02 (1Kg)	Soil		23-Oct-2014 17:37	24-Oct-2014 13:30	☐
HS15010874-18	LAFB-BSS-0-0.5 CONTROL (1Kg)	Soil		23-Oct-2014 17:15	24-Oct-2014 13:30	☐

ALS Group USA, Corp Date: 05-Feb-15

Client: ARCADIS U.S., Inc. **CASE NARRATIVE**
Project: Former Laredo AFB Bioavailablity D14-0256
Work Order: HS15010874

Work Order Comments

- Sample was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

GCMS Semivolatiles by Method SW8270

Batch ID: 90058

Sample ID: **HS15010893-01**
- MS/MSD performed on unrelated sample

Batch ID: 90047

Sample ID: **LCS-90047**
- Insufficient sample received to perform MS/MSD. LCS/LCSD provided as batch quality control.

ALS Group USA, Corp Date: 05-Feb-15

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256 WorkOrder:HS15010874
Sample ID: LAFB-BSS-0-0.5 02 (Extr.Comp1of3) Lab ID:HS15010874-12
Collection Date: 23-Oct-2014 17:37 Matrix:Liquid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 30-Jan-2015		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	1	02-Feb-2015 22:41
Acenaphthylene	U	H	0.11	1.7	mg/Kg	1	02-Feb-2015 22:41
Anthracene	U	H	0.12	1.7	mg/Kg	1	02-Feb-2015 22:41
Benz(a)anthracene	**1.2**	JH	**0.10**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Benzo(a)pyrene	**1.4**	JH	**0.12**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Benzo(b)fluoranthene	**1.8**	H	**0.12**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Benzo(g,h,i)perylene	**1.2**	JH	**0.11**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Benzo(k)fluoranthene	**0.80**	JH	**0.15**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Chrysene	**1.6**	JH	**0.17**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Dibenz(a,h)anthracene	**0.22**	JH	**0.15**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Fluoranthene	**2.2**	H	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Fluorene	U	H	0.17	1.7	mg/Kg	1	02-Feb-2015 22:41
Indeno(1,2,3-cd)pyrene	**1.1**	JH	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Naphthalene	U	H	0.13	1.7	mg/Kg	1	02-Feb-2015 22:41
Phenanthrene	**0.79**	JH	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Pyrene	**1.8**	H	**0.43**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Surr: 2-Fluorobiphenyl	*84.8*			*43-125*	*%REC*	*1*	*02-Feb-2015 22:41*
Surr: 4-Terphenyl-d14	*78.5*			*32-125*	*%REC*	*1*	*02-Feb-2015 22:41*
Surr: Nitrobenzene-d5	*82.5*			*37-125*	*%REC*	*1*	*02-Feb-2015 22:41*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 12-Feb-15

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256 WorkOrder:HS15010874
Sample ID: LAFB-BSS-0-0.5 02 (Extr.Comp2of3) Lab ID:HS15010874-13
Collection Date: 23-Oct-2014 17:37 Matrix:Extract

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 30-Jan-2015		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	1	02-Feb-2015 23:03
Acenaphthylene	U	H	0.11	1.7	mg/Kg	1	02-Feb-2015 23:03
Anthracene	U	H	0.12	1.7	mg/Kg	1	02-Feb-2015 23:03
Benz(a)anthracene	**1.4**	JH	**0.10**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Benzo(a)pyrene	**1.6**	JH	**0.12**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Benzo(b)fluoranthene	**2.0**	H	**0.12**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Benzo(g,h,i)perylene	**1.4**	JH	**0.11**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Benzo(k)fluoranthene	**1.1**	JH	**0.15**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Chrysene	**1.8**	H	**0.17**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Dibenz(a,h)anthracene	**0.36**	JH	**0.15**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Fluoranthene	**2.5**	H	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Fluorene	U	H	0.17	1.7	mg/Kg	1	02-Feb-2015 23:03
Indeno(1,2,3-cd)pyrene	**1.4**	JH	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Naphthalene	U	H	0.13	1.7	mg/Kg	1	02-Feb-2015 23:03
Phenanthrene	**0.87**	JH	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Pyrene	**2.1**	H	**0.43**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Surr: 2-Fluorobiphenyl	*95.2*			*43-125*	*%REC*	*1*	*02-Feb-2015 23:03*
Surr: 4-Terphenyl-d14	*88.3*			*32-125*	*%REC*	*1*	*02-Feb-2015 23:03*
Surr: Nitrobenzene-d5	*89.9*			*37-125*	*%REC*	*1*	*02-Feb-2015 23:03*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 12-Feb-15

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256 WorkOrder:HS15010874
Sample ID: LAFB-BSS-0-0.5 02 (Extr.Comp3of3) Lab ID:HS15010874-14
Collection Date: 26-Oct-2014 17:37 Matrix:Extract

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 30-Jan-2015		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	1	02-Feb-2015 23:25
Acenaphthylene	U	H	0.11	1.7	mg/Kg	1	02-Feb-2015 23:25
Anthracene	U	H	0.12	1.7	mg/Kg	1	02-Feb-2015 23:25
Benz(a)anthracene	**1.3**	JH	**0.10**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Benzo(a)pyrene	**1.5**	JH	**0.12**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Benzo(b)fluoranthene	**1.9**	H	**0.12**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Benzo(g,h,i)perylene	**1.3**	JH	**0.11**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Benzo(k)fluoranthene	**1.1**	JH	**0.15**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Chrysene	**1.7**	JH	**0.17**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Dibenz(a,h)anthracene	**0.23**	JH	**0.15**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Fluoranthene	**2.5**	H	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Fluorene	U	H	0.17	1.7	mg/Kg	1	02-Feb-2015 23:25
Indeno(1,2,3-cd)pyrene	**1.3**	JH	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Naphthalene	U	H	0.13	1.7	mg/Kg	1	02-Feb-2015 23:25
Phenanthrene	**0.88**	JH	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Pyrene	**2.0**	H	**0.43**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Surr: 2-Fluorobiphenyl	*91.7*			*43-125*	*%REC*	*1*	*02-Feb-2015 23:25*
Surr: 4-Terphenyl-d14	*87.7*			*32-125*	*%REC*	*1*	*02-Feb-2015 23:25*
Surr: Nitrobenzene-d5	*88.4*			*37-125*	*%REC*	*1*	*02-Feb-2015 23:25*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 05-Feb-15

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256 WorkOrder:HS15010874
Sample ID: LAFB-BSS-0-0.5 CONTROL Lab ID:HS15010874-16
Collection Date: 23-Oct-2014 17:15 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 30-Jan-2015		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	1	30-Jan-2015 19:21
Acenaphthylene	U	H	0.11	1.7	mg/Kg	1	30-Jan-2015 19:21
Anthracene	U	H	0.12	1.7	mg/Kg	1	30-Jan-2015 19:21
Benz(a)anthracene	U	H	0.10	1.7	mg/Kg	1	30-Jan-2015 19:21
Benzo(a)pyrene	U	H	0.12	1.7	mg/Kg	1	30-Jan-2015 19:21
Benzo(b)fluoranthene	U	H	0.12	1.7	mg/Kg	1	30-Jan-2015 19:21
Benzo(g,h,i)perylene	U	H	0.11	1.7	mg/Kg	1	30-Jan-2015 19:21
Benzo(k)fluoranthene	U	H	0.15	1.7	mg/Kg	1	30-Jan-2015 19:21
Chrysene	U	H	0.17	1.7	mg/Kg	1	30-Jan-2015 19:21
Dibenz(a,h)anthracene	U	H	0.15	1.7	mg/Kg	1	30-Jan-2015 19:21
Fluoranthene	U	H	0.14	1.7	mg/Kg	1	30-Jan-2015 19:21
Fluorene	U	H	0.17	1.7	mg/Kg	1	30-Jan-2015 19:21
Indeno(1,2,3-cd)pyrene	U	H	0.14	1.7	mg/Kg	1	30-Jan-2015 19:21
Naphthalene	U	H	0.13	1.7	mg/Kg	1	30-Jan-2015 19:21
Phenanthrene	U	H	0.14	1.7	mg/Kg	1	30-Jan-2015 19:21
Pyrene	U	H	0.43	1.7	mg/Kg	1	30-Jan-2015 19:21
Surr: 2-Fluorobiphenyl	*76.6*			*43-125*	*%REC*	*1*	*30-Jan-2015 19:21*
Surr: 4-Terphenyl-d14	*67.3*			*32-125*	*%REC*	*1*	*30-Jan-2015 19:21*
Surr: Nitrobenzene-d5	*72.9*			*37-125*	*%REC*	*1*	*30-Jan-2015 19:21*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 05-Feb-15

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010874

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID 90047	**Test Name :** PAHS - 8270D			**Matrix:** Soil		
HS15010874-16	LAFB-BSS-0-0.5 CONTROL	23 Oct 2014 17:15		30 Jan 2015 08:26	30 Jan 2015 19:21	1
Batch ID 90058	**Test Name :** PAHS - 8270D			**Matrix:** Soil		
HS15010874-13	LAFB-BSS-0-0.5 02 (Extr.Comp2of3)	23 Oct 2014 17:37		30 Jan 2015 10:13	02 Feb 2015 23:03	1
HS15010874-14	LAFB-BSS-0-0.5 02 (Extr.Comp3of3)	26 Oct 2014 17:37		30 Jan 2015 10:13	02 Feb 2015 23:25	1
Batch ID 90058	**Test Name :** PAHS - 8270D			**Matrix:** Liquid		
HS15010874-12	LAFB-BSS-0-0.5 02 (Extr.Comp1of3)	23 Oct 2014 17:37		30 Jan 2015 10:13	02 Feb 2015 22:41	1

ALS Group USA, Corp Date: 05-Feb-15

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010874

QC BATCH REPORT

Batch ID: 90047 **Instrument: SV-5** **Method: SW8270**

MBLK Sample ID: **MBLK-90047** Units: **ug/Kg** Analysis Date: **30-Jan-2015 12:39**
Client ID: Run ID: **SV-5_248892** SeqNo: **3171690** PrepDate: **30-Jan-2015** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	U	170								
Acenaphthylene	U	170								
Anthracene	U	170								
Benz(a)anthracene	U	170								
Benzo(a)pyrene	U	170								
Benzo(b)fluoranthene	U	170								
Benzo(g,h,i)perylene	U	170								
Benzo(k)fluoranthene	U	170								
Chrysene	U	170								
Dibenz(a,h)anthracene	U	170								
Fluoranthene	U	170								
Fluorene	U	170								
Indeno(1,2,3-cd)pyrene	U	170								
Naphthalene	U	170								
Phenanthrene	U	170								
Pyrene	U	170								
Surr: 2-Fluorobiphenyl	*2662*	*170*	*3333*	*0*	*79.9*	*43 - 125*				
Surr: 4-Terphenyl-d14	*2493*	*170*	*3333*	*0*	*74.8*	*32 - 125*				
Surr: Nitrobenzene-d5	*2788*	*170*	*3333*	*0*	*83.6*	*37 - 125*				

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 05-Feb-15

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010874

QC BATCH REPORT

Batch ID: 90047 **Instrument: SV-5** **Method: SW8270**

LCS Sample ID: **LCS-90047** Units: **ug/Kg** Analysis Date: **30-Jan-2015 13:01**
Client ID: Run ID: **SV-5_248892** SeqNo: **3171691** PrepDate: **30-Jan-2015** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	1515	170	1667	0	90.9	55 - 120				
Acenaphthylene	1494	170	1667	0	89.6	55 - 120				
Anthracene	1533	170	1667	0	92.0	55 - 120				
Benz(a)anthracene	1312	170	1667	0	78.7	55 - 125				
Benzo(a)pyrene	1232	170	1667	0	73.9	55 - 120				
Benzo(b)fluoranthene	1276	170	1667	0	76.6	55 - 125				
Benzo(g,h,i)perylene	1114	170	1667	0	66.8	55 - 120				
Benzo(k)fluoranthene	1285	170	1667	0	77.1	55 - 130				
Chrysene	1350	170	1667	0	81.0	55 - 125				
Dibenz(a,h)anthracene	1138	170	1667	0	68.3	55 - 120				
Fluoranthene	1466	170	1667	0	88.0	55 - 125				
Fluorene	1515	170	1667	0	90.9	55 - 120				
Indeno(1,2,3-cd)pyrene	1091	170	1667	0	65.4	55 - 125				
Naphthalene	1483	170	1667	0	89.0	55 - 120				
Phenanthrene	1457	170	1667	0	87.4	55 - 120				
Pyrene	1407	170	1667	0	84.4	55 - 125				
Surr: 2-Fluorobiphenyl	*3001*	*170*	*3333*	*0*	*90.0*	*43 - 125*				
Surr: 4-Terphenyl-d14	*2784*	*170*	*3333*	*0*	*83.5*	*32 - 125*				
Surr: Nitrobenzene-d5	*2891*	*170*	*3333*	*0*	*86.8*	*37 - 125*				

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 05-Feb-15

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010874

QC BATCH REPORT

Batch ID: 90047 **Instrument: SV-5** **Method: SW8270**

LCSD Sample ID: **LCSD-90047** Units: **ug/Kg** Analysis Date: **30-Jan-2015 13:23**
Client ID: Run ID: **SV-5_248892** SeqNo: **3171692** PrepDate: **30-Jan-2015** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	1490	170	1667	0	89.4	55 - 120	1515	1.69	30	
Acenaphthylene	1497	170	1667	0	89.8	55 - 120	1494	0.153	30	
Anthracene	1537	170	1667	0	92.2	55 - 120	1533	0.259	30	
Benz(a)anthracene	1361	170	1667	0	81.6	55 - 125	1312	3.61	30	
Benzo(a)pyrene	1193	170	1667	0	71.6	55 - 120	1232	3.18	30	
Benzo(b)fluoranthene	1225	170	1667	0	73.5	55 - 125	1276	4.12	30	
Benzo(g,h,i)perylene	1145	170	1667	0	68.7	55 - 120	1114	2.76	30	
Benzo(k)fluoranthene	1194	170	1667	0	71.6	55 - 130	1285	7.29	30	
Chrysene	1309	170	1667	0	78.5	55 - 125	1350	3.05	30	
Dibenz(a,h)anthracene	1194	170	1667	0	71.6	55 - 120	1138	4.82	30	
Fluoranthene	1465	170	1667	0	87.9	55 - 125	1466	0.0605	30	
Fluorene	1505	170	1667	0	90.3	55 - 120	1515	0.664	30	
Indeno(1,2,3-cd)pyrene	1118	170	1667	0	67.1	55 - 125	1091	2.5	30	
Naphthalene	1545	170	1667	0	92.7	55 - 120	1483	4.08	30	
Phenanthrene	1532	170	1667	0	91.9	55 - 120	1457	4.97	30	
Pyrene	1420	170	1667	0	85.2	55 - 125	1407	0.929	30	
Surr: 2-Fluorobiphenyl	*2939*	*170*	*3333*	*0*	*88.2*	*43 - 125*	*3001*	*2.08*	*30*	
Surr: 4-Terphenyl-d14	*2801*	*170*	*3333*	*0*	*84.0*	*32 - 125*	*2784*	*0.606*	*30*	
Surr: Nitrobenzene-d5	*2974*	*170*	*3333*	*0*	*89.2*	*37 - 125*	*2891*	*2.8*	*30*	

The following samples were anayzed in this batch: HS15010874-16

Note: See Qualifiers Page for a list of qualifiers and their explanation.

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ALS Group USA, Corp Date: 05-Feb-15

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010874

QC BATCH REPORT

Batch ID: 90058 **Instrument: SV-5** **Method: SW8270**

MBLK Sample ID: **MBLK-90058** Units: **ug/Kg** Analysis Date: **03-Feb-2015 13:43**
Client ID: Run ID: **SV-5_248985** SeqNo: **3174544** PrepDate: **30-Jan-2015** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	U	170								
Acenaphthylene	U	170								
Anthracene	U	170								
Benz(a)anthracene	U	170								
Benzo(a)pyrene	U	170								
Benzo(b)fluoranthene	U	170								
Benzo(g,h,i)perylene	U	170								
Benzo(k)fluoranthene	U	170								
Chrysene	U	170								
Dibenz(a,h)anthracene	U	170								
Fluoranthene	U	170								
Fluorene	U	170								
Indeno(1,2,3-cd)pyrene	U	170								
Naphthalene	U	170								
Phenanthrene	U	170								
Pyrene	U	170								
Surr: 2-Fluorobiphenyl	*2801*	*170*	*3333*	*0*	*84.0*	*43 - 125*				
Surr: 4-Terphenyl-d14	*2456*	*170*	*3333*	*0*	*73.7*	*32 - 125*				
Surr: Nitrobenzene-d5	*2865*	*170*	*3333*	*0*	*86.0*	*37 - 125*				

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 05-Feb-15

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010874

QC BATCH REPORT

Batch ID: 90058 **Instrument: SV-5** **Method: SW8270**

LCS Sample ID: **LCS-90058** Units: **ug/Kg** Analysis Date: **03-Feb-2015 14:06**
Client ID: Run ID: **SV-5_248985** SeqNo: **3174545** PrepDate: **30-Jan-2015** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	1475	170	1667	0	88.5	55 - 120				
Acenaphthylene	1504	170	1667	0	90.2	55 - 120				
Anthracene	1514	170	1667	0	90.8	55 - 120				
Benz(a)anthracene	1407	170	1667	0	84.4	55 - 125				
Benzo(a)pyrene	1195	170	1667	0	71.7	55 - 120				
Benzo(b)fluoranthene	1278	170	1667	0	76.7	55 - 125				
Benzo(g,h,i)perylene	1171	170	1667	0	70.2	55 - 120				
Benzo(k)fluoranthene	1097	170	1667	0	65.8	55 - 130				
Chrysene	1352	170	1667	0	81.1	55 - 125				
Dibenz(a,h)anthracene	1183	170	1667	0	71.0	55 - 120				
Fluoranthene	1483	170	1667	0	89.0	55 - 125				
Fluorene	1500	170	1667	0	90.0	55 - 120				
Indeno(1,2,3-cd)pyrene	1243	170	1667	0	74.5	55 - 125				
Naphthalene	1505	170	1667	0	90.3	55 - 120				
Phenanthrene	1435	170	1667	0	86.1	55 - 120				
Pyrene	1358	170	1667	0	81.5	55 - 125				
Surr: 2-Fluorobiphenyl	*2874*	*170*	*3333*	*0*	*86.2*	*43 - 125*				
Surr: 4-Terphenyl-d14	*2664*	*170*	*3333*	*0*	*79.9*	*32 - 125*				
Surr: Nitrobenzene-d5	*2964*	*170*	*3333*	*0*	*88.9*	*37 - 125*				

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 05-Feb-15

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010874

QC BATCH REPORT

Batch ID: 90058 **Instrument: SV-5** **Method: SW8270**

MS Sample ID: **HS15010893-01MS** Units: **ug/Kg** Analysis Date: **03-Feb-2015 18:56**
Client ID: Run ID: **SV-5_248985** SeqNo: **3175917** PrepDate: **30-Jan-2015** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	10550	10000	1661	9849	42.5	55 - 120				SO
Acenaphthylene	4222	10000	1661	0	254	55 - 120				JS
Anthracene	7120	10000	1661	5241	113	55 - 120				J
Benz(a)anthracene	6902	10000	1661	5149	106	55 - 125				J
Benzo(a)pyrene	3818	10000	1661	2672	69.0	55 - 120				J
Benzo(b)fluoranthene	2502	10000	1661	0	151	55 - 125				JS
Benzo(g,h,i)perylene	3285	10000	1661	0	198	55 - 120				JS
Benzo(k)fluoranthene	U	10000	1661	0	0	55 - 130				S
Chrysene	12300	10000	1661	10690	96.9	55 - 125				O
Dibenz(a,h)anthracene	U	10000	1661	0	0	55 - 120				S
Fluoranthene	6812	10000	1661	5241	94.6	55 - 125				J
Fluorene	16190	10000	1661	13260	176	55 - 120				SO
Indeno(1,2,3-cd)pyrene	2369	10000	1661	0	143	55 - 125				JS
Naphthalene	300700	10000	1661	316800	-970	55 - 120				SO
Phenanthrene	31390	10000	1661	31910	-31.7	55 - 120				SO
Pyrene	13890	10000	1661	12380	90.4	55 - 125				O
Surr: 2-Fluorobiphenyl	*3295*	*10000*	*3321*	*0*	*99.2*	*43 - 125*				J
Surr: 4-Terphenyl-d14	*3089*	*10000*	*3321*	*0*	*93.0*	*32 - 125*				J
Surr: Nitrobenzene-d5	*2569*	*10000*	*3321*	*0*	*77.4*	*37 - 125*				J

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 05-Feb-15

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: HS15010874

QC BATCH REPORT

Batch ID: 90058 **Instrument: SV-5** **Method: SW8270**

MSD Sample ID: **HS15010893-01MSD** Units: **ug/Kg** Analysis Date: **03-Feb-2015 19:18**
Client ID: Run ID: **SV-5_248985** SeqNo: **3175918** PrepDate: **30-Jan-2015** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	10130	10000	1663	9849	17.0	55 - 120	10550	4.09	30	SO
Acenaphthylene	3978	10000	1663	0	239	55 - 120	4222	0	30	JS
Anthracene	33140	10000	1663	5241	1680	55 - 120	7120	129	30	SR
Benz(a)anthracene	7162	10000	1663	5149	121	55 - 125	6902	0	30	J
Benzo(a)pyrene	3851	10000	1663	2672	70.9	55 - 120	3818	0	30	J
Benzo(b)fluoranthene	2424	10000	1663	0	146	55 - 125	2502	0	30	JS
Benzo(g,h,i)perylene	2819	10000	1663	0	170	55 - 120	3285	0	30	JS
Benzo(k)fluoranthene	U	10000	1663	0	0	55 - 130	0	0	30	S
Chrysene	13110	10000	1663	10690	146	55 - 125	12300	6.37	30	SO
Dibenz(a,h)anthracene	U	10000	1663	0	0	55 - 120	0	0	30	S
Fluoranthene	6907	10000	1663	5241	100	55 - 125	6812	0	30	J
Fluorene	15750	10000	1663	13260	149	55 - 120	16190	2.77	30	SO
Indeno(1,2,3-cd)pyrene	2191	10000	1663	0	132	55 - 125	2369	0	30	JS
Naphthalene	301700	10000	1663	316800	-906	55 - 120	300700	0.35	30	SO
Phenanthrene	33360	10000	1663	31910	87.0	55 - 120	31390	6.09	30	O
Pyrene	14260	10000	1663	12380	113	55 - 125	13890	2.66	30	O
Surr: 2-Fluorobiphenyl	*2804*	*10000*	*3324*	*0*	*84.4*	*43 - 125*	*3295*	*0*	*30*	J
Surr: 4-Terphenyl-d14	*2979*	*10000*	*3324*	*0*	*89.6*	*32 - 125*	*3089*	*0*	*30*	J
Surr: Nitrobenzene-d5	*2417*	*10000*	*3324*	*0*	*72.7*	*37 - 125*	*2569*	*0*	*30*	J

The following samples were anayzed in this batch: HS15010874-12 HS15010874-13 HS15010874-14

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 05-Feb-15

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
WorkOrder: **HS15010874**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/Kg	Milligrams per Kilogram

ALS Group USA, Corp Date: 05-Feb-15

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	AR - 2014	27-Mar-2015
California	2919	31-Jul-2015
Dept of Defense	L2231 Rev 3-20-2014	22-Dec-2015
Illinois	003403	09-May-2015
Kansas	E-10352 2014-2015	31-Jul-2015
Kentucky	KY 2014-2015	30-Apr-2015
Louisiana	03087 2014/2015	30-Jun-2015
North Carolina	624 - 2015	31-Dec-2015
North Dakota	R-193 2025	30-Apr-2015
Oklahoma	2014-128	31-Aug-2015
Texas	T104704231-14-14	30-Apr-2015

ALS Group USA, Corp Date: 05-Feb-15

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256
Work Order: HS15010874

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS15010874-01	LAFB-BSS-0-0.5 02 (extract 1)	Login	1/29/2015 10:23:29 AM	DJW	28A
HS15010874-02	LAFB-BSS-0-0.5 02 (extract 2)	Login	1/29/2015 10:29:29 AM	DJW	28A
HS15010874-03	LAFB-BSS-0-0.5 02 (extract 3)	Login	1/29/2015 10:29:29 AM	DJW	28A
HS15010874-04	LAFB-BSS-0-0.5 02 (extract 4)	Login	1/29/2015 10:29:29 AM	DJW	28A
HS15010874-05	LAFB-BSS-0-0.5 02 (extract 5)	Login	1/29/2015 10:29:29 AM	DJW	28A
HS15010874-06	LAFB-BSS-0-0.5 02 (extract 6)	Login	1/29/2015 10:29:30 AM	DJW	28A
HS15010874-07	LAFB-BSS-0-0.5 02 (extract 7)	Login	1/29/2015 10:29:30 AM	DJW	28A
HS15010874-08	LAFB-BSS-0-0.5 02 (extract 8)	Login	1/29/2015 10:29:30 AM	DJW	28A
HS15010874-09	LAFB-BSS-0-0.5 02 (extract 9)	Login	1/29/2015 10:29:30 AM	DJW	28A
HS15010874-10	LAFB-BSS-0-0.5 02 (extract 10)	Login	1/29/2015 10:29:30 AM	DJW	28A
HS15010874-11	LAFB-BSS-0-0.5 02 (extract 11)	Login	1/29/2015 10:29:30 AM	DJW	28A
HS15010874-12	LAFB-BSS-0-0.5 02 (Extr.Comp1of3)	Login	1/29/2015 10:32:07 AM	DJW	28A
HS15010874-13	LAFB-BSS-0-0.5 02 (Extr.Comp2of3)	Login	1/29/2015 10:35:53 AM	DJW	28A
HS15010874-14	LAFB-BSS-0-0.5 02 (Extr.Comp3of3)	Login	1/29/2015 10:35:53 AM	DJW	28A
HS15010874-16	LAFB-BSS-0-0.5 CONTROL	Login	1/29/2015 10:41:38 AM	DJW	28A
HS15010874-17	LAFB-BSS-0-0.5 02 (1Kg)	Login	1/29/2015 11:24:38 AM	DJW	Sub
HS15010874-18	LAFB-BSS-0-0.5 CONTROL (1Kg)	Login	1/29/2015 11:24:38 AM	DJW	Sub

ALS Group USA, Corp Date: 05-Feb-15

Sample Receipt Checklist

Client Name: ARCADIS-EL PASO
Work Order: HS15010874

Date/Time Received: 24-Oct-2014 13:30
Received by: DJW

Checklist completed by: *Dane J. Wacasey* eSignature 24-Oct-2014 Date

Reviewed by: *Dane J. Wacasey* eSignature 29-Jan-2015 Date

Matrices: Soil

Carrier name: Client

	Yes	No	Not Present
Shipping container/cooler in good condition?	☑	☐	☐
Custody seals intact on shipping container/cooler?	☑	☐	☐
Custody seals intact on sample bottles?	☐	☐	☑
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☐	☑	
Container/Temp Blank temperature in compliance?	☐	☑	

Temperature(s)/Thermometer(s):	25.1C/25.1C	R1
Cooler(s)/Kit(s):	5 gallon buckets	
Date/Time sample(s) sent to storage:		

	Yes	No	No VOA vials submitted / N/A
Water - VOA vials have zero headspace?	☐	☐	☑
Water - pH acceptable upon receipt?	☐	☐	☑
pH adjusted?	☐	☐	☑

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: 0 Regarding:

Comments:

Corrective Action:

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Page 1 of 1

COC ID: 22774

ALS Project Manager: Dave Wagner | ALS Work Order #:

Customer Information		Project Information	
Purchase Order		Project Name	LAFB-SGR
Work Order		Project Number	04285076.0000
Company Name	ARCADIS, Inc.	Bill To Company	ARCADIS, Inc
Send Report To	Glenn Hoeger	Invoice Attn	
Address	2929 Briarpark Suite 300	Address	
City/State/Zip	Houston, TX 77042	City/State/Zip	
Phone	520-629-8282	Phone	
Fax		Fax	
e-Mail Address	glenn.hoeger@arcadis.us.com	e-Mail Address	

Parameter/Method Request for Analysis

A: PAH for bioavailability

HS15010874
ARCADIS U.S., Inc.
Former Laredo AFB Bioavailability D14-0256

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	LAFB-BSS-0-0.5 01	10/23/14	1726	soil	NA	1											X
2	LAFB-BSS-0-0.5 02	10/23/14	1737	soil	NA	1	X	Test article Extracts & Extract PAH analysis									
3	LAFB-BSS-0-0.5 CONTROL	10/23/14	1715	soil	NA	1	X										
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Gracela Moore Gracela Moore

Shipment Method: Drop-off

Required Turnaround Time: (Check Box) ☒ Other ☐ STD 10 Wk Days ☐ 5 Wk Days ☐ 2 Wk Days ☐ 24 Hour

Results Due Date:

Relinquished by: Gracela Moore | Date: 10/24/14 | Time: 1330 | Received by: [signature] ALS

Relinquished by: | Date: | Time: | Received by (Laboratory):

Logged by (Laboratory): | Date: | Time: | Checked by (Laboratory):

Notes:

Cooler ID: 3 Buckets | Cooler Temp: 25.10

QC Package: (Check One Box Below)
☐ Level II Std QC
☐ Level III Std QC/Raw Data
☐ Level IV SW846/CLP
☐ Other
☐ TRRP Checklist
☐ TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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ALS Group USA, Corp Date: 18-Feb-15

Client:	ARCADIS U.S., Inc.	**ANALYTICAL REPORT**	
Project:	Former Laredo AFB Bioavailablity D14-0256	WorkOrder:HS15010874	
Sample ID:	LAFB-BSS-0-0.5 02 (Extr.Comp1of3)	Lab ID:HS15010874-12	
Collection Date:	23-Oct-2014 17:37	Matrix:Extract	

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS		**Method:SW8270**		Leache:SW3510 / 30-Jan-2015	Prep:SW3510 / 30-Jan-2015		Analyst: ACN
Acenaphthene	U	H	300	5000	ug/L	1	02-Feb-2015 22:41
Acenaphthylene	U	H	300	5000	ug/L	1	02-Feb-2015 22:41
Anthracene	U	H	300	5000	ug/L	1	02-Feb-2015 22:41
Benz(a)anthracene	**3,700**	JH	**300**	**5000**	**ug/L**	1	02-Feb-2015 22:41
Benzo(a)pyrene	**4,200**	JH	**400**	**5000**	**ug/L**	1	02-Feb-2015 22:41
Benzo(b)fluoranthene	**5,400**	H	**400**	**5000**	**ug/L**	1	02-Feb-2015 22:41
Benzo(g,h,i)perylene	**3,700**	JH	**300**	**5000**	**ug/L**	1	02-Feb-2015 22:41
Benzo(k)fluoranthene	**2,400**	JH	**700**	**5000**	**ug/L**	1	02-Feb-2015 22:41
Chrysene	**4,900**	JH	**800**	**5000**	**ug/L**	1	02-Feb-2015 22:41
Dibenz(a,h)anthracene	U	H	600	5000	ug/L	1	02-Feb-2015 22:41
Fluoranthene	**6,500**	H	**400**	**5000**	**ug/L**	1	02-Feb-2015 22:41
Fluorene	U	H	500	5000	ug/L	1	02-Feb-2015 22:41
Indeno(1,2,3-cd)pyrene	**3,400**	JH	**600**	**5000**	**ug/L**	1	02-Feb-2015 22:41
Naphthalene	U	H	400	5000	ug/L	1	02-Feb-2015 22:41
Phenanthrene	**2,400**	JH	**400**	**5000**	**ug/L**	1	02-Feb-2015 22:41
Pyrene	**5,300**	H	**300**	**5000**	**ug/L**	1	02-Feb-2015 22:41
Surr: 2-Fluorobiphenyl	*932*	*S*		*48-120*	*%REC*	*1*	*02-Feb-2015 22:41*
Surr: 4-Terphenyl-d14	*864*	*S*		*51-135*	*%REC*	*1*	*02-Feb-2015 22:41*
Surr: Nitrobenzene-d5	*908*	*S*		*41-120*	*%REC*	*1*	*02-Feb-2015 22:41*
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 30-Jan-2015		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	1	02-Feb-2015 22:41
Acenaphthylene	U	H	0.11	1.7	mg/Kg	1	02-Feb-2015 22:41
Anthracene	U	H	0.12	1.7	mg/Kg	1	02-Feb-2015 22:41
Benz(a)anthracene	**1.2**	JH	**0.10**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Benzo(a)pyrene	**1.4**	JH	**0.12**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Benzo(b)fluoranthene	**1.8**	H	**0.12**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Benzo(g,h,i)perylene	**1.2**	JH	**0.11**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Benzo(k)fluoranthene	**0.80**	JH	**0.15**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Chrysene	**1.6**	JH	**0.17**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Dibenz(a,h)anthracene	**0.22**	JH	**0.15**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Fluoranthene	**2.2**	H	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Fluorene	U	H	0.17	1.7	mg/Kg	1	02-Feb-2015 22:41
Indeno(1,2,3-cd)pyrene	**1.1**	JH	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Naphthalene	U	H	0.13	1.7	mg/Kg	1	02-Feb-2015 22:41
Phenanthrene	**0.79**	JH	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Pyrene	**1.8**	H	**0.43**	**1.7**	**mg/Kg**	1	02-Feb-2015 22:41
Surr: 2-Fluorobiphenyl	*84.8*			*43-125*	*%REC*	*1*	*02-Feb-2015 22:41*
Surr: 4-Terphenyl-d14	*78.5*			*32-125*	*%REC*	*1*	*02-Feb-2015 22:41*
Surr: Nitrobenzene-d5	*82.5*			*37-125*	*%REC*	*1*	*02-Feb-2015 22:41*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 18-Feb-15

Client:	ARCADIS U.S., Inc.	**ANALYTICAL REPORT**	
Project:	Former Laredo AFB Bioavailablity D14-0256	WorkOrder:HS15010874	
Sample ID:	LAFB-BSS-0-0.5 02 (Extr.Comp2of3)	Lab ID:HS15010874-13	
Collection Date:	23-Oct-2014 17:37	Matrix:Extract	

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS		**Method:SW8270**		Leache:SW3510 / 30-Jan-2015	Prep:SW3510 / 30-Jan-2015		Analyst: ACN
Acenaphthene	U	H	300	5000	ug/L	1	02-Feb-2015 23:03
Acenaphthylene	U	H	300	5000	ug/L	1	02-Feb-2015 23:03
Anthracene	U	H	300	5000	ug/L	1	02-Feb-2015 23:03
Benz(a)anthracene	**4,200**	JH	**300**	**5000**	**ug/L**	1	02-Feb-2015 23:03
Benzo(a)pyrene	**4,800**	JH	**400**	**5000**	**ug/L**	1	02-Feb-2015 23:03
Benzo(b)fluoranthene	**5,900**	H	**400**	**5000**	**ug/L**	1	02-Feb-2015 23:03
Benzo(g,h,i)perylene	**4,300**	JH	**300**	**5000**	**ug/L**	1	02-Feb-2015 23:03
Benzo(k)fluoranthene	**3,200**	JH	**700**	**5000**	**ug/L**	1	02-Feb-2015 23:03
Chrysene	**5,400**	H	**800**	**5000**	**ug/L**	1	02-Feb-2015 23:03
Dibenz(a,h)anthracene	**1,100**	JH	**600**	**5000**	**ug/L**	1	02-Feb-2015 23:03
Fluoranthene	**7,500**	H	**400**	**5000**	**ug/L**	1	02-Feb-2015 23:03
Fluorene	U	H	500	5000	ug/L	1	02-Feb-2015 23:03
Indeno(1,2,3-cd)pyrene	**4,100**	JH	**600**	**5000**	**ug/L**	1	02-Feb-2015 23:03
Naphthalene	U	H	400	5000	ug/L	1	02-Feb-2015 23:03
Phenanthrene	**2,600**	JH	**400**	**5000**	**ug/L**	1	02-Feb-2015 23:03
Pyrene	**6,200**	H	**300**	**5000**	**ug/L**	1	02-Feb-2015 23:03
Surr: 2-Fluorobiphenyl	*1050*	*S*		*48-120*	*%REC*	*1*	*02-Feb-2015 23:03*
Surr: 4-Terphenyl-d14	*971*	*S*		*51-135*	*%REC*	*1*	*02-Feb-2015 23:03*
Surr: Nitrobenzene-d5	*989*	*S*		*41-120*	*%REC*	*1*	*02-Feb-2015 23:03*
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 30-Jan-2015		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	1	02-Feb-2015 23:03
Acenaphthylene	U	H	0.11	1.7	mg/Kg	1	02-Feb-2015 23:03
Anthracene	U	H	0.12	1.7	mg/Kg	1	02-Feb-2015 23:03
Benz(a)anthracene	**1.4**	JH	**0.10**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Benzo(a)pyrene	**1.6**	JH	**0.12**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Benzo(b)fluoranthene	**2.0**	H	**0.12**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Benzo(g,h,i)perylene	**1.4**	JH	**0.11**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Benzo(k)fluoranthene	**1.1**	JH	**0.15**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Chrysene	**1.8**	H	**0.17**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Dibenz(a,h)anthracene	**0.36**	JH	**0.15**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Fluoranthene	**2.5**	H	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Fluorene	U	H	0.17	1.7	mg/Kg	1	02-Feb-2015 23:03
Indeno(1,2,3-cd)pyrene	**1.4**	JH	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Naphthalene	U	H	0.13	1.7	mg/Kg	1	02-Feb-2015 23:03
Phenanthrene	**0.87**	JH	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Pyrene	**2.1**	H	**0.43**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:03
Surr: 2-Fluorobiphenyl	*95.2*			*43-125*	*%REC*	*1*	*02-Feb-2015 23:03*
Surr: 4-Terphenyl-d14	*88.3*			*32-125*	*%REC*	*1*	*02-Feb-2015 23:03*
Surr: Nitrobenzene-d5	*89.9*			*37-125*	*%REC*	*1*	*02-Feb-2015 23:03*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 18-Feb-15

Client:	ARCADIS U.S., Inc.	**ANALYTICAL REPORT**	
Project:	Former Laredo AFB Bioavailablity D14-0256	WorkOrder:HS15010874	
Sample ID:	LAFB-BSS-0-0.5 02 (Extr.Comp3of3)	Lab ID:HS15010874-14	
Collection Date:	26-Oct-2014 17:37	Matrix:Extract	

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS		**Method:SW8270**		Leache:SW3510 / 30-Jan-2015	Prep:SW3510 / 30-Jan-2015		Analyst: ACN
Acenaphthene	U	H	300	5000	ug/L	1	02-Feb-2015 23:25
Acenaphthylene	U	H	300	5000	ug/L	1	02-Feb-2015 23:25
Anthracene	U	H	300	5000	ug/L	1	02-Feb-2015 23:25
Benz(a)anthracene	**3,900**	JH	**300**	**5000**	**ug/L**	1	02-Feb-2015 23:25
Benzo(a)pyrene	**4,400**	JH	**400**	**5000**	**ug/L**	1	02-Feb-2015 23:25
Benzo(b)fluoranthene	**5,700**	H	**400**	**5000**	**ug/L**	1	02-Feb-2015 23:25
Benzo(g,h,i)perylene	**3,900**	JH	**300**	**5000**	**ug/L**	1	02-Feb-2015 23:25
Benzo(k)fluoranthene	**3,200**	JH	**700**	**5000**	**ug/L**	1	02-Feb-2015 23:25
Chrysene	**5,000**	JH	**800**	**5000**	**ug/L**	1	02-Feb-2015 23:25
Dibenz(a,h)anthracene	U	H	600	5000	ug/L	1	02-Feb-2015 23:25
Fluoranthene	**7,400**	H	**400**	**5000**	**ug/L**	1	02-Feb-2015 23:25
Fluorene	U	H	500	5000	ug/L	1	02-Feb-2015 23:25
Indeno(1,2,3-cd)pyrene	**3,800**	JH	**600**	**5000**	**ug/L**	1	02-Feb-2015 23:25
Naphthalene	U	H	400	5000	ug/L	1	02-Feb-2015 23:25
Phenanthrene	**2,600**	JH	**400**	**5000**	**ug/L**	1	02-Feb-2015 23:25
Pyrene	**5,900**	H	**300**	**5000**	**ug/L**	1	02-Feb-2015 23:25
Surr: 2-Fluorobiphenyl	*1010*	*S*		*48-120*	*%REC*	*1*	*02-Feb-2015 23:25*
Surr: 4-Terphenyl-d14	*964*	*S*		*51-135*	*%REC*	*1*	*02-Feb-2015 23:25*
Surr: Nitrobenzene-d5	*973*	*S*		*41-120*	*%REC*	*1*	*02-Feb-2015 23:25*
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 30-Jan-2015		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	1	02-Feb-2015 23:25
Acenaphthylene	U	H	0.11	1.7	mg/Kg	1	02-Feb-2015 23:25
Anthracene	U	H	0.12	1.7	mg/Kg	1	02-Feb-2015 23:25
Benz(a)anthracene	**1.3**	JH	**0.10**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Benzo(a)pyrene	**1.5**	JH	**0.12**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Benzo(b)fluoranthene	**1.9**	H	**0.12**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Benzo(g,h,i)perylene	**1.3**	JH	**0.11**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Benzo(k)fluoranthene	**1.1**	JH	**0.15**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Chrysene	**1.7**	JH	**0.17**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Dibenz(a,h)anthracene	**0.23**	JH	**0.15**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Fluoranthene	**2.5**	H	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Fluorene	U	H	0.17	1.7	mg/Kg	1	02-Feb-2015 23:25
Indeno(1,2,3-cd)pyrene	**1.3**	JH	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Naphthalene	U	H	0.13	1.7	mg/Kg	1	02-Feb-2015 23:25
Phenanthrene	**0.88**	JH	**0.14**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Pyrene	**2.0**	H	**0.43**	**1.7**	**mg/Kg**	1	02-Feb-2015 23:25
Surr: 2-Fluorobiphenyl	*91.7*			*43-125*	*%REC*	*1*	*02-Feb-2015 23:25*
Surr: 4-Terphenyl-d14	*87.7*			*32-125*	*%REC*	*1*	*02-Feb-2015 23:25*
Surr: Nitrobenzene-d5	*88.4*			*37-125*	*%REC*	*1*	*02-Feb-2015 23:25*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Group USA, Corp Date: 18-Feb-15

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Former Laredo AFB Bioavailablity D14-0256 WorkOrder:HS15010874
Sample ID: LAFB-BSS-0-0.5 CONTROL Lab ID:HS15010874-16
Collection Date: 23-Oct-2014 17:15 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
PAHS - 8270D		**Method:SW8270**			Prep:SW3541 / 30-Jan-2015		Analyst: GEY
Acenaphthene	U	H	0.15	1.7	mg/Kg	1	30-Jan-2015 19:21
Acenaphthylene	U	H	0.11	1.7	mg/Kg	1	30-Jan-2015 19:21
Anthracene	U	H	0.12	1.7	mg/Kg	1	30-Jan-2015 19:21
Benz(a)anthracene	U	H	0.10	1.7	mg/Kg	1	30-Jan-2015 19:21
Benzo(a)pyrene	U	H	0.12	1.7	mg/Kg	1	30-Jan-2015 19:21
Benzo(b)fluoranthene	U	H	0.12	1.7	mg/Kg	1	30-Jan-2015 19:21
Benzo(g,h,i)perylene	U	H	0.11	1.7	mg/Kg	1	30-Jan-2015 19:21
Benzo(k)fluoranthene	U	H	0.15	1.7	mg/Kg	1	30-Jan-2015 19:21
Chrysene	U	H	0.17	1.7	mg/Kg	1	30-Jan-2015 19:21
Dibenz(a,h)anthracene	U	H	0.15	1.7	mg/Kg	1	30-Jan-2015 19:21
Fluoranthene	U	H	0.14	1.7	mg/Kg	1	30-Jan-2015 19:21
Fluorene	U	H	0.17	1.7	mg/Kg	1	30-Jan-2015 19:21
Indeno(1,2,3-cd)pyrene	U	H	0.14	1.7	mg/Kg	1	30-Jan-2015 19:21
Naphthalene	U	H	0.13	1.7	mg/Kg	1	30-Jan-2015 19:21
Phenanthrene	U	H	0.14	1.7	mg/Kg	1	30-Jan-2015 19:21
Pyrene	U	H	0.43	1.7	mg/Kg	1	30-Jan-2015 19:21
Surr: 2-Fluorobiphenyl	*76.6*			*43-125*	*%REC*	*1*	*30-Jan-2015 19:21*
Surr: 4-Terphenyl-d14	*67.3*			*32-125*	*%REC*	*1*	*30-Jan-2015 19:21*
Surr: Nitrobenzene-d5	*72.9*			*37-125*	*%REC*	*1*	*30-Jan-2015 19:21*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

SIGMA-ALDRICH®

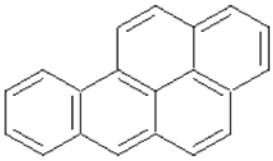
sigma-aldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA
Website: www.sigmaaldrich.com
Email USA: techserv@sial.com
Outside USA: eurtechserv@sial.com

Certificate of Analysis

Product Name:
Benzo[a]pyrene – ≥96% (HPLC)

Product Number:	**B1760**
Batch Number:	**SLBG9477V**
Brand:	SIGMA
CAS Number:	50-32-8
MDL Number:	MFCD00003602
Formula:	C20H12
Formula Weight:	252.31 g/mol
Quality Release Date:	31 MAY 2013
Recommended Retest Date:	MAY 2017



Test	Specification	Result
Appearance (Color)	Light Yellow to Yellow-Green, Yellow-Orange	Yellow
Appearance (Form)	Powder	Powder
Solubility (Color)	Light Yellow to Yellow-Green, Yellow-Orange	Yellow
Solubility (Turbidity) 50 mg/mL, CHCl3	Clear	Clear
Purity (HPLC)	≥ 96 %	97 %

Rodney Burbach, Manager
Analytical Services
St. Louis, Missouri US

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Version Number: 1 Page 1 of 1

Certificate of Analysis **Page 1 of 1**

Fisher Scientific

1 Reagent Lane
Fair Lawn, NJ 07410
201.796.7100 tel
201.796.1329 fax

Certificate of Analysis

Fisher Scientific's Quality System has been found to conform to Quality Management System Standard ISO9001:2008 standard by SAI Global Certificate Number CERT - 0064970

This is to certify that units of the above mentioned lot number were tested and found to comply with the specifications of the grade listed. Certain data have been supplied by third parties. Fisher Scientific expressly disclaims all warranties, expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose. Certain products (USP/FCC/NF/EP/BP/JP grades) are sold for use in food, drug, or medical device manufacturing. Fisher does not claim regulatory coverage under 21 CFR nor maintain DMF's with the FDA. The following are the actual analytical results obtained:

Catalog Number	D37	**Quality Test / Release Date**	8/20/2013
Lot Number	135146		
Description	METHYLENE CHLORIDE, A.C.S.		
Country of Origin	United States	*** Suggested Retest Date**	Aug-2018
Chemical Origin	Organic - synthetic		
BSE/TSE Comment	Methylene Chloride is made from hydrocarbon feedstocks and chlorine, and never comes into contact with materials of animal origin. Therefore, there is no issue with BSE/TSE with this product.		
Chemical Comment	This product contains no genetically modified materials and is free of any known allergy-stimulating food substances. Melamine is not used in the manufacture or processing of this product, nor is there a credible chemical route for its formation. While it is not analyzed for melamine, there is no reason to believe that there is any melamine in this product.		

Result name	Units	Specifications	Test Value
APPEARANCE		REPORT	CLEAR COLORLESS LIQUID
ASSAY	%	>= 99.5	99.9
COLOR	APHA	<= 10	5
DENSITY AT 25 DEGREES C	GM/ML	Inclusive Between 1.315 - 1.321	1.316
EVAPORATION RESIDUE	%	<= 0.002	<0.0002
FREE HALOGENS	PASS/FAIL	= PASS TEST	PASS TEST
IDENTIFICATION	PASS/FAIL	= PASS TEST	PASS TEST
TITRATABLE ACID	mEq/g	<= 0.0003	0.00009
WATER (H2O)	%	<= 0.02	0.002

CERTIFIED BY

Lab Manager BPF

Note: The data listed is valid for all package sizes of this lot of this product, expressed as a extension of this catalog number listed above. If there are any questions with this certificate, please call Chemical Services at (800) 227-6701.
*Based on suggested storage condition.

APPENDIX B

Dose Analysis

ALS Results 78
AXYS Results 107

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887
www.alsglobal.com

March 06, 2015

Glenn Hoeger
ARCADIS U.S., Inc.
401 East Main Street, Suite 400
El Paso, TX 79901

Work Order: **HS15030060**

Laboratory Results for: **Study 033244 Week of Study 1and2 Remix**

Dear Glenn,

ALS Environmental received 12 sample(s) on Mar 03, 2015 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: Dane.Wacasey
Dane J. Wacasey

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Work Order: HS15030060

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS15030060-01	27-LAFB-BSS-0-0.5 T	Solid		02-Mar-2015 00:00	03-Mar-2015 09:50	☐
HS15030060-02	29- LAFB-BSS-0-0.5 M	Solid		02-Mar-2015 00:00	03-Mar-2015 09:50	☐
HS15030060-03	31- LAFB-BSS-0-0.5 B	Solid		02-Mar-2015 00:00	03-Mar-2015 09:50	☐
HS15030060-04	33-SL BG 9477V T	Solid		02-Mar-2015 00:00	03-Mar-2015 09:50	☐
HS15030060-05	35-SL BG 9477V M	Solid		02-Mar-2015 00:00	03-Mar-2015 09:50	☐
HS15030060-06	37-SL BG 9477V B	Solid		02-Mar-2015 00:00	03-Mar-2015 09:50	☐
HS15030060-07	39- LAFB-BSS-0-0502 T	Solid		02-Mar-2015 00:00	03-Mar-2015 09:50	☐
HS15030060-08	41- LAFB-BSS-0-0502 M	Solid		02-Mar-2015 00:00	03-Mar-2015 09:50	☐
HS15030060-09	43- LAFB-BSS-0-0502 B	Solid		02-Mar-2015 00:00	03-Mar-2015 09:50	☐
HS15030060-10	45-HS15010874-12,13,14 T	Solid		02-Mar-2015 00:00	03-Mar-2015 09:50	☐
HS15030060-11	47-HS15010874-12,13,14 M	Solid		02-Mar-2015 00:00	03-Mar-2015 09:50	☐
HS15030060-12	49-HS15010874-12,13,14 B	Solid		02-Mar-2015 00:00	03-Mar-2015 09:50	☐

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Work Order: HS15030060

CASE NARRATIVE

GCMS Semivolatiles by Method SW8270

Batch ID: 91072

- All samples in work order HS15030060 were analyzed at a dilution due to matrix interference.

Sample ID: **27-LAFB-BSS-0-0.5 T (HS15030060-01)**
Sample ID: **29- LAFB-BSS-0-0.5 M (HS15030060-02)**
Sample ID: **31- LAFB-BSS-0-0.5 B (HS15030060-03)**
Sample ID: **33-SL BG 9477V T (HS15030060-04)**
Sample ID: **35-SL BG 9477V M (HS15030060-05)**
Sample ID: **37-SL BG 9477V B (HS15030060-06)**
Sample ID: **39- LAFB-BSS-0-0502 T (HS15030060-07)**
Sample ID: **43- LAFB-BSS-0-0502 B (HS15030060-09)**
Sample ID: **47-HS15010874-12,13,14 M (HS15030060-11)**
Sample ID: **49-HS15010874-12,13,14 B (HS15030060-12)**

- One or more of the GCMS semi-volatile internal standards were recovered at <50%. The sample was reanalyzed with similar results indicating a sample matrix interference.

Sample ID: **33-SL BG 9477V T (HS15030060-04)**
Sample ID: **35-SL BG 9477V M (HS15030060-05)**

- One or more of the method 8270 surrogates were recovered outside of the control limits. This was due to a dilution required for sample analysis.

Client:	ARCADIS U.S., Inc.	**ANALYTICAL REPORT**
Project:	Study 033244 Week of Study 1and2 Remix	WorkOrder:HS15030060
Sample ID:	27-LAFB-BSS-0-0.5 T	Lab ID:HS15030060-01
Collection Date:	02-Mar-2015 00:00	Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene		U	30	250	ug/Kg	5	04-Mar-2015 15:33
Acenaphthylene		U	26	250	ug/Kg	5	04-Mar-2015 15:33
Anthracene		U	45	250	ug/Kg	5	04-Mar-2015 15:33
Benz(a)anthracene		U	34	250	ug/Kg	5	04-Mar-2015 15:33
Benzo(a)pyrene		U	22	250	ug/Kg	5	04-Mar-2015 15:33
Benzo(b)fluoranthene		U	26	250	ug/Kg	5	04-Mar-2015 15:33
Benzo(g,h,i)perylene		U	26	250	ug/Kg	5	04-Mar-2015 15:33
Benzo(k)fluoranthene		U	26	250	ug/Kg	5	04-Mar-2015 15:33
Chrysene		U	22	250	ug/Kg	5	04-Mar-2015 15:33
Dibenz(a,h)anthracene		U	38	250	ug/Kg	5	04-Mar-2015 15:33
Fluoranthene		U	30	250	ug/Kg	5	04-Mar-2015 15:33
Fluorene		U	49	250	ug/Kg	5	04-Mar-2015 15:33
Indeno(1,2,3-cd)pyrene		U	34	250	ug/Kg	5	04-Mar-2015 15:33
Naphthalene		U	30	250	ug/Kg	5	04-Mar-2015 15:33
Phenanthrene		U	26	250	ug/Kg	5	04-Mar-2015 15:33
Pyrene		U	22	250	ug/Kg	5	04-Mar-2015 15:33
Surr: 2-Fluorobiphenyl	*72.4*			*43-125*	*%REC*	*5*	*04-Mar-2015 15:33*
Surr: 4-Terphenyl-d14	*79.6*			*32-125*	*%REC*	*5*	*04-Mar-2015 15:33*
Surr: Nitrobenzene-d5	*83.4*			*37-125*	*%REC*	*5*	*04-Mar-2015 15:33*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client:	ARCADIS U.S., Inc.	**ANALYTICAL REPORT**
Project:	Study 033244 Week of Study 1and2 Remix	WorkOrder:HS15030060
Sample ID:	29- LAFB-BSS-0-0.5 M	Lab ID:HS15030060-02
Collection Date:	02-Mar-2015 00:00	Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene	U		30	250	ug/Kg	5	04-Mar-2015 16:55
Acenaphthylene	U		26	250	ug/Kg	5	04-Mar-2015 16:55
Anthracene	U		45	250	ug/Kg	5	04-Mar-2015 16:55
Benz(a)anthracene	U		34	250	ug/Kg	5	04-Mar-2015 16:55
Benzo(a)pyrene	**54**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 16:55
Benzo(b)fluoranthene	**75**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 16:55
Benzo(g,h,i)perylene	U		26	250	ug/Kg	5	04-Mar-2015 16:55
Benzo(k)fluoranthene	**55**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 16:55
Chrysene	U		22	250	ug/Kg	5	04-Mar-2015 16:55
Dibenz(a,h)anthracene	U		37	250	ug/Kg	5	04-Mar-2015 16:55
Fluoranthene	U		30	250	ug/Kg	5	04-Mar-2015 16:55
Fluorene	U		49	250	ug/Kg	5	04-Mar-2015 16:55
Indeno(1,2,3-cd)pyrene	U		34	250	ug/Kg	5	04-Mar-2015 16:55
Naphthalene	U		30	250	ug/Kg	5	04-Mar-2015 16:55
Phenanthrene	U		26	250	ug/Kg	5	04-Mar-2015 16:55
Pyrene	U		22	250	ug/Kg	5	04-Mar-2015 16:55
Surr: 2-Fluorobiphenyl	*95.1*	*J*		*43-125*	*%REC*	*5*	*04-Mar-2015 16:55*
Surr: 4-Terphenyl-d14	*91.6*	*J*		*32-125*	*%REC*	*5*	*04-Mar-2015 16:55*
Surr: Nitrobenzene-d5	*115*			*37-125*	*%REC*	*5*	*04-Mar-2015 16:55*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Sample ID: 31- LAFB-BSS-0-0.5 B
Collection Date: 02-Mar-2015 00:00

WorkOrder:HS15030060
Lab ID:HS15030060-03
Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene	U		30	250	ug/Kg	5	04-Mar-2015 17:14
Acenaphthylene	U		26	250	ug/Kg	5	04-Mar-2015 17:14
Anthracene	U		45	250	ug/Kg	5	04-Mar-2015 17:14
Benz(a)anthracene	U		33	250	ug/Kg	5	04-Mar-2015 17:14
Benzo(a)pyrene	U		22	250	ug/Kg	5	04-Mar-2015 17:14
Benzo(b)fluoranthene	U		26	250	ug/Kg	5	04-Mar-2015 17:14
Benzo(g,h,i)perylene	U		26	250	ug/Kg	5	04-Mar-2015 17:14
Benzo(k)fluoranthene	U		26	250	ug/Kg	5	04-Mar-2015 17:14
Chrysene	U		22	250	ug/Kg	5	04-Mar-2015 17:14
Dibenz(a,h)anthracene	U		37	250	ug/Kg	5	04-Mar-2015 17:14
Fluoranthene	U		30	250	ug/Kg	5	04-Mar-2015 17:14
Fluorene	U		48	250	ug/Kg	5	04-Mar-2015 17:14
Indeno(1,2,3-cd)pyrene	U		33	250	ug/Kg	5	04-Mar-2015 17:14
Naphthalene	U		30	250	ug/Kg	5	04-Mar-2015 17:14
Phenanthrene	U		26	250	ug/Kg	5	04-Mar-2015 17:14
Pyrene	U		22	250	ug/Kg	5	04-Mar-2015 17:14
Surr: 2-Fluorobiphenyl	*84.2*	*J*		*43-125*	*%REC*	*5*	*04-Mar-2015 17:14*
Surr: 4-Terphenyl-d14	*94.1*	*J*		*32-125*	*%REC*	*5*	*04-Mar-2015 17:14*
Surr: Nitrobenzene-d5	*122*			*37-125*	*%REC*	*5*	*04-Mar-2015 17:14*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Sample ID: 33-SL BG 9477V T
Collection Date: 02-Mar-2015 00:00

WorkOrder:HS15030060
Lab ID:HS15030060-04
Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene		U	30	250	ug/Kg	5	04-Mar-2015 17:33
Acenaphthylene		U	26	250	ug/Kg	5	04-Mar-2015 17:33
Anthracene		U	45	250	ug/Kg	5	04-Mar-2015 17:33
Benz(a)anthracene		U	33	250	ug/Kg	5	04-Mar-2015 17:33
Benzo(a)pyrene		U	22	250	ug/Kg	5	04-Mar-2015 17:33
Benzo(b)fluoranthene		U	26	250	ug/Kg	5	04-Mar-2015 17:33
Benzo(g,h,i)perylene		U	26	250	ug/Kg	5	04-Mar-2015 17:33
Benzo(k)fluoranthene		U	26	250	ug/Kg	5	04-Mar-2015 17:33
Chrysene		U	22	250	ug/Kg	5	04-Mar-2015 17:33
Dibenz(a,h)anthracene		U	37	250	ug/Kg	5	04-Mar-2015 17:33
Fluoranthene		U	30	250	ug/Kg	5	04-Mar-2015 17:33
Fluorene		U	48	250	ug/Kg	5	04-Mar-2015 17:33
Indeno(1,2,3-cd)pyrene		U	33	250	ug/Kg	5	04-Mar-2015 17:33
Naphthalene		U	30	250	ug/Kg	5	04-Mar-2015 17:33
Phenanthrene		U	26	250	ug/Kg	5	04-Mar-2015 17:33
Pyrene		U	22	250	ug/Kg	5	04-Mar-2015 17:33
Surr: 2-Fluorobiphenyl	*91.4*	*J*		*43-125*	*%REC*	*5*	*04-Mar-2015 17:33*
Surr: 4-Terphenyl-d14	*89.6*	*J*		*32-125*	*%REC*	*5*	*04-Mar-2015 17:33*
Surr: Nitrobenzene-d5	*148*	*S*		*37-125*	*%REC*	*5*	*04-Mar-2015 17:33*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Sample ID: 35-SL BG 9477V M
Collection Date: 02-Mar-2015 00:00

WorkOrder:HS15030060
Lab ID:HS15030060-05
Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene	U		30	250	ug/Kg	5	04-Mar-2015 17:54
Acenaphthylene	U		26	250	ug/Kg	5	04-Mar-2015 17:54
Anthracene	U		45	250	ug/Kg	5	04-Mar-2015 17:54
Benz(a)anthracene	U		34	250	ug/Kg	5	04-Mar-2015 17:54
Benzo(a)pyrene	U		22	250	ug/Kg	5	04-Mar-2015 17:54
Benzo(b)fluoranthene	U		26	250	ug/Kg	5	04-Mar-2015 17:54
Benzo(g,h,i)perylene	U		26	250	ug/Kg	5	04-Mar-2015 17:54
Benzo(k)fluoranthene	U		26	250	ug/Kg	5	04-Mar-2015 17:54
Chrysene	U		22	250	ug/Kg	5	04-Mar-2015 17:54
Dibenz(a,h)anthracene	U		37	250	ug/Kg	5	04-Mar-2015 17:54
Fluoranthene	U		30	250	ug/Kg	5	04-Mar-2015 17:54
Fluorene	U		49	250	ug/Kg	5	04-Mar-2015 17:54
Indeno(1,2,3-cd)pyrene	U		34	250	ug/Kg	5	04-Mar-2015 17:54
Naphthalene	U		30	250	ug/Kg	5	04-Mar-2015 17:54
Phenanthrene	U		26	250	ug/Kg	5	04-Mar-2015 17:54
Pyrene	U		22	250	ug/Kg	5	04-Mar-2015 17:54
Surr: 2-Fluorobiphenyl	*96.0*	*J*		*43-125*	*%REC*	*5*	*04-Mar-2015 17:54*
Surr: 4-Terphenyl-d14	*99.2*			*32-125*	*%REC*	*5*	*04-Mar-2015 17:54*
Surr: Nitrobenzene-d5	*166*	*S*		*37-125*	*%REC*	*5*	*04-Mar-2015 17:54*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Sample ID: 37-SL BG 9477V B
Collection Date: 02-Mar-2015 00:00

WorkOrder:HS15030060
Lab ID:HS15030060-06
Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene	U		30	240	ug/Kg	5	04-Mar-2015 18:13
Acenaphthylene	U		26	240	ug/Kg	5	04-Mar-2015 18:13
Anthracene	U		44	240	ug/Kg	5	04-Mar-2015 18:13
Benz(a)anthracene	U		33	240	ug/Kg	5	04-Mar-2015 18:13
Benzo(a)pyrene	U		22	240	ug/Kg	5	04-Mar-2015 18:13
Benzo(b)fluoranthene	U		26	240	ug/Kg	5	04-Mar-2015 18:13
Benzo(g,h,i)perylene	U		26	240	ug/Kg	5	04-Mar-2015 18:13
Benzo(k)fluoranthene	U		26	240	ug/Kg	5	04-Mar-2015 18:13
Chrysene	U		22	240	ug/Kg	5	04-Mar-2015 18:13
Dibenz(a,h)anthracene	U		37	240	ug/Kg	5	04-Mar-2015 18:13
Fluoranthene	U		30	240	ug/Kg	5	04-Mar-2015 18:13
Fluorene	U		48	240	ug/Kg	5	04-Mar-2015 18:13
Indeno(1,2,3-cd)pyrene	U		33	240	ug/Kg	5	04-Mar-2015 18:13
Naphthalene	U		30	240	ug/Kg	5	04-Mar-2015 18:13
Phenanthrene	U		26	240	ug/Kg	5	04-Mar-2015 18:13
Pyrene	U		22	240	ug/Kg	5	04-Mar-2015 18:13
Surr: 2-Fluorobiphenyl	*72.3*	*J*		*43-125*	*%REC*	*5*	*04-Mar-2015 18:13*
Surr: 4-Terphenyl-d14	*80.1*	*J*		*32-125*	*%REC*	*5*	*04-Mar-2015 18:13*
Surr: Nitrobenzene-d5	*117*			*37-125*	*%REC*	*5*	*04-Mar-2015 18:13*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Sample ID: 39- LAFB-BSS-0-0502 T
Collection Date: 02-Mar-2015 00:00

WorkOrder:HS15030060
Lab ID:HS15030060-07
Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene	U		30	250	ug/Kg	5	04-Mar-2015 18:32
Acenaphthylene	U		26	250	ug/Kg	5	04-Mar-2015 18:32
Anthracene	U		45	250	ug/Kg	5	04-Mar-2015 18:32
Benz(a)anthracene	**140**	J	**33**	**250**	**ug/Kg**	5	04-Mar-2015 18:32
Benzo(a)pyrene	**180**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 18:32
Benzo(b)fluoranthene	**200**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 18:32
Benzo(g,h,i)perylene	**160**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 18:32
Benzo(k)fluoranthene	**120**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 18:32
Chrysene	**170**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 18:32
Dibenz(a,h)anthracene	U		37	250	ug/Kg	5	04-Mar-2015 18:32
Fluoranthene	**210**	J	**30**	**250**	**ug/Kg**	5	04-Mar-2015 18:32
Fluorene	U		48	250	ug/Kg	5	04-Mar-2015 18:32
Indeno(1,2,3-cd)pyrene	**150**	J	**33**	**250**	**ug/Kg**	5	04-Mar-2015 18:32
Naphthalene	U		30	250	ug/Kg	5	04-Mar-2015 18:32
Phenanthrene	**77**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 18:32
Pyrene	**200**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 18:32
Surr: 2-Fluorobiphenyl	*84.1*	*J*		*43-125*	*%REC*	*5*	*04-Mar-2015 18:32*
Surr: 4-Terphenyl-d14	*89.1*	*J*		*32-125*	*%REC*	*5*	*04-Mar-2015 18:32*
Surr: Nitrobenzene-d5	*96.7*	*J*		*37-125*	*%REC*	*5*	*04-Mar-2015 18:32*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Sample ID: 41- LAFB-BSS-0-0502 M
Collection Date: 02-Mar-2015 00:00

WorkOrder:HS15030060
Lab ID:HS15030060-08
Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene	U		30	250	ug/Kg	5	04-Mar-2015 18:52
Acenaphthylene	U		26	250	ug/Kg	5	04-Mar-2015 18:52
Anthracene	U		45	250	ug/Kg	5	04-Mar-2015 18:52
Benz(a)anthracene	**140**	J	**33**	**250**	**ug/Kg**	5	04-Mar-2015 18:52
Benzo(a)pyrene	**160**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 18:52
Benzo(b)fluoranthene	**230**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 18:52
Benzo(g,h,i)perylene	**120**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 18:52
Benzo(k)fluoranthene	**110**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 18:52
Chrysene	**170**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 18:52
Dibenz(a,h)anthracene	U		37	250	ug/Kg	5	04-Mar-2015 18:52
Fluoranthene	**200**	J	**30**	**250**	**ug/Kg**	5	04-Mar-2015 18:52
Fluorene	U		48	250	ug/Kg	5	04-Mar-2015 18:52
Indeno(1,2,3-cd)pyrene	**110**	J	**33**	**250**	**ug/Kg**	5	04-Mar-2015 18:52
Naphthalene	U		30	250	ug/Kg	5	04-Mar-2015 18:52
Phenanthrene	**72**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 18:52
Pyrene	**220**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 18:52
Surr: 2-Fluorobiphenyl	*96.1*	*J*		*43-125*	*%REC*	*5*	*04-Mar-2015 18:52*
Surr: 4-Terphenyl-d14	*99.5*			*32-125*	*%REC*	*5*	*04-Mar-2015 18:52*
Surr: Nitrobenzene-d5	*105*			*37-125*	*%REC*	*5*	*04-Mar-2015 18:52*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Sample ID: 43- LAFB-BSS-0-0502 B
Collection Date: 02-Mar-2015 00:00

WorkOrder:HS15030060
Lab ID:HS15030060-09
Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene	U		30	250	ug/Kg	5	04-Mar-2015 19:11
Acenaphthylene	U		26	250	ug/Kg	5	04-Mar-2015 19:11
Anthracene	**94**	J	**45**	**250**	**ug/Kg**	5	04-Mar-2015 19:11
Benz(a)anthracene	**750**		**34**	**250**	**ug/Kg**	5	04-Mar-2015 19:11
Benzo(a)pyrene	**930**		**22**	**250**	**ug/Kg**	5	04-Mar-2015 19:11
Benzo(b)fluoranthene	**1,000**		**26**	**250**	**ug/Kg**	5	04-Mar-2015 19:11
Benzo(g,h,i)perylene	**610**		**26**	**250**	**ug/Kg**	5	04-Mar-2015 19:11
Benzo(k)fluoranthene	**560**		**26**	**250**	**ug/Kg**	5	04-Mar-2015 19:11
Chrysene	**810**		**22**	**250**	**ug/Kg**	5	04-Mar-2015 19:11
Dibenz(a,h)anthracene	U		37	250	ug/Kg	5	04-Mar-2015 19:11
Fluoranthene	**1,200**		**30**	**250**	**ug/Kg**	5	04-Mar-2015 19:11
Fluorene	U		48	250	ug/Kg	5	04-Mar-2015 19:11
Indeno(1,2,3-cd)pyrene	**720**		**34**	**250**	**ug/Kg**	5	04-Mar-2015 19:11
Naphthalene	U		30	250	ug/Kg	5	04-Mar-2015 19:11
Phenanthrene	**400**		**26**	**250**	**ug/Kg**	5	04-Mar-2015 19:11
Pyrene	**1,000**		**22**	**250**	**ug/Kg**	5	04-Mar-2015 19:11
Surr: 2-Fluorobiphenyl	*74.3*	*J*		*43-125*	*%REC*	*5*	*04-Mar-2015 19:11*
Surr: 4-Terphenyl-d14	*74.3*	*J*		*32-125*	*%REC*	*5*	*04-Mar-2015 19:11*
Surr: Nitrobenzene-d5	*93.0*	*J*		*37-125*	*%REC*	*5*	*04-Mar-2015 19:11*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Sample ID: 45-HS15010874-12,13,14 T
Collection Date: 02-Mar-2015 00:00

WorkOrder:HS15030060
Lab ID:HS15030060-10
Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene	U		30	250	ug/Kg	5	04-Mar-2015 19:30
Acenaphthylene	U		26	250	ug/Kg	5	04-Mar-2015 19:30
Anthracene	U		45	250	ug/Kg	5	04-Mar-2015 19:30
Benz(a)anthracene	**96**	J	**34**	**250**	**ug/Kg**	5	04-Mar-2015 19:30
Benzo(a)pyrene	**120**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 19:30
Benzo(b)fluoranthene	**160**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 19:30
Benzo(g,h,i)perylene	**96**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 19:30
Benzo(k)fluoranthene	**58**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 19:30
Chrysene	**110**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 19:30
Dibenz(a,h)anthracene	U		37	250	ug/Kg	5	04-Mar-2015 19:30
Fluoranthene	**130**	J	**30**	**250**	**ug/Kg**	5	04-Mar-2015 19:30
Fluorene	U		49	250	ug/Kg	5	04-Mar-2015 19:30
Indeno(1,2,3-cd)pyrene	U		34	250	ug/Kg	5	04-Mar-2015 19:30
Naphthalene	U		30	250	ug/Kg	5	04-Mar-2015 19:30
Phenanthrene	**43**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 19:30
Pyrene	**130**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 19:30
Surr: 2-Fluorobiphenyl	*122*			*43-125*	*%REC*	*5*	*04-Mar-2015 19:30*
Surr: 4-Terphenyl-d14	*113*			*32-125*	*%REC*	*5*	*04-Mar-2015 19:30*
Surr: Nitrobenzene-d5	*122*			*37-125*	*%REC*	*5*	*04-Mar-2015 19:30*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Sample ID: 47-HS15010874-12,13,14 M
Collection Date: 02-Mar-2015 00:00

WorkOrder:HS15030060
Lab ID:HS15030060-11
Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene	U		30	250	ug/Kg	5	04-Mar-2015 19:49
Acenaphthylene	U		26	250	ug/Kg	5	04-Mar-2015 19:49
Anthracene	U		45	250	ug/Kg	5	04-Mar-2015 19:49
Benz(a)anthracene	**110**	J	**34**	**250**	**ug/Kg**	5	04-Mar-2015 19:49
Benzo(a)pyrene	**140**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 19:49
Benzo(b)fluoranthene	**170**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 19:49
Benzo(g,h,i)perylene	U		26	250	ug/Kg	5	04-Mar-2015 19:49
Benzo(k)fluoranthene	**66**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 19:49
Chrysene	**100**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 19:49
Dibenz(a,h)anthracene	U		37	250	ug/Kg	5	04-Mar-2015 19:49
Fluoranthene	**170**	J	**30**	**250**	**ug/Kg**	5	04-Mar-2015 19:49
Fluorene	U		49	250	ug/Kg	5	04-Mar-2015 19:49
Indeno(1,2,3-cd)pyrene	U		34	250	ug/Kg	5	04-Mar-2015 19:49
Naphthalene	U		30	250	ug/Kg	5	04-Mar-2015 19:49
Phenanthrene	**75**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 19:49
Pyrene	**160**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 19:49
Surr: 2-Fluorobiphenyl	*108*			*43-125*	*%REC*	*5*	*04-Mar-2015 19:49*
Surr: 4-Terphenyl-d14	*101*			*32-125*	*%REC*	*5*	*04-Mar-2015 19:49*
Surr: Nitrobenzene-d5	*121*			*37-125*	*%REC*	*5*	*04-Mar-2015 19:49*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Sample ID: 49-HS15010874-12,13,14 B
Collection Date: 02-Mar-2015 00:00

WorkOrder:HS15030060
Lab ID:HS15030060-12
Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene	U		30	250	ug/Kg	5	04-Mar-2015 20:09
Acenaphthylene	U		26	250	ug/Kg	5	04-Mar-2015 20:09
Anthracene	U		45	250	ug/Kg	5	04-Mar-2015 20:09
Benz(a)anthracene	**120**	J	**33**	**250**	**ug/Kg**	5	04-Mar-2015 20:09
Benzo(a)pyrene	**130**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 20:09
Benzo(b)fluoranthene	**170**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 20:09
Benzo(g,h,i)perylene	U		26	250	ug/Kg	5	04-Mar-2015 20:09
Benzo(k)fluoranthene	**110**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 20:09
Chrysene	**150**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 20:09
Dibenz(a,h)anthracene	U		37	250	ug/Kg	5	04-Mar-2015 20:09
Fluoranthene	**190**	J	**30**	**250**	**ug/Kg**	5	04-Mar-2015 20:09
Fluorene	U		48	250	ug/Kg	5	04-Mar-2015 20:09
Indeno(1,2,3-cd)pyrene	U		33	250	ug/Kg	5	04-Mar-2015 20:09
Naphthalene	U		30	250	ug/Kg	5	04-Mar-2015 20:09
Phenanthrene	**73**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 20:09
Pyrene	**170**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 20:09
Surr: 2-Fluorobiphenyl	*121*			*43-125*	*%REC*	*5*	*04-Mar-2015 20:09*
Surr: 4-Terphenyl-d14	*101*			*32-125*	*%REC*	*5*	*04-Mar-2015 20:09*
Surr: Nitrobenzene-d5	*117*			*37-125*	*%REC*	*5*	*04-Mar-2015 20:09*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
WorkOrder: HS15030060

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID 91072	**Test Name :** LOW-LEVEL PAHS			**Matrix:** Solid		
HS15030060-01	27-LAFB-BSS-0-0.5 T	02 Mar 2015 00:00		03 Mar 2015 15:45	04 Mar 2015 15:33	5
HS15030060-02	29- LAFB-BSS-0-0.5 M	02 Mar 2015 00:00		03 Mar 2015 15:45	04 Mar 2015 16:55	5
HS15030060-03	31- LAFB-BSS-0-0.5 B	02 Mar 2015 00:00		03 Mar 2015 15:45	04 Mar 2015 17:14	5
HS15030060-04	33-SL BG 9477V T	02 Mar 2015 00:00		03 Mar 2015 15:45	04 Mar 2015 17:33	5
HS15030060-05	35-SL BG 9477V M	02 Mar 2015 00:00		03 Mar 2015 15:45	04 Mar 2015 17:54	5
HS15030060-06	37-SL BG 9477V B	02 Mar 2015 00:00		03 Mar 2015 15:45	04 Mar 2015 18:13	5
HS15030060-07	39- LAFB-BSS-0-0502 T	02 Mar 2015 00:00		03 Mar 2015 15:45	04 Mar 2015 18:32	5
HS15030060-08	41- LAFB-BSS-0-0502 M	02 Mar 2015 00:00		03 Mar 2015 15:45	04 Mar 2015 18:52	5
HS15030060-09	43- LAFB-BSS-0-0502 B	02 Mar 2015 00:00		03 Mar 2015 15:45	04 Mar 2015 19:11	5
HS15030060-10	45-HS15010874-12,13,14 T	02 Mar 2015 00:00		03 Mar 2015 15:45	04 Mar 2015 19:30	5
HS15030060-11	47-HS15010874-12,13,14 M	02 Mar 2015 00:00		03 Mar 2015 15:45	04 Mar 2015 19:49	5
HS15030060-12	49-HS15010874-12,13,14 B	02 Mar 2015 00:00		03 Mar 2015 15:45	04 Mar 2015 20:09	5

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
WorkOrder: HS15030060

QC BATCH REPORT

Batch ID: 91072 **Instrument: SV-6** **Method: SW8270**

MBLK Sample ID: **MBLK-91072** Units: **ug/Kg** Analysis Date: **04-Mar-2015 10:00**
Client ID: Run ID: **SV-6_250582** SeqNo: **3204107** PrepDate: **03-Mar-2015** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	U	3.3								
Acenaphthylene	U	3.3								
Anthracene	U	3.3								
Benz(a)anthracene	U	3.3								
Benzo(a)pyrene	U	3.3								
Benzo(b)fluoranthene	U	3.3								
Benzo(g,h,i)perylene	U	3.3								
Benzo(k)fluoranthene	U	3.3								
Chrysene	U	3.3								
Dibenz(a,h)anthracene	U	3.3								
Fluoranthene	U	3.3								
Fluorene	U	3.3								
Indeno(1,2,3-cd)pyrene	U	3.3								
Naphthalene	U	3.3								
Phenanthrene	U	3.3								
Pyrene	U	3.3								
Surr: 2-Fluorobiphenyl	*161.5*	*6.6*	*167*	*0*	*96.7*	*43 - 125*				
Surr: 4-Terphenyl-d14	*183*	*6.6*	*167*	*0*	*110*	*32 - 125*				
Surr: Nitrobenzene-d5	*136.3*	*6.6*	*167*	*0*	*81.6*	*37 - 125*				

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
WorkOrder: HS15030060

QC BATCH REPORT

Batch ID: 91072 **Instrument: SV-6** **Method: SW8270**

LCS Sample ID: **LCS-91072** Units: **ug/Kg** Analysis Date: **04-Mar-2015 10:21**
Client ID: Run ID: **SV-6_250582** SeqNo: **3204108** PrepDate: **03-Mar-2015** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	125.2	3.3	167	0	75.0	50 - 120				
Acenaphthylene	122.7	3.3	167	0	73.5	50 - 120				
Anthracene	128.2	3.3	167	0	76.8	50 - 123				
Benz(a)anthracene	138	3.3	167	0	82.6	50 - 131				
Benzo(a)pyrene	144.3	3.3	167	0	86.4	50 - 130				
Benzo(b)fluoranthene	146.7	3.3	167	0	87.9	50 - 137				
Benzo(g,h,i)perylene	140	3.3	167	0	83.8	50 - 130				
Benzo(k)fluoranthene	126.5	3.3	167	0	75.7	50 - 143				
Chrysene	136.1	3.3	167	0	81.5	50 - 130				
Dibenz(a,h)anthracene	148.3	3.3	167	0	88.8	50 - 130				
Fluoranthene	135.3	3.3	167	0	81.0	50 - 131				
Fluorene	132	3.3	167	0	79.0	50 - 125				
Indeno(1,2,3-cd)pyrene	153.6	3.3	167	0	92.0	45 - 139				
Naphthalene	135	3.3	167	0	80.9	50 - 125				
Phenanthrene	136.5	3.3	167	0	81.7	50 - 125				
Pyrene	135.4	3.3	167	0	81.1	45 - 130				
Surr: 2-Fluorobiphenyl	*136.3*	*6.6*	*167*	*0*	*81.6*	*43 - 125*				
Surr: 4-Terphenyl-d14	*166.1*	*6.6*	*167*	*0*	*99.5*	*32 - 125*				
Surr: Nitrobenzene-d5	*136.7*	*6.6*	*167*	*0*	*81.8*	*37 - 125*				

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
WorkOrder: HS15030060

QC BATCH REPORT

Batch ID: 91072 **Instrument: SV-6** **Method: SW8270**

MS Sample ID: **HS15030060-01MS** Units: **ug/Kg** Analysis Date: **04-Mar-2015 16:33**
Client ID: **27-LAFB-BSS-0-0.5 T** Run ID: **SV-6_250582** SeqNo: **3204129** PrepDate: **03-Mar-2015** DF: **5**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	379	120	502	0	75.5	50 - 120				
Acenaphthylene	386.8	120	502	0	77.0	50 - 120				
Anthracene	368.7	120	502	0	73.5	50 - 123				
Benz(a)anthracene	450.5	120	502	0	89.7	50 - 131				
Benzo(a)pyrene	438.2	120	502	0	87.3	50 - 130				
Benzo(b)fluoranthene	399.9	120	502	0	79.7	50 - 137				
Benzo(g,h,i)perylene	438.6	120	502	0	87.4	50 - 130				
Benzo(k)fluoranthene	446.3	120	502	0	88.9	50 - 143				
Chrysene	413.1	120	502	0	82.3	50 - 130				
Dibenz(a,h)anthracene	455.7	120	502	0	90.8	50 - 130				
Fluoranthene	397.8	120	502	0	79.2	50 - 131				
Fluorene	393.8	120	502	0	78.5	50 - 125				
Indeno(1,2,3-cd)pyrene	421	120	502	0	83.9	45 - 139				
Naphthalene	396.1	120	502	0	78.9	50 - 125				
Phenanthrene	380.6	120	502	0	75.8	50 - 125				
Pyrene	461.4	120	502	0	91.9	45 - 130				
Surr: 2-Fluorobiphenyl	*405.4*	*250*	*502*	*0*	*80.8*	*43 - 125*				
Surr: 4-Terphenyl-d14	*438.6*	*250*	*502*	*0*	*87.4*	*32 - 125*				
Surr: Nitrobenzene-d5	*439.1*	*250*	*502*	*0*	*87.5*	*37 - 125*				

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
WorkOrder: HS15030060

QC BATCH REPORT

Batch ID: 91072 **Instrument: SV-6** **Method: SW8270**

MSD Sample ID: **HS15030060-01MSD** Units: **ug/Kg** Analysis Date: **04-Mar-2015 16:12**
Client ID: **27-LAFB-BSS-0-0.5 T** Run ID: **SV-6_250582** SeqNo: **3204128** PrepDate: **03-Mar-2015** DF: **5**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	385.6	120	503.5	0	76.6	50 - 120	379	1.73	30	
Acenaphthylene	411.8	120	503.5	0	81.8	50 - 120	386.8	6.28	30	
Anthracene	408.4	120	503.5	0	81.1	50 - 123	368.7	10.2	30	
Benz(a)anthracene	489.7	120	503.5	0	97.2	50 - 131	450.5	8.33	30	
Benzo(a)pyrene	470.9	120	503.5	0	93.5	50 - 130	438.2	7.2	30	
Benzo(b)fluoranthene	462.1	120	503.5	0	91.8	50 - 137	399.9	14.4	30	
Benzo(g,h,i)perylene	495.1	120	503.5	0	98.3	50 - 130	438.6	12.1	30	
Benzo(k)fluoranthene	473.1	120	503.5	0	94.0	50 - 143	446.3	5.83	30	
Chrysene	433.3	120	503.5	0	86.1	50 - 130	413.1	4.77	30	
Dibenz(a,h)anthracene	523.2	120	503.5	0	104	50 - 130	455.7	13.8	30	
Fluoranthene	457.8	120	503.5	0	90.9	50 - 131	397.8	14	30	
Fluorene	423.9	120	503.5	0	84.2	50 - 125	393.8	7.35	30	
Indeno(1,2,3-cd)pyrene	493.2	120	503.5	0	97.9	45 - 139	421	15.8	30	
Naphthalene	405.4	120	503.5	0	80.5	50 - 125	396.1	2.33	30	
Phenanthrene	428.8	120	503.5	0	85.2	50 - 125	380.6	11.9	30	
Pyrene	511	120	503.5	0	101	45 - 130	461.4	10.2	30	
Surr: 2-Fluorobiphenyl	*412.3*	*250*	*503.5*	*0*	*81.9*	*43 - 125*	*405.4*	*1.69*	*30*	
Surr: 4-Terphenyl-d14	*530.1*	*250*	*503.5*	*0*	*105*	*32 - 125*	*438.6*	*18.9*	*30*	
Surr: Nitrobenzene-d5	*435.1*	*250*	*503.5*	*0*	*86.4*	*37 - 125*	*439.1*	*0.917*	*30*	

The following samples were anayzed in this batch:

HS15030060-01	HS15030060-02	HS15030060-03	HS15030060-04
HS15030060-05	HS15030060-06	HS15030060-07	HS15030060-08
HS15030060-09	HS15030060-10	HS15030060-11	HS15030060-12

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
WorkOrder: **HS15030060**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
µg/Kg	Micrograms per Kilogram

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	AR - 2014	27-Mar-2015
California	2919	31-Jul-2016
Dept of Defense	L2231 Rev 3-20-2014	22-Dec-2015
Illinois	003403	09-May-2015
Kansas	E-10352 2014-2015	31-Jul-2015
Kentucky	KY 2014-2015	30-Apr-2015
Louisiana	03087 2014/2015	30-Jun-2015
North Carolina	624 - 2015	31-Dec-2015
North Dakota	R-193 2025	30-Apr-2015
Oklahoma	2014-128	31-Aug-2015
Texas	T104704231-14-14	30-Apr-2015

Client: ARCADIS U.S., Inc.
Project: Study 033244 Week of Study 1and2 Remix
Work Order: HS15030060

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS15030060-01	27-LAFB-BSS-0-0.5 T	Login	3/3/2015 11:41:32 AM	RPG	13B
HS15030060-02	29- LAFB-BSS-0-0.5 M	Login	3/3/2015 11:41:32 AM	RPG	13B
HS15030060-03	31- LAFB-BSS-0-0.5 B	Login	3/3/2015 11:41:32 AM	RPG	13B
HS15030060-04	33-SL BG 9477V T	Login	3/3/2015 11:41:32 AM	RPG	13B
HS15030060-05	35-SL BG 9477V M	Login	3/3/2015 11:41:32 AM	RPG	13B
HS15030060-06	37-SL BG 9477V B	Login	3/3/2015 11:41:32 AM	RPG	13B
HS15030060-07	39- LAFB-BSS-0-0502 T	Login	3/3/2015 11:41:32 AM	RPG	13B
HS15030060-08	41- LAFB-BSS-0-0502 M	Login	3/3/2015 11:41:32 AM	RPG	13B
HS15030060-09	43- LAFB-BSS-0-0502 B	Login	3/3/2015 11:41:32 AM	RPG	13B
HS15030060-10	45-HS15010874-12,13,14 T	Login	3/3/2015 11:41:32 AM	RPG	13B
HS15030060-11	47-HS15010874-12,13,14 M	Login	3/3/2015 11:41:32 AM	RPG	13B
HS15030060-12	49-HS15010874-12,13,14 B	Login	3/3/2015 11:41:32 AM	RPG	13B

Sample Receipt Checklist

Client Name: ARCADIS-EL PASO
Work Order: HS15030060

Date/Time Received: **03-Mar-2015 09:50**
Received by: **RPG**

Checklist completed by: *Raegen Giga* (eSignature) 3-Mar-2015 (Date)

Reviewed by: *Dane J. Wacasey* (eSignature) 4-Mar-2015 (Date)

Matrices: **feed**

Carrier name: **FedEx**

	Yes	No	Not Present
Shipping container/cooler in good condition?	☑	☐	☐
Custody seals intact on shipping container/cooler?	☐	☐	☑
Custody seals intact on sample bottles?	☐	☐	☑
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature in compliance?	☑	☐	

Temperature(s)/Thermometer(s):	1.8c/1.8c c/u	IR 1
Cooler(s)/Kit(s):	Styrofoam Box	
Date/Time sample(s) sent to storage:	03/03/2015 11:58	

	Yes	No	N/A
Water - VOA vials have zero headspace?	☐	☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	☐	☐	☑
pH adjusted?	☐	☐	☑

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: 0 Regarding:

Comments:

Corrective Action:

HS15030060

ARCADIS U.S., Inc.

Study# 033244 Week of Study 1&2 Remix

SAMPLE INDEX / TRANSFER

Study # 033244

Week of Study 1&2 remix

Form prepared by (init/date) JNJ 3/2/15

Date diet / dose prepared: 3/2/15

Sampled by (init. / date): JNJ 3/2/15

Sample #	Stored	Amount	Test material	Group	Site	Prepared Conc.	Date sent for analysis
27	R	~30g	Sieved soil lot LAFB-BSS-0-0.5	1	T	0ppm	3/2/15
28				1	T		
29				1	M		3/2/15
30				1	M		
31				1	B		3/2/15
32		~30g	Sieved soil lot LAFB-BSS-0-0.5	1	B	0ppm	
33		~20g	B(a)P lot SLBG9477V	2	T	0.15ppm	3/2/15
34				2	T		
35				2	M		3/2/15
36				2	M		
37				2	B		3/2/15
38	R	~20g	B(a)P lot SLBG9477V	2	B	0.15ppm (C) ~~0.15ppm~~ (E)	

Measured amount (init.): NA Device: NA

Approximate amount (init.) JNJ 3/2/15

Storage codes: A = Ambient R = Refrigerator F = Freezer

Samples stored in: LS-RC-00004

Sample Site: **T** = Top **M** = Middle **B** = Bottom, or Random Bottle Number

Sample(s) sent by: JNJ Date: 3/2/15

Sample(s) received by: RG Date: 03/03/15 09-50

(E) JNJ 3/2/15 (C) 0.15ppm JNJ 3/2/15

AF-0019- 09

Exact Copy of the Original if stamped in red. Original is stored in:

Facility Files

Study File 033244

Initials JNJ Date 3/2/15

HS15030060

ARCADIS U.S., Inc.

Study# 033244 Week of Study 1&2 Remix

SAMPLE INDEX / TRANSFER

Study # 033244

Week of Study 1&2 remix

Form prepared by (init/date) JNJ 3/2/15

Date diet / dose prepared: 3/2/15

Sampled by (init. / date): JNJ 3/2/15

Sample #	Stored	Amount	Test material	Group	Site	Prepared Conc.	Date sent for analysis
39	R	~20g	Sieved Soil lot LAFB-BSS-0-0502	3	T	0.15ppm	3/2/15
40				3	T		
41				3	M		3/2/15
42				3	M		
43				3	B		3/2/15
44			Sieved Soil lot LAFB-BSS-0-0502	3	B	0.15ppm	
45			Extract lot HS15010874-12,13,14	4	T	0.15ppm	3/2/15
46				4	T		
47				4	M		3/2/15
48				4	M		
49				4	B		3/2/15
50	R	~20g	Extract lot HS15010874-12,13,14	4	B	0.15ppm	

Exact Copy of the Original if stamped in red. Original located in: Facility Files Study File 033244 Initials JNJ Date 3/2/15

Measured amount (init.): NA Device: NA

Approximate amount (init.) JNJ 3/2/15

Storage codes: A = Ambient R = Refrigerator F = Freezer

Samples stored in: LS-RC-00004

Sample Site: **T** = Top **M** = Middle **B** = Bottom, or Random Bottle Number

Sample(s) sent by: JNJ Date: 3/2/15

Sample(s) received by: RG Date: 03/03/15 09:50.

AF-0019- 09

To: ALS Life Sciences
Attn: Dane Wacasey
10450 Stancliff Rd, Suite 210
Houston, TX 77099 USA

Date: 3/2/2015

From: Tammy Taylopr

The enclosed shipment was shipped on ice packs and contains a total of 12 samples for analysis from Ricerca Study 033244. Please review the included Sample Index Transfer Form upon receipt.

Please electronically return signed copies of this letter and Sample Index Transfer Form upon the arrival of this shipment.

Sincerely,

Tammy Taylor

Tammy Taylor
Toxicology Formulations Lab
Ricerca Biosciences
tammy.taylor@ricerca.com
Phone: 440.357.3770

The package was received in good condition YES / NO (please circle one)

Please indicate any problems regarding this shipment:
NONE.

Name: R Giga 09:50 am Date: 03/03/15

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com. FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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RICERCA BIOSCIENCES LLC
7528 AUBURN ROAD

CONCORD, OH 44077

Origin ID: LNNA

FedEx Express

J141214073003uv

Ship Date: 02MAR15
ActWgt: 23.0 LB MAN
CAD: 0155888/CAFE2807

Delivery Address Bar Code

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Invoice #
PO #
Dept #

SHIP TO: (440) 357-3391 BILL SENDER

DANE WACASEY
ALS LIFE SCIENCES
10450 STANCLIFF ROAD
SUITE 210
HOUSTON, TX 77099

TUE - 03 MAR 10:30A
PRIORITY OVERNIGHT

TRK# 0201 5604 5726 6097

XH SGRA

77099
TX-US
IAH

521C1/879A/6F03

Client:	ARCADIS U.S., Inc.	**ANALYTICAL REPORT**
Project:	Study 033244 Week of Study 1and2 Remix	WorkOrder:HS15030060
Sample ID:	29- LAFB-BSS-0-0.5 M	Lab ID:HS15030060-02
Collection Date:	02-Mar-2015 00:00	Matrix:Solid

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS		**Method:SW8270**			Prep:SW3541 / 03-Mar-2015		Analyst: ACN
Acenaphthene	U		30	250	ug/Kg	5	04-Mar-2015 16:55
Acenaphthylene	U		26	250	ug/Kg	5	04-Mar-2015 16:55
Anthracene	U		45	250	ug/Kg	5	04-Mar-2015 16:55
Benz(a)anthracene	U		34	250	ug/Kg	5	04-Mar-2015 16:55
Benzo(a)pyrene	**54**	J	**22**	**250**	**ug/Kg**	5	04-Mar-2015 16:55
Benzo(b)fluoranthene	**75**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 16:55
Benzo(g,h,i)perylene	U		26	250	ug/Kg	5	04-Mar-2015 16:55
Benzo(k)fluoranthene	**55**	J	**26**	**250**	**ug/Kg**	5	04-Mar-2015 16:55
Chrysene	U		22	250	ug/Kg	5	04-Mar-2015 16:55
Dibenz(a,h)anthracene	U		37	250	ug/Kg	5	04-Mar-2015 16:55
Fluoranthene	U		30	250	ug/Kg	5	04-Mar-2015 16:55
Fluorene	U		49	250	ug/Kg	5	04-Mar-2015 16:55
Indeno(1,2,3-cd)pyrene	U		34	250	ug/Kg	5	04-Mar-2015 16:55
Naphthalene	U		30	250	ug/Kg	5	04-Mar-2015 16:55
Phenanthrene	U		26	250	ug/Kg	5	04-Mar-2015 16:55
Pyrene	U		22	250	ug/Kg	5	04-Mar-2015 16:55
Surr: 2-Fluorobiphenyl	*95.1*	*J*		*43-125*	*%REC*	*5*	*04-Mar-2015 16:55*
Surr: 4-Terphenyl-d14	*91.6*	*J*		*32-125*	*%REC*	*5*	*04-Mar-2015 16:55*
Surr: Nitrobenzene-d5	*115*			*37-125*	*%REC*	*5*	*04-Mar-2015 16:55*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

AXYS | Axys Analytical Services Ltd
2045 Mills Road West
SIDNEY, BRITISH COLUMBIA, CANADA V8L 5X2
TEL 250-655-5800 FAX 250-655-5811
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AXYS Client No.: 4765

Client Address: ARCADIS U.S., Inc.
630 Plaza Drive, Suite 600
Highlands Ranch, CO, US, 80129

The AXYS contact for these data is Kirsten Anderson.

BATCH SUMMARY

Batch ID: WG51719	***Date:*** 17-Jul-2015
Analysis Type: PAH	***Matrix Type:*** Tissue

BATCH MAKEUP

Contract: 4765

Samples:

L23192-16	137 Top
L23437-1	57 Top
L23437-2	58 Middle
L23437-3	59 Bottom
L23437-4	60 Top
L23437-5	61 Middle
L23437-6	62 Bottom
L23437-7	63 Top
L23437-8	64 Middle
L23437-9	65 Bottom
L23437-10	66 Top
L23437-11	67 Middle
L23437-12	68 Bottom

Blank: WG51719-101

Reference or Spike: WG51719-102

Duplicate:

Comments:
1. Data are considered final.
2. Data are not blank corrected.

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FQA-006 Rev. 2. 18-Jul-1994

AXYS METHOD MLA-021 Rev 12

Form 3A
INITIAL CALIBRATION RELATIVE RESPONSES

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 08-Jul-2015

Instrument ID: LR GC/MS

GC Column ID: RTX5

CS0 Data Filename: N/A

CS1 Data Filename: PH5U0282.D

CS2 Data Filename: PH5U0283.D

CS3 Data Filename: PH5U0284.D

CS4 Data Filename: PH5U0286.D

CS5 Data Filename: PH5U0285.D

CS6 Data Filename: N/A

		RELATIVE RESPONSE (RR)								
COMPOUND	**LAB FLAG [1]**	**CS0**	**CS1**	**CS2**	**CS3**	**CS4**	**CS5**	**CS6**	**MEAN RR**	**CV (%RSD)[2]**
Naphthalene			1.17	1.19	1.18	1.20	1.22		1.19	1.68
Acenaphthylene			1.19	1.22	1.22	1.24	1.27		1.23	2.31
Acenaphthene			0.67	0.69	0.69	0.72	0.72		0.70	3.13
Fluorene			0.76	0.74	0.76	0.78	0.82		0.77	3.90
Phenanthrene			1.18	1.18	1.18	1.19	1.21		1.19	1.15
Anthracene			1.12	1.14	1.17	1.18	1.22		1.17	3.29
Fluoranthene			1.34	1.39	1.41	1.43	1.45		1.40	2.96
Pyrene			1.41	1.46	1.47	1.47	1.46		1.45	1.75
Benz[a]anthracene			1.49	1.49	1.50	1.51	1.54		1.51	1.46
Chrysene			1.24	1.28	1.31	1.33	1.31		1.29	2.84
Benzo[b]fluoranthene			1.65	1.60	1.59	1.59	1.62		1.61	1.61
Benzo[j,k]fluoranthenes			1.17	1.25	1.24	1.26	1.25		1.24	2.86
Benzo[e]pyrene			1.27	1.32	1.37	1.38	1.38		1.35	3.58
Benzo[a]pyrene			1.27	1.33	1.38	1.42	1.43		1.37	4.78
Perylene			1.34	1.42	1.50	1.57	1.61		1.49	7.30
Dibenz[a,h]anthracene			1.48	1.49	1.60	1.68	1.72		1.59	6.80
Indeno[1,2,3-cd]pyrene			1.39	1.41	1.42	1.45	1.50		1.43	2.94
Benzo[ghi]perylene			1.34	1.40	1.42	1.47	1.51		1.43	4.47
2-Methylnaphthalene			1.26	1.28	1.27	1.29	1.32		1.28	1.63
2,6-Dimethylnaphthalene			1.26	1.26	1.26	1.28	1.29		1.27	1.13
2,3,5-Trimethylnaphthalene			1.06	1.08	1.08	1.12	1.15		1.10	3.39
1-Methylphenanthrene			0.77	0.77	0.80	0.86	0.88		0.82	5.84
Dibenzothiophene			1.19	1.20	1.20	1.22	1.23		1.21	1.14

(1) Where applicable, custom lab flags have been used on this report.
(2) QC limit is 20% for native compounds with a labeled analog, 35% for those without a labeled analog.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Simin Yassari_____

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Report Filename: GENERIC-SPECS_PAH_LO_08-Jul-2015_PH5U__Form3A_GS60148.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 3B
INITIAL CALIBRATION RELATIVE RESPONSES

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 08-Jul-2015

Instrument ID: LR GC/MS

GC Column ID: RTX5

CS0 Data Filename: N/A

CS1 Data Filename: PH5U0282.D

CS2 Data Filename: PH5U0283.D

CS3 Data Filename: PH5U0284.D

CS4 Data Filename: PH5U0286.D

CS5 Data Filename: PH5U0285.D

CS6 Data Filename: N/A

		RELATIVE RESPONSE (RR)								
LABELED COMPOUND	**LAB FLAG [1]**	**CS0**	**CS1**	**CS2**	**CS3**	**CS4**	**CS5**	**CS6**	**MEAN RR**	**CV (%RSD)[2]**
Naphthalene d-8			1.83	1.81	1.82	1.78	1.77		1.80	1.43
2-Methylnaphthalene d-10			1.13	1.12	1.13	1.11	1.10		1.12	0.96
2,6-Dimethylnaphthalene d-12			0.97	0.97	0.97	0.98	0.98		0.97	0.44
Acenaphthylene d-8			1.90	1.90	1.88	1.81	1.88		1.87	2.01
Dibenzothiophene d-8			0.92	0.91	0.92	0.90	0.91		0.91	0.70
Phenanthrene d-10			0.94	0.95	0.95	0.93	0.93		0.94	1.09
Fluoranthene d-10			0.93	0.90	0.93	0.92	0.93		0.92	1.15
Benzo[a]anthracene d-12			0.81	0.79	0.80	0.81	0.81		0.80	0.99
Chrysene d-12			0.96	0.95	0.96	0.97	0.99		0.97	1.51
Benzo[b]fluoranthene d-12			0.89	0.89	0.88	0.89	0.90		0.89	0.94
Benzo[k]fluoranthene d-12			1.17	1.16	1.20	1.24	1.30		1.21	4.66
Benzo[a]pyrene d-12			0.95	0.94	0.95	0.97	1.01		0.96	2.78
Perylene d-12			0.85	0.84	0.85	0.87	0.88		0.86	1.74
Dibenzo[a,h]anthracene d-14			0.76	0.75	0.76	0.78	0.81		0.77	2.79
Indeno[1,2,3-cd]pyrene d-12			0.93	0.89	0.91	0.93	0.92		0.92	1.63
Benzo[ghi]perylene d-12			0.98	0.99	0.99	1.02	1.03		1.00	2.20

(1) Where applicable, custom lab flags have been used on this report.
(2) QC limit is 35% for labeled compounds.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

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Report Filename: GENERIC-SPECS_PAH_LO_08-Jul-2015_PH5U__Form3B_GS60148.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 3C
INITIAL CALIBRATION ION ABUNDANCE RATIOS

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 08-Jul-2015

Instrument ID: LR GC/MS

GC Column ID: RTX5

CS0 Data Filename: N/A

CS1 Data Filename: PH5U0282.D

CS2 Data Filename: PH5U0283.D

CS3 Data Filename: PH5U0284.D

CS4 Data Filename: PH5U0286.D

CS5 Data Filename: PH5U0285.D

CS6 Data Filename: N/A

COMPOUND	LAB FLAG [1]	M/Z's FORMING RATIO	ION ABUNDANCE RATIO CS0	CS1	CS2	CS3	CS4	CS5	CS6
Naphthalene		**128,102**		0.07	0.06	0.06	0.06	0.06	
Acenaphthylene		**152,151**		0.19	0.20	0.19	0.19	0.19	
Acenaphthene		**154,153**		1.11	1.11	1.12	1.12	1.12	
Fluorene		**166,165**		0.94	0.98	0.97	0.97	0.97	
Phenanthrene		**178,176**		0.19	0.18	0.19	0.19	0.19	
Anthracene		**178,176**		0.18	0.18	0.18	0.18	0.18	
Fluoranthene		**202,200**		0.20	0.20	0.20	0.20	0.20	
Pyrene		**202,200**		0.21	0.20	0.20	0.20	0.20	
Benz[a]anthracene		**228,226**		0.25	0.25	0.26	0.26	0.26	
Chrysene		**228,226**		0.29	0.28	0.29	0.29	0.29	
Benzo[b]fluoranthene		**252,253**		0.24	0.23	0.21	0.22	0.21	
Benzo[j,k]fluoranthenes		**252,253**		0.23	0.21	0.21	0.21	0.21	
Benzo[e]pyrene		**252,253**		0.22	0.21	0.21	0.22	0.21	
Benzo[a]pyrene		**252,253**		0.21	0.21	0.21	0.22	0.22	
Perylene		**252,253**		0.23	0.21	0.21	0.21	0.21	
Dibenz[a,h]anthracene		**278,139**		0.14	0.13	0.14	0.14	0.14	
Indeno[1,2,3-cd]pyrene		**276,138**		0.24	0.20	0.18	0.18	0.18	
Benzo[ghi]perylene		**276,138**		0.19	0.20	0.19	0.19	0.19	
2-Methylnaphthalene		**142,141**		0.85	0.87	0.87	0.87	0.87	
2,6-Dimethylnaphthalene		**156,141**		0.66	0.65	0.66	0.66	0.66	
2,3,5-Trimethylnaphthalene		**170,155**		0.85	0.87	0.87	0.87	0.87	
1-Methylphenanthrene		**192,191**		0.57	0.56	0.58	0.58	0.58	
Dibenzothiophene		**184,152**		0.08	0.08	0.08	0.08	0.08	

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

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Report Filename: GENERIC-SPECS_PAH_LO_08-Jul-2015_PH5U__Form3C_GS60148.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 3D
INITIAL CALIBRATION ION ABUNDANCE RATIOS

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 08-Jul-2015

Instrument ID: LR GC/MS

GC Column ID: RTX5

CS0 Data Filename: N/A

CS1 Data Filename: PH5U0282.D

CS2 Data Filename: PH5U0283.D

CS3 Data Filename: PH5U0284.D

CS4 Data Filename: PH5U0286.D

CS5 Data Filename: PH5U0285.D

CS6 Data Filename: N/A

LABELED COMPOUND	LAB FLAG[1]	M/Z's FORMING RATIO	ION ABUNDANCE RATIO CS0	CS1	CS2	CS3	CS4	CS5	CS6
Naphthalene d-8		**136,134**		0.09	0.09	0.09	0.09	0.09	
2-Methylnaphthalene d-10		**152,151**		0.17	0.17	0.17	0.17	0.17	
2,6-Dimethylnaphthalene d-12		**168,150**		0.74	0.73	0.74	0.73	0.73	
Acenaphthylene d-8		**160,158**		0.15	0.15	0.15	0.15	0.15	
Dibenzothiophene d-8		**192,160**		0.08	0.08	0.08	0.08	0.08	
Phenanthrene d-10		**188,184**		0.14	0.14	0.14	0.14	0.14	
Fluoranthene d-10		**212,208**		0.17	0.16	0.17	0.17	0.17	
Benzo[a]anthracene d-12		**240,236**		0.24	0.24	0.25	0.24	0.24	
Chrysene d-12		**240,236**		0.27	0.26	0.27	0.27	0.26	
Benzo[b]fluoranthene d-12		**264,260**		0.21	0.21	0.21	0.21	0.21	
Benzo[k]fluoranthene d-12		**264,260**		0.20	0.20	0.20	0.20	0.20	
Benzo[a]pyrene d-12		**264,260**		0.20	0.20	0.20	0.20	0.20	
Perylene d-12		**264,260**		0.25	0.26	0.26	0.26	0.26	
Dibenzo[a,h]anthracene d-14		**292,288**		0.32	0.33	0.33	0.32	0.34	
Indeno[1,2,3-cd]pyrene d-12		**288,284**		0.18	0.18	0.18	0.18	0.18	
Benzo[ghi]perylene d-12		**288,284**		0.19	0.20	0.20	0.19	0.20	

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Simin Yassari_____

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Report Filename: GENERIC-SPECS_PAH_LO_08-Jul-2015_PH5U__Form3D_GS60148.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 4A
CALIBRATION VERIFICATION

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date:	08-Jul-2015	**VER Data Filename:**	PH5U0291.D
Instrument ID:	LR GC/MS	**Analysis Date:**	13-Jul-2015
GC Column ID:	RTX5	**Analysis Time:**	09:04:00

COMPOUND	CAS NO.	LAB FLAG [1]	m/e ION CHANNELS	ION ABUND. RATIO	QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene	91-20-3		128,102	0.07	0.06-0.08	1940	1470-2450
Acenaphthylene	208-96-8		152,151	0.19	0.15-0.23	1960	1480-2470
Acenaphthene	83-32-9		154,153	1.11	0.89-1.33	2060	1490-2490
Fluorene	86-73-7		166,165	0.97	0.78-1.16	1910	1460-2440
Phenanthrene	85-01-8		178,176	0.19	0.15-0.23	1960	1480-2470
Anthracene	120-12-7		178,176	0.18	0.14-0.22	1970	1490-2480
Fluoranthene	206-44-0		202,200	0.20	0.16-0.24	1980	1490-2480
Pyrene	129-00-0		202,200	0.20	0.16-0.24	1900	1470-2440
Benz[a]anthracene	56-55-3		228,226	0.26	0.21-0.31	1890	1470-2460
Chrysene	218-01-9		228,226	0.29	0.23-0.35	1950	1490-2480
Benzo[b]fluoranthene	205-99-2		252,253	0.22	0.18-0.26	1870	1480-2470
Benzo[j,k]fluoranthenes			252,253	0.21	0.17-0.25	1930	1480-2460
Benzo[e]pyrene	192-97-2		252,253	0.22	0.18-0.26	1950	1490-2490
Benzo[a]pyrene	50-32-8		252,253	0.21	0.17-0.25	1970	1490-2480
Perylene	198-55-0		252,253	0.21	0.17-0.25	1990	1490-2490
Dibenz[a,h]anthracene	53-70-3		278,139	0.13	0.08-0.18	1950	1490-2490
Indeno[1,2,3-cd]pyrene	193-39-5		276,138	0.17	0.11-0.23	1880	1480-2460
Benzo[ghi]perylene	191-24-2		276,138	0.18	0.12-0.24	1920	1480-2460
2-Methylnaphthalene	91-57-6		142,141	0.87	0.70-1.04	2000	1530-2550
2,6-Dimethylnaphthalene	581-42-0		156,141	0.65	0.52-0.78	1960	1500-2500
2,3,5-Trimethylnaphthalene	2245-38-7		170,155	0.86	0.69-1.03	1970	1460-2440
1-Methylphenanthrene	832-69-9		192,191	0.58	0.46-0.70	1650	1220-2030
Dibenzothiophene	132-65-0		184,152	0.08	0.06-0.10	1970	1500-2500

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Simin Yassari_____

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Report Filename: GENERIC-SPECS_PAH_LO_PH5U0291.D__Form4A_SJ1908840.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 4B
CALIBRATION VERIFICATION

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date:	08-Jul-2015	**VER Data Filename:**	PH5U0291.D
Instrument ID:	LR GC/MS	**Analysis Date:**	13-Jul-2015
GC Column ID:	RTX5	**Analysis Time:**	09:04:00

LABELED COMPOUND	CAS NO.	LAB FLAG [1]	m/e ION CHANNELS	ION ABUND. RATIO	QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene d-8	1146-65-2		136,134	0.09	0.07-0.11	2030	1500-2500
2-Methylnaphthalene d-10	7297-45-2		152,151	0.17	0.14-0.20	2030	1500-2500
2,6-Dimethylnaphthalene d-12	350820-12-1		168,150	0.73	0.58-0.88	2050	1510-2520
Acenaphthylene d-8	93951-97-4		160,158	0.15	0.12-0.18	1910	1500-2500
Dibenzothiophene d-8	33262-29-2		192,160	0.08	0.06-0.10	1940	1510-2510
Phenanthrene d-10	1517-22-2		188,184	0.14	0.11-0.17	1990	1510-2510
Fluoranthene d-10	93951-69-0		212,208	0.17	0.14-0.20	2010	1500-2510
Benzo[a]anthracene d-12	1718-53-2		240,236	0.24	0.19-0.29	1990	1500-2500
Chrysene d-12	1719-03-5		240,236	0.26	0.21-0.31	1980	1500-2500
Benzo[b]fluoranthene d-12	93951-98-5		264,260	0.21	0.17-0.25	2050	1520-2530
Benzo[k]fluoranthene d-12	93952-01-3		264,260	0.20	0.16-0.24	2050	1500-2510
Benzo[a]pyrene d-12	63466-71-7		264,260	0.20	0.16-0.24	2030	1500-2510
Perylene d-12	1520-96-3		264,260	0.25	0.20-0.30	2050	1510-2510
Dibenzo[a,h]anthracene d-14	13250-98-1		292,288	0.31	0.20-0.42	2130	1500-2500
Indeno[1,2,3-cd]pyrene d-12	203578-33-0		288,284	0.18	0.12-0.24	2060	1500-2500
Benzo[ghi]perylene d-12	93951-66-7		288,284	0.19	0.12-0.26	2060	1500-2510

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Simin Yassari_____

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Report Filename: GENERIC-SPECS_PAH_LO_PH5U0291.D__Form4B_SJ1908840.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 4A
CALIBRATION VERIFICATION

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date:	08-Jul-2015	**VER Data Filename:**	PH5U0305.D
Instrument ID:	LR GC/MS	**Analysis Date:**	13-Jul-2015
GC Column ID:	RTX5	**Analysis Time:**	19:32:00

COMPOUND	CAS NO.	LAB FLAG [1]	m/e ION CHANNELS	ION ABUND. RATIO	QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene	91-20-3		128,102	0.06	0.05-0.07	1940	1470-2450
Acenaphthylene	208-96-8		152,151	0.19	0.15-0.23	1980	1480-2470
Acenaphthene	83-32-9		154,153	1.12	0.90-1.34	2080	1490-2490
Fluorene	86-73-7		166,165	0.97	0.78-1.16	1950	1460-2440
Phenanthrene	85-01-8		178,176	0.19	0.15-0.23	1950	1480-2470
Anthracene	120-12-7		178,176	0.18	0.14-0.22	1960	1490-2480
Fluoranthene	206-44-0		202,200	0.20	0.16-0.24	1980	1490-2480
Pyrene	129-00-0		202,200	0.20	0.16-0.24	1900	1470-2440
Benz[a]anthracene	56-55-3		228,226	0.26	0.21-0.31	1910	1470-2460
Chrysene	218-01-9		228,226	0.29	0.23-0.35	1960	1490-2480
Benzo[b]fluoranthene	205-99-2		252,253	0.22	0.18-0.26	1880	1480-2470
Benzo[j,k]fluoranthenes			252,253	0.21	0.17-0.25	1910	1480-2460
Benzo[e]pyrene	192-97-2		252,253	0.21	0.17-0.25	1980	1490-2490
Benzo[a]pyrene	50-32-8		252,253	0.21	0.17-0.25	2010	1490-2480
Perylene	198-55-0		252,253	0.21	0.17-0.25	2020	1490-2490
Dibenz[a,h]anthracene	53-70-3		278,139	0.13	0.08-0.18	1960	1490-2490
Indeno[1,2,3-cd]pyrene	193-39-5		276,138	0.16	0.10-0.22	1920	1480-2460
Benzo[ghi]perylene	191-24-2		276,138	0.18	0.12-0.24	1970	1480-2460
2-Methylnaphthalene	91-57-6		142,141	0.87	0.70-1.04	2000	1530-2550
2,6-Dimethylnaphthalene	581-42-0		156,141	0.65	0.52-0.78	1960	1500-2500
2,3,5-Trimethylnaphthalene	2245-38-7		170,155	0.86	0.69-1.03	1990	1460-2440
1-Methylphenanthrene	832-69-9		192,191	0.58	0.46-0.70	1650	1220-2030
Dibenzothiophene	132-65-0		184,152	0.08	0.06-0.10	1950	1500-2500

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Simin Yassari_____

For Axys Internal Use Only [XSL Template: Pest4A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: GENERIC-SPECS_PAH_LO_PH5U0305.D__Form4A_SJ1909422.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 4B
CALIBRATION VERIFICATION

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date:	08-Jul-2015	**VER Data Filename:**	PH5U0305.D
Instrument ID:	LR GC/MS	**Analysis Date:**	13-Jul-2015
GC Column ID:	RTX5	**Analysis Time:**	19:32:00

LABELED COMPOUND	CAS NO.	LAB FLAG [1]	m/e ION CHANNELS	ION ABUND. RATIO	QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene d-8	1146-65-2		136,134	0.09	0.07-0.11	1970	1500-2500
2-Methylnaphthalene d-10	7297-45-2		152,151	0.17	0.14-0.20	1970	1500-2500
2,6-Dimethylnaphthalene d-12	350820-12-1		168,150	0.72	0.58-0.86	2020	1510-2520
Acenaphthylene d-8	93951-97-4		160,158	0.15	0.12-0.18	1890	1500-2500
Dibenzothiophene d-8	33262-29-2		192,160	0.08	0.06-0.10	1990	1510-2510
Phenanthrene d-10	1517-22-2		188,184	0.14	0.11-0.17	2020	1510-2510
Fluoranthene d-10	93951-69-0		212,208	0.17	0.14-0.20	2040	1500-2510
Benzo[a]anthracene d-12	1718-53-2		240,236	0.24	0.19-0.29	1990	1500-2500
Chrysene d-12	1719-03-5		240,236	0.26	0.21-0.31	2030	1500-2500
Benzo[b]fluoranthene d-12	93951-98-5		264,260	0.21	0.17-0.25	2000	1520-2530
Benzo[k]fluoranthene d-12	93952-01-3		264,260	0.20	0.16-0.24	2090	1500-2510
Benzo[a]pyrene d-12	63466-71-7		264,260	0.20	0.16-0.24	2010	1500-2510
Perylene d-12	1520-96-3		264,260	0.25	0.20-0.30	2030	1510-2510
Dibenzo[a,h]anthracene d-14	13250-98-1		292,288	0.33	0.21-0.45	2090	1500-2500
Indeno[1,2,3-cd]pyrene d-12	203578-33-0		288,284	0.18	0.12-0.24	1990	1500-2500
Benzo[ghi]perylene d-12	93951-66-7		288,284	0.19	0.12-0.26	1980	1500-2510

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Simin Yassari_____

For Axys Internal Use Only [XSL Template: Pest4B.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: GENERIC-SPECS_PAH_LO_PH5U0305.D__Form4B_SJ1909422.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
137 Top
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23192-16 R
Matrix:	TISSUE	**Sample Size:**	2.07 g (wet)
Sample Receipt Date:	13-May-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 13:09:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0296.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	6.29

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	4.13	0.394 (S)	0.07	1.006
Acenaphthylene	208-96-8	K J	0.347	0.312 (S)	0.39	1.003
Acenaphthene	83-32-9	J	1.04	0.482 (S)	1.24	1.048
Fluorene	86-73-7	B J	0.591	0.275 (S)	0.98	0.844
Phenanthrene	85-01-8		15.7	0.184 (S)	0.18	1.004
Anthracene	120-12-7	J	2.18	0.187 (S)	0.18	1.012
Fluoranthene	206-44-0		44.2	0.123 (S)	0.19	1.002
Pyrene	129-00-0		39.0	0.118 (S)	0.19	1.033
Benz[a]anthracene [3]	56-55-3		24.6	0.0850 (S)	0.26	1.003
Chrysene [4]	218-01-9		29.1	0.0763 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		32.5	0.216 (S)	0.23	1.004
Benzo[j,k]fluoranthenes			25.4	0.230 (S)	0.24	1.003
Benzo[e]pyrene	192-97-2		21.1	0.284 (S)	0.22	0.995
Benzo[a]pyrene	50-32-8		27.3	0.280 (S)	0.23	1.004
Perylene	198-55-0	J	8.06	0.300 (S)	0.21	1.004
Dibenz[a,h]anthracene [5]	53-70-3	J	4.62	0.314 (S)	0.11	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		26.1	0.174 (S)	0.21	1.002
Benzo[ghi]perylene	191-24-2		22.6	0.153 (S)	0.18	1.002
2-Methylnaphthalene	91-57-6	B J	5.08	0.484 (S)	0.95	1.010
2,6-Dimethylnaphthalene	581-42-0	U		0.682 (S)		
2,3,5-Trimethylnaphthalene	2245-38-7	K J	1.64	0.656 (S)	0.55	1.235
1-Methylphenanthrene	832-69-9	J	1.15	0.253 (S)	0.57	1.112
Dibenzothiophene	132-65-0	B J	0.650	0.132 (S)	0.08	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23192-16_Form1A_PH5U0296.D_SJ1910257.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 2

ANALYSIS REPORT

CLIENT SAMPLE NO.
137 Top
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23192-16 R
Matrix:	TISSUE	**Sample Size:**	2.07 g (wet)
Sample Receipt Date:	13-May-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 13:09:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0296.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	6.29

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	808	40.4	0.09	0.602
2-Methylnaphthalene d-10		2000	865	43.3	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	918	45.6	0.72	0.895
Acenaphthylene d-8		2000	902	45.1	0.15	0.961
Dibenzothiophene d-8		2010	1310	65.1	0.08	0.791
Phenanthrene d-10		2010	1450	72.0	0.14	0.807
Fluoranthene d-10		2010	1600	79.8	0.16	0.971
Benzo[a]anthracene d-12		2000	1710	85.5	0.24	1.165
Chrysene d-12		2000	1800	90.1	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1710	84.8	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1670	83.2	0.20	0.962
Benzo[a]pyrene d-12		2010	1740	86.6	0.19	1.009
Perylene d-12		2010	1790	88.9	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1800	89.8	0.29	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1640	82.0	0.18	1.207
Benzo[ghi]perylene d-12		2010	1770	88.1	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23192-16_Form2_PH5U0296.D_SJ1910257.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
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Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-1
Matrix:	TISSUE	**Sample Size:**	2.09 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 14:18:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0298.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	8.38

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	3.56	0.261 (S)	0.07	1.007
Acenaphthylene	208-96-8	K J	0.529	0.137 (S)	0.36	1.003
Acenaphthene	83-32-9	J	0.795	0.357 (S)	1.22	1.048
Fluorene	86-73-7	B J	0.775	0.168 (S)	1.03	0.845
Phenanthrene	85-01-8	B J	5.82	0.101 (S)	0.16	1.004
Anthracene	120-12-7	J	0.543	0.102 (S)	0.18	1.012
Fluoranthene	206-44-0	J	7.91	0.0783 (S)	0.18	1.002
Pyrene	129-00-0	J	8.78	0.0756 (S)	0.21	1.033
Benz[a]anthracene [3]	56-55-3	J	4.52	0.110 (S)	0.26	1.003
Chrysene [4]	218-01-9	J	6.20	0.0938 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2	J	6.50	0.268 (S)	0.25	1.004
Benzo[j,k]fluoranthenes		J	5.17	0.267 (S)	0.22	1.002
Benzo[e]pyrene	192-97-2	J	6.24	0.328 (S)	0.20	0.996
Benzo[a]pyrene	50-32-8	J	6.40	0.323 (S)	0.25	1.004
Perylene	198-55-0	J	2.22	0.360 (S)	0.21	1.004
Dibenz[a,h]anthracene [5]	53-70-3	J	1.43	0.587 (S)	0.16	1.003
Indeno[1,2,3-cd]pyrene	193-39-5	J	7.35	0.564 (S)	0.21	1.002
Benzo[ghi]perylene	191-24-2	J	8.24	0.490 (S)	0.20	1.002
2-Methylnaphthalene	91-57-6	B J	3.17	0.300 (S)	0.89	1.010
2,6-Dimethylnaphthalene	581-42-0	J	0.841	0.346 (S)	0.63	1.012
2,3,5-Trimethylnaphthalene	2245-38-7	J	0.966	0.400 (S)	0.77	1.235
1-Methylphenanthrene	832-69-9	J	0.558	0.285 (S)	0.62	1.112
Dibenzothiophene	132-65-0	K B J	0.266	0.120 (S)	0.20	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-1_Form1A_PH5U0298.D_SJ1910258.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
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Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-1
Matrix:	TISSUE	**Sample Size:**	2.09 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 14:18:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0298.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	8.38

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	1130	56.7	0.09	0.602
2-Methylnaphthalene d-10		2000	1250	62.7	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1340	66.5	0.72	0.895
Acenaphthylene d-8		2000	1310	65.6	0.15	0.961
Dibenzothiophene d-8		2010	1440	71.5	0.08	0.791
Phenanthrene d-10		2010	1560	77.6	0.14	0.807
Fluoranthene d-10		2010	1520	75.8	0.17	0.971
Benzo[a]anthracene d-12		2000	1580	78.8	0.24	1.165
Chrysene d-12		2000	1650	82.3	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1430	70.8	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1480	74.0	0.19	0.962
Benzo[a]pyrene d-12		2010	1550	77.2	0.19	1.009
Perylene d-12		2010	1530	76.2	0.25	1.024
Dibenzo[a,h]anthracene d-14		2000	1290	64.3	0.31	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1360	68.1	0.18	1.207
Benzo[ghi]perylene d-12		2010	1490	74.4	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-1_Form2_PH5U0298.D_SJ1910258.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
58 Middle
Sample Collection:
23-Jun-2015

Form 1A
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-2
Matrix:	TISSUE	**Sample Size:**	1.97 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 15:07:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0299.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	6.08

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	3.27	0.280 (S)	0.06	1.006
Acenaphthylene	208-96-8	J	0.437	0.243 (S)	0.23	1.003
Acenaphthene	83-32-9	J	0.815	0.557 (S)	1.30	1.048
Fluorene	86-73-7	B J	0.797	0.382 (S)	0.95	0.844
Phenanthrene	85-01-8	B J	5.16	0.151 (S)	0.20	1.004
Anthracene	120-12-7	K J	0.459	0.154 (S)	0.31	1.012
Fluoranthene	206-44-0	J	8.02	0.143 (S)	0.21	1.002
Pyrene	129-00-0	J	8.57	0.138 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3	J	6.24	0.204 (S)	0.26	1.003
Chrysene [4]	218-01-9	J	7.90	0.178 (S)	0.28	1.003
Benzo[b]fluoranthene	205-99-2	J	10.4	0.197 (S)	0.21	1.004
Benzo[j,k]fluoranthenes		K J	7.31	0.197 (S)	0.27	1.002
Benzo[e]pyrene	192-97-2	J	7.31	0.250 (S)	0.22	0.996
Benzo[a]pyrene	50-32-8	J	8.59	0.246 (S)	0.22	1.004
Perylene	198-55-0	K J	3.19	0.273 (S)	0.14	1.004
Dibenz[a,h]anthracene [5]	53-70-3	J	1.72	0.375 (S)	0.12	1.003
Indeno[1,2,3-cd]pyrene	193-39-5	J	8.54	0.273 (S)	0.22	1.002
Benzo[ghi]perylene	191-24-2	J	8.45	0.240 (S)	0.15	1.002
2-Methylnaphthalene	91-57-6	B J	2.80	0.368 (S)	0.91	1.010
2,6-Dimethylnaphthalene	581-42-0	J	0.824	0.577 (S)	0.74	1.012
2,3,5-Trimethylnaphthalene	2245-38-7	K J	0.954	0.495 (S)	0.63	1.229
1-Methylphenanthrene	832-69-9	K J	0.446	0.269 (S)	0.82	1.112
Dibenzothiophene	132-65-0	K B J	0.356	0.101 (S)	0.05	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-2_Form1A_PH5U0299.D_SJ1910259.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 2

ANALYSIS REPORT

CLIENT SAMPLE NO.
58 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-2
Matrix:	TISSUE	**Sample Size:**	1.97 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 15:07:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0299.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	6.08

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	1030	51.7	0.09	0.602
2-Methylnaphthalene d-10		2000	1110	55.5	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1150	57.0	0.72	0.895
Acenaphthylene d-8		2000	1130	56.7	0.15	0.961
Dibenzothiophene d-8		2010	1320	65.8	0.08	0.791
Phenanthrene d-10		2010	1440	71.6	0.14	0.807
Fluoranthene d-10		2010	1470	73.5	0.17	0.971
Benzo[a]anthracene d-12		2000	1560	78.0	0.24	1.165
Chrysene d-12		2000	1630	81.6	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1550	76.8	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1580	78.7	0.19	0.962
Benzo[a]pyrene d-12		2010	1620	81.0	0.19	1.009
Perylene d-12		2010	1620	80.4	0.25	1.024
Dibenzo[a,h]anthracene d-14		2000	1640	81.8	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1530	76.4	0.18	1.207
Benzo[ghi]perylene d-12		2010	1640	81.7	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-2_Form2_PH5U0299.D_SJ1910259.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
59 Bottom
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.		06262044.0000	
Contract No.:	4765	**Lab Sample I.D.:**	L23437-3
Matrix:	TISSUE	**Sample Size:**	1.96 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 15:56:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0300.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	6.52

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	3.70	0.341 (S)	0.07	1.007
Acenaphthylene	208-96-8	K J	0.476	0.142 (S)	0.55	1.003
Acenaphthene	83-32-9	J	0.967	0.433 (S)	1.01	1.048
Fluorene	86-73-7	B J	0.651	0.134 (S)	0.96	0.844
Phenanthrene	85-01-8	B J	5.07	0.180 (S)	0.20	1.004
Anthracene	120-12-7	J	0.478	0.183 (S)	0.21	1.012
Fluoranthene	206-44-0	J	6.01	0.0926 (S)	0.19	1.002
Pyrene	129-00-0	J	6.88	0.0893 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3	K J	3.28	0.164 (S)	0.19	1.003
Chrysene [4]	218-01-9	J	3.91	0.140 (S)	0.31	1.003
Benzo[b]fluoranthene	205-99-2	J	3.21	0.228 (S)	0.24	1.004
Benzo[j,k]fluoranthenes		J	2.22	0.226 (S)	0.24	1.002
Benzo[e]pyrene	192-97-2	J	2.71	0.293 (S)	0.24	0.995
Benzo[a]pyrene	50-32-8	J	3.14	0.288 (S)	0.21	1.004
Perylene	198-55-0	J	1.15	0.309 (S)	0.19	1.004
Dibenz[a,h]anthracene [5]	53-70-3	K J	0.532	0.374 (S)	0.26	1.003
Indeno[1,2,3-cd]pyrene	193-39-5	K B J	3.57	0.228 (S)	0.48	1.002
Benzo[ghi]perylene	191-24-2	J	3.10	0.206 (S)	0.23	1.002
2-Methylnaphthalene	91-57-6	B J	3.14	0.317 (S)	0.84	1.010
2,6-Dimethylnaphthalene	581-42-0	J	0.787	0.422 (S)	0.69	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	J	1.41	0.698 (S)	0.72	1.235
1-Methylphenanthrene	832-69-9	K J	0.570	0.380 (S)	0.75	1.112
Dibenzothiophene	132-65-0	K B J	0.314	0.226 (S)	0.18	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-3_Form1A_PH5U0300.D_SJ1910260.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
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Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-3
Matrix:	TISSUE	**Sample Size:**	1.96 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 15:56:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0300.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	6.52

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This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	909	45.4	0.09	0.602
2-Methylnaphthalene d-10		2000	1030	51.7	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1110	55.3	0.72	0.895
Acenaphthylene d-8		2000	1120	56.1	0.15	0.961
Dibenzothiophene d-8		2010	1400	69.7	0.08	0.791
Phenanthrene d-10		2010	1520	75.4	0.14	0.807
Fluoranthene d-10		2010	1600	80.0	0.16	0.971
Benzo[a]anthracene d-12		2000	1740	86.9	0.24	1.165
Chrysene d-12		2000	1810	90.6	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1710	84.5	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1770	88.3	0.19	0.962
Benzo[a]pyrene d-12		2010	1790	89.1	0.19	1.009
Perylene d-12		2010	1820	90.3	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1810	90.3	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1680	83.9	0.18	1.207
Benzo[ghi]perylene d-12		2010	1780	88.7	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-3_Form2_PH5U0300.D_SJ1910260.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
60 Top
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-4
Matrix:	TISSUE	**Sample Size:**	1.98 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 16:45:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0301.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	6.88

This page is part of a total report that contains information necessary for accreditation compliance.
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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	3.74	0.574 (S)	0.07	1.007
Acenaphthylene	208-96-8	K J	0.437	0.305 (S)	0.53	1.003
Acenaphthene	83-32-9	J	1.09	0.451 (S)	0.90	1.048
Fluorene	86-73-7	B J	0.724	0.204 (S)	1.04	0.844
Phenanthrene	85-01-8	B J	3.77	0.187 (S)	0.21	1.004
Anthracene	120-12-7	K J	0.333	0.190 (S)	0.29	1.012
Fluoranthene	206-44-0	B J	1.76	0.0944 (S)	0.21	1.002
Pyrene	129-00-0	B J	3.19	0.0911 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3	J	0.241	0.109 (S)	0.28	1.003
Chrysene [4]	218-01-9	K B J	0.498	0.0900 (S)	0.39	1.003
Benzo[b]fluoranthene	205-99-2	U		0.257 (S)		
Benzo[j,k]fluoranthenes		U		0.253 (S)		
Benzo[e]pyrene	192-97-2	U		0.321 (S)		
Benzo[a]pyrene	50-32-8		637	0.316 (S)	0.22	1.004
Perylene	198-55-0	K J	0.458	0.339 (S)	1.33	1.007
Dibenz[a,h]anthracene [5]	53-70-3	U		0.177 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	K B J	0.392	0.175 (S)	2.95	1.004
Benzo[ghi]perylene	191-24-2	K J	0.502	0.151 (S)	0.41	1.002
2-Methylnaphthalene	91-57-6	B J	3.36	0.444 (S)	0.87	1.010
2,6-Dimethylnaphthalene	581-42-0	J	0.797	0.360 (S)	0.71	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	J	0.935	0.700 (S)	0.83	1.229
1-Methylphenanthrene	832-69-9	J	0.440	0.307 (S)	0.55	1.112
Dibenzothiophene	132-65-0	K B J	0.369	0.196 (S)	0.17	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-4_Form1A_PH5U0301.D_SJ1910261.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
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Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-4
Matrix:	TISSUE	**Sample Size:**	1.98 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 16:45:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0301.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	6.88

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	745	37.3	0.09	0.602
2-Methylnaphthalene d-10		2000	910	45.5	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1030	51.0	0.73	0.895
Acenaphthylene d-8		2000	1080	54.0	0.16	0.961
Dibenzothiophene d-8		2010	1330	66.3	0.08	0.791
Phenanthrene d-10		2010	1430	71.1	0.14	0.807
Fluoranthene d-10		2010	1480	73.9	0.17	0.971
Benzo[a]anthracene d-12		2000	1610	80.5	0.24	1.165
Chrysene d-12		2000	1710	85.4	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1590	78.7	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1660	82.8	0.19	0.962
Benzo[a]pyrene d-12		2010	1690	84.2	0.19	1.009
Perylene d-12		2010	1710	84.9	0.25	1.024
Dibenzo[a,h]anthracene d-14		2000	1680	83.8	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1560	77.9	0.18	1.207
Benzo[ghi]perylene d-12		2010	1690	84.5	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-4_Form2_PH5U0301.D_SJ1910261.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
61 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-5
Matrix:	TISSUE	**Sample Size:**	2.01 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 17:34:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0302.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	5.95

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This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	3.61	0.498 (S)	0.05	1.006
Acenaphthylene	208-96-8	K J	0.520	0.280 (S)	0.34	1.003
Acenaphthene	83-32-9	K J	0.762	0.551 (S)	1.40	1.048
Fluorene	86-73-7	B J	0.768	0.182 (S)	0.96	0.845
Phenanthrene	85-01-8	B J	4.10	0.266 (S)	0.18	1.004
Anthracene	120-12-7	K J	0.366	0.270 (S)	0.30	1.012
Fluoranthene	206-44-0	J	1.89	0.108 (S)	0.19	1.002
Pyrene	129-00-0	B J	3.16	0.104 (S)	0.19	1.033
Benz[a]anthracene [3]	56-55-3	J	0.235	0.0863 (S)	0.25	1.003
Chrysene [4]	218-01-9	B J	0.659	0.0732 (S)	0.31	1.003
Benzo[b]fluoranthene	205-99-2	U		0.283 (S)		
Benzo[j,k]fluoranthenes		K J	0.472	0.270 (S)	0.49	1.001
Benzo[e]pyrene	192-97-2	U		0.356 (S)		
Benzo[a]pyrene	50-32-8		648	0.351 (S)	0.22	1.004
Perylene	198-55-0	K J	0.394	0.368 (S)	5.79	1.008
Dibenz[a,h]anthracene [5]	53-70-3	K J	0.193	0.145 (S)	0.40	1.003
Indeno[1,2,3-cd]pyrene	193-39-5	K B J	0.437	0.158 (S)	2.49	1.003
Benzo[ghi]perylene	191-24-2	K J	0.626	0.136 (S)	0.48	1.002
2-Methylnaphthalene	91-57-6	B J	3.64	0.600 (S)	0.90	1.010
2,6-Dimethylnaphthalene	581-42-0	K J	1.17	0.814 (S)	0.44	1.012
2,3,5-Trimethylnaphthalene	2245-38-7	K J	4.57	0.696 (S)	0.34	1.235
1-Methylphenanthrene	832-69-9	J	0.495	0.420 (S)	0.52	1.112
Dibenzothiophene	132-65-0	K B J	0.300	0.203 (S)	0.25	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-5_Form1A_PH5U0302.D_SJ1910262.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 2

ANALYSIS REPORT

CLIENT SAMPLE NO.
61 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-5
Matrix:	TISSUE	**Sample Size:**	2.01 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 17:34:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0302.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	5.95

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	757	37.8	0.09	0.602
2-Methylnaphthalene d-10		2000	844	42.2	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	941	46.7	0.72	0.895
Acenaphthylene d-8		2000	954	47.7	0.15	0.961
Dibenzothiophene d-8		2010	1320	65.7	0.08	0.791
Phenanthrene d-10		2010	1460	72.5	0.14	0.807
Fluoranthene d-10		2010	1560	77.9	0.17	0.971
Benzo[a]anthracene d-12		2000	1700	85.2	0.24	1.165
Chrysene d-12		2000	1770	88.6	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1670	82.5	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1750	87.0	0.19	0.962
Benzo[a]pyrene d-12		2010	1760	87.7	0.19	1.009
Perylene d-12		2010	1820	90.5	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1750	87.6	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1630	81.7	0.18	1.207
Benzo[ghi]perylene d-12		2010	1750	87.5	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-5_Form2_PH5U0302.D_SJ1910262.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
62 Bottom
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-6
Matrix:	TISSUE	**Sample Size:**	1.99 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 18:23:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0303.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	7.25

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	3.86	0.479 (S)	0.07	1.006
Acenaphthylene	208-96-8	K J	0.535	0.257 (S)	0.34	1.003
Acenaphthene	83-32-9	J	0.903	0.357 (S)	1.07	1.048
Fluorene	86-73-7	B J	0.729	0.227 (S)	0.93	0.845
Phenanthrene	85-01-8	B J	3.87	0.186 (S)	0.19	1.004
Anthracene	120-12-7	J	0.374	0.189 (S)	0.21	1.012
Fluoranthene	206-44-0	J	1.85	0.0719 (S)	0.21	1.002
Pyrene	129-00-0	B J	3.24	0.0694 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3	J	0.353	0.136 (S)	0.25	1.003
Chrysene [4]	218-01-9	B J	0.534	0.114 (S)	0.33	1.003
Benzo[b]fluoranthene	205-99-2	U		0.304 (S)		
Benzo[j,k]fluoranthenes		U		0.294 (S)		
Benzo[e]pyrene	192-97-2	U		0.385 (S)		
Benzo[a]pyrene	50-32-8		648	0.379 (S)	0.22	1.004
Perylene	198-55-0	J	8.68	0.398 (S)	0.22	1.000
Dibenz[a,h]anthracene [5]	53-70-3	U		0.167 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	K B J	0.503	0.149 (S)	2.82	1.004
Benzo[ghi]perylene	191-24-2	K J	0.413	0.128 (S)	0.48	1.002
2-Methylnaphthalene	91-57-6	B J	3.66	0.561 (S)	0.89	1.010
2,6-Dimethylnaphthalene	581-42-0	K J	0.999	0.455 (S)	0.39	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	K J	3.43	0.620 (S)	0.43	1.235
1-Methylphenanthrene	832-69-9	J	0.435	0.305 (S)	0.69	1.112
Dibenzothiophene	132-65-0	K B J	0.272	0.133 (S)	0.32	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-6_Form1A_PH5U0303.D_SJ1910263.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
62 Bottom
Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-6
Matrix:	TISSUE	**Sample Size:**	1.99 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 18:23:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0303.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	7.25

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This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	821	41.1	0.09	0.602
2-Methylnaphthalene d-10		2000	990	49.5	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1140	56.5	0.72	0.895
Acenaphthylene d-8		2000	1130	56.7	0.15	0.961
Dibenzothiophene d-8		2010	1350	67.2	0.08	0.791
Phenanthrene d-10		2010	1460	72.4	0.14	0.807
Fluoranthene d-10		2010	1540	76.8	0.17	0.971
Benzo[a]anthracene d-12		2000	1660	82.8	0.24	1.165
Chrysene d-12		2000	1740	87.1	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1670	82.9	0.21	0.958
Benzo[k]fluoranthene d-12		2010	1690	84.5	0.19	0.962
Benzo[a]pyrene d-12		2010	1760	87.8	0.19	1.009
Perylene d-12		2010	1780	88.4	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1720	85.9	0.31	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1630	81.5	0.18	1.207
Benzo[ghi]perylene d-12		2010	1760	88.0	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-6_Form2_PH5U0303.D_SJ1910263.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
63 Top
Sample Collection:
23-Jun-2015

Form 1A
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-7
Matrix:	TISSUE	**Sample Size:**	2.13 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 21:58:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0308.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	7.24

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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	4.88	0.310 (S)	0.06	1.007
Acenaphthylene	208-96-8	K J	0.717	0.181 (S)	0.28	1.003
Acenaphthene	83-32-9	J	3.62	0.564 (S)	1.15	1.048
Fluorene	86-73-7	B J	1.78	0.706 (S)	0.90	0.845
Phenanthrene	85-01-8		72.9	0.287 (S)	0.19	1.004
Anthracene	120-12-7	J	10.4	0.292 (S)	0.18	1.012
Fluoranthene	206-44-0		215	0.429 (S)	0.20	1.002
Pyrene	129-00-0		205	0.414 (S)	0.21	1.033
Benz[a]anthracene [3]	56-55-3		123	0.655 (S)	0.25	1.003
Chrysene [4]	218-01-9		155	0.559 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		169	0.366 (S)	0.23	1.004
Benzo[j,k]fluoranthenes			130	0.365 (S)	0.24	1.003
Benzo[e]pyrene	192-97-2		126	0.455 (S)	0.23	0.995
Benzo[a]pyrene	50-32-8		135	0.448 (S)	0.23	1.004
Perylene	198-55-0		41.9	0.493 (S)	0.22	1.004
Dibenz[a,h]anthracene [5]	53-70-3		24.4	0.548 (S)	0.12	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		124	0.441 (S)	0.17	1.002
Benzo[ghi]perylene	191-24-2		120	0.411 (S)	0.18	1.002
2-Methylnaphthalene	91-57-6	B J	3.79	0.482 (S)	0.94	1.009
2,6-Dimethylnaphthalene	581-42-0	J	0.916	0.472 (S)	0.75	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	K J	1.26	0.815 (S)	0.36	1.235
1-Methylphenanthrene	832-69-9	J	4.36	0.516 (S)	0.61	1.112
Dibenzothiophene	132-65-0	J	3.19	0.212 (S)	0.07	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-7_Form1A_PH5U0308.D_SJ1910247.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 2

ANALYSIS REPORT

CLIENT SAMPLE NO.
63 Top
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-7
Matrix:	TISSUE	**Sample Size:**	2.13 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 21:58:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0308.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng absolute	**% Moisture:**	7.24

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This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	1020	50.9	0.09	0.601
2-Methylnaphthalene d-10		2000	1080	54.0	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1150	57.1	0.72	0.895
Acenaphthylene d-8		2000	1120	55.8	0.15	0.961
Dibenzothiophene d-8		2010	1260	62.4	0.08	0.791
Phenanthrene d-10		2010	1380	68.9	0.14	0.807
Fluoranthene d-10		2010	1370	68.3	0.17	0.971
Benzo[a]anthracene d-12		2000	1400	69.9	0.24	1.165
Chrysene d-12		2000	1470	73.4	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1320	65.2	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1400	69.6	0.19	0.961
Benzo[a]pyrene d-12		2010	1450	72.4	0.18	1.009
Perylene d-12		2010	1440	71.6	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1370	68.6	0.29	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1300	64.8	0.18	1.207
Benzo[ghi]perylene d-12		2010	1370	68.4	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-7_Form2_PH5U0308.D_SJ1910247.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
64 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-8
Matrix:	TISSUE	**Sample Size:**	1.98 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 22:47:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0309.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	3.73

This page is part of a total report that contains information necessary for accreditation compliance.
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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	6.15	0.297 (S)	0.06	1.007
Acenaphthylene	208-96-8	K J	0.527	0.191 (S)	0.32	1.003
Acenaphthene	83-32-9	J	4.03	0.431 (S)	1.14	1.048
Fluorene	86-73-7	B J	1.44	0.277 (S)	0.96	0.844
Phenanthrene	85-01-8		61.5	0.515 (S)	0.19	1.003
Anthracene	120-12-7	J	7.20	0.523 (S)	0.21	1.012
Fluoranthene	206-44-0		213	0.339 (S)	0.20	1.002
Pyrene	129-00-0		205	0.328 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3	K J	1.96	0.488 (S)	0.14	1.000
Chrysene [4]	218-01-9		163	0.461 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		186	0.429 (S)	0.23	1.004
Benzo[j,k]fluoranthenes			158	0.439 (S)	0.22	1.003
Benzo[e]pyrene	192-97-2		138	0.556 (S)	0.22	0.996
Benzo[a]pyrene	50-32-8		156	0.548 (S)	0.22	1.004
Perylene	198-55-0		47.5	0.574 (S)	0.20	1.004
Dibenz[a,h]anthracene [5]	53-70-3		25.3	0.791 (S)	0.13	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		135	0.974 (S)	0.18	1.002
Benzo[ghi]perylene	191-24-2		136	0.920 (S)	0.18	1.003
2-Methylnaphthalene	91-57-6	B J	4.25	0.267 (S)	0.82	1.010
2,6-Dimethylnaphthalene	581-42-0	J	1.10	0.475 (S)	0.69	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	K J	1.97	0.597 (S)	0.48	1.235
1-Methylphenanthrene	832-69-9	J	4.03	0.421 (S)	0.62	1.112
Dibenzothiophene	132-65-0	J	2.69	0.194 (S)	0.08	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-8_Form1A_PH5U0309.D_SJ1910248.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 2

ANALYSIS REPORT

CLIENT SAMPLE NO.
64 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-8
Matrix:	TISSUE	**Sample Size:**	1.98 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 22:47:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0309.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng absolute	**% Moisture:**	3.73

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	1190	59.4	0.09	0.602
2-Methylnaphthalene d-10		2000	1290	64.4	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1350	67.0	0.73	0.895
Acenaphthylene d-8		2000	1320	66.2	0.15	0.961
Dibenzothiophene d-8		2010	1490	74.1	0.08	0.791
Phenanthrene d-10		2010	1580	78.7	0.14	0.807
Fluoranthene d-10		2010	1610	80.5	0.17	0.971
Benzo[a]anthracene d-12		2000	1770	88.4	0.24	1.165
Chrysene d-12		2000	1820	90.8	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1710	84.4	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1720	85.6	0.20	0.961
Benzo[a]pyrene d-12		2010	1790	89.2	0.19	1.008
Perylene d-12		2010	1810	90.0	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1870	93.3	0.29	1.211
Indeno[1,2,3-cd]pyrene d-12		2000	1730	86.7	0.18	1.207
Benzo[ghi]perylene d-12		2010	1790	89.3	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-8_Form2_PH5U0309.D_SJ1910248.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
65 Bottom
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-9
Matrix:	TISSUE	**Sample Size:**	2.06 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 23:36:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0310.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	8.74

This page is part of a total report that contains information necessary for accreditation compliance.
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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	6.32	0.351 (S)	0.07	1.006
Acenaphthylene	208-96-8	K J	0.561	0.197 (S)	0.35	1.003
Acenaphthene	83-32-9	J	4.65	0.591 (S)	1.17	1.048
Fluorene	86-73-7	B J	1.56	0.613 (S)	0.94	0.844
Phenanthrene	85-01-8		116	0.173 (S)	0.19	1.003
Anthracene	120-12-7		14.6	0.175 (S)	0.20	1.012
Fluoranthene	206-44-0		318	0.442 (S)	0.21	1.002
Pyrene	129-00-0		285	0.426 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3		174	0.394 (S)	0.26	1.003
Chrysene [4]	218-01-9		216	0.360 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		231	0.601 (S)	0.23	1.004
Benzo[j,k]fluoranthenes			176	0.597 (S)	0.24	1.003
Benzo[e]pyrene	192-97-2		171	0.765 (S)	0.22	0.995
Benzo[a]pyrene	50-32-8		196	0.753 (S)	0.22	1.004
Perylene	198-55-0		56.1	0.802 (S)	0.23	1.004
Dibenz[a,h]anthracene [5]	53-70-3		33.1	0.379 (S)	0.13	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		165	0.554 (S)	0.17	1.002
Benzo[ghi]perylene	191-24-2		167	0.506 (S)	0.17	1.002
2-Methylnaphthalene	91-57-6	B J	4.89	0.345 (S)	0.87	1.009
2,6-Dimethylnaphthalene	581-42-0	J	1.42	0.465 (S)	0.52	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	J	1.16	1.05 (S)	0.77	1.229
1-Methylphenanthrene	832-69-9	J	6.65	0.442 (S)	0.56	1.112
Dibenzothiophene	132-65-0	J	4.71	0.239 (S)	0.09	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-9_Form1A_PH5U0310.D_SJ1910249.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
65 Bottom
Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-9
Matrix:	TISSUE	**Sample Size:**	2.06 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 23:36:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0310.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng absolute	**% Moisture:**	8.74

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This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	954	47.7	0.09	0.602
2-Methylnaphthalene d-10		2000	1040	51.9	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1090	54.2	0.73	0.895
Acenaphthylene d-8		2000	1140	57.2	0.15	0.961
Dibenzothiophene d-8		2010	1450	72.3	0.08	0.791
Phenanthrene d-10		2010	1560	77.6	0.14	0.807
Fluoranthene d-10		2010	1610	80.5	0.17	0.971
Benzo[a]anthracene d-12		2000	1700	84.8	0.25	1.165
Chrysene d-12		2000	1770	88.4	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1690	83.5	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1730	86.4	0.19	0.961
Benzo[a]pyrene d-12		2010	1790	89.5	0.19	1.009
Perylene d-12		2010	1780	88.5	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1800	90.1	0.29	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1720	85.8	0.18	1.207
Benzo[ghi]perylene d-12		2010	1800	89.9	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-9_Form2_PH5U0310.D_SJ1910249.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
66 Top
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-10
Matrix:	TISSUE	**Sample Size:**	2.01 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	14-Jul-2015 **Time:** 00:25:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0311.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	7.91

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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	5.88	0.410 (S)	0.06	1.006
Acenaphthylene	208-96-8	K J	0.665	0.367 (S)	0.36	1.003
Acenaphthene	83-32-9	J	3.37	0.847 (S)	1.24	1.048
Fluorene	86-73-7	B J	1.32	0.181 (S)	1.05	0.844
Phenanthrene	85-01-8		71.5	0.252 (S)	0.19	1.003
Anthracene	120-12-7	J	9.24	0.256 (S)	0.19	1.012
Fluoranthene	206-44-0		211	0.313 (S)	0.20	1.002
Pyrene	129-00-0		191	0.302 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3		124	0.157 (S)	0.27	1.003
Chrysene [4]	218-01-9		156	0.142 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		171	0.350 (S)	0.22	1.004
Benzo[j,k]fluoranthenes			148	0.362 (S)	0.22	1.003
Benzo[e]pyrene	192-97-2		129	0.483 (S)	0.20	0.995
Benzo[a]pyrene	50-32-8		155	0.475 (S)	0.22	1.004
Perylene	198-55-0		42.8	0.495 (S)	0.23	1.004
Dibenz[a,h]anthracene [5]	53-70-3		26.3	0.296 (S)	0.11	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		125	0.344 (S)	0.18	1.002
Benzo[ghi]perylene	191-24-2		124	0.320 (S)	0.18	1.002
2-Methylnaphthalene	91-57-6	B J	4.33	0.504 (S)	0.93	1.009
2,6-Dimethylnaphthalene	581-42-0	J	1.08	0.536 (S)	0.57	1.012
2,3,5-Trimethylnaphthalene	2245-38-7	J	1.85	0.965 (S)	0.70	1.235
1-Methylphenanthrene	832-69-9	J	4.81	0.342 (S)	0.57	1.112
Dibenzothiophene	132-65-0	J	3.05	0.247 (S)	0.07	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-10_Form1A_PH5U0311.D_SJ1910250.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
66 Top
Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-10
Matrix:	TISSUE	**Sample Size:**	2.01 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	14-Jul-2015 **Time:** 00:25:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0311.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng absolute	**% Moisture:**	7.91

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	681	34.1	0.09	0.602
2-Methylnaphthalene d-10		2000	733	36.6	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	824	40.9	0.73	0.895
Acenaphthylene d-8		2000	849	42.4	0.15	0.961
Dibenzothiophene d-8		2010	1270	63.2	0.08	0.791
Phenanthrene d-10		2010	1400	69.4	0.14	0.807
Fluoranthene d-10		2010	1530	76.6	0.17	0.971
Benzo[a]anthracene d-12		2000	1680	83.9	0.24	1.165
Chrysene d-12		2000	1730	86.6	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1700	84.3	0.20	0.957
Benzo[k]fluoranthene d-12		2010	1710	85.1	0.19	0.961
Benzo[a]pyrene d-12		2010	1720	85.9	0.19	1.009
Perylene d-12		2010	1730	86.1	0.25	1.024
Dibenzo[a,h]anthracene d-14		2000	1800	90.0	0.29	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1700	85.1	0.18	1.207
Benzo[ghi]perylene d-12		2010	1780	88.7	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-10_Form2_PH5U0311.D_SJ1910250.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
67 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-11
Matrix:	TISSUE	**Sample Size:**	2.06 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	14-Jul-2015 **Time:** 01:13:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0312.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	8.60

This page is part of a total report that contains information necessary for accreditation compliance.
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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	5.88	0.674 (S)	0.06	1.006
Acenaphthylene	208-96-8	K J	0.778	0.432 (S)	0.32	1.002
Acenaphthene	83-32-9	J	3.64	0.761 (S)	1.13	1.048
Fluorene	86-73-7	B J	1.48	0.203 (S)	0.81	0.844
Phenanthrene	85-01-8		75.7	0.141 (S)	0.19	1.003
Anthracene	120-12-7	J	9.26	0.143 (S)	0.18	1.012
Fluoranthene	206-44-0		219	0.467 (S)	0.20	1.002
Pyrene	129-00-0		197	0.451 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3		129	0.426 (S)	0.26	1.003
Chrysene [4]	218-01-9		168	0.409 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		187	0.495 (S)	0.22	1.003
Benzo[j,k]fluoranthenes			153	0.506 (S)	0.22	1.003
Benzo[e]pyrene	192-97-2		135	0.638 (S)	0.22	0.996
Benzo[a]pyrene	50-32-8		155	0.628 (S)	0.22	1.004
Perylene	198-55-0		46.6	0.660 (S)	0.21	1.004
Dibenz[a,h]anthracene [5]	53-70-3		27.2	0.565 (S)	0.11	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		132	0.362 (S)	0.16	1.002
Benzo[ghi]perylene	191-24-2		135	0.336 (S)	0.17	1.003
2-Methylnaphthalene	91-57-6	B J	4.14	0.628 (S)	0.95	1.010
2,6-Dimethylnaphthalene	581-42-0	J	1.05	0.662 (S)	0.63	1.010
2,3,5-Trimethylnaphthalene	2245-38-7	K J	5.93	1.16 (S)	0.39	1.234
1-Methylphenanthrene	832-69-9	J	4.62	0.285 (S)	0.69	1.112
Dibenzothiophene	132-65-0	J	3.11	0.179 (S)	0.09	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-11_Form1A_PH5U0312.D_SJ1910251.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 2

ANALYSIS REPORT

CLIENT SAMPLE NO.
67 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.		06262044.0000	
Contract No.:	4765	**Lab Sample I.D.:**	L23437-11
Matrix:	TISSUE	**Sample Size:**	2.06 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	14-Jul-2015 **Time:** 01:13:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0312.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng absolute	**% Moisture:**	8.60

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	478	23.9	0.09	0.602
2-Methylnaphthalene d-10		2000	614	30.7	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	790	39.2	0.72	0.895
Acenaphthylene d-8		2000	836	41.8	0.15	0.961
Dibenzothiophene d-8		2010	1360	67.5	0.08	0.791
Phenanthrene d-10		2010	1460	72.7	0.14	0.807
Fluoranthene d-10		2010	1610	80.3	0.17	0.971
Benzo[a]anthracene d-12		2000	1710	85.7	0.24	1.165
Chrysene d-12		2000	1740	87.0	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1680	83.2	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1720	85.8	0.19	0.961
Benzo[a]pyrene d-12		2010	1790	89.4	0.19	1.008
Perylene d-12		2010	1810	90.0	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1790	89.7	0.29	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1730	86.6	0.18	1.207
Benzo[ghi]perylene d-12		2010	1790	89.1	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-11_Form2_PH5U0312.D_SJ1910251.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
68 Bottom
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.		06262044.0000	
Contract No.:	4765	**Lab Sample I.D.:**	L23437-12
Matrix:	TISSUE	**Sample Size:**	2.09 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	14-Jul-2015 **Time:** 02:02:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0313.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	8.53

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	6.02	0.468 (S)	0.06	1.007
Acenaphthylene	208-96-8	K J	0.526	0.371 (S)	0.32	1.003
Acenaphthene	83-32-9	J	3.36	0.677 (S)	1.04	1.048
Fluorene	86-73-7	B J	1.37	0.296 (S)	0.89	0.844
Phenanthrene	85-01-8		72.6	0.596 (S)	0.19	1.004
Anthracene	120-12-7	J	8.89	0.606 (S)	0.18	1.012
Fluoranthene	206-44-0		213	0.198 (S)	0.20	1.002
Pyrene	129-00-0		189	0.191 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3		127	0.456 (S)	0.27	1.003
Chrysene [4]	218-01-9		162	0.421 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		177	0.402 (S)	0.23	1.003
Benzo[j,k]fluoranthenes			146	0.402 (S)	0.23	1.003
Benzo[e]pyrene	192-97-2		130	0.534 (S)	0.23	0.996
Benzo[a]pyrene	50-32-8		156	0.526 (S)	0.22	1.004
Perylene	198-55-0		45.2	0.560 (S)	0.22	1.004
Dibenz[a,h]anthracene [5]	53-70-3		25.8	0.484 (S)	0.11	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		128	0.884 (S)	0.18	1.002
Benzo[ghi]perylene	191-24-2		128	0.822 (S)	0.17	1.002
2-Methylnaphthalene	91-57-6	B J	4.22	0.737 (S)	0.87	1.009
2,6-Dimethylnaphthalene	581-42-0	K J	1.03	0.527 (S)	0.34	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	K J	1.80	1.07 (S)	0.67	1.234
1-Methylphenanthrene	832-69-9	J	4.42	0.479 (S)	0.59	1.112
Dibenzothiophene	132-65-0	J	2.91	0.118 (S)	0.08	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-12_Form1A_PH5U0313.D_SJ1910252.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
68 Bottom
Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-12
Matrix:	TISSUE	**Sample Size:**	2.09 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	14-Jul-2015 **Time:** 02:02:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0313.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng absolute	**% Moisture:**	8.53

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	812	40.6	0.09	0.602
2-Methylnaphthalene d-10		2000	860	43.0	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	917	45.5	0.73	0.895
Acenaphthylene d-8		2000	943	47.1	0.15	0.961
Dibenzothiophene d-8		2010	1350	67.2	0.08	0.791
Phenanthrene d-10		2010	1470	72.9	0.14	0.807
Fluoranthene d-10		2010	1550	77.5	0.17	0.971
Benzo[a]anthracene d-12		2000	1680	84.0	0.24	1.165
Chrysene d-12		2000	1700	85.0	0.27	1.170
Benzo[b]fluoranthene d-12		2020	1650	81.4	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1680	83.6	0.19	0.961
Benzo[a]pyrene d-12		2010	1730	86.0	0.19	1.008
Perylene d-12		2010	1740	86.4	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1780	88.9	0.28	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1670	83.5	0.18	1.207
Benzo[ghi]perylene d-12		2010	1760	87.5	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-12_Form2_PH5U0313.D_SJ1910252.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

Form 1A
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	N/A
Contract No.:	4765	**Lab Sample I.D.:**	WG51719-101
Matrix:	CANOLA OIL	**Sample Size:**	2.00 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 12:20:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0295.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D

Concentration Units: ng/g

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	J	2.94	0.555 (S)	0.06	1.007
Acenaphthylene	208-96-8	U		0.272 (S)		
Acenaphthene	83-32-9	U		0.440 (S)		
Fluorene	86-73-7	K J	0.221	0.143 (S)	1.27	0.844
Phenanthrene	85-01-8	J	0.950	0.106 (S)	0.20	1.004
Anthracene	120-12-7	U		0.108 (S)		
Fluoranthene	206-44-0	K J	0.177	0.0555 (S)	0.26	1.002
Pyrene	129-00-0	K J	0.342	0.0535 (S)	0.26	1.033
Benz[a]anthracene [3]	56-55-3	U		0.146 (S)		
Chrysene [4]	218-01-9	K J	0.131	0.123 (S)	0.44	1.002
Benzo[b]fluoranthene	205-99-2	U		0.246 (S)		
Benzo[j,k]fluoranthenes		U		0.246 (S)		
Benzo[e]pyrene	192-97-2	U		0.372 (S)		
Benzo[a]pyrene	50-32-8	U		0.366 (S)		
Perylene	198-55-0	U		0.436 (S)		
Dibenz[a,h]anthracene [5]	53-70-3	U		0.222 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	K J	0.509	0.309 (S)	2.73	1.004
Benzo[ghi]perylene	191-24-2	U		0.279 (S)		
2-Methylnaphthalene	91-57-6	J	1.17	0.449 (S)	0.75	1.010
2,6-Dimethylnaphthalene	581-42-0	U		0.967 (S)		
2,3,5-Trimethylnaphthalene	2245-38-7	U		0.412 (S)		
1-Methylphenanthrene	832-69-9	U		0.327 (S)		
Dibenzothiophene	132-65-0	K J	0.245	0.156 (S)	0.16	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_WG51719-101_Form1A_PH5U0295.D_SJ1910255.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	N/A
Contract No.:	4765	**Lab Sample I.D.:**	WG51719-101
Matrix:	CANOLA OIL	**Sample Size:**	2.00 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 12:20:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0295.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute		

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	696	34.8	0.09	0.602
2-Methylnaphthalene d-10		2000	813	40.6	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	965	47.9	0.72	0.895
Acenaphthylene d-8		2000	899	44.9	0.15	0.961
Dibenzothiophene d-8		2010	1360	67.5	0.08	0.791
Phenanthrene d-10		2010	1500	74.5	0.14	0.807
Fluoranthene d-10		2010	1560	77.9	0.17	0.971
Benzo[a]anthracene d-12		2000	1630	81.3	0.24	1.165
Chrysene d-12		2000	1750	87.5	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1660	82.1	0.20	0.957
Benzo[k]fluoranthene d-12		2010	1680	84.0	0.19	0.962
Benzo[a]pyrene d-12		2010	1460	72.9	0.19	1.009
Perylene d-12		2010	1350	67.0	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1690	84.6	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1590	79.5	0.18	1.207
Benzo[ghi]perylene d-12		2010	1700	84.6	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_WG51719-101_Form2_PH5U0295.D_SJ1910255.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 8A
ONGOING PRECISION AND RECOVERY (OPR)

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4765	**OPR Data Filename:**	**PH5U0292.D**
Matrix:	TISSUE	**Lab Sample I.D.:**	WG51719-102
Extraction Date:	02-Jul-2015	**Analysis Date:**	13-Jul-2015 **Time:** 09:53:00

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON 100 uL EXTRACT.

COMPOUND	CAS NO.	LAB FLAG [1]	ION ABUND. RATIO	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS (ng/mL)	% RECOVERY
Naphthalene	91-20-3		0.06	19700	19800	13800 - 25600	101
Acenaphthylene	208-96-8		0.19	19900	20100	13900 - 27800	101
Acenaphthene	83-32-9		1.12	20000	21400	14000 - 26000	107
Fluorene	86-73-7		0.98	19700	18500	11800 - 27500	93.9
Phenanthrene	85-01-8		0.19	19900	20400	14000 - 25900	103
Anthracene	120-12-7		0.18	19900	18400	14000 - 25900	92.3
Fluoranthene	206-44-0		0.20	20000	20900	14000 - 26000	104
Pyrene	129-00-0		0.20	19700	19700	13800 - 25600	100
Benz[a]anthracene	56-55-3		0.26	19800	20100	13800 - 25700	102
Chrysene	218-01-9		0.29	20000	20100	14000 - 26000	101
Benzo[b]fluoranthene	205-99-2		0.22	19900	19900	13900 - 25900	99.8
Benzo[j,k]fluoranthenes			0.22	19900	19700	13900 - 25800	99.4
Benzo[e]pyrene	192-97-2		0.22	20100	19600	14000 - 26100	97.8
Benzo[a]pyrene	50-32-8		0.22	20000	18900	14000 - 26000	94.5
Perylene	198-55-0		0.22	20100	19600	14000 - 26100	97.9
Dibenz[a,h]anthracene	53-70-3		0.13	20100	19600	14000 - 26100	97.9
Indeno[1,2,3-cd]pyrene	193-39-5		0.17	19800	20000	13900 - 25800	101
Benzo[ghi]perylene	191-24-2		0.19	19800	19600	13900 - 25800	98.9
2-Methylnaphthalene	91-57-6		0.87	20500	21000	14400 - 26700	102
2,6-Dimethylnaphthalene	581-42-0		0.65	20200	21000	14100 - 26200	104
2,3,5-Trimethylnaphthalene	2245-38-7		0.87	19600	25300	9810 - 29400	129
1-Methylphenanthrene	832-69-9		0.58	16400	18000	8180 - 24500	110
Dibenzothiophene	132-65-0		0.08	20100	20500	12100 - 28100	102

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: Pest8A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_WG51719-102_Form8A_SJ1910253.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 8B
ONGOING PRECISION AND RECOVERY (OPR)

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4765 **OPR Data Filename:** **PH5U0292.D**

Matrix: TISSUE **Lab Sample I.D.:** WG51719-102

Extraction Date: 02-Jul-2015 **Analysis Date:** 13-Jul-2015 **Time:** 09:53:00

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON 100 uL EXTRACT.

LABELED COMPOUND	CAS NO.	LAB FLAG [1]	ION ABUND. RATIO	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS (ng/mL)	% RECOVERY
Naphthalene d-8	1146-65-2		0.09	20000	7000	3000-26000	35.0
2-Methylnaphthalene d-10	7297-45-2		0.17	20000	8810	4000-26000	44.1
2,6-Dimethylnaphthalene d-12	350820-12-1		0.72	20200	11200	4030-26200	55.6
Acenaphthylene d-8	93951-97-4		0.15	20000	11600	4000-26000	58.1
Dibenzothiophene d-8	33262-29-2		0.08	20100	15100	6030-26100	75.1
Phenanthrene d-10	1517-22-2		0.14	20100	15700	6030-26100	78.3
Fluoranthene d-10	93951-69-0		0.17	20100	17300	6020-26100	86.3
Benzo[a]anthracene d-12	1718-53-2		0.24	20000	17000	6000-26000	85.2
Chrysene d-12	1719-03-5		0.26	20000	17400	6000-26000	87.2
Benzo[b]fluoranthene d-12	93951-98-5		0.20	20200	17100	6060-26300	84.6
Benzo[k]fluoranthene d-12	93952-01-3		0.19	20100	17900	6020-26100	89.2
Benzo[a]pyrene d-12	63466-71-7		0.19	20100	18200	6020-26100	90.7
Perylene d-12	1520-96-3		0.24	20100	17900	6030-26100	88.9
Dibenzo[a,h]anthracene d-14	13250-98-1		0.30	20000	19500	6000-26000	97.4
Indeno[1,2,3-cd]pyrene d-12	203578-33-0		0.18	20000	17300	6000-26000	86.7
Benzo[ghi]perylene d-12	93951-66-7		0.19	20100	18500	6020-26100	92.5

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

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Report Filename: PAH_PAH_LO_LPAR_WG51719-102_Form8B_SJ1910253.html; Workgroup: WG51719; Design ID: 2591]

Accreditation Scope

AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev.23

				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
BFR	BTBPE	AXYS MLA-033	MLA-033			Y										Y							Y														
	DBDPE	AXYS MLA-033	MLA-033			Y										Y							Y														
	HBB	AXYS MLA-033	MLA-033			Y										Y							Y														
	PBEB	AXYS MLA-033	MLA-033			Y										Y							Y														
BPA and MPE	4,4'-dihydroxy-2,2-diphenylpropane (Bisphenol A) (BPA)	AXYS MLA-059	MLA-059																			Y															
	Mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP)	AXYS MLA-059	MLA-059																			Y															
	Mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP)	AXYS MLA-059	MLA-059																			Y															
	Mono-(3-carboxypropyl) phthalate (MCPP)	AXYS MLA-059	MLA-059																			Y															
	Mono-2-ethylhexyl phthalate (MEHP)	AXYS MLA-059	MLA-059																			Y															
	Mono-benzyl phthalate (MBzP)	AXYS MLA-059	MLA-059																			Y															
	Mono-butyl phthalate (MBP) (n + iso)	AXYS MLA-059	MLA-059																			Y															
	Mono-cyclohexyl phthalate (MCHP)	AXYS MLA-059	MLA-059																			Y															
	Mono-ethyl phthalate (MEP)	AXYS MLA-059	MLA-059																			Y															
	Mono-iso-nonyl phthalate (MiNP)	AXYS MLA-059	MLA-059																			Y															
	Mono-methyl phthalate (MMP)	AXYS MLA-059	MLA-059																			Y															
HBCDD	alpha-hexabromocyclododecane (a-HBCDD)	AXYS MLA-070	MLA-070		Y																																
	beta-hexabromocyclododecane (b-HBCDD)	AXYS MLA-070	MLA-070		Y																																
	gamma-hexabromocyclododecane (g-HBCDD)	AXYS MLA-070	MLA-070		Y																																
OC Pesticides	2,4'-DDD	AXYS MLA-007	MLA-007		Y	Y										Y							Y														
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y										Y				
		EPA 8270	MLA-007										Y																								
	2,4'-DDE	AXYS MLA-007	MLA-007		Y	Y										Y							Y														
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y										Y				
		EPA 8270	MLA-007										Y																								
	2,4'-DDT	AXYS MLA-007	MLA-007		Y	Y										Y							Y														
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y										Y				
		EPA 8270	MLA-007										Y																								
	4,4'-DDD	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	4,4'-DDE	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	4,4'-DDT	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Aldrin	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Alpha-HCH	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Beta-HCH	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	

Accreditation Scope

AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev.23

				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Chlordane, technical	AXYS MLA-007	MLA-007					Y							Y														Y							Y	
		EPA 625	MLA-007																									Y							Y		
		EPA 8270	MLA-007				Y	Y			Y	Y		Y	Y														Y			Y	Y		Y	Y	
	cis-Chlordane (alpha-Chlordane)	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 8270	MLA-007					Y			Y		Y	Y	Y														Y			Y			Y	Y	
	cis-Nonachlor	AXYS MLA-007	MLA-007		Y	Y										Y							Y														
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y											Y			
		EPA 8270	MLA-007										Y																								
	Delta-HCH	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																										Y			Y	Y			Y	
		EPA 8081	MLA-007					Y			Y	Y	Y		Y																						
	Dieldrin	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Endosulphan I	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Endosulphan II	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Endosulphan sulphate	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Endrin	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Endrin aldehyde	AXYS MLA-007	MLA-007			Y		Y							Y								Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Endrin ketone	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y								
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y											Y			
		EPA 8081	MLA-007					Y			Y		Y		Y																						
	Gamma-HCH (Lindane)	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Heptachlor	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Heptachlor epoxide	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	

Accreditation Scope

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Hexachlorobenzene	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 1625	MLA-007																									Y	Y			Y				Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Methoxychlor	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																										Y			Y	Y			Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
		SM6630B	MLA-007																									Y									
	Mirex	AXYS MLA-007	MLA-007		Y	Y		Y								Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y						Y					Y		Y	
		EPA 8270	MLA-007					Y			Y		Y																Y			Y	Y		Y	Y	
	Oxychlordane	AXYS MLA-007	MLA-007		Y	Y										Y							Y														
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y											Y			
		EPA 8270	MLA-007										Y																								
	Toxaphene	EPA 8270	MLA-007										Y																								
	trans-Chlordane (gamma-Chlordane)	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 8270	MLA-007					Y			Y		Y	Y	Y														Y			Y			Y	Y	
	trans-Nonachlor	AXYS MLA-007	MLA-007		Y	Y										Y																					
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y											Y			
		EPA 8270	MLA-007										Y																								
PAH	1,2,6-Trimethylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	1,2-Dimethylnaphthalene	AXYS MLA-021	MLA-021			Y																	Y														
	1,4,6,7-Tetramethylnaphthalene	AXYS MLA-021	MLA-021			Y																	Y														
	1,7-Dimethylfluorene	AXYS MLA-021	MLA-021			Y																	Y														
	1,7-Dimethylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	1,8-Dimethylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	1-Methylchrysene	AXYS MLA-021	MLA-021			Y																	Y														
	1-Methylnaphthalene	AXYS MLA-021	MLA-021			Y																	Y														
	1-Methylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	2,3,5-Trimethylnaphthalene	AXYS MLA-021	MLA-021			Y																	Y														
	2,3,6-Trimethylnaphthalene	AXYS MLA-021	MLA-021			Y																	Y														
	2,4-Dimethyldibenzothiophene	AXYS MLA-021	MLA-021			Y																	Y														
	2,6-Dimethylnaphthalene	AXYS MLA-021	MLA-021			Y																	Y														
	2,6-Dimethylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	2/3-Methyldibenzothiophenes	AXYS MLA-021	MLA-021			Y																	Y														
	2-Methylanthracene	AXYS MLA-021	MLA-021			Y																	Y														
	2-Methylfluorene	AXYS MLA-021	MLA-021			Y																	Y														
	2-methylnaphthalene	AXYS MLA-021	MLA-021			Y		Y							Y								Y														
		EPA 8270	MLA-021				Y	Y			Y				Y																						
	2-Methylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	3,6-Dimethylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	3-Methylfluoranthene/ Benzo(a)fluorene	AXYS MLA-021	MLA-021			Y																	Y														
	3-Methylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	5,9-Dimethylchrysene	AXYS MLA-021	MLA-021			Y																	Y														
	5/6-Methylchrysenes	AXYS MLA-021	MLA-021			Y																	Y														

Accreditation Scope

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	7-Methylbenzo(a)pyrene	AXYS MLA-021	MLA-021			Y																	Y														
	9/4-Methylphenanthrenes	AXYS MLA-021	MLA-021			Y																	Y														
	Acenaphthene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Acenaphthylene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Anthracene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Benz[a]anthracene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Benzo[a]pyrene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Benzo[b]fluoranthene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Benzo[e]pyrene	AXYS MLA-021	MLA-021			Y										Y							Y														
	Benzo[ghi]perylene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Benzo[j/k]fluoranthenes	AXYS MLA-021	MLA-021													Y							Y														
	Benzo[k]fluoranthene	AXYS MLA-021	MLA-021					Y							Y								Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-021				Y	Y			Y			Y	Y																						
	Biphenyl	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Acenaphthenes	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Benz(a)anthracenes/chrysenes	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Benzofluoranthenes/ Benzopyrenes	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Biphenyls	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Dibenzothiophene	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Fluoranthenes/Pyrenes	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Fluorenes	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Naphthalenes	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Phenanthrenes/Anthracenes	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Benz(a)anthracenes/Chrysenes	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Benzofluoranthenes/ Benzopyrenes	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Biphenyls	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Dibenzothiophene	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Fluoranthenes/Pyrenes	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Fluorenes	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Naphthalenes	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Phenanthrenes/Anthracenes	AXYS MLA-021	MLA-021			Y																	Y														
	C3-Benz(a)anthracenes/Chrysenes	AXYS MLA-021	MLA-021			Y																	Y														
	C3-Dibenzothiophene	AXYS MLA-021	MLA-021			Y																	Y														
	C3-Fluoranthenes/Pyrenes	AXYS MLA-021	MLA-021			Y																	Y														
	C3-Fluorenes	AXYS MLA-021	MLA-021			Y																	Y														

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	C3-Naphthalenes	AXYS MLA-021	MLA-021			Y																	Y														
	C3-Phenanthrenes/Anthracenes	AXYS MLA-021	MLA-021			Y																	Y														
	C4-Benz(a)anthracenes/Chrysenes	AXYS MLA-021	MLA-021			Y																	Y														
	C4-Dibenzothiophene	AXYS MLA-021	MLA-021			Y																	Y														
	C4-Fluoranthenes/Pyrenes	AXYS MLA-021	MLA-021			Y																	Y														
	C4-Naphthalenes	AXYS MLA-021	MLA-021			Y																	Y														
	C4-Phenanthrenes/Anthracenes	AXYS MLA-021	MLA-021			Y																	Y														
	Chrysene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Dibenz[ah]anthracene	AXYS MLA-021	MLA-021			Y										Y							Y														
	Dibenzo[ah]anthracene	AXYS MLA-021	MLA-021					Y							Y														Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Dibenzothiophene	AXYS MLA-021	MLA-021			Y																	Y														
	Fluoranthene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Fluorene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Indeno[1,2,3-cd]pyrene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Naphthalene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Perylene	AXYS MLA-021	MLA-021			Y										Y							Y														
	Phenanthrene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Pyrene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Retene	AXYS MLA-021	MLA-021			Y																	Y														
Parabens	Benzylparaben (Benzyl 4-hydroxybenzoate)	AXYS MLA-064	MLA-064																			Y															
	Butylparaben (n-Butyl 4-hydroxybenzoate and isobutyl 4-hydroxybenzoate)	AXYS MLA-064	MLA-064																			Y															
	Ethylparaben (Ethyl 4-hydroxybenzoate)	AXYS MLA-064	MLA-064																			Y															
	Isopropylparaben (Isopropyl 4-hydroxybenzoate)	AXYS MLA-064	MLA-064																			Y															
	Methylparaben (Methyl 4-hydroxybenzoate)	AXYS MLA-064	MLA-064																			Y															
	n-Propylparaben (Propyl 4-hydroxybenzoate)	AXYS MLA-064	MLA-064																			Y															
PBDPE	BDE 10 2,6-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 100 2,2',4,4',6-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 105 2,3,3',4,4'-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 11 3,3'-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 116 2,3,4,5,6-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y			

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 119 2,3',4,4',6-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 12 3,4-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 126 3,3',4,4',5-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 13 3,4'-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 140 2,2',3,4,4',6'-hexabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 15 4,4'-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 153 2,2',4,4',5,5'-hexabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 154 2,2',4,4',5',6-hexabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 155 2,2',4,4',6,6'-hexabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 166 2,3,4,4',5,6-hexabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 17 2,2',4-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 181 2,2',3,4,4',5,6-heptabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 190 2,3,3',4,4',5,6-heptabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 206 2,2',3,3',4,4',5,5',6-nonabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 207 2,2',3,3',4,4',5,6,6'-nonabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 208 2,2',3,3',4,5,5',6,6'-nonabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 209 Decabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 25 2,3',4-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 28 2,4,4'-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 30 2,4,6-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 35 3,3',4-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 37 3,4,4'-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 47 2,2',4,4'-tetrabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 49 2,2',4,5'-tetrabromodiphenylether	EPA 1614	MLA-033										Y																					Y		
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 66 2,3',4,4'-tetrabromodiphenylether	EPA 1614	MLA-033										Y																					Y		

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 7 2,4-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 75 2,4,4',6-tetrabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 77 3,3',4,4'-tetrabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 8 2,4'-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 85 2,2',3,4,4'-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 99 2,2',4,4',5-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE-183 2,2',3,4,4',5',6-heptabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE-33 2',3,4-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
PCB	PCB 1 2-Chlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 10 2,6-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 100 2,2',4,4',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 101 2,2',4,5,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 101/90/89	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 102 2,2',4,5,6'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 103 2,2',4,5',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 104 2,2',4,6,6'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 105 2,3,3',4,4'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 105/127	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 106 2,3,3',4,5-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 107 2,3,3',4',5-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 107/109	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 108 2,3,3',4,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 109 2,3,3',4,6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 11 3,3'-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 110 2,3,3',4',6-Pentachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 111 2,3,3',5,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 111/117	EPA 8270	MLA-007										Y																								
	PCB 112 2,3,3',5,6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 113 2,3,3',5',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 114 2,3,4,4',5-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 115 2,3,4,4',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 116 2,3,4,5,6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 117 2,3,4',5,6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 118 2,3',4,4',5-Pentachlorobiphenyl	AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 118/106	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 119 2,3',4,4',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 12 3,4-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 12/13	EPA 8270	MLA-007										Y																								
	PCB 120 2,3',4,5,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 121 2,3',4,5',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 122 2,3,3',4',5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 123 2,3',4,4',5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 124 2,3',4',5,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	PCB 125 2,3',4',5',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 126 3,3',4,4',5-Pentachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 127 3,3',4,5,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 128 2,2',3,3',4,4'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 129 2,2',3,3',4,5-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 13 3,4'-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 130 2,2',3,3',4,5'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 131 2,2',3,3',4,6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 131/142	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 132 2,2',3,3',4,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 132/168	EPA 8270	MLA-007										Y																								
	PCB 133 2,2',3,3',5,5'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 134 2,2',3,3',5,6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 134/143	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 135 2,2',3,3',5,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 136 2,2',3,3',6,6'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 137 2,2',3,4,4',5-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 138 2,2',3,4,4',5'-Hexachlorobiphenyl	AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	PCB 138/163/164	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 139 2,2',3,4,4',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 14 3,5-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 140 2,2',3,4,4',6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 141 2,2',3,4,5,5'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 142 2,2',3,4,5,6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 143 2,2',3,4,5,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 144 2,2',3,4,5',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 144/135	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 145 2,2',3,4,6,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 146 2,2',3,4',5,5'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 147 2,2',3,4',5,6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 148 2,2',3,4',5,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 149 2,2',3,4',5',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 149/139	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 15 4,4'-Dichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 150 2,2',3,4',6,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 151 2,2',3,5,5',6-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	PCB 152 2,2',3,5,6,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 153 2,2',4,4',5,5'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 154 2,2',4,4',5,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 155 2,2',4,4',6,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 156 2,3,3',4,4',5-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 157 2,3,3',4,4',5'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 158 2,3,3',4,4',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 158/160	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 159 2,3,3',4,5,5'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 16 2,2',3-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 16/32	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 160 2,3,3',4,5,6-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 161 2,3,3',4,5',6-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 162 2,3,3',4',5,5'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 163 2,3,3',4',5,6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 164 2,3,3',4',5',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 165 2,3,3',5,5',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 166 2,3,4,4',5,6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 167 2,3',4,4',5,5'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 168 2,3',4,4',5',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 169 3,3',4,4',5,5'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 17 2,2',4-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 170 2,2',3,3',4,4',5-Heptachlorobiphenyl	AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 170/190	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 171 2,2',3,3',4,4',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 172 2,2',3,3',4,5,5'-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 172/192	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 173 2,2',3,3',4,5,6-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 174 2,2',3,3',4,5,6'-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 174/181	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 175 2,2',3,3',4,5',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 176 2,2',3,3',4,6,6'-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 177 2,2',3,3',4,5',6'-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	PCB 178 2,2',3,3',5,5',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 179 2,2',3,3',5,6,6'-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 18 2,2',5-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 180 2,2',3,4,4',5,5'-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 181 2,2',3,4,4',5,6-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 182 2,2',3,4,4',5,6'-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 183 2,2',3,4,4',5',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 184 2,2',3,4,4',6,6'-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 185 2,2',3,4,5,5',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 186 2,2',3,4,5,6,6'-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 187 2,2',3,4',5,5',6-Heptachlorobiphenyl	AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 187/182	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 188 2,2',3,4',5,6,6'-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 19 2,2',6-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 190 2,3,3',4,4',5,6-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 191 2,3,3',4,4',5',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 192 2,3,3',4,5,5',6-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 193 2,3,3',4',5,5',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 194 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 195 2,2',3,3',4,4',5,6-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 196 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 196/203	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 197 2,2',3,3',4,4',6,6'-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 198 2,2',3,3',4,5,5',6-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 199 2,2',3,3',4,5,5',6'-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 2 3-Chlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 20 2,3,3'-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 200 2,2',3,3',4,5,6,6'-Octachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 201 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	PCB 202 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 203 2,2',3,4,4',5,5',6-Octachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 204 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 205 2,3,3',4,4',5,5',6-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 206 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 207 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 208 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 209 Decachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 21 2,3,4-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 22 2,3,4'-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 23 2,3,5-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 23/34	EPA 8270	MLA-007										Y																								
	PCB 24 2,3,6-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 24/27	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 25 2,3',4-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 26 2,3',5-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 27 2,3',6-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 28 2,4,4'-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 29 2,4,5-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 3 4-Chlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 30 2,4,6-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 31 2,4',5-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 32 2,4',6-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 33 2,3',4'-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 33/20/21	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 34 2,3',5'-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 35 3,3',4-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 36 3,3',5-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 37 3,4,4'-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 38 3,4,5-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 39 3,4',5-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 4 2,2'-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 4/10	EPA 8270	MLA-007										Y																								
	PCB 40 2,2',3,3'-Tetrachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 41 2,2',3,4-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 41/71/64/68	AXYS MLA-007	MLA-007			Y										Y							Y														

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		EPA 8270	MLA-007										Y																								
	PCB 42 2,2',3,4'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 42/59	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 43 2,2',3,5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 44 2,2',3,5'-Tetrachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 45 2,2',3,6-Tetrachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 46 2,2',3,6'-Tetrachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 47 2,2',4,4'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 47/48/75	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 48 2,2',4,5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 49 2,2',4,5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 49/43	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 5 2,3-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 50 2,2',4,6-Tetrachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 51 2,2',4,6'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 52 2,2',5,5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 52/73	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 53 2,2',5,6'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 54 2,2',6,6'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 55 2,3,3',4-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 56 2,3,3',4'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 56/60	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 57 2,3,3',5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 58 2,3,3',5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 59 2,3,3',6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 6 2,3'-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 60 2,3,4,4'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 61 2,3,4,5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 62 2,3,4,6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 62/65	EPA 8270	MLA-007										Y																								
	PCB 63 2,3,4',5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 64 2,3,4',6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 65 2,3,5,6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 66 2,3',4,4'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 66/80	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 67 2,3',4,5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 68 2,3',4,5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 69 2,3',4,6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 7 2,4-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 7/9	EPA 8270	MLA-007										Y																								
	PCB 70 2,3',4',5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 70/76	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 71 2,3',4',6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 72 2,3',5,5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 73 2,3',5',6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 74 2,4,4',5-Tetrachlorobiphenyl	AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 74/61	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 75 2,4,4',6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 76 2,3',4',5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 77 3,3',4,4'-Tetrachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 78 3,3',4,5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 79 3,3',4,5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 8 2,4'-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 8/5	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 80 3,3',5,5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 81 3,4,4',5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 82 2,2',3,3',4-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 83 2,2',3,3',5-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 83/108	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 84 2,2',3,3',6-Pentachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 85 2,2',3,4,4'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 85/120	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 86 2,2',3,4,5-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 87 2,2',3,4,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 87/115/116	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 88 2,2',3,4,6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 88/121	EPA 8270	MLA-007										Y																								
	PCB 89 2,2',3,4,6'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 9 2,5-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 90 2,2',3,4',5-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 91 2,2',3,4',6-Pentachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 92 2,2',3,5,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 93 2,2',3,5,6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 94 2,2',3,5,6'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 95 2,2',3,5',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 95/93	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 96 2,2',3,6,6'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 97 2,2',3,4',5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 97/86	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 98 2,2',3,4',6'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 98/102	EPA 8270	MLA-007										Y																								
	PCB 99 2,2',4,4',5-Pentachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB Aroclor 1016	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y			Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	PCB Aroclor 1016/1242	EPA 8270	MLA-007										Y																								
	PCB Aroclor 1221	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y		Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	PCB Aroclor 1232	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y		Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	PCB Aroclor 1242	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y			Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	PCB Aroclor 1248	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y		Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	PCB Aroclor 1254	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y		Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	PCB Aroclor 1260	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y		Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	PCB Aroclor 1268	AXYS MLA-007	MLA-007			Y										Y							Y														
	PCB congeners, total	EPA 1668	MLA-010					Y			Y				Y														Y			Y				Y	
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	Total Dichlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Heptachlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Hexachlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Monochlorobiphenyls	AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Nonachlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Octachlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	Total Pentachlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Polychlorinated biphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
	Total Tetrachlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Trichlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
PCDDF	1,2,3,4,6,7,8-HpCDD	EPA 1613	MLA-017										Y	Y	Y						Y						Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,4,6,7,8-HpCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,4,7,8,9-HpCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,4,7,8-HxCDD	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,4,7,8-HxCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,6,7,8-HxCDD	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,6,7,8-HxCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,7,8,9-HxCDD	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,7,8,9-HxCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,7,8-PeCDD	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,7,8-PeCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	2,3,4,6,7,8-HxCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	2,3,4,7,8-PeCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	2,3,7,8-TCDD	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	

Accreditation Scope

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	2,3,7,8-TCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	OCDD	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	OCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	Total HpCDD	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total HpCDF	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total HxCDD	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total HxCDF	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total PeCDD	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total PeCDF	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total TCDD	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total TCDF	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
PFC	Perfluorobutanesulfonate (PFBS)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorobutanoate (PFBA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorodecanoate (PFDA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorododecanoate (PFDoA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluoroheptanoate (PFHpA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorohexanesulfonate (PFHxS)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorohexanoate (PFHxA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorononanoate (PFNA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorooctane sulfonamide (PFOSA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorooctanesulfonate (PFOS)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorooctanoate (PFOA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluoropentanoate (PFPeA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluoroundecanoate (PFUnA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
PPCP	1,7-Dimethylxanthine	EPA 1694	MLA-075											Y																				Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	10-hydroxy-amitriptyline	AXYS MLA-075	MLA-075			Y																	Y														
	2-hydroxy-ibuprofen	AXYS MLA-075	MLA-075			Y																	Y														
	4-Epianhydrochlortetracycline (EACTC)	EPA 1694	MLA-075											Y																				Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	4-Epianhydrotetracycline (EATC)	EPA 1694	MLA-075											Y																				Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	4-Epichlortetracycline (ECTC)	EPA 1694	MLA-075											Y																				Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	4-Epioxytetracycline (EOTC)	EPA 1694	MLA-075											Y																				Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	4-Epitetracycline (ETC)	EPA 1694	MLA-075											Y																				Y		

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-075	MLA-075			Y																	Y													
	Acetaminophen	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Albuterol	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Alprazolam	AXYS MLA-075	MLA-075			Y																	Y													
	Amitriptyline	AXYS MLA-075	MLA-075			Y																	Y													
	Amlodipine	AXYS MLA-075	MLA-075			Y																	Y													
	Amphetamine	AXYS MLA-075	MLA-075			Y																	Y													
	Anhydrochlortetracycline (ACTC)	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Anhydrotetracycline (ATC)	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Atenolol	AXYS MLA-075	MLA-075			Y																	Y													
	Atorvastatin	AXYS MLA-075	MLA-075			Y																	Y													
	Azithromycin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Benzoylecgonine	AXYS MLA-075	MLA-075			Y																	Y													
	Benztropine	AXYS MLA-075	MLA-075			Y																	Y													
	Betamethasone	AXYS MLA-075	MLA-075			Y																	Y													
	Bisphenol A	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Caffeine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Carbadox	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Carbamazepine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Cefotaxime	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Chlortetracycline (CTC)	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Cimetidine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Ciprofloxacin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Clarithromycin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Clinafloxacin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Clonidine	AXYS MLA-075	MLA-075			Y																	Y													
	Cloxacillin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Cocaine	AXYS MLA-075	MLA-075			Y																	Y													
	Codeine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Cotinine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	DEET (N,N-diethyl-m-toluamide)	AXYS MLA-075	MLA-075			Y																	Y													
	Dehydronifedipine	EPA 1694	MLA-075											Y																					Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-075	MLA-075			Y																	Y													
	Demeclocycline	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Desmethyldiltiazem	AXYS MLA-075	MLA-075			Y																	Y													
	Diazepam	AXYS MLA-075	MLA-075			Y																	Y													
	Digoxigenin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Digoxin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Diltiazem	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Diphenhydramine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Doxycycline	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Enalapril	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Enrofloxacin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Erythromycin	AXYS MLA-075	MLA-075			Y																	Y													
	Erythromycin anydrate	EPA 1694	MLA-075											Y																					Y	
	Flumequine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Fluocinonide	AXYS MLA-075	MLA-075			Y																	Y													
	Fluoxetine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Fluticasone propionate	AXYS MLA-075	MLA-075			Y																	Y													
	Furosemide	AXYS MLA-075	MLA-075			Y																	Y													
	Gemfibrozil	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Glipizide	AXYS MLA-075	MLA-075			Y																	Y													
	Glyburide	AXYS MLA-075	MLA-075			Y																	Y													
	Hydrochlorothiazide	AXYS MLA-075	MLA-075			Y																	Y													
	Hydrocodone	AXYS MLA-075	MLA-075			Y																	Y													
	Hydrocortisone	AXYS MLA-075	MLA-075			Y																	Y													
	Ibuprofen	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Isochlortetracycline (ICTC)	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Lincomycin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Lomefloxacin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Meprobamate	AXYS MLA-075	MLA-075			Y																	Y													
	Metformin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Methylprednisolone	AXYS MLA-075	MLA-075			Y																	Y													
	Metoprolol	AXYS MLA-075	MLA-075			Y																	Y													
	Miconazole	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
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	Minocycline	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Naproxen	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Norfloxacin	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Norfluoxetine	AXYS MLA-075	MLA-075			Y																	Y														
	Norgestimate	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Norverapamil	AXYS MLA-075	MLA-075			Y																	Y														
	Ofloxacin	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Ormetoprim	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Oxacillin	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Oxolinic acid	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Oxycodone	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Oxytetracycline (OTC)	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Paroxetine	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Penicillin G	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Penicillin V	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Prednisolone	AXYS MLA-075	MLA-075			Y																	Y														
	Prednisone	AXYS MLA-075	MLA-075			Y																	Y														
	Promethazine	AXYS MLA-075	MLA-075			Y																	Y														
	Propoxyphene	AXYS MLA-075	MLA-075			Y																	Y														
	Propranolol	AXYS MLA-075	MLA-075			Y																	Y														
	Ranitidine	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Roxithromycin	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Sarafloxacin	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Sertraline	AXYS MLA-075	MLA-075			Y																	Y														
	Simvastatin	AXYS MLA-075	MLA-075			Y																	Y														
	Sulfachloropyridazine	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Sulfadiazine	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Sulfadimethoxine	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Sulfamerazine	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Sulfamethazine	EPA 1694	MLA-075											Y																					Y		

Accreditation Scope

AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev.23

				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-075	MLA-075			Y																	Y													
	Sulfamethizole	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Sulfamethoxazole	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Sulfanilamide	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Sulfathiazole	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Tetracycline (TC)	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Theophylline	AXYS MLA-075	MLA-075			Y																	Y													
	Thiabendazole	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Trenbolone	AXYS MLA-075	MLA-075			Y																	Y													
	Trenbolone acetate	AXYS MLA-075	MLA-075			Y																	Y													
	Triamterene	AXYS MLA-075	MLA-075			Y																	Y													
	Triclocarban	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Triclosan	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Trimethoprim	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Tylosin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Valsartan	AXYS MLA-075	MLA-075			Y																	Y													
	Verapamil	AXYS MLA-075	MLA-075			Y																	Y													
	Virginiamycin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Warfarin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
Targeted Metabolites	11, 14, 17-eicosatrienoic acid (eicosatrienoic acid)	AXYS MLM-001	MLM-001													Y																				
	11, 14-eicosadienoic acid	AXYS MLM-001	MLM-001													Y																				
	3-hydroxytyrosine	AXYS MLM-001	MLM-001													Y																				
	Acetylcarnitine	AXYS MLM-001	MLM-001													Y																				
	Acetylornithine	AXYS MLM-001	MLM-001													Y																				
	Alanine	AXYS MLM-001	MLM-001													Y																				
	alpha-Aminoadipic acid	AXYS MLM-001	MLM-001													Y																				
	Arginine	AXYS MLM-001	MLM-001													Y																				
	Asparagine	AXYS MLM-001	MLM-001													Y																				
	Aspartate	AXYS MLM-001	MLM-001													Y																				
	Asymmetric dimethylarginine	AXYS MLM-001	MLM-001													Y																				
	Butenylcarnitine	AXYS MLM-001	MLM-001													Y																				
	Butyrylcarnitine	AXYS MLM-001	MLM-001													Y																				
	C22:5 ISOMER 1 (tentatively all-cis-4, 8, 12, 15, 19-docosapentaenoic acid)	AXYS MLM-001	MLM-001													Y																				
	C22:5 ISOMER 2 (all-cis-7,10,13,16,19-docosapentaenoic acid (DPA)	AXYS MLM-001	MLM-001													Y																				
	C22:5 ISOMER 3 (tentatively all-cis-4, 7, 10, 13, 16-docosapentaenoic acid)	AXYS MLM-001	MLM-001													Y																				
	Carnitine	AXYS MLM-001	MLM-001													Y																				
	Carnosine	AXYS MLM-001	MLM-001													Y																				
	chenodeoxycholic acid	AXYS MLM-001	MLM-001													Y																				

Accreditation Scope

AXYS Analytical Services Ltd.
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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	cholic acid	AXYS MLM-001	MLM-001													Y																					
	Citrulline	AXYS MLM-001	MLM-001													Y																					
	Creatinine	AXYS MLM-001	MLM-001													Y																					
	Decadienylcarnitine	AXYS MLM-001	MLM-001													Y																					
	decanoic acid (capric acid)	AXYS MLM-001	MLM-001													Y																					
	Decanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Decenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	deoxycholic acid	AXYS MLM-001	MLM-001													Y																					
	docosahexaenoic acid (DHA)	AXYS MLM-001	MLM-001													Y																					
	docosatetraenoic acid (adrenic acid)	AXYS MLM-001	MLM-001													Y																					
	Dodecanedioylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Dodecanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Dodecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Dopamine	AXYS MLM-001	MLM-001													Y																					
	eicosapentaenoic acid (EPA)	AXYS MLM-001	MLM-001													Y																					
	Eicosatetraenoic acid (arachidonic acid)	AXYS MLM-001	MLM-001													Y																					
	eicosatrienoic acid (dihomo-γ-linolenic acid)	AXYS MLM-001	MLM-001													Y																					
	Glutaconylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Glutamate	AXYS MLM-001	MLM-001													Y																					
	Glutamine	AXYS MLM-001	MLM-001													Y																					
	Glutarylcarnitine (Hydroxyhexanoylcarnitine)	AXYS MLM-001	MLM-001													Y																					
	Glycine	AXYS MLM-001	MLM-001													Y																					
	glycochenodeoxycholic acid	AXYS MLM-001	MLM-001													Y																					
	glycocholic acid	AXYS MLM-001	MLM-001													Y																					
	glycodeoxycholic acid	AXYS MLM-001	MLM-001													Y																					
	Hexadecadienylcarnitine	AXYS MLM-001	MLM-001													Y																					
	hexadecanoic acid (palmitic acid)	AXYS MLM-001	MLM-001													Y																					
	Hexadecanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	hexadecenoic acid (palmitoleic acid)	AXYS MLM-001	MLM-001													Y																					
	Hexadecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hexanoylcarnitine (Fumarylcarnitine)	AXYS MLM-001	MLM-001													Y																					
	Hexenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hexose (sum isomers)	AXYS MLM-001	MLM-001													Y																					
	Histamine	AXYS MLM-001	MLM-001													Y																					
	Histidine	AXYS MLM-001	MLM-001													Y																					
	Hydroxyhexadecadienylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxyhexadecanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxyhexadecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxylbutyrylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxyoctadecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxyproline	AXYS MLM-001	MLM-001													Y																					
	Hydroxypropionylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxysphingomyeline C14:1	AXYS MLM-001	MLM-001													Y																					
	Hydroxysphingomyeline C16:1	AXYS MLM-001	MLM-001													Y																					
	Hydroxysphingomyeline C22:1	AXYS MLM-001	MLM-001													Y																					
	Hydroxysphingomyeline C22:2	AXYS MLM-001	MLM-001													Y																					
	Hydroxysphingomyeline C24:1	AXYS MLM-001	MLM-001													Y																					
	Hydroxytetradecadienylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxytetradecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxyvalerylcarnitine (Methylmalonylcarnitine)	AXYS MLM-001	MLM-001													Y																					

Accreditation Scope

AXYS Analytical Services Ltd.
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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	Isoleucine	AXYS MLM-001	MLM-001													Y																					
	Kynurenine	AXYS MLM-001	MLM-001													Y																					
	Leucine	AXYS MLM-001	MLM-001													Y																					
	lithocholic acid	AXYS MLM-001	MLM-001													Y																					
	Lysine	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C14:0	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C16:0	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C16:1	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C17:0	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C18:0	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C18:1	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C18:2	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C20:3	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C20:4	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C24:0	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C26:1	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C28:0	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C28:1	AXYS MLM-001	MLM-001													Y																					
	Methionine	AXYS MLM-001	MLM-001													Y																					
	Methioninesulfoxide	AXYS MLM-001	MLM-001													Y																					
	Methylglutarylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Nitrotyrosine	AXYS MLM-001	MLM-001													Y																					
	Nonaylcarnitine	AXYS MLM-001	MLM-001													Y																					
	octadecadienoic acid (linoleic acid)	AXYS MLM-001	MLM-001													Y																					
	Octadecadienylcarnitine	AXYS MLM-001	MLM-001													Y																					
	octadecanoic acid (stearic acid)	AXYS MLM-001	MLM-001													Y																					
	Octadecanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	octadecatrienoic acid (γ-linolenic acid)	AXYS MLM-001	MLM-001													Y																					
	Octadecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Octanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Ornithine	AXYS MLM-001	MLM-001													Y																					
	Phenylalanine	AXYS MLM-001	MLM-001													Y																					
	Phenylethylamine	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C30:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C30:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C30:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C32:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C32:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C34:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C34:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C34:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C34:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C36:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C36:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C36:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C36:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C36:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C36:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C38:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C38:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C38:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C38:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C38:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C38:6	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C40:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C40:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C40:3	AXYS MLM-001	MLM-001													Y																					

Accreditation Scope

AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev.23

				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable							
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	Phosphatidylcholine acyl-alkyl C40:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C40:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C40:6	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C42:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C42:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C42:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C42:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C42:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C42:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C44:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C44:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C44:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C44:6	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C24:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C26:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C28:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C30:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C30:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C32:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C32:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C32:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C32:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C34:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C34:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C34:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C34:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:6	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C38:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C38:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C38:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C38:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C38:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C38:6	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C40:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C40:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C40:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C40:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C40:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C40:6	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C42:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C42:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C42:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C42:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C42:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C42:6	AXYS MLM-001	MLM-001													Y																					
	Pimelylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Proline	AXYS MLM-001	MLM-001													Y																					
	Propenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Propionylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Putrescine	AXYS MLM-001	MLM-001													Y																					
	Sarcosine	AXYS MLM-001	MLM-001													Y																					
	Serine	AXYS MLM-001	MLM-001													Y																					

Accreditation Scope

AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev.23

				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	Serotonin	AXYS MLM-001	MLM-001													Y																					
	Spermidine	AXYS MLM-001	MLM-001													Y																					
	Spermine	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C16:0	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C16:1	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C18:0	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C18:1	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C20:2	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C22:3	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C24:0	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C24:1	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C26:0	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C26:1	AXYS MLM-001	MLM-001													Y																					
	Symmetric dimethylarginine	AXYS MLM-001	MLM-001													Y																					
	Taurine	AXYS MLM-001	MLM-001													Y																					
	taurochenodeoxycholic acid	AXYS MLM-001	MLM-001													Y																					
	taurocholic acid	AXYS MLM-001	MLM-001													Y																					
	taurodeoxycholic acid	AXYS MLM-001	MLM-001													Y																					
	taurolithocholic acid	AXYS MLM-001	MLM-001													Y																					
	tauroursodexoycholic acid	AXYS MLM-001	MLM-001													Y																					
	Tetradecadienylcarnitine	AXYS MLM-001	MLM-001													Y																					
	tetradecanoic acid (myristic acid)	AXYS MLM-001	MLM-001													Y																					
	Tetradecanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Tetradecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Threonine	AXYS MLM-001	MLM-001													Y																					
	Tiglylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Total dimethylarginine	AXYS MLM-001	MLM-001													Y																					
	Tryptophan	AXYS MLM-001	MLM-001													Y																					
	Tyrosine	AXYS MLM-001	MLM-001													Y																					
	ursodexoycholic acid	AXYS MLM-001	MLM-001													Y																					
	Valerylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Valine	AXYS MLM-001	MLM-001													Y																					
TBBPA	Tetrabromobisphenol A	AXYS MLA-079	MLA-079		Y																																

Note*
Analysis of pesticides and PCBs in non-potable water samples by AXYS method MLA-007, with the exception of NPDES or State permitted discharges and Stormwater applications, may fall within the scope of Washington State Department of Ecology solids matrix accreditation, subject to approval of the Ecology Project Manager.

Legend

BPA and mPE	Bisphenol A and mono-Phthalate Esters
HBCDD	Hexabromocyclododecane
OC Pesticides	Organochlorine Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PBDPE	Polybrominated diphenylethers
PCB	Polychlorinated Biphenyls
PCDDF	Polychlorinated dibenzodioxins/furans
PFC	Perfluorinated Compounds
PPCP	Pharmaceutical and Personal Care Products
TBBPA	Tetrabromobisphenol A
California DPH	California Department of Public Health, Lab ID 2911
Florida DOH	Florida Department of Health, Lab ID E871007, (NELAC Standard)
Pennsylvania DEP	Pennsylvania Departmnent of Environmental Protection
Minnesota DOH	Minnesota Department of Health, Lab ID 232-999-430, (NELAC Standard)
New Jersey DEP	New Jersey Department of Environmental Protection, Lab ID CANA005, (NELAC Standard)
New York DOH	New York Department of Health, Lab ID 11674, (NELAC Standard)
Washington DE	Washington Department of Ecology, Lab ID C404
Virginia DGS	Virginia Department of General Services, Division of Consolidated Laboratory Services, Lab ID 460224, (NELAC Standard)
Maine DOH	Maine Center for Disease Control and Prevention, Department of Health and Human Services, Lab ID CN00003
CALA	Canadian Association for Laboratory Accreditation Inc., Lab ID A2637, (ISO/IEC 17025:2005 Standard)
ANAB	ANSI-ASQ National Accreditation Board, certificate AT-1861, (ISO/IEC 17025:2005 Standard)

APPENDIX C

Deviations, Protocol, and Amendments

Deviations with Study Impact

None

Deviations with No Study Impact

The protocol specified that the methylene chloride would be stored refrigerated. Per the storage conditions on the bottle and the MSDS, the methylene chloride was stored ambient. The methylene chloride was stored as directed by the bottle label.

The protocol on pages 5 and 6 stated that Groups 1 and 3 diets would be prepared by initially incorporating test article (soil sample) into a small amount of diet in a bowl, mixing with a spoon, and then adding that to the remaining diet in a plastic bag. This step was skipped and the required amount of test article was instead added directly to the plastic bag containing the remaining amount of diet. Additionally, the vessel containing the test article was “rinsed” three times with a small amount of diet to capture soil particles which adhered to the sides of the vessel, with the rinsate being added to the plastic bag. The step of mixing in a bowl was not needed to produce diets with acceptable test article levels.

The protocol on page 7 stated that back-up formulation samples would be disposed of if not analyzed. Diets mixed on 23-Feb-2015 were remixed on 02-Mar-2015. Prior to remixing the back-up samples were added back into the diets in order to conserve diet. Group 2 diet was remixed a second time on 10-March-2015. Prior to re-mixing the back-up samples were added back into the diets in order to conserve diet. Back-up samples had been stored under the same conditions and in the same storage cabinet as the test diets were stored.

The protocol specified the weight range for the mice to be between 22-24 grams at the initiation of dosing. The weight range of the animals on Day 1, body weights collected prior to dosing, was 19.9-22.8 grams. Larger animals produce a sufficient quantity of urine to allow analysis for the presence of aromatic hydrocarbons. Though generally weighing less than the desired range, ample quantities of urine were produced and collected in each group on each day.

The protocol specified that animals were to be acclimated to the study room for a minimum of 7 days prior to initiation of dosing. Animals were acclimated to the initial study room for 42 days, however, on Day 3 all animals were moved to a different study room for the remainder of the study. Animals were acclimated to the facility during their 42 day acclimation period. The room the animals were moved to is in the same hallway as the original room.

Protocol

Study Title	Pilot Study; Laredo AFB : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice
Testing Facility	Ricerca Biosciences, LLC Drug Safety and Metabolism 7528 Auburn Road Concord OH 44077
Study Number	033244
ARCADIS Project Number	06262044.0000
Ricerca Document Number	033244-0
Compliance Status	Non-GLP
Version	Final

Responsible Personnel

Study Director:	Roger Hawks, Ph.D., DABT phone: 440-357-3744 facsimile: 440-357-3800 cell: 440-231-2535 email: roger.hawks@ricerca.com
Sponsor Contact:	Glenn Hoeger Arcadis, U.S., Inc. 1 South Church Avenue, Suite 1120 Tucson, Arizona 85701 Phone: 520-629-8282 facsimile: 520-620-6476 email: glenn.hoeger@arcadis-us.com

Sponsor-enlisted Contributing Scientist(s):

Dose Formulation Analysis:	Hoai Van, Ph.D. ALS Life Sciences 10450 Stancliff Rd, Suite 210 Houston, TX 77099 USA phone: 281-530-5656 email: Hoai.Van@alsglobal.com
Bioanalytical Analysis (Urine):	Million Woodneh AXYS Analytical Service, LTD. 2045 Mills Road, West, Sidney, BC Canada V8L 5X2 email: mwoodneh@axys.com phone: 250-655-5837

Supervisory Personnel:

Manager:	Roger Hawks, Ph.D, DABT
Attending Veterinarian:	Lou Turchyn, Ph.D., D.V.M.

Introduction

Objective(s)

The objective(s) of this study are to provide urine samples to analyze for the presence of polycyclic aromatic hydrocarbons (PAHs) in urine following offering to mice feed containing PAH-contaminated soil and solvent extracts of PAH-contaminated soil.

Sponsor

Arcadis U.S., Inc.
630 Plaza Drive, Suite 100
Highlands Ranch, CO
80129

Proposed Schedule of Events

Study Initiation:	Date protocol/study plan is signed by study director
Experimental Start:	February 23, 2015
First Day of Dosing:	March, 2015
Last Day of Dosing:	March, 2015
Experimental Completion:	The date the last subreport is signed.

Regulatory Compliance

This non-GLP study will be performed according to the protocol and testing facility standard operating procedures.

Test Article and Positive Control

Identification	Test Articles - Sieved soil; sieved soil extracts in methylene chloride.
	Positive Control - Benzo(a)pyrene B(a)P
Lot Numbers/Sample IDs	LAFB-BSS-0-0.5 CONTROL: Clean Soil Sample (Group 1)
	SLBG9477V: Benzo(a)pyrene B(a)P (Group 2)
	LAFB-BSS-0-0.5 02: Soil Test Article (Group 3)
	HS15010874-12, 13, 14: Soil Test Article Extract (Group 4)
	135146: Methylene chloride (vehicle for Group 2)
Purity/Correction Factor	Test articles and positive control will be used without a correction factor

Bulk Stability	Any available information about bulk stability of either the test articles or positive control will be included in the study file.
Storage Conditions	Positive control to be stored at ambient room temperature. Test article to be stored refrigerated at a target temperature of 2-8°C.
Characteristics	Any information methods, composition, or other characteristics that define the test article or positive control articles, which are supplied by the sponsor/manufacturer, will be included in the final report.
Safety	An MSDS or other suitable document will be provided for the Benzo(a)pyrene (B(a)P). Specific laboratory safety procedures will be employed when working with the positive control and test articles. A memo detailing safety procedures associated with this study has been generated, circulated, and placed in the study file.
Retention Sample	No retention sample will be collected.
Accountability	Maintained according to testing facility SOPs
Disposition	Disposition of the remaining test articles and positive control article will be specified in the final report.

Vehicle Components

Identification	No vehicle to be used for the sieved soil and extract. The B(a)P will be mixed with methylene chloride and then mixed into the diet with the methylene chloride subsequently evaporated with nitrogen.
Storage Conditions	Methylene chloride to be stored refrigerated at a target temperature of 2-8°C.
Characteristics	Any information methods, composition, or other characteristics that define the test article or positive control articles or vehicle, which are supplied by the sponsor/manufacturer, will be included in the final report.

Safety	An MSDS or other suitable document will be provided for methylene chloride. Specific laboratory safety procedures will be employed when working with the positive control and test articles. A memo detailing safety procedures associated with this study has been generated, circulated, and placed in the study file. .

Dose Formulation

Frequency of Preparation	All diets will be prepared once prior to dosing.
Procedures - General	Documented concentrations of B(a)P in soil and extract will be used to calculate PAH concentration in diet preparation (i.e. – B(a)P concentration is to be the proxy for PAH concentration). All calculations used to prepared diets will be provided to the Sponsor Contact for verification prior to diet preparation. Diet preparation will only proceed following approval of all calculations by Sponsor. Duration of mixing for each diet of each group will be recorded and will be a minimum of 15 minutes, with longer durations if deemed necessary. Care will be taken not to grind or otherwise crush soil test articles during mixing. Details of the procedures used will be recorded and included in the final report.
Procedures – General Instructions for Each Group	Sieved soil control test article (Group 1) - The appropriate amount of test article will be initially incorporated into a small amount of rodent meal using a bowl and mixing spoon followed by mixing with the remaining amount of meal for that batch in a plastic bag. Positive control test article (Group 2) - Thirty mLs stock solution contain B(a)P will be prepared. This stock solution will be added to 20 grams of NIH-31 diet to prepare a stock diet. An appropriate amount of stock diet will be added to NIH-31 to prepare positive control diet. Sieved soil test article (Group 3) - The appropriate

	amount of test article will be initially incorporated into a small amount of rodent meal using a bowl and mixing spoon followed by mixing with the remaining amount of meal for that batch in a plastic bag. Extract test article (Group 4) - The extract test article will be initially incorporated into diet by applying the total volume of extract in methylene chloride directly to small amount of rodent meal using a bowl and mixing spoon. The methylene chloride will be allowed to evaporate from the diet under a hood. The diet prepared as above will be considered a “Stock diet”. An appropriate amount of this stock diet will be mixed in a plastic bag with the remaining amount of meal for that batch to match the 10% (by weight) Soil Test Article diet concentration for B(a)P.
Storage Conditions	Test article and positive control diets to be stored refrigerated at 2-8° C.

Diet Formulation Analysis

Concentration and Homogeneity	The concentration will be determined for each test diet prepared. Prior to analysis, these samples will be stored under monitored refrigerated conditions at of 2-8°C. Duplicate samples will be collected (approximately 30 g each sample) from the top, middle, and bottom of each test diet preparation. One set of each of the above duplicate concentration samples will be shipped on with ice packs to the Contributing Scientist, Dose Formulation Analysis. The duplicate sets will be retained at a controlled temperature of 2-8°C as a backup at the Testing Facility (to be discarded or stored or shipped to Sponsor after satisfactory results have been obtained on the first set of samples).
Stability	Stability testing will not be performed.

General	Results from formulation analyses will be included in a dose formulation report, which will be included in the final study report. All remaining dose formulations will be properly discarded when the final dose formulation report is issued or will be shipped to the Sponsor or the Sponsor's designated laboratory.
Shipping Address:	Dose formulation samples will be sent to the following address: Dane Wacasey ALS Life Sciences 10450 Stancliff Rd, Suite 210 Houston, TX 77099 USA phone: 281-530-5656 email: Dane.Wacasey@alsglobal.com

Test System

Humane Care of Animals

Treatment of the animals (including but not limited to all husbandry, housing, and feeding conditions) will be conducted in accordance with the guidelines recommended in Guide for the Care and Use of Laboratory Animals (National Academy Press, Washington DC, 2011). Housing will also conform to the USDA Animal Welfare Act (9 CFR Parts 1, 2, and 3).

Species	mus musculus
Strain	B6C3F1
Source	Charles River Laboratories
History	The animals will be experimentally naïve.
Weight at Initiation of Dosing	Target of 22-24 grams
Number and Sex	16 females, plus 4 extra
Identification	An ear tag with a matching cage card will be used.

Justification	Mice are commonly used in safety evaluation studies that are accepted by appropriate regulatory agencies. The total number of animals used in this study was the minimum required to properly achieve study objectives. This determination was based on historically established conventions in the industry for this type of study.
Receipt and Acclimation	Animals will be received from their source and acclimated to the facility and husbandry conditions according to Facility SOPs. Prior to release to study, health status of the animals will be reviewed by a member of the veterinary staff. Data collected on animals prior to release to study will be maintained as facility records.
Housing/ Sanitation	Upon receipt, animals will be housed singly and in stainless steel wire bottom cages. Following randomization, animals will be housed four per cage, each group in a single cage, in Nalgene® metabolism cages. Animal room and cage cleaning will be performed according to testing facility SOPs.
Diet	Certified NIH-31 7017C diet as meal will be available ad libitum, except during protocol-specified periods of fasting. Analysis of diet has been performed by the manufacturer and has been certified to be within specifications.
Fasting	The animals will be fasted as noted in subsequent section(s) of the protocol for data-specific collection periods.
Water	Tap water filtered through a 0.22 µM PES filter will be available ad libitum while mice are in their home cage. Water to be filtered will be supplied by the City of Painesville and is routinely analyzed to monitor chemical and bacterial levels and to determine priority pollutants.
Contaminants	Results of the food and water analyses are reviewed periodically by a staff veterinarian or designee. No contaminants are known to be present in the food or water that may interfere with the results of the study.

Environment	Temperature: 68 – 79°F (20 – 26°C) Humidity: 30 – 70% Light: An alternating 12-hour light/dark cycle will be maintained, except during study-specific procedures. Addition or loss of time due to Daylight Savings time adjustments will not be considered as deviations. Ventilation: The airflow will be set for at least 10 air changes per hour with 100% fresh air (no air recirculation). The environmental conditions of the animal room will be monitored and documented.
Environmental Enrichment/ Supplements	Species-specific enrichment or supplements will be provided per facility SOPs.

Study Design

Randomization	Animals considered healthy and acceptable for study will be assigned to Study Groups using a computer-generated randomization procedure based on body weight. Control for siblings will be performed, if possible. Randomization into study groups will occur between Day -5 to -1. Animals not assigned to study groups will be allocated into a spare group. Spare animals will be released from study on or after Day 1.

Predose

Animals will be acclimated to the study room for a minimum of 7 days prior to initiation of dosing.

Animals may be acclimated to study-specific experimental procedures to identify animals which may exhibit increased levels of stress or resistance to the procedure.

Animals deemed unfit to receive test or control article based on predose data (including behavioral issues) will be removed from the study group and replaced by a spare animal.

Any predose data collected for selection of animals to be randomized to study will be maintained in the study files.

Treatment Groups and Dose Administration

The mice will be assigned to groups as shown in the table below. The first day of administration will be designated as Day 1 of the study.

Group Assignment and Dose Levels

Dose Group	Number of Animals (Female)	Test Article	Lot Number	Dose Level	
				Weight %	B(a)P
1	4	Sieved soil negative control	LAFB-BSS-0-0.5 CONTROL	10% (w/w) of diet	0 ppm
2	4	Benzo(a)pyrene (B(a)P) Positive control	SLBG9477V	Not Applicable	0.15 ppm
3	4	Sieved Soil	LAFB-BSS-0-0.5 02	10% (w/w) of diet	0.15 ppm
4	4	Extract of Sieved Soil	HS15010874-12, 13, 14	Not Applicable	0.15 ppm

Dose Administration

Dose Administration

Animals will receive the test or positive control article mixed in their diet for 14 consecutive days. All animals will be terminated the day following completion of dosing.

Route of Administration

All administrations will be given by the oral route as a diet admixture.

Justification of Route

This administration route is consistent with the

Dose Level Details	route of exposure used in “Technical Report for Experiment No. 6722: Chronic Bioassay of Two Composite Samples From Selected Manufactured Gas Plant Waste Sites”, Beland and Culp, 1998 Dosages for Groups 1, 3, and 4 are based on a 10% soil level in diet for the weight % aspect of the dose, and based on the B(a)P mass in parts per million (ppm) found in a 10% soil/diet mixture prepared using the test article (i.e.- soil) provided. Group 1 is a negative control group in which will soil which is known to not contain detectable residues of B(a)P is mixed with diet (animal feed) to 10% w/w. Group 2 is a positive control group in which diet is mixed with Benzo(a)pyrene (B(a)P) such that the B(a)P level in the diet is equivalent to the B(a)P level in the Group 3 diet. Group 3 will be soil which is known to contain detectable residues of PAH (polycyclic aromatic hydrocarbons) mixed with diet to 10% w/w. Group 4 will be solvent extracts of soil which is known to contain detectable residues of PAHs mixed with diet to achieve ppm levels of B(a)P which are equivalent to the B(a)P level in the Group 3 diet. Groups 2, 3, and 4 diets will thus be targeted to contain identical nominal ppm levels of B(a)P with the desired level of B(a)P in each diet matching that found in the Group 3 10% w/w diet).
Justification of Dose Levels	Dose levels were selected by the Study Director in agreement with the Sponsor and based on available data.
Justification of Frequency	The frequency of administration is conventional for studies of this type.

In-Life Observations and Measurements

Toxicity Animals

Clinical Observations	Daily cageside clinical observations will be performed twice daily at approximately the same time each day.
Detailed Clinical Observations	Detailed clinical observations will be performed prior to randomization.
General	Animals appearing to be in pain or distress will be brought to the attention of the Study Director and/or a staff veterinarian.
Body Weights	Body weights will be measured predose, as needed, to monitor animal body weights. Animal body weights at first dose of 22 to 24 grams will be targeted for use on study. Body weights will be measured predose for the purposes of randomization, and daily for the remainder of the in-life period.
Food Consumption	Quantitatively, once predose, and daily for the remainder of the in-life. Food consumption per cage will be divided by four obtain an average food consumption per animal.
Observations for Potential Fecal Contamination	Twice daily observations of the urine collection cups will be performed. Fecal contamination of collected urine will be recorded and feces will be removed if possible. Pictures will be taken daily of pooled urine.

Urine Collection

Sample Collection	Daily urine observations will be made from each cage (i.e. – urine volume and color photograph). The minimum volume of urine required for analysis is 4 milliliters (mL). The sponsor will be contacted on Day 4, and other days as necessary, to report trends in urine volumes for each test group. Any revisions to urine collection protocol will be agreed to prior to collection of urine samples for analysis on Day 7. Urine samples for analysis will be collected twice with targeted days being on Days 7 and 14, but the specific day may be changed based on discussion with the Sponsor. The specific days urine samples are collected for analysis will be recorded and reported. Urine samples will be stored frozen in a freezer set to maintain ≤-70 °C, in pre-labeled urine collection vials, until shipment to the analytical lab on Day 14. Samples will be shipped on ice packs. The volume of urine collected each day from each group/cage will be recorded and reported in the final study report. Should no urine be present in collection cups documentation will be made.

Euthanasia/Necropsy

Morbidity/ Mortality	Animals considered moribund will be euthanized by CO_2 overdose on the day the determination is made.

Unscheduled Necropsy	If an animal is found dead or is euthanized moribund following initiation of dosing, it will be necropsied. If necropsy personnel are not available at the time the animal is found dead or euthanized moribund, the carcass will be refrigerated until necropsy can be conducted. The gross necropsy will be conducted for the purpose of attempting to determine cause of death and will include examination of: All external surfaces and orifices Internal organs and tissues All abnormalities will be described and recorded
Scheduled Necropsy	Following collection of the final in-life samples, all surviving animals will be euthanized by CO_2 overdose and their carcasses will be frozen and retained by Ricerca for up to three months for possible future evaluation. After three months carcasses will be disposed of appropriately or will be shipped to the Sponsor.

Major Computer Systems/Software

The computer systems used on this study may include, but not be limited to, the following systems. All version numbers of the applications, as well as validation or qualification status, are maintained by Ricerca Biosciences, LLC, and will be presented in appropriate sections of the final report.

Application Name	Function
Siemens REMs Infocenter[V]	Archiving and reporting environmental records
Siemens REMs Insight[V]	Environmental data collection, monitoring and alarming of critical environments
Provantis	In-life test system data and statistical evaluation
Microsoft Office	Collection of word processing and spreadsheets used for report production
RATS	In-house system used to schedule study activities
SAS	Statistical analysis of data within Provantis system

Statistical Analysis

When appropriate, numeric animal data will be evaluated statistically. Data considered to be parametric (continuous data, typically with normal distributions) will be evaluated by analysis of variance (ANOVA) with $p \leq 0.05$. If significance exists, pairwise comparisons of each dose group with the control group will be made using a post hoc test, Bonferroni or Dunnett, ($p \leq 0.05$). to identify statistical differences between each dose level group and control values. Data considered to be non-parametric (discontinuous data or non-normally distributed) will be evaluated using a Kruskal-Wallis Test ($p \leq 0.05$) on ranked data for group significance. If significance exists, pairwise comparisons of each dose group with the control group will be made using a post hoc test Wilcoxon with Bonferroni-Holm adjustment, ($p \leq 0.05$).

Statistical evaluation may not be conducted for particular parameters if there is lack of sufficient data due to excess animal mortality or other pertinent factors.

Animal Care and Use Statement

The research described does not unnecessarily duplicate previous animal experiments and is being conducted in the absence of acceptable non-animal alternatives to accomplish its objectives. The protocol and any amendments or procedures involving the care or use of animals in this study will be reviewed and approved by Ricerca's Institutional Animal Care and Use Committee (IACUC) prior to the initiation of such procedures (i.e., prior to the start of the study for most protocol-specified procedures).

Palliative and Prophylactic Measures

The Study Director, in consultation with a staff veterinarian, may approve palliative and/or prophylactic treatment of animals. Under emergency situations, the Study Director authorizes a staff veterinarian to approve palliative and/or prophylactic treatments; under such circumstances the Study Director and Sponsor will be notified of treatment as soon as possible

Quality Assurance

This is a non-GLP study, and therefore no Quality Assurance audits will be conducted.

Sponsor Review

The Sponsor may send representatives to inspect the study and the premises during normal working hours during the course of the study and/or to review the raw data and the final report.

Protocol Changes and Deviations

Changes to the approved protocol will be in the form of amendments approved by the Study Director and the Sponsor Representative. Amendments will clearly describe the protocol changes and will include the effective date of the change and justification for the change. The Sponsor may authorize protocol changes by telephone or other electronic means when he/she cannot be physically present for signature. Protocol deviations will be noted in the study records and reported.

Records

Following completion of analysis and prior to completion of the final report the raw data and final report will be shipped to the Sponsor. Biological and formulation samples may be shipped to the Sponsor or destroyed.

External test sites will be responsible for archiving data produced at their own sites.

Reporting

The Study Director will prepare a final report of the study results. This report will include a comprehensive presentation of data, as well as interpretations of the data. The name and address of the facility conducting the study and dates on which the study was initiated and completed will be included in the report.

Approval for Study Initiation

Sponsor Contact

Date: February 23, 2015

Glenn C. Hoeger
Arcadis, U.S., Inc.

Study Director

Date: 23-Feb-15

Roger Hawks, Ph.D., DABT
Ricerca Biosciences, LLC

Testing Facility Management

Date: February 23, 2015

Drug Safety and Metabolism
Ricerca Biosciences, LLC

PROTOCOL AMENDMENT
Number One

Study Title

<u>Pilot Study; Laredo AFB</u> : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Study Number: **033244**

Page 1 of 4

Testing Facility:
Ricerca Biosciences, LLC
Drug Safety and Metabolism
7528 Auburn Road
Concord OH 44077

Additions/changes are in bold underlined text.
Deletions are in strike through.

Sponsor

Arcadis U.S., Inc.
630 Plaza Drive, Suite 100
Highlands Ranch, CO
80129

Page 2 of Final Protocol

Supervisory Personnel:

Manager:	Roger Hawks, Ph.D, DABT
Attending Veterinarian:	Lou Turchyn, ~~Ph.D.,~~ D.V.M.

Rationale

Dr. Turchyn does not have a Ph.D.

Page 13 of Final Protocol

Urine Collection

Sample Collection	Daily urine observations… until shipment to the analytical lab on Day 14. Samples will be shipped on **dry ice** ~~ice packs~~. The volume of urine collected each day from each group/cage will be recorded and reported in the final study report. Should no urine be present in collection cups documentation will be made.

Rationale

Dry ice rather than ice packs have been advised by the analytical laboratory performing the urine analysis.

Page 14 of Final Protocol

Euthanasia/Necropsy

Scheduled Necropsy	Following collection of the final in-life samples, all surviving animals will be euthanized by CO_2 overdose and their carcasses will be **appropriately disposed.** ~~frozen and retained by Ricerca for up to three months for possible future evaluation. After three months carcasses will be disposed of appropriately or will be shipped to the Sponsor~~.

Rationale

Retention of carcasses is no longer needed per the Sponsor.

Effective Date

The effective date is the date that the amendment is signed by the Study Director.

Protocol Amendment Approval

Sponsor Representative

Glenn C. Hoeger
Arcadis, Inc.

Date: 03/04/2015

Study Director

Roger Hawks, Ph.D., DABT
Ricerca Biosciences, LLC

Date: 4-March-2015

Testing Facility Management

Drug Safety and Metabolism
Ricerca Biosciences, LLC

Date: March 4, 2015

PROTOCOL AMENDMENT
Number Two

Study Title

<u>Pilot Study; Laredo AFB</u> : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Study Number: **033244**

Testing Facility:
Ricerca Biosciences, LLC
Drug Safety and Metabolism
7528 Auburn Road
Concord OH 44077

Additions/changes are in bold underlined text.
Deletions are in strike through.

Sponsor

Arcadis U.S., Inc.
630 Plaza Drive, Suite 100
Highlands Ranch, CO
80129

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Group Assignment and Dose Levels

Dose Group	Number of Animals (Female)	Test Article	Lot Number	Dose Level	
				Weight %	B(a)P
1	4	Sieved soil negative control	LAFB-BSS-0-0.5 CONTROL	10% (w/w) of diet	0 ppm
2	4	Benzo(a)pyrene (B(a)P) Positive control	SLBG9477V	Not Applicable	~~0.15 ppm~~ **0.67 ppm**
3	4	Sieved Soil	LAFB-BSS-0-0.5 02	10% (w/w) of diet	0.15 ppm
4	4	Extract of Sieved Soil	HS15010874-12, 13, 14	Not Applicable	0.15 ppm

Rationale

The targeted concentration of B(a)P is being increased after analytical chemistry data showed that diet prepared at the 0.15 ppm target were much lower than the target concentration. To account for apparent loss of B(a)P during the diet preparation process, B(a)P at a targeted level of 0.67 ppm is being added the Group 2 diet.

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Dose Level Details

Dosages for Groups 1, 3, and 4 are…

Group 2 is a positive control group in which diet is mixed with Benzo(a)pyrene (B(a)P) such that the B(a)P level in the diet is **targeted to be approximately 4.5 times** ~~equivalent to~~ the B(a)P level in the Group 3 diet.

Group 3 will be soil which is…
…that found in the Group 3 10% w/w diet).

Rationale

The targeted concentration of B(a)P is being increased after analytical chemistry data showed that diet prepared at the 0.15 ppm target were much lower than the target concentration. To account for apparent loss of B(a)P during the diet preparation process, B(a)P at a targeted level of 0.67 ppm is being added the

Page 13 of Final Protocol

Sample Collection	Daily urine observations will be made from each cage (i.e. – urine volume and color photograph). ~~The minimum volume of urine required for analysis is 4 milliliters (mL). The sponsor will be contacted on Day 4, and other days as necessary, to report trends in urine volumes for each test group. Any revisions to urine collection protocol will be agreed to prior to collection of urine samples for analysis on Day 7. Urine samples for analysis will be collected twice with targeted days being on Days 7 and 14, but the specific day may be changed based on discussion with the Sponsor. The specific days urine samples are collected for analysis will be recorded and reported.~~ Urine samples will be stored frozen in a freezer set to maintain ≤-70 °C, in pre-labeled urine collection vials, until shipment to the analytical lab on **<u>or after</u>** Day 14. Samples will be shipped on dry ice. The volume of urine collected each day from each group/cage will be recorded and reported in the final study report. Should no urine be present in collection cups documentation will be made.

Rationale

Shipping all samples collected has been decided to be a more appropriate course of action.

Effective Date

The effective date is the date that the amendment is signed by the Study Director.

Protocol Amendment Approval

Sponsor Representative

Glenn C. Hoeger
Arcadis, Inc.

Date: 03/11/2015

Study Director

Roger Hawks, Ph.D., DABT
Ricerca Biosciences, LLC

Date: 12-March-2015

Testing Facility Management

Drug Safety and Metabolism
Ricerca Biosciences, LLC

Date: March 12, 2015

PROTOCOL AMENDMENT
Number Three

Study Title

<u>Pilot Study; Laredo AFB</u> : Fourteen-Day Diet Mix of Soil and Soil Extracts in Mice

Study Number: **033244**

Page 1 of 4

Testing Facility:
Ricerca Biosciences, LLC
Drug Safety and Metabolism
7528 Auburn Road
Concord OH 44077

Additions/changes are in bold underlined text.
Deletions are in strike through.

Sponsor

Arcadis U.S., Inc.
630 Plaza Drive, Suite 100
Highlands Ranch, CO
80129

Page 2 of Final Protocol

Dose Formulation Analysis:

Hoai Van, Ph.D.
ALS Life Sciences
10450 Stancliff Rd, Suite 210
Houston, TX 77099 USA
phone: 281-530-5656
email: Hoai.Van@alsglobal.com

and

Million Woodneh
AXYS Analytical Service, LTD.
2045 Mills Road, West, Sidney, BC
Canada V8L 5X2
phone: 250-655-5837
email: mwoodneh@axys.com

Rationale

Sponsor requested that AXYS Analytical perform analysis of the diet mixtures prepared on this study.

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Shipping Address: **The initial set of d**~~D~~ose formulation samples will be sent to the following address:

Dane Wacasey
ALS Life Sciences
10450 Stancliff Rd, Suite 210
Houston, TX 77099 USA
phone: 281-530-5656
email: Dane.Wacasey@alsglobal.com

A second set of dose formulation samples will be sent to the following address:

Million Woodneh
AXYS Analytical Service, LTD.
2045 Mills Road, West, Sidney, BC
Canada V8L 5X2
email: mwoodneh@axys.com
phone: 250-655-5837

Rationale

Sponsor requested that AXYS Analytical perform analysis of the diet mixtures prepared on this study.

Effective Date

The effective date is the date that the amendment is signed by the Study Director.

Protocol Amendment Approval

Sponsor Representative

Glenn C. Hoeger
Arcadis, Inc.

Date: 06/17/2015

Study Director

Roger Hawks, Ph.D., DABT
Ricerca Biosciences, LLC

Date: 19-June-2015

Testing Facility Management

Drug Safety and Metabolism
Ricerca Biosciences, LLC

Date: 19 - June 2015

Appendix C

AXYS Diet Analytical Reports

AXYS | Axys Analytical Services Ltd
2045 Mills Road West
SIDNEY, BRITISH COLUMBIA, CANADA V8L 5X2
TEL 250-655-5800 FAX 250-655-5811
www.axysanalytical.com

AXYS Client No.: 4765

Client Address: ARCADIS U.S., Inc.
630 Plaza Drive, Suite 600
Highlands Ranch, CO, US, 80129

The AXYS contact for these data is Kirsten Anderson.

BATCH SUMMARY

Batch ID: WG51719	***Date:*** 17-Jul-2015
Analysis Type: PAH	***Matrix Type:*** Tissue

BATCH MAKEUP

Contract: 4765

Samples:

L23192-16	137 Top
L23437-1	57 Top
L23437-2	58 Middle
L23437-3	59 Bottom
L23437-4	60 Top
L23437-5	61 Middle
L23437-6	62 Bottom
L23437-7	63 Top
L23437-8	64 Middle
L23437-9	65 Bottom
L23437-10	66 Top
L23437-11	67 Middle
L23437-12	68 Bottom

Blank: WG51719-101

Reference or Spike: WG51719-102

Duplicate:

Comments:
1. Data are considered final.
2. Data are not blank corrected.

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February 1993

FQA-006 Rev. 2. 18-Jul-1994

AXYS METHOD MLA-021 Rev 12

Form 3A
INITIAL CALIBRATION RELATIVE RESPONSES

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 08-Jul-2015

Instrument ID: LR GC/MS

GC Column ID: RTX5

CS0 Data Filename: N/A

CS1 Data Filename: PH5U0282.D

CS2 Data Filename: PH5U0283.D

CS3 Data Filename: PH5U0284.D

CS4 Data Filename: PH5U0286.D

CS5 Data Filename: PH5U0285.D

CS6 Data Filename: N/A

		RELATIVE RESPONSE (RR)								
COMPOUND	**LAB FLAG [1]**	**CS0**	**CS1**	**CS2**	**CS3**	**CS4**	**CS5**	**CS6**	**MEAN RR**	**CV (%RSD)[2]**
Naphthalene			1.17	1.19	1.18	1.20	1.22		1.19	1.68
Acenaphthylene			1.19	1.22	1.22	1.24	1.27		1.23	2.31
Acenaphthene			0.67	0.69	0.69	0.72	0.72		0.70	3.13
Fluorene			0.76	0.74	0.76	0.78	0.82		0.77	3.90
Phenanthrene			1.18	1.18	1.18	1.19	1.21		1.19	1.15
Anthracene			1.12	1.14	1.17	1.18	1.22		1.17	3.29
Fluoranthene			1.34	1.39	1.41	1.43	1.45		1.40	2.96
Pyrene			1.41	1.46	1.47	1.47	1.46		1.45	1.75
Benz[a]anthracene			1.49	1.49	1.50	1.51	1.54		1.51	1.46
Chrysene			1.24	1.28	1.31	1.33	1.31		1.29	2.84
Benzo[b]fluoranthene			1.65	1.60	1.59	1.59	1.62		1.61	1.61
Benzo[j,k]fluoranthenes			1.17	1.25	1.24	1.26	1.25		1.24	2.86
Benzo[e]pyrene			1.27	1.32	1.37	1.38	1.38		1.35	3.58
Benzo[a]pyrene			1.27	1.33	1.38	1.42	1.43		1.37	4.78
Perylene			1.34	1.42	1.50	1.57	1.61		1.49	7.30
Dibenz[a,h]anthracene			1.48	1.49	1.60	1.68	1.72		1.59	6.80
Indeno[1,2,3-cd]pyrene			1.39	1.41	1.42	1.45	1.50		1.43	2.94
Benzo[ghi]perylene			1.34	1.40	1.42	1.47	1.51		1.43	4.47
2-Methylnaphthalene			1.26	1.28	1.27	1.29	1.32		1.28	1.63
2,6-Dimethylnaphthalene			1.26	1.26	1.26	1.28	1.29		1.27	1.13
2,3,5-Trimethylnaphthalene			1.06	1.08	1.08	1.12	1.15		1.10	3.39
1-Methylphenanthrene			0.77	0.77	0.80	0.86	0.88		0.82	5.84
Dibenzothiophene			1.19	1.20	1.20	1.22	1.23		1.21	1.14

(1) Where applicable, custom lab flags have been used on this report.
(2) QC limit is 20% for native compounds with a labeled analog, 35% for those without a labeled analog.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Simin Yassari_____

For Axys Internal Use Only [XSL Template: Form3A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: GENERIC-SPECS_PAH_LO_08-Jul-2015_PH5U__Form3A_GS60148.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 3B
INITIAL CALIBRATION RELATIVE RESPONSES

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 08-Jul-2015

Instrument ID: LR GC/MS

GC Column ID: RTX5

CS0 Data Filename: N/A

CS1 Data Filename: PH5U0282.D

CS2 Data Filename: PH5U0283.D

CS3 Data Filename: PH5U0284.D

CS4 Data Filename: PH5U0286.D

CS5 Data Filename: PH5U0285.D

CS6 Data Filename: N/A

		RELATIVE RESPONSE (RR)								
LABELED COMPOUND	**LAB FLAG [1]**	**CS0**	**CS1**	**CS2**	**CS3**	**CS4**	**CS5**	**CS6**	**MEAN RR**	**CV (%RSD)[2]**
Naphthalene d-8			1.83	1.81	1.82	1.78	1.77		1.80	1.43
2-Methylnaphthalene d-10			1.13	1.12	1.13	1.11	1.10		1.12	0.96
2,6-Dimethylnaphthalene d-12			0.97	0.97	0.97	0.98	0.98		0.97	0.44
Acenaphthylene d-8			1.90	1.90	1.88	1.81	1.88		1.87	2.01
Dibenzothiophene d-8			0.92	0.91	0.92	0.90	0.91		0.91	0.70
Phenanthrene d-10			0.94	0.95	0.95	0.93	0.93		0.94	1.09
Fluoranthene d-10			0.93	0.90	0.93	0.92	0.93		0.92	1.15
Benzo[a]anthracene d-12			0.81	0.79	0.80	0.81	0.81		0.80	0.99
Chrysene d-12			0.96	0.95	0.96	0.97	0.99		0.97	1.51
Benzo[b]fluoranthene d-12			0.89	0.89	0.88	0.89	0.90		0.89	0.94
Benzo[k]fluoranthene d-12			1.17	1.16	1.20	1.24	1.30		1.21	4.66
Benzo[a]pyrene d-12			0.95	0.94	0.95	0.97	1.01		0.96	2.78
Perylene d-12			0.85	0.84	0.85	0.87	0.88		0.86	1.74
Dibenzo[a,h]anthracene d-14			0.76	0.75	0.76	0.78	0.81		0.77	2.79
Indeno[1,2,3-cd]pyrene d-12			0.93	0.89	0.91	0.93	0.92		0.92	1.63
Benzo[ghi]perylene d-12			0.98	0.99	0.99	1.02	1.03		1.00	2.20

(1) Where applicable, custom lab flags have been used on this report.
(2) QC limit is 35% for labeled compounds.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Simin Yassari_____

For Axys Internal Use Only [XSL Template: Form3B.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: GENERIC-SPECS_PAH_LO_08-Jul-2015_PH5U__Form3B_GS60148.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 3C
INITIAL CALIBRATION ION ABUNDANCE RATIOS

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 08-Jul-2015

Instrument ID: LR GC/MS

GC Column ID: RTX5

CS0 Data Filename: N/A

CS1 Data Filename: PH5U0282.D

CS2 Data Filename: PH5U0283.D

CS3 Data Filename: PH5U0284.D

CS4 Data Filename: PH5U0286.D

CS5 Data Filename: PH5U0285.D

CS6 Data Filename: N/A

COMPOUND	LAB FLAG [1]	M/Z's FORMING RATIO	ION ABUNDANCE RATIO CS0	CS1	CS2	CS3	CS4	CS5	CS6
Naphthalene		**128,102**		0.07	0.06	0.06	0.06	0.06	
Acenaphthylene		**152,151**		0.19	0.20	0.19	0.19	0.19	
Acenaphthene		**154,153**		1.11	1.11	1.12	1.12	1.12	
Fluorene		**166,165**		0.94	0.98	0.97	0.97	0.97	
Phenanthrene		**178,176**		0.19	0.18	0.19	0.19	0.19	
Anthracene		**178,176**		0.18	0.18	0.18	0.18	0.18	
Fluoranthene		**202,200**		0.20	0.20	0.20	0.20	0.20	
Pyrene		**202,200**		0.21	0.20	0.20	0.20	0.20	
Benz[a]anthracene		**228,226**		0.25	0.25	0.26	0.26	0.26	
Chrysene		**228,226**		0.29	0.28	0.29	0.29	0.29	
Benzo[b]fluoranthene		**252,253**		0.24	0.23	0.21	0.22	0.21	
Benzo[j,k]fluoranthenes		**252,253**		0.23	0.21	0.21	0.21	0.21	
Benzo[e]pyrene		**252,253**		0.22	0.21	0.21	0.22	0.21	
Benzo[a]pyrene		**252,253**		0.21	0.21	0.21	0.22	0.22	
Perylene		**252,253**		0.23	0.21	0.21	0.21	0.21	
Dibenz[a,h]anthracene		**278,139**		0.14	0.13	0.14	0.14	0.14	
Indeno[1,2,3-cd]pyrene		**276,138**		0.24	0.20	0.18	0.18	0.18	
Benzo[ghi]perylene		**276,138**		0.19	0.20	0.19	0.19	0.19	
2-Methylnaphthalene		**142,141**		0.85	0.87	0.87	0.87	0.87	
2,6-Dimethylnaphthalene		**156,141**		0.66	0.65	0.66	0.66	0.66	
2,3,5-Trimethylnaphthalene		**170,155**		0.85	0.87	0.87	0.87	0.87	
1-Methylphenanthrene		**192,191**		0.57	0.56	0.58	0.58	0.58	
Dibenzothiophene		**184,152**		0.08	0.08	0.08	0.08	0.08	

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Simin Yassari_____

For Axys Internal Use Only [XSL Template: Form3C.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: GENERIC-SPECS_PAH_LO_08-Jul-2015_PH5U__Form3C_GS60148.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 3D
INITIAL CALIBRATION ION ABUNDANCE RATIOS

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 08-Jul-2015

Instrument ID: LR GC/MS

GC Column ID: RTX5

CS0 Data Filename: N/A

CS1 Data Filename: PH5U0282.D

CS2 Data Filename: PH5U0283.D

CS3 Data Filename: PH5U0284.D

CS4 Data Filename: PH5U0286.D

CS5 Data Filename: PH5U0285.D

CS6 Data Filename: N/A

LABELED COMPOUND	LAB FLAG[1]	M/Z's FORMING RATIO	ION ABUNDANCE RATIO CS0	CS1	CS2	CS3	CS4	CS5	CS6
Naphthalene d-8		**136,134**		0.09	0.09	0.09	0.09	0.09	
2-Methylnaphthalene d-10		**152,151**		0.17	0.17	0.17	0.17	0.17	
2,6-Dimethylnaphthalene d-12		**168,150**		0.74	0.73	0.74	0.73	0.73	
Acenaphthylene d-8		**160,158**		0.15	0.15	0.15	0.15	0.15	
Dibenzothiophene d-8		**192,160**		0.08	0.08	0.08	0.08	0.08	
Phenanthrene d-10		**188,184**		0.14	0.14	0.14	0.14	0.14	
Fluoranthene d-10		**212,208**		0.17	0.16	0.17	0.17	0.17	
Benzo[a]anthracene d-12		**240,236**		0.24	0.24	0.25	0.24	0.24	
Chrysene d-12		**240,236**		0.27	0.26	0.27	0.27	0.26	
Benzo[b]fluoranthene d-12		**264,260**		0.21	0.21	0.21	0.21	0.21	
Benzo[k]fluoranthene d-12		**264,260**		0.20	0.20	0.20	0.20	0.20	
Benzo[a]pyrene d-12		**264,260**		0.20	0.20	0.20	0.20	0.20	
Perylene d-12		**264,260**		0.25	0.26	0.26	0.26	0.26	
Dibenzo[a,h]anthracene d-14		**292,288**		0.32	0.33	0.33	0.32	0.34	
Indeno[1,2,3-cd]pyrene d-12		**288,284**		0.18	0.18	0.18	0.18	0.18	
Benzo[ghi]perylene d-12		**288,284**		0.19	0.20	0.20	0.19	0.20	

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Simin Yassari_____

For Axys Internal Use Only [XSL Template: Form3D.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: GENERIC-SPECS_PAH_LO_08-Jul-2015_PH5U__Form3D_GS60148.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 4A
CALIBRATION VERIFICATION

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date:	08-Jul-2015	**VER Data Filename:**	PH5U0291.D
Instrument ID:	LR GC/MS	**Analysis Date:**	13-Jul-2015
GC Column ID:	RTX5	**Analysis Time:**	09:04:00

COMPOUND	CAS NO.	LAB FLAG [1]	m/e ION CHANNELS	ION ABUND. RATIO	QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene	91-20-3		128,102	0.07	0.06-0.08	1940	1470-2450
Acenaphthylene	208-96-8		152,151	0.19	0.15-0.23	1960	1480-2470
Acenaphthene	83-32-9		154,153	1.11	0.89-1.33	2060	1490-2490
Fluorene	86-73-7		166,165	0.97	0.78-1.16	1910	1460-2440
Phenanthrene	85-01-8		178,176	0.19	0.15-0.23	1960	1480-2470
Anthracene	120-12-7		178,176	0.18	0.14-0.22	1970	1490-2480
Fluoranthene	206-44-0		202,200	0.20	0.16-0.24	1980	1490-2480
Pyrene	129-00-0		202,200	0.20	0.16-0.24	1900	1470-2440
Benz[a]anthracene	56-55-3		228,226	0.26	0.21-0.31	1890	1470-2460
Chrysene	218-01-9		228,226	0.29	0.23-0.35	1950	1490-2480
Benzo[b]fluoranthene	205-99-2		252,253	0.22	0.18-0.26	1870	1480-2470
Benzo[j,k]fluoranthenes			252,253	0.21	0.17-0.25	1930	1480-2460
Benzo[e]pyrene	192-97-2		252,253	0.22	0.18-0.26	1950	1490-2490
Benzo[a]pyrene	50-32-8		252,253	0.21	0.17-0.25	1970	1490-2480
Perylene	198-55-0		252,253	0.21	0.17-0.25	1990	1490-2490
Dibenz[a,h]anthracene	53-70-3		278,139	0.13	0.08-0.18	1950	1490-2490
Indeno[1,2,3-cd]pyrene	193-39-5		276,138	0.17	0.11-0.23	1880	1480-2460
Benzo[ghi]perylene	191-24-2		276,138	0.18	0.12-0.24	1920	1480-2460
2-Methylnaphthalene	91-57-6		142,141	0.87	0.70-1.04	2000	1530-2550
2,6-Dimethylnaphthalene	581-42-0		156,141	0.65	0.52-0.78	1960	1500-2500
2,3,5-Trimethylnaphthalene	2245-38-7		170,155	0.86	0.69-1.03	1970	1460-2440
1-Methylphenanthrene	832-69-9		192,191	0.58	0.46-0.70	1650	1220-2030
Dibenzothiophene	132-65-0		184,152	0.08	0.06-0.10	1970	1500-2500

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Simin Yassari_____

For Axys Internal Use Only [XSL Template: Pest4A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: GENERIC-SPECS_PAH_LO_PH5U0291.D__Form4A_SJ1908840.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 4B
CALIBRATION VERIFICATION

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date:	08-Jul-2015	**VER Data Filename:**	PH5U0291.D
Instrument ID:	LR GC/MS	**Analysis Date:**	13-Jul-2015
GC Column ID:	RTX5	**Analysis Time:**	09:04:00

LABELED COMPOUND	CAS NO.	LAB FLAG [1]	m/e ION CHANNELS	ION ABUND. RATIO	QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene d-8	1146-65-2		136,134	0.09	0.07-0.11	2030	1500-2500
2-Methylnaphthalene d-10	7297-45-2		152,151	0.17	0.14-0.20	2030	1500-2500
2,6-Dimethylnaphthalene d-12	350820-12-1		168,150	0.73	0.58-0.88	2050	1510-2520
Acenaphthylene d-8	93951-97-4		160,158	0.15	0.12-0.18	1910	1500-2500
Dibenzothiophene d-8	33262-29-2		192,160	0.08	0.06-0.10	1940	1510-2510
Phenanthrene d-10	1517-22-2		188,184	0.14	0.11-0.17	1990	1510-2510
Fluoranthene d-10	93951-69-0		212,208	0.17	0.14-0.20	2010	1500-2510
Benzo[a]anthracene d-12	1718-53-2		240,236	0.24	0.19-0.29	1990	1500-2500
Chrysene d-12	1719-03-5		240,236	0.26	0.21-0.31	1980	1500-2500
Benzo[b]fluoranthene d-12	93951-98-5		264,260	0.21	0.17-0.25	2050	1520-2530
Benzo[k]fluoranthene d-12	93952-01-3		264,260	0.20	0.16-0.24	2050	1500-2510
Benzo[a]pyrene d-12	63466-71-7		264,260	0.20	0.16-0.24	2030	1500-2510
Perylene d-12	1520-96-3		264,260	0.25	0.20-0.30	2050	1510-2510
Dibenzo[a,h]anthracene d-14	13250-98-1		292,288	0.31	0.20-0.42	2130	1500-2500
Indeno[1,2,3-cd]pyrene d-12	203578-33-0		288,284	0.18	0.12-0.24	2060	1500-2500
Benzo[ghi]perylene d-12	93951-66-7		288,284	0.19	0.12-0.26	2060	1500-2510

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Simin Yassari_____

For Axys Internal Use Only [XSL Template: Pest4B.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: GENERIC-SPECS_PAH_LO_PH5U0291.D__Form4B_SJ1908840.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 4A
CALIBRATION VERIFICATION

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date:	08-Jul-2015	**VER Data Filename:**	PH5U0305.D
Instrument ID:	LR GC/MS	**Analysis Date:**	13-Jul-2015
GC Column ID:	RTX5	**Analysis Time:**	19:32:00

COMPOUND	CAS NO.	LAB FLAG [1]	m/e ION CHANNELS	ION ABUND. RATIO	QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene	91-20-3		128,102	0.06	0.05-0.07	1940	1470-2450
Acenaphthylene	208-96-8		152,151	0.19	0.15-0.23	1980	1480-2470
Acenaphthene	83-32-9		154,153	1.12	0.90-1.34	2080	1490-2490
Fluorene	86-73-7		166,165	0.97	0.78-1.16	1950	1460-2440
Phenanthrene	85-01-8		178,176	0.19	0.15-0.23	1950	1480-2470
Anthracene	120-12-7		178,176	0.18	0.14-0.22	1960	1490-2480
Fluoranthene	206-44-0		202,200	0.20	0.16-0.24	1980	1490-2480
Pyrene	129-00-0		202,200	0.20	0.16-0.24	1900	1470-2440
Benz[a]anthracene	56-55-3		228,226	0.26	0.21-0.31	1910	1470-2460
Chrysene	218-01-9		228,226	0.29	0.23-0.35	1960	1490-2480
Benzo[b]fluoranthene	205-99-2		252,253	0.22	0.18-0.26	1880	1480-2470
Benzo[j,k]fluoranthenes			252,253	0.21	0.17-0.25	1910	1480-2460
Benzo[e]pyrene	192-97-2		252,253	0.21	0.17-0.25	1980	1490-2490
Benzo[a]pyrene	50-32-8		252,253	0.21	0.17-0.25	2010	1490-2480
Perylene	198-55-0		252,253	0.21	0.17-0.25	2020	1490-2490
Dibenz[a,h]anthracene	53-70-3		278,139	0.13	0.08-0.18	1960	1490-2490
Indeno[1,2,3-cd]pyrene	193-39-5		276,138	0.16	0.10-0.22	1920	1480-2460
Benzo[ghi]perylene	191-24-2		276,138	0.18	0.12-0.24	1970	1480-2460
2-Methylnaphthalene	91-57-6		142,141	0.87	0.70-1.04	2000	1530-2550
2,6-Dimethylnaphthalene	581-42-0		156,141	0.65	0.52-0.78	1960	1500-2500
2,3,5-Trimethylnaphthalene	2245-38-7		170,155	0.86	0.69-1.03	1990	1460-2440
1-Methylphenanthrene	832-69-9		192,191	0.58	0.46-0.70	1650	1220-2030
Dibenzothiophene	132-65-0		184,152	0.08	0.06-0.10	1950	1500-2500

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Simin Yassari_____

For Axys Internal Use Only [XSL Template: Pest4A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: GENERIC-SPECS_PAH_LO_PH5U0305.D__Form4A_SJ1909422.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 4B
CALIBRATION VERIFICATION

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date:	08-Jul-2015	**VER Data Filename:**	PH5U0305.D
Instrument ID:	LR GC/MS	**Analysis Date:**	13-Jul-2015
GC Column ID:	RTX5	**Analysis Time:**	19:32:00

LABELED COMPOUND	CAS NO.	LAB FLAG [1]	m/e ION CHANNELS	ION ABUND. RATIO	QC LIMITS	CONC. FOUND (ng/mL)	CONC. RANGE (ng/mL)
Naphthalene d-8	1146-65-2		136,134	0.09	0.07-0.11	1970	1500-2500
2-Methylnaphthalene d-10	7297-45-2		152,151	0.17	0.14-0.20	1970	1500-2500
2,6-Dimethylnaphthalene d-12	350820-12-1		168,150	0.72	0.58-0.86	2020	1510-2520
Acenaphthylene d-8	93951-97-4		160,158	0.15	0.12-0.18	1890	1500-2500
Dibenzothiophene d-8	33262-29-2		192,160	0.08	0.06-0.10	1990	1510-2510
Phenanthrene d-10	1517-22-2		188,184	0.14	0.11-0.17	2020	1510-2510
Fluoranthene d-10	93951-69-0		212,208	0.17	0.14-0.20	2040	1500-2510
Benzo[a]anthracene d-12	1718-53-2		240,236	0.24	0.19-0.29	1990	1500-2500
Chrysene d-12	1719-03-5		240,236	0.26	0.21-0.31	2030	1500-2500
Benzo[b]fluoranthene d-12	93951-98-5		264,260	0.21	0.17-0.25	2000	1520-2530
Benzo[k]fluoranthene d-12	93952-01-3		264,260	0.20	0.16-0.24	2090	1500-2510
Benzo[a]pyrene d-12	63466-71-7		264,260	0.20	0.16-0.24	2010	1500-2510
Perylene d-12	1520-96-3		264,260	0.25	0.20-0.30	2030	1510-2510
Dibenzo[a,h]anthracene d-14	13250-98-1		292,288	0.33	0.21-0.45	2090	1500-2500
Indeno[1,2,3-cd]pyrene d-12	203578-33-0		288,284	0.18	0.12-0.24	1990	1500-2500
Benzo[ghi]perylene d-12	93951-66-7		288,284	0.19	0.12-0.26	1980	1500-2510

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Simin Yassari_____

For Axys Internal Use Only [XSL Template: Pest4B.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: GENERIC-SPECS_PAH_LO_PH5U0305.D__Form4B_SJ1909422.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
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Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23192-16 R
Matrix:	TISSUE	**Sample Size:**	2.07 g (wet)
Sample Receipt Date:	13-May-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 13:09:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0296.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	6.29

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	4.13	0.394 (S)	0.07	1.006
Acenaphthylene	208-96-8	K J	0.347	0.312 (S)	0.39	1.003
Acenaphthene	83-32-9	J	1.04	0.482 (S)	1.24	1.048
Fluorene	86-73-7	B J	0.591	0.275 (S)	0.98	0.844
Phenanthrene	85-01-8		15.7	0.184 (S)	0.18	1.004
Anthracene	120-12-7	J	2.18	0.187 (S)	0.18	1.012
Fluoranthene	206-44-0		44.2	0.123 (S)	0.19	1.002
Pyrene	129-00-0		39.0	0.118 (S)	0.19	1.033
Benz[a]anthracene [3]	56-55-3		24.6	0.0850 (S)	0.26	1.003
Chrysene [4]	218-01-9		29.1	0.0763 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		32.5	0.216 (S)	0.23	1.004
Benzo[j,k]fluoranthenes			25.4	0.230 (S)	0.24	1.003
Benzo[e]pyrene	192-97-2		21.1	0.284 (S)	0.22	0.995
Benzo[a]pyrene	50-32-8		27.3	0.280 (S)	0.23	1.004
Perylene	198-55-0	J	8.06	0.300 (S)	0.21	1.004
Dibenz[a,h]anthracene [5]	53-70-3	J	4.62	0.314 (S)	0.11	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		26.1	0.174 (S)	0.21	1.002
Benzo[ghi]perylene	191-24-2		22.6	0.153 (S)	0.18	1.002
2-Methylnaphthalene	91-57-6	B J	5.08	0.484 (S)	0.95	1.010
2,6-Dimethylnaphthalene	581-42-0	U		0.682 (S)		
2,3,5-Trimethylnaphthalene	2245-38-7	K J	1.64	0.656 (S)	0.55	1.235
1-Methylphenanthrene	832-69-9	J	1.15	0.253 (S)	0.57	1.112
Dibenzothiophene	132-65-0	B J	0.650	0.132 (S)	0.08	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23192-16_Form1A_PH5U0296.D_SJ1910257.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
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Sample Collection:
N/A

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23192-16 R
Matrix:	TISSUE	**Sample Size:**	2.07 g (wet)
Sample Receipt Date:	13-May-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 13:09:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0296.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	6.29

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	808	40.4	0.09	0.602
2-Methylnaphthalene d-10		2000	865	43.3	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	918	45.6	0.72	0.895
Acenaphthylene d-8		2000	902	45.1	0.15	0.961
Dibenzothiophene d-8		2010	1310	65.1	0.08	0.791
Phenanthrene d-10		2010	1450	72.0	0.14	0.807
Fluoranthene d-10		2010	1600	79.8	0.16	0.971
Benzo[a]anthracene d-12		2000	1710	85.5	0.24	1.165
Chrysene d-12		2000	1800	90.1	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1710	84.8	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1670	83.2	0.20	0.962
Benzo[a]pyrene d-12		2010	1740	86.6	0.19	1.009
Perylene d-12		2010	1790	88.9	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1800	89.8	0.29	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1640	82.0	0.18	1.207
Benzo[ghi]perylene d-12		2010	1770	88.1	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23192-16_Form2_PH5U0296.D_SJ1910257.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
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Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-1
Matrix:	TISSUE	**Sample Size:**	2.09 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 14:18:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0298.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	8.38

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	3.56	0.261 (S)	0.07	1.007
Acenaphthylene	208-96-8	K J	0.529	0.137 (S)	0.36	1.003
Acenaphthene	83-32-9	J	0.795	0.357 (S)	1.22	1.048
Fluorene	86-73-7	B J	0.775	0.168 (S)	1.03	0.845
Phenanthrene	85-01-8	B J	5.82	0.101 (S)	0.16	1.004
Anthracene	120-12-7	J	0.543	0.102 (S)	0.18	1.012
Fluoranthene	206-44-0	J	7.91	0.0783 (S)	0.18	1.002
Pyrene	129-00-0	J	8.78	0.0756 (S)	0.21	1.033
Benz[a]anthracene [3]	56-55-3	J	4.52	0.110 (S)	0.26	1.003
Chrysene [4]	218-01-9	J	6.20	0.0938 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2	J	6.50	0.268 (S)	0.25	1.004
Benzo[j,k]fluoranthenes		J	5.17	0.267 (S)	0.22	1.002
Benzo[e]pyrene	192-97-2	J	6.24	0.328 (S)	0.20	0.996
Benzo[a]pyrene	50-32-8	J	6.40	0.323 (S)	0.25	1.004
Perylene	198-55-0	J	2.22	0.360 (S)	0.21	1.004
Dibenz[a,h]anthracene [5]	53-70-3	J	1.43	0.587 (S)	0.16	1.003
Indeno[1,2,3-cd]pyrene	193-39-5	J	7.35	0.564 (S)	0.21	1.002
Benzo[ghi]perylene	191-24-2	J	8.24	0.490 (S)	0.20	1.002
2-Methylnaphthalene	91-57-6	B J	3.17	0.300 (S)	0.89	1.010
2,6-Dimethylnaphthalene	581-42-0	J	0.841	0.346 (S)	0.63	1.012
2,3,5-Trimethylnaphthalene	2245-38-7	J	0.966	0.400 (S)	0.77	1.235
1-Methylphenanthrene	832-69-9	J	0.558	0.285 (S)	0.62	1.112
Dibenzothiophene	132-65-0	K B J	0.266	0.120 (S)	0.20	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-1_Form1A_PH5U0298.D_SJ1910258.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
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Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-1
Matrix:	TISSUE	**Sample Size:**	2.09 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 14:18:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0298.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	8.38

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	1130	56.7	0.09	0.602
2-Methylnaphthalene d-10		2000	1250	62.7	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1340	66.5	0.72	0.895
Acenaphthylene d-8		2000	1310	65.6	0.15	0.961
Dibenzothiophene d-8		2010	1440	71.5	0.08	0.791
Phenanthrene d-10		2010	1560	77.6	0.14	0.807
Fluoranthene d-10		2010	1520	75.8	0.17	0.971
Benzo[a]anthracene d-12		2000	1580	78.8	0.24	1.165
Chrysene d-12		2000	1650	82.3	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1430	70.8	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1480	74.0	0.19	0.962
Benzo[a]pyrene d-12		2010	1550	77.2	0.19	1.009
Perylene d-12		2010	1530	76.2	0.25	1.024
Dibenzo[a,h]anthracene d-14		2000	1290	64.3	0.31	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1360	68.1	0.18	1.207
Benzo[ghi]perylene d-12		2010	1490	74.4	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-1_Form2_PH5U0298.D_SJ1910258.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
58 Middle
Sample Collection:
23-Jun-2015

Form 1A
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-2
Matrix:	TISSUE	**Sample Size:**	1.97 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 15:07:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0299.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	6.08

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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	3.27	0.280 (S)	0.06	1.006
Acenaphthylene	208-96-8	J	0.437	0.243 (S)	0.23	1.003
Acenaphthene	83-32-9	J	0.815	0.557 (S)	1.30	1.048
Fluorene	86-73-7	B J	0.797	0.382 (S)	0.95	0.844
Phenanthrene	85-01-8	B J	5.16	0.151 (S)	0.20	1.004
Anthracene	120-12-7	K J	0.459	0.154 (S)	0.31	1.012
Fluoranthene	206-44-0	J	8.02	0.143 (S)	0.21	1.002
Pyrene	129-00-0	J	8.57	0.138 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3	J	6.24	0.204 (S)	0.26	1.003
Chrysene [4]	218-01-9	J	7.90	0.178 (S)	0.28	1.003
Benzo[b]fluoranthene	205-99-2	J	10.4	0.197 (S)	0.21	1.004
Benzo[j,k]fluoranthenes		K J	7.31	0.197 (S)	0.27	1.002
Benzo[e]pyrene	192-97-2	J	7.31	0.250 (S)	0.22	0.996
Benzo[a]pyrene	50-32-8	J	8.59	0.246 (S)	0.22	1.004
Perylene	198-55-0	K J	3.19	0.273 (S)	0.14	1.004
Dibenz[a,h]anthracene [5]	53-70-3	J	1.72	0.375 (S)	0.12	1.003
Indeno[1,2,3-cd]pyrene	193-39-5	J	8.54	0.273 (S)	0.22	1.002
Benzo[ghi]perylene	191-24-2	J	8.45	0.240 (S)	0.15	1.002
2-Methylnaphthalene	91-57-6	B J	2.80	0.368 (S)	0.91	1.010
2,6-Dimethylnaphthalene	581-42-0	J	0.824	0.577 (S)	0.74	1.012
2,3,5-Trimethylnaphthalene	2245-38-7	K J	0.954	0.495 (S)	0.63	1.229
1-Methylphenanthrene	832-69-9	K J	0.446	0.269 (S)	0.82	1.112
Dibenzothiophene	132-65-0	K B J	0.356	0.101 (S)	0.05	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-2_Form1A_PH5U0299.D_SJ1910259.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
58 Middle
Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-2
Matrix:	TISSUE	**Sample Size:**	1.97 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 15:07:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0299.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	6.08

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LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	1030	51.7	0.09	0.602
2-Methylnaphthalene d-10		2000	1110	55.5	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1150	57.0	0.72	0.895
Acenaphthylene d-8		2000	1130	56.7	0.15	0.961
Dibenzothiophene d-8		2010	1320	65.8	0.08	0.791
Phenanthrene d-10		2010	1440	71.6	0.14	0.807
Fluoranthene d-10		2010	1470	73.5	0.17	0.971
Benzo[a]anthracene d-12		2000	1560	78.0	0.24	1.165
Chrysene d-12		2000	1630	81.6	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1550	76.8	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1580	78.7	0.19	0.962
Benzo[a]pyrene d-12		2010	1620	81.0	0.19	1.009
Perylene d-12		2010	1620	80.4	0.25	1.024
Dibenzo[a,h]anthracene d-14		2000	1640	81.8	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1530	76.4	0.18	1.207
Benzo[ghi]perylene d-12		2010	1640	81.7	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-2_Form2_PH5U0299.D_SJ1910259.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
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Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.		06262044.0000	
Contract No.:	4765	**Lab Sample I.D.:**	L23437-3
Matrix:	TISSUE	**Sample Size:**	1.96 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 15:56:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0300.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	6.52

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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	3.70	0.341 (S)	0.07	1.007
Acenaphthylene	208-96-8	K J	0.476	0.142 (S)	0.55	1.003
Acenaphthene	83-32-9	J	0.967	0.433 (S)	1.01	1.048
Fluorene	86-73-7	B J	0.651	0.134 (S)	0.96	0.844
Phenanthrene	85-01-8	B J	5.07	0.180 (S)	0.20	1.004
Anthracene	120-12-7	J	0.478	0.183 (S)	0.21	1.012
Fluoranthene	206-44-0	J	6.01	0.0926 (S)	0.19	1.002
Pyrene	129-00-0	J	6.88	0.0893 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3	K J	3.28	0.164 (S)	0.19	1.003
Chrysene [4]	218-01-9	J	3.91	0.140 (S)	0.31	1.003
Benzo[b]fluoranthene	205-99-2	J	3.21	0.228 (S)	0.24	1.004
Benzo[j,k]fluoranthenes		J	2.22	0.226 (S)	0.24	1.002
Benzo[e]pyrene	192-97-2	J	2.71	0.293 (S)	0.24	0.995
Benzo[a]pyrene	50-32-8	J	3.14	0.288 (S)	0.21	1.004
Perylene	198-55-0	J	1.15	0.309 (S)	0.19	1.004
Dibenz[a,h]anthracene [5]	53-70-3	K J	0.532	0.374 (S)	0.26	1.003
Indeno[1,2,3-cd]pyrene	193-39-5	K B J	3.57	0.228 (S)	0.48	1.002
Benzo[ghi]perylene	191-24-2	J	3.10	0.206 (S)	0.23	1.002
2-Methylnaphthalene	91-57-6	B J	3.14	0.317 (S)	0.84	1.010
2,6-Dimethylnaphthalene	581-42-0	J	0.787	0.422 (S)	0.69	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	J	1.41	0.698 (S)	0.72	1.235
1-Methylphenanthrene	832-69-9	K J	0.570	0.380 (S)	0.75	1.112
Dibenzothiophene	132-65-0	K B J	0.314	0.226 (S)	0.18	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-3_Form1A_PH5U0300.D_SJ1910260.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
59 Bottom
Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-3
Matrix:	TISSUE	**Sample Size:**	1.96 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 15:56:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0300.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	6.52

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LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	909	45.4	0.09	0.602
2-Methylnaphthalene d-10		2000	1030	51.7	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1110	55.3	0.72	0.895
Acenaphthylene d-8		2000	1120	56.1	0.15	0.961
Dibenzothiophene d-8		2010	1400	69.7	0.08	0.791
Phenanthrene d-10		2010	1520	75.4	0.14	0.807
Fluoranthene d-10		2010	1600	80.0	0.16	0.971
Benzo[a]anthracene d-12		2000	1740	86.9	0.24	1.165
Chrysene d-12		2000	1810	90.6	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1710	84.5	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1770	88.3	0.19	0.962
Benzo[a]pyrene d-12		2010	1790	89.1	0.19	1.009
Perylene d-12		2010	1820	90.3	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1810	90.3	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1680	83.9	0.18	1.207
Benzo[ghi]perylene d-12		2010	1780	88.7	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-3_Form2_PH5U0300.D_SJ1910260.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
60 Top
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-4
Matrix:	TISSUE	**Sample Size:**	1.98 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 16:45:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0301.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	6.88

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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	3.74	0.574 (S)	0.07	1.007
Acenaphthylene	208-96-8	K J	0.437	0.305 (S)	0.53	1.003
Acenaphthene	83-32-9	J	1.09	0.451 (S)	0.90	1.048
Fluorene	86-73-7	B J	0.724	0.204 (S)	1.04	0.844
Phenanthrene	85-01-8	B J	3.77	0.187 (S)	0.21	1.004
Anthracene	120-12-7	K J	0.333	0.190 (S)	0.29	1.012
Fluoranthene	206-44-0	B J	1.76	0.0944 (S)	0.21	1.002
Pyrene	129-00-0	B J	3.19	0.0911 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3	J	0.241	0.109 (S)	0.28	1.003
Chrysene [4]	218-01-9	K B J	0.498	0.0900 (S)	0.39	1.003
Benzo[b]fluoranthene	205-99-2	U		0.257 (S)		
Benzo[j,k]fluoranthenes		U		0.253 (S)		
Benzo[e]pyrene	192-97-2	U		0.321 (S)		
Benzo[a]pyrene	50-32-8		637	0.316 (S)	0.22	1.004
Perylene	198-55-0	K J	0.458	0.339 (S)	1.33	1.007
Dibenz[a,h]anthracene [5]	53-70-3	U		0.177 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	K B J	0.392	0.175 (S)	2.95	1.004
Benzo[ghi]perylene	191-24-2	K J	0.502	0.151 (S)	0.41	1.002
2-Methylnaphthalene	91-57-6	B J	3.36	0.444 (S)	0.87	1.010
2,6-Dimethylnaphthalene	581-42-0	J	0.797	0.360 (S)	0.71	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	J	0.935	0.700 (S)	0.83	1.229
1-Methylphenanthrene	832-69-9	J	0.440	0.307 (S)	0.55	1.112
Dibenzothiophene	132-65-0	K B J	0.369	0.196 (S)	0.17	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-4_Form1A_PH5U0301.D_SJ1910261.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
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Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-4
Matrix:	TISSUE	**Sample Size:**	1.98 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 16:45:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0301.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	6.88

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This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	745	37.3	0.09	0.602
2-Methylnaphthalene d-10		2000	910	45.5	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1030	51.0	0.73	0.895
Acenaphthylene d-8		2000	1080	54.0	0.16	0.961
Dibenzothiophene d-8		2010	1330	66.3	0.08	0.791
Phenanthrene d-10		2010	1430	71.1	0.14	0.807
Fluoranthene d-10		2010	1480	73.9	0.17	0.971
Benzo[a]anthracene d-12		2000	1610	80.5	0.24	1.165
Chrysene d-12		2000	1710	85.4	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1590	78.7	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1660	82.8	0.19	0.962
Benzo[a]pyrene d-12		2010	1690	84.2	0.19	1.009
Perylene d-12		2010	1710	84.9	0.25	1.024
Dibenzo[a,h]anthracene d-14		2000	1680	83.8	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1560	77.9	0.18	1.207
Benzo[ghi]perylene d-12		2010	1690	84.5	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-4_Form2_PH5U0301.D_SJ1910261.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
61 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	06262044.0000		
Contract No.:	4765	**Lab Sample I.D.:**	L23437-5
Matrix:	TISSUE	**Sample Size:**	2.01 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 17:34:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0302.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	5.95

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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	3.61	0.498 (S)	0.05	1.006
Acenaphthylene	208-96-8	K J	0.520	0.280 (S)	0.34	1.003
Acenaphthene	83-32-9	K J	0.762	0.551 (S)	1.40	1.048
Fluorene	86-73-7	B J	0.768	0.182 (S)	0.96	0.845
Phenanthrene	85-01-8	B J	4.10	0.266 (S)	0.18	1.004
Anthracene	120-12-7	K J	0.366	0.270 (S)	0.30	1.012
Fluoranthene	206-44-0	J	1.89	0.108 (S)	0.19	1.002
Pyrene	129-00-0	B J	3.16	0.104 (S)	0.19	1.033
Benz[a]anthracene [3]	56-55-3	J	0.235	0.0863 (S)	0.25	1.003
Chrysene [4]	218-01-9	B J	0.659	0.0732 (S)	0.31	1.003
Benzo[b]fluoranthene	205-99-2	U		0.283 (S)		
Benzo[j,k]fluoranthenes		K J	0.472	0.270 (S)	0.49	1.001
Benzo[e]pyrene	192-97-2	U		0.356 (S)		
Benzo[a]pyrene	50-32-8		648	0.351 (S)	0.22	1.004
Perylene	198-55-0	K J	0.394	0.368 (S)	5.79	1.008
Dibenz[a,h]anthracene [5]	53-70-3	K J	0.193	0.145 (S)	0.40	1.003
Indeno[1,2,3-cd]pyrene	193-39-5	K B J	0.437	0.158 (S)	2.49	1.003
Benzo[ghi]perylene	191-24-2	K J	0.626	0.136 (S)	0.48	1.002
2-Methylnaphthalene	91-57-6	B J	3.64	0.600 (S)	0.90	1.010
2,6-Dimethylnaphthalene	581-42-0	K J	1.17	0.814 (S)	0.44	1.012
2,3,5-Trimethylnaphthalene	2245-38-7	K J	4.57	0.696 (S)	0.34	1.235
1-Methylphenanthrene	832-69-9	J	0.495	0.420 (S)	0.52	1.112
Dibenzothiophene	132-65-0	K B J	0.300	0.203 (S)	0.25	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-5_Form1A_PH5U0302.D_SJ1910262.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 2

ANALYSIS REPORT

CLIENT SAMPLE NO.
61 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-5
Matrix:	TISSUE	**Sample Size:**	2.01 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 17:34:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0302.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	5.95

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This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	757	37.8	0.09	0.602
2-Methylnaphthalene d-10		2000	844	42.2	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	941	46.7	0.72	0.895
Acenaphthylene d-8		2000	954	47.7	0.15	0.961
Dibenzothiophene d-8		2010	1320	65.7	0.08	0.791
Phenanthrene d-10		2010	1460	72.5	0.14	0.807
Fluoranthene d-10		2010	1560	77.9	0.17	0.971
Benzo[a]anthracene d-12		2000	1700	85.2	0.24	1.165
Chrysene d-12		2000	1770	88.6	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1670	82.5	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1750	87.0	0.19	0.962
Benzo[a]pyrene d-12		2010	1760	87.7	0.19	1.009
Perylene d-12		2010	1820	90.5	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1750	87.6	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1630	81.7	0.18	1.207
Benzo[ghi]perylene d-12		2010	1750	87.5	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-5_Form2_PH5U0302.D_SJ1910262.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
62 Bottom
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.		06262044.0000	
Contract No.:	4765	**Lab Sample I.D.:**	L23437-6
Matrix:	TISSUE	**Sample Size:**	1.99 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 18:23:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0303.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	7.25

This page is part of a total report that contains information necessary for accreditation compliance.
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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	3.86	0.479 (S)	0.07	1.006
Acenaphthylene	208-96-8	K J	0.535	0.257 (S)	0.34	1.003
Acenaphthene	83-32-9	J	0.903	0.357 (S)	1.07	1.048
Fluorene	86-73-7	B J	0.729	0.227 (S)	0.93	0.845
Phenanthrene	85-01-8	B J	3.87	0.186 (S)	0.19	1.004
Anthracene	120-12-7	J	0.374	0.189 (S)	0.21	1.012
Fluoranthene	206-44-0	J	1.85	0.0719 (S)	0.21	1.002
Pyrene	129-00-0	B J	3.24	0.0694 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3	J	0.353	0.136 (S)	0.25	1.003
Chrysene [4]	218-01-9	B J	0.534	0.114 (S)	0.33	1.003
Benzo[b]fluoranthene	205-99-2	U		0.304 (S)		
Benzo[j,k]fluoranthenes		U		0.294 (S)		
Benzo[e]pyrene	192-97-2	U		0.385 (S)		
Benzo[a]pyrene	50-32-8		648	0.379 (S)	0.22	1.004
Perylene	198-55-0	J	8.68	0.398 (S)	0.22	1.000
Dibenz[a,h]anthracene [5]	53-70-3	U		0.167 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	K B J	0.503	0.149 (S)	2.82	1.004
Benzo[ghi]perylene	191-24-2	K J	0.413	0.128 (S)	0.48	1.002
2-Methylnaphthalene	91-57-6	B J	3.66	0.561 (S)	0.89	1.010
2,6-Dimethylnaphthalene	581-42-0	K J	0.999	0.455 (S)	0.39	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	K J	3.43	0.620 (S)	0.43	1.235
1-Methylphenanthrene	832-69-9	J	0.435	0.305 (S)	0.69	1.112
Dibenzothiophene	132-65-0	K B J	0.272	0.133 (S)	0.32	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-6_Form1A_PH5U0303.D_SJ1910263.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
62 Bottom
Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-6
Matrix:	TISSUE	**Sample Size:**	1.99 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 18:23:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0303.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute	**% Moisture:**	7.25

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This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	821	41.1	0.09	0.602
2-Methylnaphthalene d-10		2000	990	49.5	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1140	56.5	0.72	0.895
Acenaphthylene d-8		2000	1130	56.7	0.15	0.961
Dibenzothiophene d-8		2010	1350	67.2	0.08	0.791
Phenanthrene d-10		2010	1460	72.4	0.14	0.807
Fluoranthene d-10		2010	1540	76.8	0.17	0.971
Benzo[a]anthracene d-12		2000	1660	82.8	0.24	1.165
Chrysene d-12		2000	1740	87.1	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1670	82.9	0.21	0.958
Benzo[k]fluoranthene d-12		2010	1690	84.5	0.19	0.962
Benzo[a]pyrene d-12		2010	1760	87.8	0.19	1.009
Perylene d-12		2010	1780	88.4	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1720	85.9	0.31	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1630	81.5	0.18	1.207
Benzo[ghi]perylene d-12		2010	1760	88.0	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

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Report Filename: PAH_PAH_LO_LPAR_L23437-6_Form2_PH5U0303.D_SJ1910263.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
63 Top
Sample Collection:
23-Jun-2015

Form 1A
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-7
Matrix:	TISSUE	**Sample Size:**	2.13 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 21:58:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0308.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	7.24

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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	4.88	0.310 (S)	0.06	1.007
Acenaphthylene	208-96-8	K J	0.717	0.181 (S)	0.28	1.003
Acenaphthene	83-32-9	J	3.62	0.564 (S)	1.15	1.048
Fluorene	86-73-7	B J	1.78	0.706 (S)	0.90	0.845
Phenanthrene	85-01-8		72.9	0.287 (S)	0.19	1.004
Anthracene	120-12-7	J	10.4	0.292 (S)	0.18	1.012
Fluoranthene	206-44-0		215	0.429 (S)	0.20	1.002
Pyrene	129-00-0		205	0.414 (S)	0.21	1.033
Benz[a]anthracene [3]	56-55-3		123	0.655 (S)	0.25	1.003
Chrysene [4]	218-01-9		155	0.559 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		169	0.366 (S)	0.23	1.004
Benzo[j,k]fluoranthenes			130	0.365 (S)	0.24	1.003
Benzo[e]pyrene	192-97-2		126	0.455 (S)	0.23	0.995
Benzo[a]pyrene	50-32-8		135	0.448 (S)	0.23	1.004
Perylene	198-55-0		41.9	0.493 (S)	0.22	1.004
Dibenz[a,h]anthracene [5]	53-70-3		24.4	0.548 (S)	0.12	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		124	0.441 (S)	0.17	1.002
Benzo[ghi]perylene	191-24-2		120	0.411 (S)	0.18	1.002
2-Methylnaphthalene	91-57-6	B J	3.79	0.482 (S)	0.94	1.009
2,6-Dimethylnaphthalene	581-42-0	J	0.916	0.472 (S)	0.75	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	K J	1.26	0.815 (S)	0.36	1.235
1-Methylphenanthrene	832-69-9	J	4.36	0.516 (S)	0.61	1.112
Dibenzothiophene	132-65-0	J	3.19	0.212 (S)	0.07	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-7_Form1A_PH5U0308.D_SJ1910247.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
63 Top
Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-7
Matrix:	TISSUE	**Sample Size:**	2.13 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 21:58:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0308.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng absolute	**% Moisture:**	7.24

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	1020	50.9	0.09	0.601
2-Methylnaphthalene d-10		2000	1080	54.0	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1150	57.1	0.72	0.895
Acenaphthylene d-8		2000	1120	55.8	0.15	0.961
Dibenzothiophene d-8		2010	1260	62.4	0.08	0.791
Phenanthrene d-10		2010	1380	68.9	0.14	0.807
Fluoranthene d-10		2010	1370	68.3	0.17	0.971
Benzo[a]anthracene d-12		2000	1400	69.9	0.24	1.165
Chrysene d-12		2000	1470	73.4	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1320	65.2	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1400	69.6	0.19	0.961
Benzo[a]pyrene d-12		2010	1450	72.4	0.18	1.009
Perylene d-12		2010	1440	71.6	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1370	68.6	0.29	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1300	64.8	0.18	1.207
Benzo[ghi]perylene d-12		2010	1370	68.4	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-7_Form2_PH5U0308.D_SJ1910247.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
64 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-8
Matrix:	TISSUE	**Sample Size:**	1.98 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 22:47:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0309.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	3.73

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	6.15	0.297 (S)	0.06	1.007
Acenaphthylene	208-96-8	K J	0.527	0.191 (S)	0.32	1.003
Acenaphthene	83-32-9	J	4.03	0.431 (S)	1.14	1.048
Fluorene	86-73-7	B J	1.44	0.277 (S)	0.96	0.844
Phenanthrene	85-01-8		61.5	0.515 (S)	0.19	1.003
Anthracene	120-12-7	J	7.20	0.523 (S)	0.21	1.012
Fluoranthene	206-44-0		213	0.339 (S)	0.20	1.002
Pyrene	129-00-0		205	0.328 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3	K J	1.96	0.488 (S)	0.14	1.000
Chrysene [4]	218-01-9		163	0.461 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		186	0.429 (S)	0.23	1.004
Benzo[j,k]fluoranthenes			158	0.439 (S)	0.22	1.003
Benzo[e]pyrene	192-97-2		138	0.556 (S)	0.22	0.996
Benzo[a]pyrene	50-32-8		156	0.548 (S)	0.22	1.004
Perylene	198-55-0		47.5	0.574 (S)	0.20	1.004
Dibenz[a,h]anthracene [5]	53-70-3		25.3	0.791 (S)	0.13	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		135	0.974 (S)	0.18	1.002
Benzo[ghi]perylene	191-24-2		136	0.920 (S)	0.18	1.003
2-Methylnaphthalene	91-57-6	B J	4.25	0.267 (S)	0.82	1.010
2,6-Dimethylnaphthalene	581-42-0	J	1.10	0.475 (S)	0.69	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	K J	1.97	0.597 (S)	0.48	1.235
1-Methylphenanthrene	832-69-9	J	4.03	0.421 (S)	0.62	1.112
Dibenzothiophene	132-65-0	J	2.69	0.194 (S)	0.08	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-8_Form1A_PH5U0309.D_SJ1910248.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 2

ANALYSIS REPORT

CLIENT SAMPLE NO.
64 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-8
Matrix:	TISSUE	**Sample Size:**	1.98 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 22:47:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0309.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng absolute	**% Moisture:**	3.73

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	1190	59.4	0.09	0.602
2-Methylnaphthalene d-10		2000	1290	64.4	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1350	67.0	0.73	0.895
Acenaphthylene d-8		2000	1320	66.2	0.15	0.961
Dibenzothiophene d-8		2010	1490	74.1	0.08	0.791
Phenanthrene d-10		2010	1580	78.7	0.14	0.807
Fluoranthene d-10		2010	1610	80.5	0.17	0.971
Benzo[a]anthracene d-12		2000	1770	88.4	0.24	1.165
Chrysene d-12		2000	1820	90.8	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1710	84.4	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1720	85.6	0.20	0.961
Benzo[a]pyrene d-12		2010	1790	89.2	0.19	1.008
Perylene d-12		2010	1810	90.0	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1870	93.3	0.29	1.211
Indeno[1,2,3-cd]pyrene d-12		2000	1730	86.7	0.18	1.207
Benzo[ghi]perylene d-12		2010	1790	89.3	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

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Report Filename: PAH_PAH_LO_LPAR_L23437-8_Form2_PH5U0309.D_SJ1910248.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
65 Bottom
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-9
Matrix:	TISSUE	**Sample Size:**	2.06 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 23:36:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0310.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	8.74

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This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	6.32	0.351 (S)	0.07	1.006
Acenaphthylene	208-96-8	K J	0.561	0.197 (S)	0.35	1.003
Acenaphthene	83-32-9	J	4.65	0.591 (S)	1.17	1.048
Fluorene	86-73-7	B J	1.56	0.613 (S)	0.94	0.844
Phenanthrene	85-01-8		116	0.173 (S)	0.19	1.003
Anthracene	120-12-7		14.6	0.175 (S)	0.20	1.012
Fluoranthene	206-44-0		318	0.442 (S)	0.21	1.002
Pyrene	129-00-0		285	0.426 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3		174	0.394 (S)	0.26	1.003
Chrysene [4]	218-01-9		216	0.360 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		231	0.601 (S)	0.23	1.004
Benzo[j,k]fluoranthenes			176	0.597 (S)	0.24	1.003
Benzo[e]pyrene	192-97-2		171	0.765 (S)	0.22	0.995
Benzo[a]pyrene	50-32-8		196	0.753 (S)	0.22	1.004
Perylene	198-55-0		56.1	0.802 (S)	0.23	1.004
Dibenz[a,h]anthracene [5]	53-70-3		33.1	0.379 (S)	0.13	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		165	0.554 (S)	0.17	1.002
Benzo[ghi]perylene	191-24-2		167	0.506 (S)	0.17	1.002
2-Methylnaphthalene	91-57-6	B J	4.89	0.345 (S)	0.87	1.009
2,6-Dimethylnaphthalene	581-42-0	J	1.42	0.465 (S)	0.52	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	J	1.16	1.05 (S)	0.77	1.229
1-Methylphenanthrene	832-69-9	J	6.65	0.442 (S)	0.56	1.112
Dibenzothiophene	132-65-0	J	4.71	0.239 (S)	0.09	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-9_Form1A_PH5U0310.D_SJ1910249.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
65 Bottom
Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-9
Matrix:	TISSUE	**Sample Size:**	2.06 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 23:36:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0310.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng absolute	**% Moisture:**	8.74

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LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	954	47.7	0.09	0.602
2-Methylnaphthalene d-10		2000	1040	51.9	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	1090	54.2	0.73	0.895
Acenaphthylene d-8		2000	1140	57.2	0.15	0.961
Dibenzothiophene d-8		2010	1450	72.3	0.08	0.791
Phenanthrene d-10		2010	1560	77.6	0.14	0.807
Fluoranthene d-10		2010	1610	80.5	0.17	0.971
Benzo[a]anthracene d-12		2000	1700	84.8	0.25	1.165
Chrysene d-12		2000	1770	88.4	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1690	83.5	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1730	86.4	0.19	0.961
Benzo[a]pyrene d-12		2010	1790	89.5	0.19	1.009
Perylene d-12		2010	1780	88.5	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1800	90.1	0.29	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1720	85.8	0.18	1.207
Benzo[ghi]perylene d-12		2010	1800	89.9	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

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Report Filename: PAH_PAH_LO_LPAR_L23437-9_Form2_PH5U0310.D_SJ1910249.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
66 Top
Sample Collection:
23-Jun-2015

Form 1A
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-10
Matrix:	TISSUE	**Sample Size:**	2.01 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	14-Jul-2015 **Time:** 00:25:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0311.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	7.91

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COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	5.88	0.410 (S)	0.06	1.006
Acenaphthylene	208-96-8	K J	0.665	0.367 (S)	0.36	1.003
Acenaphthene	83-32-9	J	3.37	0.847 (S)	1.24	1.048
Fluorene	86-73-7	B J	1.32	0.181 (S)	1.05	0.844
Phenanthrene	85-01-8		71.5	0.252 (S)	0.19	1.003
Anthracene	120-12-7	J	9.24	0.256 (S)	0.19	1.012
Fluoranthene	206-44-0		211	0.313 (S)	0.20	1.002
Pyrene	129-00-0		191	0.302 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3		124	0.157 (S)	0.27	1.003
Chrysene [4]	218-01-9		156	0.142 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		171	0.350 (S)	0.22	1.004
Benzo[j,k]fluoranthenes			148	0.362 (S)	0.22	1.003
Benzo[e]pyrene	192-97-2		129	0.483 (S)	0.20	0.995
Benzo[a]pyrene	50-32-8		155	0.475 (S)	0.22	1.004
Perylene	198-55-0		42.8	0.495 (S)	0.23	1.004
Dibenz[a,h]anthracene [5]	53-70-3		26.3	0.296 (S)	0.11	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		125	0.344 (S)	0.18	1.002
Benzo[ghi]perylene	191-24-2		124	0.320 (S)	0.18	1.002
2-Methylnaphthalene	91-57-6	B J	4.33	0.504 (S)	0.93	1.009
2,6-Dimethylnaphthalene	581-42-0	J	1.08	0.536 (S)	0.57	1.012
2,3,5-Trimethylnaphthalene	2245-38-7	J	1.85	0.965 (S)	0.70	1.235
1-Methylphenanthrene	832-69-9	J	4.81	0.342 (S)	0.57	1.112
Dibenzothiophene	132-65-0	J	3.05	0.247 (S)	0.07	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-10_Form1A_PH5U0311.D_SJ1910250.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
66 Top
Sample Collection:
23-Jun-2015

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	06262044.0000
Contract No.:	4765	**Lab Sample I.D.:**	L23437-10
Matrix:	TISSUE	**Sample Size:**	2.01 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	14-Jul-2015 **Time:** 00:25:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0311.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng absolute	**% Moisture:**	7.91

This page is part of a total report that contains information necessary for accreditation compliance.
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LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	681	34.1	0.09	0.602
2-Methylnaphthalene d-10		2000	733	36.6	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	824	40.9	0.73	0.895
Acenaphthylene d-8		2000	849	42.4	0.15	0.961
Dibenzothiophene d-8		2010	1270	63.2	0.08	0.791
Phenanthrene d-10		2010	1400	69.4	0.14	0.807
Fluoranthene d-10		2010	1530	76.6	0.17	0.971
Benzo[a]anthracene d-12		2000	1680	83.9	0.24	1.165
Chrysene d-12		2000	1730	86.6	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1700	84.3	0.20	0.957
Benzo[k]fluoranthene d-12		2010	1710	85.1	0.19	0.961
Benzo[a]pyrene d-12		2010	1720	85.9	0.19	1.009
Perylene d-12		2010	1730	86.1	0.25	1.024
Dibenzo[a,h]anthracene d-14		2000	1800	90.0	0.29	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1700	85.1	0.18	1.207
Benzo[ghi]perylene d-12		2010	1780	88.7	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-10_Form2_PH5U0311.D_SJ1910250.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
67 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	06262044.0000		
Contract No.:	4765	**Lab Sample I.D.:**	L23437-11
Matrix:	TISSUE	**Sample Size:**	2.06 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	14-Jul-2015 **Time:** 01:13:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0312.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	8.60

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	5.88	0.674 (S)	0.06	1.006
Acenaphthylene	208-96-8	K J	0.778	0.432 (S)	0.32	1.002
Acenaphthene	83-32-9	J	3.64	0.761 (S)	1.13	1.048
Fluorene	86-73-7	B J	1.48	0.203 (S)	0.81	0.844
Phenanthrene	85-01-8		75.7	0.141 (S)	0.19	1.003
Anthracene	120-12-7	J	9.26	0.143 (S)	0.18	1.012
Fluoranthene	206-44-0		219	0.467 (S)	0.20	1.002
Pyrene	129-00-0		197	0.451 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3		129	0.426 (S)	0.26	1.003
Chrysene [4]	218-01-9		168	0.409 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		187	0.495 (S)	0.22	1.003
Benzo[j,k]fluoranthenes			153	0.506 (S)	0.22	1.003
Benzo[e]pyrene	192-97-2		135	0.638 (S)	0.22	0.996
Benzo[a]pyrene	50-32-8		155	0.628 (S)	0.22	1.004
Perylene	198-55-0		46.6	0.660 (S)	0.21	1.004
Dibenz[a,h]anthracene [5]	53-70-3		27.2	0.565 (S)	0.11	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		132	0.362 (S)	0.16	1.002
Benzo[ghi]perylene	191-24-2		135	0.336 (S)	0.17	1.003
2-Methylnaphthalene	91-57-6	B J	4.14	0.628 (S)	0.95	1.010
2,6-Dimethylnaphthalene	581-42-0	J	1.05	0.662 (S)	0.63	1.010
2,3,5-Trimethylnaphthalene	2245-38-7	K J	5.93	1.16 (S)	0.39	1.234
1-Methylphenanthrene	832-69-9	J	4.62	0.285 (S)	0.69	1.112
Dibenzothiophene	132-65-0	J	3.11	0.179 (S)	0.09	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-11_Form1A_PH5U0312.D_SJ1910251.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 2

ANALYSIS REPORT

CLIENT SAMPLE NO.
67 Middle
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.		06262044.0000	
Contract No.:	4765	**Lab Sample I.D.:**	L23437-11
Matrix:	TISSUE	**Sample Size:**	2.06 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	14-Jul-2015 **Time:** 01:13:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0312.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng absolute	**% Moisture:**	8.60

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	478	23.9	0.09	0.602
2-Methylnaphthalene d-10		2000	614	30.7	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	790	39.2	0.72	0.895
Acenaphthylene d-8		2000	836	41.8	0.15	0.961
Dibenzothiophene d-8		2010	1360	67.5	0.08	0.791
Phenanthrene d-10		2010	1460	72.7	0.14	0.807
Fluoranthene d-10		2010	1610	80.3	0.17	0.971
Benzo[a]anthracene d-12		2000	1710	85.7	0.24	1.165
Chrysene d-12		2000	1740	87.0	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1680	83.2	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1720	85.8	0.19	0.961
Benzo[a]pyrene d-12		2010	1790	89.4	0.19	1.008
Perylene d-12		2010	1810	90.0	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1790	89.7	0.29	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1730	86.6	0.18	1.207
Benzo[ghi]perylene d-12		2010	1790	89.1	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-11_Form2_PH5U0312.D_SJ1910251.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
68 Bottom
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.		06262044.0000	
Contract No.:	4765	**Lab Sample I.D.:**	L23437-12
Matrix:	TISSUE	**Sample Size:**	2.09 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	14-Jul-2015 **Time:** 02:02:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0313.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng/g (wet weight basis)	**% Moisture:**	8.53

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	B J	6.02	0.468 (S)	0.06	1.007
Acenaphthylene	208-96-8	K J	0.526	0.371 (S)	0.32	1.003
Acenaphthene	83-32-9	J	3.36	0.677 (S)	1.04	1.048
Fluorene	86-73-7	B J	1.37	0.296 (S)	0.89	0.844
Phenanthrene	85-01-8		72.6	0.596 (S)	0.19	1.004
Anthracene	120-12-7	J	8.89	0.606 (S)	0.18	1.012
Fluoranthene	206-44-0		213	0.198 (S)	0.20	1.002
Pyrene	129-00-0		189	0.191 (S)	0.20	1.033
Benz[a]anthracene [3]	56-55-3		127	0.456 (S)	0.27	1.003
Chrysene [4]	218-01-9		162	0.421 (S)	0.29	1.003
Benzo[b]fluoranthene	205-99-2		177	0.402 (S)	0.23	1.003
Benzo[j,k]fluoranthenes			146	0.402 (S)	0.23	1.003
Benzo[e]pyrene	192-97-2		130	0.534 (S)	0.23	0.996
Benzo[a]pyrene	50-32-8		156	0.526 (S)	0.22	1.004
Perylene	198-55-0		45.2	0.560 (S)	0.22	1.004
Dibenz[a,h]anthracene [5]	53-70-3		25.8	0.484 (S)	0.11	1.003
Indeno[1,2,3-cd]pyrene	193-39-5		128	0.884 (S)	0.18	1.002
Benzo[ghi]perylene	191-24-2		128	0.822 (S)	0.17	1.002
2-Methylnaphthalene	91-57-6	B J	4.22	0.737 (S)	0.87	1.009
2,6-Dimethylnaphthalene	581-42-0	K J	1.03	0.527 (S)	0.34	1.011
2,3,5-Trimethylnaphthalene	2245-38-7	K J	1.80	1.07 (S)	0.67	1.234
1-Methylphenanthrene	832-69-9	J	4.42	0.479 (S)	0.59	1.112
Dibenzothiophene	132-65-0	J	2.91	0.118 (S)	0.08	1.003

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in the associated blank and concentration in sample is less than 10X the concentration in the associated blank; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-12_Form1A_PH5U0313.D_SJ1910252.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 2

ANALYSIS REPORT

CLIENT SAMPLE NO.
68 Bottom
Sample Collection:
23-Jun-2015

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	06262044.0000		
Contract No.:	4765	**Lab Sample I.D.:**	L23437-12
Matrix:	TISSUE	**Sample Size:**	2.09 g (wet)
Sample Receipt Date:	24-Jun-2015	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	14-Jul-2015 **Time:** 02:02:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0313.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0305.D
Concentration Units:	ng absolute	**% Moisture:**	8.53

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	812	40.6	0.09	0.602
2-Methylnaphthalene d-10		2000	860	43.0	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	917	45.5	0.73	0.895
Acenaphthylene d-8		2000	943	47.1	0.15	0.961
Dibenzothiophene d-8		2010	1350	67.2	0.08	0.791
Phenanthrene d-10		2010	1470	72.9	0.14	0.807
Fluoranthene d-10		2010	1550	77.5	0.17	0.971
Benzo[a]anthracene d-12		2000	1680	84.0	0.24	1.165
Chrysene d-12		2000	1700	85.0	0.27	1.170
Benzo[b]fluoranthene d-12		2020	1650	81.4	0.21	0.957
Benzo[k]fluoranthene d-12		2010	1680	83.6	0.19	0.961
Benzo[a]pyrene d-12		2010	1730	86.0	0.19	1.008
Perylene d-12		2010	1740	86.4	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1780	88.9	0.28	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1670	83.5	0.18	1.207
Benzo[ghi]perylene d-12		2010	1760	87.5	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_L23437-12_Form2_PH5U0313.D_SJ1910252.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 1A

ANALYSIS REPORT

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	N/A
Contract No.:	4765	**Lab Sample I.D.:**	WG51719-101
Matrix:	CANOLA OIL	**Sample Size:**	2.00 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 12:20:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0295.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D

Concentration Units: ng/g

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
Naphthalene	91-20-3	J	2.94	0.555 (S)	0.06	1.007
Acenaphthylene	208-96-8	U		0.272 (S)		
Acenaphthene	83-32-9	U		0.440 (S)		
Fluorene	86-73-7	K J	0.221	0.143 (S)	1.27	0.844
Phenanthrene	85-01-8	J	0.950	0.106 (S)	0.20	1.004
Anthracene	120-12-7	U		0.108 (S)		
Fluoranthene	206-44-0	K J	0.177	0.0555 (S)	0.26	1.002
Pyrene	129-00-0	K J	0.342	0.0535 (S)	0.26	1.033
Benz[a]anthracene [3]	56-55-3	U		0.146 (S)		
Chrysene [4]	218-01-9	K J	0.131	0.123 (S)	0.44	1.002
Benzo[b]fluoranthene	205-99-2	U		0.246 (S)		
Benzo[j,k]fluoranthenes		U		0.246 (S)		
Benzo[e]pyrene	192-97-2	U		0.372 (S)		
Benzo[a]pyrene	50-32-8	U		0.366 (S)		
Perylene	198-55-0	U		0.436 (S)		
Dibenz[a,h]anthracene [5]	53-70-3	U		0.222 (S)		
Indeno[1,2,3-cd]pyrene	193-39-5	K J	0.509	0.309 (S)	2.73	1.004
Benzo[ghi]perylene	191-24-2	U		0.279 (S)		
2-Methylnaphthalene	91-57-6	J	1.17	0.449 (S)	0.75	1.010
2,6-Dimethylnaphthalene	581-42-0	U		0.967 (S)		
2,3,5-Trimethylnaphthalene	2245-38-7	U		0.412 (S)		
1-Methylphenanthrene	832-69-9	U		0.327 (S)		
Dibenzothiophene	132-65-0	K J	0.245	0.156 (S)	0.16	1.003

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = contract defined limit.
(3) May co-elute with Cyclopenta(cd)pyrene.
(4) May co-elute with Triphenylene.
(5) May co-elute with Dibenz[a,c]anthracene.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest1A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_WG51719-101_Form1A_PH5U0295.D_SJ1910255.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

Form 2
ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	N/A
Contract No.:	4765	**Lab Sample I.D.:**	WG51719-101
Matrix:	CANOLA OIL	**Sample Size:**	2.00 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	08-Jul-2015
Extraction Date:	02-Jul-2015	**Instrument ID:**	LR GC/MS
Analysis Date:	13-Jul-2015 **Time:** 12:20:00	**GC Column ID:**	RTX5
Extract Volume (uL):	500	**Sample Data Filename:**	**PH5U0295.D**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PH5U0295.D
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PH5U0291.D
Concentration Units:	ng absolute		

This page is part of a total report that contains information necessary for accreditation compliance.
This test is not NELAP accredited. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG [1]	SPIKE CONC.	CONC. FOUND	R(%) [2]	ION ABUND. RATIO	RRT
Naphthalene d-8		2000	696	34.8	0.09	0.602
2-Methylnaphthalene d-10		2000	813	40.6	0.17	0.752
2,6-Dimethylnaphthalene d-12		2020	965	47.9	0.72	0.895
Acenaphthylene d-8		2000	899	44.9	0.15	0.961
Dibenzothiophene d-8		2010	1360	67.5	0.08	0.791
Phenanthrene d-10		2010	1500	74.5	0.14	0.807
Fluoranthene d-10		2010	1560	77.9	0.17	0.971
Benzo[a]anthracene d-12		2000	1630	81.3	0.24	1.165
Chrysene d-12		2000	1750	87.5	0.26	1.170
Benzo[b]fluoranthene d-12		2020	1660	82.1	0.20	0.957
Benzo[k]fluoranthene d-12		2010	1680	84.0	0.19	0.962
Benzo[a]pyrene d-12		2010	1460	72.9	0.19	1.009
Perylene d-12		2010	1350	67.0	0.24	1.024
Dibenzo[a,h]anthracene d-14		2000	1690	84.6	0.30	1.212
Indeno[1,2,3-cd]pyrene d-12		2000	1590	79.5	0.18	1.207
Benzo[ghi]perylene d-12		2010	1700	84.6	0.19	1.238

(1) Where applicable, custom lab flags have been used on this report.
(2) R% = percent recovery.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

For Axys Internal Use Only [XSL Template: Pest2.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_WG51719-101_Form2_PH5U0295.D_SJ1910255.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 8A
ONGOING PRECISION AND RECOVERY (OPR)

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4765	**OPR Data Filename:**	**PH5U0292.D**
Matrix:	TISSUE	**Lab Sample I.D.:**	WG51719-102
Extraction Date:	02-Jul-2015	**Analysis Date:**	13-Jul-2015 **Time:** 09:53:00

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON 100 uL EXTRACT.

COMPOUND	CAS NO.	LAB FLAG [1]	ION ABUND. RATIO	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS (ng/mL)	% RECOVERY
Naphthalene	91-20-3		0.06	19700	19800	13800 - 25600	101
Acenaphthylene	208-96-8		0.19	19900	20100	13900 - 27800	101
Acenaphthene	83-32-9		1.12	20000	21400	14000 - 26000	107
Fluorene	86-73-7		0.98	19700	18500	11800 - 27500	93.9
Phenanthrene	85-01-8		0.19	19900	20400	14000 - 25900	103
Anthracene	120-12-7		0.18	19900	18400	14000 - 25900	92.3
Fluoranthene	206-44-0		0.20	20000	20900	14000 - 26000	104
Pyrene	129-00-0		0.20	19700	19700	13800 - 25600	100
Benz[a]anthracene	56-55-3		0.26	19800	20100	13800 - 25700	102
Chrysene	218-01-9		0.29	20000	20100	14000 - 26000	101
Benzo[b]fluoranthene	205-99-2		0.22	19900	19900	13900 - 25900	99.8
Benzo[j,k]fluoranthenes			0.22	19900	19700	13900 - 25800	99.4
Benzo[e]pyrene	192-97-2		0.22	20100	19600	14000 - 26100	97.8
Benzo[a]pyrene	50-32-8		0.22	20000	18900	14000 - 26000	94.5
Perylene	198-55-0		0.22	20100	19600	14000 - 26100	97.9
Dibenz[a,h]anthracene	53-70-3		0.13	20100	19600	14000 - 26100	97.9
Indeno[1,2,3-cd]pyrene	193-39-5		0.17	19800	20000	13900 - 25800	101
Benzo[ghi]perylene	191-24-2		0.19	19800	19600	13900 - 25800	98.9
2-Methylnaphthalene	91-57-6		0.87	20500	21000	14400 - 26700	102
2,6-Dimethylnaphthalene	581-42-0		0.65	20200	21000	14100 - 26200	104
2,3,5-Trimethylnaphthalene	2245-38-7		0.87	19600	25300	9810 - 29400	129
1-Methylphenanthrene	832-69-9		0.58	16400	18000	8180 - 24500	110
Dibenzothiophene	132-65-0		0.08	20100	20500	12100 - 28100	102

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.
Signed: _____Henry Huang_____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: Pest8A.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_WG51719-102_Form8A_SJ1910253.html; Workgroup: WG51719; Design ID: 2591]

AXYS METHOD MLA-021 Rev 12

Form 8B
ONGOING PRECISION AND RECOVERY (OPR)

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4765 **OPR Data Filename:** **PH5U0292.D**

Matrix: TISSUE **Lab Sample I.D.:** WG51719-102

Extraction Date: 02-Jul-2015 **Analysis Date:** 13-Jul-2015 **Time:** 09:53:00

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON 100 uL EXTRACT.

LABELED COMPOUND	CAS NO.	LAB FLAG [1]	ION ABUND. RATIO	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS (ng/mL)	% RECOVERY
Naphthalene d-8	1146-65-2		0.09	20000	7000	3000-26000	35.0
2-Methylnaphthalene d-10	7297-45-2		0.17	20000	8810	4000-26000	44.1
2,6-Dimethylnaphthalene d-12	350820-12-1		0.72	20200	11200	4030-26200	55.6
Acenaphthylene d-8	93951-97-4		0.15	20000	11600	4000-26000	58.1
Dibenzothiophene d-8	33262-29-2		0.08	20100	15100	6030-26100	75.1
Phenanthrene d-10	1517-22-2		0.14	20100	15700	6030-26100	78.3
Fluoranthene d-10	93951-69-0		0.17	20100	17300	6020-26100	86.3
Benzo[a]anthracene d-12	1718-53-2		0.24	20000	17000	6000-26000	85.2
Chrysene d-12	1719-03-5		0.26	20000	17400	6000-26000	87.2
Benzo[b]fluoranthene d-12	93951-98-5		0.20	20200	17100	6060-26300	84.6
Benzo[k]fluoranthene d-12	93952-01-3		0.19	20100	17900	6020-26100	89.2
Benzo[a]pyrene d-12	63466-71-7		0.19	20100	18200	6020-26100	90.7
Perylene d-12	1520-96-3		0.24	20100	17900	6030-26100	88.9
Dibenzo[a,h]anthracene d-14	13250-98-1		0.30	20000	19500	6000-26000	97.4
Indeno[1,2,3-cd]pyrene d-12	203578-33-0		0.18	20000	17300	6000-26000	86.7
Benzo[ghi]perylene d-12	93951-66-7		0.19	20100	18500	6020-26100	92.5

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: Pest8B.xsl; Created: 17-Jul-2015 11:13:16; Application: XMLTransformer-1.14.15;
Report Filename: PAH_PAH_LO_LPAR_WG51719-102_Form8B_SJ1910253.html; Workgroup: WG51719; Design ID: 2591]

Accreditation Scope

AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev.23

				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
BFR	BTBPE	AXYS MLA-033	MLA-033			Y										Y							Y														
	DBDPE	AXYS MLA-033	MLA-033			Y										Y							Y														
	HBB	AXYS MLA-033	MLA-033			Y										Y							Y														
	PBEB	AXYS MLA-033	MLA-033			Y										Y							Y														
BPA and MPE	4,4'-dihydroxy-2,2-diphenylpropane (Bisphenol A) (BPA)	AXYS MLA-059	MLA-059																			Y															
	Mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP)	AXYS MLA-059	MLA-059																			Y															
	Mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP)	AXYS MLA-059	MLA-059																			Y															
	Mono-(3-carboxypropyl) phthalate (MCPP)	AXYS MLA-059	MLA-059																			Y															
	Mono-2-ethylhexyl phthalate (MEHP)	AXYS MLA-059	MLA-059																			Y															
	Mono-benzyl phthalate (MBzP)	AXYS MLA-059	MLA-059																			Y															
	Mono-butyl phthalate (MBP) (n + iso)	AXYS MLA-059	MLA-059																			Y															
	Mono-cyclohexyl phthalate (MCHP)	AXYS MLA-059	MLA-059																			Y															
	Mono-ethyl phthalate (MEP)	AXYS MLA-059	MLA-059																			Y															
	Mono-iso-nonyl phthalate (MiNP)	AXYS MLA-059	MLA-059																			Y															
	Mono-methyl phthalate (MMP)	AXYS MLA-059	MLA-059																			Y															
HBCDD	alpha-hexabromocyclododecane (a-HBCDD)	AXYS MLA-070	MLA-070		Y																																
	beta-hexabromocyclododecane (b-HBCDD)	AXYS MLA-070	MLA-070		Y																																
	gamma-hexabromocyclododecane (g-HBCDD)	AXYS MLA-070	MLA-070		Y																																
OC Pesticides	2,4'-DDD	AXYS MLA-007	MLA-007		Y	Y										Y							Y														
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y										Y				
		EPA 8270	MLA-007										Y																								
	2,4'-DDE	AXYS MLA-007	MLA-007		Y	Y										Y							Y														
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y										Y				
		EPA 8270	MLA-007										Y																								
	2,4'-DDT	AXYS MLA-007	MLA-007		Y	Y										Y							Y														
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y										Y				
		EPA 8270	MLA-007										Y																								
	4,4'-DDD	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y				Y			Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	4,4'-DDE	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y				Y			Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	4,4'-DDT	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y				Y			Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Aldrin	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y				Y			Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Alpha-HCH	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y				Y			Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Beta-HCH	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y				Y			Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	

Accreditation Scope

AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev.23

				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Chlordane, technical	AXYS MLA-007	MLA-007					Y							Y														Y							Y	
		EPA 625	MLA-007																									Y							Y		
		EPA 8270	MLA-007				Y	Y			Y	Y		Y	Y														Y			Y	Y		Y	Y	
	cis-Chlordane (alpha-Chlordane)	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 8270	MLA-007					Y			Y		Y	Y	Y														Y			Y			Y	Y	
	cis-Nonachlor	AXYS MLA-007	MLA-007		Y	Y										Y							Y														
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y											Y			
		EPA 8270	MLA-007										Y																								
	Delta-HCH	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																										Y			Y	Y			Y	
		EPA 8081	MLA-007					Y			Y	Y	Y		Y																						
	Dieldrin	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Endosulphan I	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Endosulphan II	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Endosulphan sulphate	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Endrin	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Endrin aldehyde	AXYS MLA-007	MLA-007			Y		Y							Y								Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Endrin ketone	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y								
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y											Y			
		EPA 8081	MLA-007					Y			Y		Y		Y																						
	Gamma-HCH (Lindane)	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Heptachlor	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Heptachlor epoxide	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	

Accreditation Scope

AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev.23

				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Hexachlorobenzene	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 1625	MLA-007																									Y	Y			Y				Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
	Methoxychlor	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 608	MLA-007																										Y			Y	Y			Y	
		EPA 8081	MLA-007				Y	Y			Y	Y	Y	Y	Y																						
		SM6630B	MLA-007																									Y									
	Mirex	AXYS MLA-007	MLA-007		Y	Y		Y								Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y						Y					Y		Y	
		EPA 8270	MLA-007					Y			Y		Y																Y			Y	Y		Y	Y	
	Oxychlordane	AXYS MLA-007	MLA-007		Y	Y										Y							Y														
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y											Y			
		EPA 8270	MLA-007										Y																								
	Toxaphene	EPA 8270	MLA-007										Y																								
	trans-Chlordane (gamma-Chlordane)	AXYS MLA-007	MLA-007		Y	Y		Y							Y	Y							Y						Y							Y	
		AXYS MLA-028	MLA-028		Y	Y		Y					Y		Y	Y							Y						Y					Y		Y	
		EPA 8270	MLA-007					Y			Y		Y	Y	Y														Y			Y			Y	Y	
	trans-Nonachlor	AXYS MLA-007	MLA-007		Y	Y										Y																					
		AXYS MLA-028	MLA-028		Y	Y							Y			Y							Y											Y			
		EPA 8270	MLA-007										Y																								
PAH	1,2,6-Trimethylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	1,2-Dimethylnaphthalene	AXYS MLA-021	MLA-021			Y																	Y														
	1,4,6,7-Tetramethylnaphthalene	AXYS MLA-021	MLA-021			Y																	Y														
	1,7-Dimethylfluorene	AXYS MLA-021	MLA-021			Y																	Y														
	1,7-Dimethylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	1,8-Dimethylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	1-Methylchrysene	AXYS MLA-021	MLA-021			Y																	Y														
	1-Methylnaphthalene	AXYS MLA-021	MLA-021			Y																	Y														
	1-Methylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	2,3,5-Trimethylnaphthalene	AXYS MLA-021	MLA-021			Y																	Y														
	2,3,6-Trimethylnaphthalene	AXYS MLA-021	MLA-021			Y																	Y														
	2,4-Dimethyldibenzothiophene	AXYS MLA-021	MLA-021			Y																	Y														
	2,6-Dimethylnaphthalene	AXYS MLA-021	MLA-021			Y																	Y														
	2,6-Dimethylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	2/3-Methyldibenzothiophenes	AXYS MLA-021	MLA-021			Y																	Y														
	2-Methylanthracene	AXYS MLA-021	MLA-021			Y																	Y														
	2-Methylfluorene	AXYS MLA-021	MLA-021			Y																	Y														
	2-methylnaphthalene	AXYS MLA-021	MLA-021			Y		Y							Y								Y														
		EPA 8270	MLA-021				Y	Y			Y				Y																						
	2-Methylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	3,6-Dimethylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	3-Methylfluoranthene/ Benzo(a)fluorene	AXYS MLA-021	MLA-021			Y																	Y														
	3-Methylphenanthrene	AXYS MLA-021	MLA-021			Y																	Y														
	5,9-Dimethylchrysene	AXYS MLA-021	MLA-021			Y																	Y														
	5/6-Methylchrysenes	AXYS MLA-021	MLA-021			Y																	Y														

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	7-Methylbenzo(a)pyrene	AXYS MLA-021	MLA-021			Y																	Y														
	9/4-Methylphenanthrenes	AXYS MLA-021	MLA-021			Y																	Y														
	Acenaphthene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Acenaphthylene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Anthracene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Benz[a]anthracene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Benzo[a]pyrene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Benzo[b]fluoranthene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Benzo[e]pyrene	AXYS MLA-021	MLA-021			Y										Y							Y														
	Benzo[ghi]perylene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Benzo[j/k]fluoranthenes	AXYS MLA-021	MLA-021													Y							Y														
	Benzo[k]fluoranthene	AXYS MLA-021	MLA-021					Y							Y								Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-021				Y	Y			Y			Y	Y																						
	Biphenyl	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Acenaphthenes	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Benz(a)anthracenes/chrysenes	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Benzofluoranthenes/ Benzopyrenes	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Biphenyls	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Dibenzothiophene	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Fluoranthenes/Pyrenes	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Fluorenes	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Naphthalenes	AXYS MLA-021	MLA-021			Y																	Y														
	C1-Phenanthrenes/Anthracenes	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Benz(a)anthracenes/Chrysenes	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Benzofluoranthenes/ Benzopyrenes	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Biphenyls	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Dibenzothiophene	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Fluoranthenes/Pyrenes	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Fluorenes	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Naphthalenes	AXYS MLA-021	MLA-021			Y																	Y														
	C2-Phenanthrenes/Anthracenes	AXYS MLA-021	MLA-021			Y																	Y														
	C3-Benz(a)anthracenes/Chrysenes	AXYS MLA-021	MLA-021			Y																	Y														
	C3-Dibenzothiophene	AXYS MLA-021	MLA-021			Y																	Y														
	C3-Fluoranthenes/Pyrenes	AXYS MLA-021	MLA-021			Y																	Y														
	C3-Fluorenes	AXYS MLA-021	MLA-021			Y																	Y														

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	C3-Naphthalenes	AXYS MLA-021	MLA-021			Y																	Y														
	C3-Phenanthrenes/Anthracenes	AXYS MLA-021	MLA-021			Y																	Y														
	C4-Benz(a)anthracenes/Chrysenes	AXYS MLA-021	MLA-021			Y																	Y														
	C4-Dibenzothiophene	AXYS MLA-021	MLA-021			Y																	Y														
	C4-Fluoranthenes/Pyrenes	AXYS MLA-021	MLA-021			Y																	Y														
	C4-Naphthalenes	AXYS MLA-021	MLA-021			Y																	Y														
	C4-Phenanthrenes/Anthracenes	AXYS MLA-021	MLA-021			Y																	Y														
	Chrysene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Dibenz[ah]anthracene	AXYS MLA-021	MLA-021			Y										Y							Y														
	Dibenzo[ah]anthracene	AXYS MLA-021	MLA-021					Y							Y														Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Dibenzothiophene	AXYS MLA-021	MLA-021			Y																	Y														
	Fluoranthene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Fluorene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Indeno[1,2,3-cd]pyrene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Naphthalene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Perylene	AXYS MLA-021	MLA-021			Y										Y							Y														
	Phenanthrene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Pyrene	AXYS MLA-021	MLA-021			Y		Y							Y	Y							Y						Y							Y	
		EPA 1625	MLA-021																									Y	Y			Y	Y			Y	
		EPA 8270	MLA-021				Y	Y			Y	Y		Y	Y																						
	Retene	AXYS MLA-021	MLA-021			Y																	Y														
Parabens	Benzylparaben (Benzyl 4-hydroxybenzoate)	AXYS MLA-064	MLA-064																			Y															
	Butylparaben (n-Butyl 4-hydroxybenzoate and isobutyl 4-hydroxybenzoate)	AXYS MLA-064	MLA-064																			Y															
	Ethylparaben (Ethyl 4-hydroxybenzoate)	AXYS MLA-064	MLA-064																			Y															
	Isopropylparaben (Isopropyl 4-hydroxybenzoate)	AXYS MLA-064	MLA-064																			Y															
	Methylparaben (Methyl 4-hydroxybenzoate)	AXYS MLA-064	MLA-064																			Y															
	n-Propylparaben (Propyl 4-hydroxybenzoate)	AXYS MLA-064	MLA-064																			Y															
PBDPE	BDE 10 2,6-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 100 2,2',4,4',6-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 105 2,3,3',4,4'-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 11 3,3'-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 116 2,3,4,5,6-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y			

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable							
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		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 119 2,3',4,4',6-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 12 3,4-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 126 3,3',4,4',5-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 13 3,4'-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 140 2,2',3,4,4',6'-hexabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 15 4,4'-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 153 2,2',4,4',5,5'-hexabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 154 2,2',4,4',5',6-hexabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 155 2,2',4,4',6,6'-hexabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 166 2,3,4,4',5,6-hexabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 17 2,2',4-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 181 2,2',3,4,4',5,6-heptabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 190 2,3,3',4,4',5,6-heptabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 206 2,2',3,3',4,4',5,5',6-nonabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 207 2,2',3,3',4,4',5,6,6'-nonabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 208 2,2',3,3',4,5,5',6,6'-nonabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 209 Decabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 25 2,3',4-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 28 2,4,4'-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 30 2,4,6-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 35 3,3',4-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 37 3,4,4'-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 47 2,2',4,4'-tetrabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 49 2,2',4,5'-tetrabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y													
	BDE 66 2,3',4,4'-tetrabromodiphenylether	EPA 1614	MLA-033										Y																					Y			

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 7 2,4-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 75 2,4,4',6-tetrabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 77 3,3',4,4'-tetrabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 8 2,4'-dibromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 85 2,2',3,4,4'-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE 99 2,2',4,4',5-pentabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE-183 2,2',3,4,4',5',6-heptabromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
	BDE-33 2',3,4-tribromodiphenylether	EPA 1614	MLA-033										Y																					Y			
		AXYS MLA-033	MLA-033		Y	Y										Y							Y														
PCB	PCB 1 2-Chlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 10 2,6-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 100 2,2',4,4',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 101 2,2',4,5,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 101/90/89	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 102 2,2',4,5,6'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 103 2,2',4,5',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 104 2,2',4,6,6'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 105 2,3,3',4,4'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 105/127	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 106 2,3,3',4,5-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 107 2,3,3',4',5-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 107/109	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 108 2,3,3',4,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 109 2,3,3',4,6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 11 3,3'-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 110 2,3,3',4',6-Pentachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 111 2,3,3',5,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 111/117	EPA 8270	MLA-007										Y																								
	PCB 112 2,3,3',5,6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 113 2,3,3',5',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 114 2,3,4,4',5-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 115 2,3,4,4',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 116 2,3,4,5,6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 117 2,3,4',5,6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 118 2,3',4,4',5-Pentachlorobiphenyl	AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 118/106	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 119 2,3',4,4',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 12 3,4-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 12/13	EPA 8270	MLA-007										Y																								
	PCB 120 2,3',4,5,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 121 2,3',4,5',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 122 2,3,3',4',5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 123 2,3',4,4',5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 124 2,3',4',5,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	PCB 125 2,3',4',5',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 126 3,3',4,4',5-Pentachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 127 3,3',4,5,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 128 2,2',3,3',4,4'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 129 2,2',3,3',4,5-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 13 3,4'-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 130 2,2',3,3',4,5'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 131 2,2',3,3',4,6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 131/142	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 132 2,2',3,3',4,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 132/168	EPA 8270	MLA-007										Y																								
	PCB 133 2,2',3,3',5,5'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 134 2,2',3,3',5,6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 134/143	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 135 2,2',3,3',5,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 136 2,2',3,3',6,6'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 137 2,2',3,4,4',5-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 138 2,2',3,4,4',5'-Hexachlorobiphenyl	AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	PCB 138/163/164	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 139 2,2',3,4,4',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 14 3,5-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 140 2,2',3,4,4',6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 141 2,2',3,4,5,5'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 142 2,2',3,4,5,6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 143 2,2',3,4,5,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 144 2,2',3,4,5',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 144/135	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 145 2,2',3,4,6,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 146 2,2',3,4',5,5'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 147 2,2',3,4',5,6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 148 2,2',3,4',5,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 149 2,2',3,4',5',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 149/139	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 15 4,4'-Dichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 150 2,2',3,4',6,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 151 2,2',3,5,5',6-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	PCB 152 2,2',3,5,6,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 153 2,2',4,4',5,5'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 154 2,2',4,4',5,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 155 2,2',4,4',6,6'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 156 2,3,3',4,4',5-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 157 2,3,3',4,4',5'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 158 2,3,3',4,4',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 158/160	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 159 2,3,3',4,5,5'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 16 2,2',3-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 16/32	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 160 2,3,3',4,5,6-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 161 2,3,3',4,5',6-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 162 2,3,3',4',5,5'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 163 2,3,3',4',5,6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 164 2,3,3',4',5',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 165 2,3,3',5,5',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 166 2,3,4,4',5,6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 167 2,3',4,4',5,5'-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 168 2,3',4,4',5',6-Hexachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 169 3,3',4,4',5,5'-Hexachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 17 2,2',4-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 170 2,2',3,3',4,4',5-Heptachlorobiphenyl	AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 170/190	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 171 2,2',3,3',4,4',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 172 2,2',3,3',4,5,5'-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 172/192	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 173 2,2',3,3',4,5,6-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 174 2,2',3,3',4,5,6'-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 174/181	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 175 2,2',3,3',4,5',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 176 2,2',3,3',4,6,6'-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 177 2,2',3,3',4,5',6'-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	PCB 178 2,2',3,3',5,5',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 179 2,2',3,3',5,6,6'-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 18 2,2',5-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 180 2,2',3,4,4',5,5'-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 181 2,2',3,4,4',5,6-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 182 2,2',3,4,4',5,6'-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 183 2,2',3,4,4',5',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 184 2,2',3,4,4',6,6'-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 185 2,2',3,4,5,5',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 186 2,2',3,4,5,6,6'-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 187 2,2',3,4',5,5',6-Heptachlorobiphenyl	AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 187/182	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 188 2,2',3,4',5,6,6'-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 189 2,3,3',4,4',5,5'-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 19 2,2',6-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 190 2,3,3',4,4',5,6-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 191 2,3,3',4,4',5',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 192 2,3,3',4,5,5',6-Heptachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 193 2,3,3',4',5,5',6-Heptachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 194 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 195 2,2',3,3',4,4',5,6-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 196 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 196/203	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 197 2,2',3,3',4,4',6,6'-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 198 2,2',3,3',4,5,5',6-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 199 2,2',3,3',4,5,5',6'-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 2 3-Chlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 20 2,3,3'-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 200 2,2',3,3',4,5,6,6'-Octachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 201 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	PCB 202 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 203 2,2',3,4,4',5,5',6-Octachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 204 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 205 2,3,3',4,4',5,5',6-Octachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 206 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 207 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 208 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 209 Decachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 21 2,3,4-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 22 2,3,4'-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 23 2,3,5-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 23/34	EPA 8270	MLA-007										Y																								
	PCB 24 2,3,6-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 24/27	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 25 2,3',4-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 26 2,3',5-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 27 2,3',6-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 28 2,4,4'-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 29 2,4,5-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 3 4-Chlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 30 2,4,6-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 31 2,4',5-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 32 2,4',6-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 33 2,3',4'-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 33/20/21	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 34 2,3',5'-Trichlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 35 3,3',4-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 36 3,3',5-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 37 3,4,4'-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 38 3,4,5-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 39 3,4',5-Trichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 4 2,2'-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 4/10	EPA 8270	MLA-007										Y																								
	PCB 40 2,2',3,3'-Tetrachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 41 2,2',3,4-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 41/71/64/68	AXYS MLA-007	MLA-007			Y										Y							Y														

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		EPA 8270	MLA-007										Y																								
	PCB 42 2,2',3,4'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 42/59	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 43 2,2',3,5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 44 2,2',3,5'-Tetrachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 45 2,2',3,6-Tetrachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 46 2,2',3,6'-Tetrachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 47 2,2',4,4'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 47/48/75	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 48 2,2',4,5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 49 2,2',4,5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 49/43	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 5 2,3-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 50 2,2',4,6-Tetrachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 51 2,2',4,6'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 52 2,2',5,5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 52/73	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 53 2,2',5,6'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 54 2,2',6,6'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 55 2,3,3',4-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 56 2,3,3',4'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 56/60	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 57 2,3,3',5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 58 2,3,3',5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 59 2,3,3',6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 6 2,3'-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 60 2,3,4,4'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 61 2,3,4,5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 62 2,3,4,6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 62/65	EPA 8270	MLA-007										Y																								
	PCB 63 2,3,4',5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 64 2,3,4',6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 65 2,3,5,6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 66 2,3',4,4'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 66/80	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 67 2,3',4,5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 68 2,3',4,5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 69 2,3',4,6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 7 2,4-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 7/9	EPA 8270	MLA-007										Y																								
	PCB 70 2,3',4',5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 70/76	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 71 2,3',4',6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 72 2,3',5,5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 73 2,3',5',6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 74 2,4,4',5-Tetrachlorobiphenyl	AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 74/61	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 75 2,4,4',6-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 76 2,3',4',5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 77 3,3',4,4'-Tetrachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 78 3,3',4,5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 79 3,3',4,5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 8 2,4'-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 8/5	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 80 3,3',5,5'-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 81 3,4,4',5-Tetrachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 82 2,2',3,3',4-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 83 2,2',3,3',5-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 83/108	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 84 2,2',3,3',6-Pentachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 85 2,2',3,4,4'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 85/120	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 86 2,2',3,4,5-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 87 2,2',3,4,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 87/115/116	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 88 2,2',3,4,6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 88/121	EPA 8270	MLA-007										Y																								
	PCB 89 2,2',3,4,6'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 9 2,5-Dichlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y		Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 90 2,2',3,4',5-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 91 2,2',3,4',6-Pentachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 92 2,2',3,5,5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 93 2,2',3,5,6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 94 2,2',3,5,6'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 95 2,2',3,5',6-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 95/93	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 96 2,2',3,6,6'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 97 2,2',3,4',5'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 97/86	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
	PCB 98 2,2',3,4',6'-Pentachlorobiphenyl	EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB 98/102	EPA 8270	MLA-007										Y																								
	PCB 99 2,2',4,4',5-Pentachlorobiphenyl	AXYS MLA-007	MLA-007			Y										Y							Y														
		AXYS MLA-901	MLA-901		Y																																
		EPA 1668	MLA-010					Y		Y	Y	Y	Y	Y	Y														Y		Y	Y	Y	Y		Y	Y
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y		Y							Y	Y							Y						Y							Y	
	PCB Aroclor 1016	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y			Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	PCB Aroclor 1016/1242	EPA 8270	MLA-007										Y																								
	PCB Aroclor 1221	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y		Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	PCB Aroclor 1232	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y		Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	PCB Aroclor 1242	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y			Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	PCB Aroclor 1248	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y		Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	PCB Aroclor 1254	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y		Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	PCB Aroclor 1260	AXYS MLA-007	MLA-007			Y		Y							Y	Y							Y						Y							Y	
		EPA 1668	MLA-010					Y			Y				Y														Y			Y			Y	Y	
		EPA 625	MLA-007																									Y	Y			Y	Y		Y	Y	
		EPA 8270	MLA-007				Y	Y			Y	Y	Y		Y																						
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	PCB Aroclor 1268	AXYS MLA-007	MLA-007			Y										Y							Y														
	PCB congeners, total	EPA 1668	MLA-010					Y			Y				Y														Y			Y				Y	
		AXYS MLA-010	MLA-010					Y							Y														Y							Y	
	Total Dichlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Heptachlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Hexachlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Monochlorobiphenyls	AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Nonachlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Octachlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	Total Pentachlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Polychlorinated biphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
	Total Tetrachlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
	Total Trichlorobiphenyls	AXYS MLA-007	MLA-007			Y										Y							Y														
		EPA 8270	MLA-007										Y																								
		AXYS MLA-010	MLA-010		Y	Y										Y							Y														
PCDDF	1,2,3,4,6,7,8-HpCDD	EPA 1613	MLA-017										Y	Y	Y						Y						Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,4,6,7,8-HpCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,4,7,8,9-HpCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,4,7,8-HxCDD	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,4,7,8-HxCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,6,7,8-HxCDD	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,6,7,8-HxCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,7,8,9-HxCDD	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,7,8,9-HxCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,7,8-PeCDD	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	1,2,3,7,8-PeCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	2,3,4,6,7,8-HxCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	2,3,4,7,8-PeCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	2,3,7,8-TCDD	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	2,3,7,8-TCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	OCDD	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	OCDF	EPA 1613	MLA-017										Y	Y	Y						Y							Y	Y		Y	Y	Y	Y	Y	Y	
		EPA 8290	MLA-017				Y	Y		Y	Y	Y			Y		Y		Y	Y	Y								Y			Y	Y			Y	
		AXYS MLA-017	MLA-017	Y	Y	Y		Y							Y	Y	Y				Y		Y						Y							Y	
	Total HpCDD	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total HpCDF	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total HxCDD	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total HxCDF	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total PeCDD	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total PeCDF	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total TCDD	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
	Total TCDF	EPA 1613	MLA-017											Y	Y						Y							Y	Y						Y	Y	
		EPA 8290	MLA-017					Y		Y		Y			Y		Y		Y	Y	Y								Y				Y			Y	
		AXYS MLA-017	MLA-017					Y							Y		Y				Y								Y							Y	
PFC	Perfluorobutanesulfonate (PFBS)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorobutanoate (PFBA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorodecanoate (PFDA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorododecanoate (PFDoA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable									
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluoroheptanoate (PFHpA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorohexanesulfonate (PFHxS)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorohexanoate (PFHxA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorononanoate (PFNA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorooctane sulfonamide (PFOSA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorooctanesulfonate (PFOS)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluorooctanoate (PFOA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluoropentanoate (PFPeA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
	Perfluoroundecanoate (PFUnA)	AXYS MLA-041	MLA-041			Y		Y	Y	Y					Y																						
		AXYS MLA-042	MLA-042		Y																																
		AXYS MLA-043	MLA-043													Y	Y	Y	Y		Y																
		AXYS MLA-060	MLA-060																				Y	Y	Y	Y	Y		Y	Y	Y					Y	
PPCP	1,7-Dimethylxanthine	EPA 1694	MLA-075											Y																				Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	10-hydroxy-amitriptyline	AXYS MLA-075	MLA-075			Y																	Y														
	2-hydroxy-ibuprofen	AXYS MLA-075	MLA-075			Y																	Y														
	4-Epianhydrochlortetracycline (EACTC)	EPA 1694	MLA-075											Y																				Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	4-Epianhydrotetracycline (EATC)	EPA 1694	MLA-075											Y																				Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	4-Epichlortetracycline (ECTC)	EPA 1694	MLA-075											Y																				Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	4-Epioxytetracycline (EOTC)	EPA 1694	MLA-075											Y																				Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	4-Epitetracycline (ETC)	EPA 1694	MLA-075											Y																				Y		

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-075	MLA-075			Y																	Y													
	Acetaminophen	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Albuterol	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Alprazolam	AXYS MLA-075	MLA-075			Y																	Y													
	Amitriptyline	AXYS MLA-075	MLA-075			Y																	Y													
	Amlodipine	AXYS MLA-075	MLA-075			Y																	Y													
	Amphetamine	AXYS MLA-075	MLA-075			Y																	Y													
	Anhydrochlortetracycline (ACTC)	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Anhydrotetracycline (ATC)	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Atenolol	AXYS MLA-075	MLA-075			Y																	Y													
	Atorvastatin	AXYS MLA-075	MLA-075			Y																	Y													
	Azithromycin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Benzoylecgonine	AXYS MLA-075	MLA-075			Y																	Y													
	Benztropine	AXYS MLA-075	MLA-075			Y																	Y													
	Betamethasone	AXYS MLA-075	MLA-075			Y																	Y													
	Bisphenol A	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Caffeine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Carbadox	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Carbamazepine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Cefotaxime	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Chlortetracycline (CTC)	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Cimetidine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Ciprofloxacin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Clarithromycin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Clinafloxacin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Clonidine	AXYS MLA-075	MLA-075			Y																	Y													
	Cloxacillin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Cocaine	AXYS MLA-075	MLA-075			Y																	Y													
	Codeine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Cotinine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	DEET (N,N-diethyl-m-toluamide)	AXYS MLA-075	MLA-075			Y																	Y													
	Dehydronifedipine	EPA 1694	MLA-075											Y																					Y	

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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
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		AXYS MLA-075	MLA-075			Y																	Y													
	Demeclocycline	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Desmethyldiltiazem	AXYS MLA-075	MLA-075			Y																	Y													
	Diazepam	AXYS MLA-075	MLA-075			Y																	Y													
	Digoxigenin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Digoxin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Diltiazem	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Diphenhydramine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Doxycycline	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Enalapril	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Enrofloxacin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Erythromycin	AXYS MLA-075	MLA-075			Y																	Y													
	Erythromycin anydrate	EPA 1694	MLA-075											Y																					Y	
	Flumequine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Fluocinonide	AXYS MLA-075	MLA-075			Y																	Y													
	Fluoxetine	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Fluticasone propionate	AXYS MLA-075	MLA-075			Y																	Y													
	Furosemide	AXYS MLA-075	MLA-075			Y																	Y													
	Gemfibrozil	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Glipizide	AXYS MLA-075	MLA-075			Y																	Y													
	Glyburide	AXYS MLA-075	MLA-075			Y																	Y													
	Hydrochlorothiazide	AXYS MLA-075	MLA-075			Y																	Y													
	Hydrocodone	AXYS MLA-075	MLA-075			Y																	Y													
	Hydrocortisone	AXYS MLA-075	MLA-075			Y																	Y													
	Ibuprofen	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Isochlortetracycline (ICTC)	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Lincomycin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Lomefloxacin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Meprobamate	AXYS MLA-075	MLA-075			Y																	Y													
	Metformin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Methylprednisolone	AXYS MLA-075	MLA-075			Y																	Y													
	Metoprolol	AXYS MLA-075	MLA-075			Y																	Y													
	Miconazole	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													

Accreditation Scope

AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev.23

				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	Minocycline	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Naproxen	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Norfloxacin	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Norfluoxetine	AXYS MLA-075	MLA-075			Y																	Y														
	Norgestimate	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Norverapamil	AXYS MLA-075	MLA-075			Y																	Y														
	Ofloxacin	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Ormetoprim	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Oxacillin	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Oxolinic acid	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Oxycodone	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Oxytetracycline (OTC)	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Paroxetine	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Penicillin G	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Penicillin V	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Prednisolone	AXYS MLA-075	MLA-075			Y																	Y														
	Prednisone	AXYS MLA-075	MLA-075			Y																	Y														
	Promethazine	AXYS MLA-075	MLA-075			Y																	Y														
	Propoxyphene	AXYS MLA-075	MLA-075			Y																	Y														
	Propranolol	AXYS MLA-075	MLA-075			Y																	Y														
	Ranitidine	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Roxithromycin	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Sarafloxacin	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Sertraline	AXYS MLA-075	MLA-075			Y																	Y														
	Simvastatin	AXYS MLA-075	MLA-075			Y																	Y														
	Sulfachloropyridazine	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Sulfadiazine	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Sulfadimethoxine	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Sulfamerazine	EPA 1694	MLA-075											Y																					Y		
		AXYS MLA-075	MLA-075			Y																	Y														
	Sulfamethazine	EPA 1694	MLA-075											Y																					Y		

Accreditation Scope

AXYS Analytical Services Ltd.
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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
		AXYS MLA-075	MLA-075			Y																	Y													
	Sulfamethizole	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Sulfamethoxazole	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Sulfanilamide	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Sulfathiazole	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Tetracycline (TC)	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Theophylline	AXYS MLA-075	MLA-075			Y																	Y													
	Thiabendazole	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Trenbolone	AXYS MLA-075	MLA-075			Y																	Y													
	Trenbolone acetate	AXYS MLA-075	MLA-075			Y																	Y													
	Triamterene	AXYS MLA-075	MLA-075			Y																	Y													
	Triclocarban	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Triclosan	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Trimethoprim	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Tylosin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Valsartan	AXYS MLA-075	MLA-075			Y																	Y													
	Verapamil	AXYS MLA-075	MLA-075			Y																	Y													
	Virginiamycin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
	Warfarin	EPA 1694	MLA-075											Y																					Y	
		AXYS MLA-075	MLA-075			Y																	Y													
Targeted Metabolites	11, 14, 17-eicosatrienoic acid (eicosatrienoic acid)	AXYS MLM-001	MLM-001													Y																				
	11, 14-eicosadienoic acid	AXYS MLM-001	MLM-001													Y																				
	3-hydroxytyrosine	AXYS MLM-001	MLM-001													Y																				
	Acetylcarnitine	AXYS MLM-001	MLM-001													Y																				
	Acetylornithine	AXYS MLM-001	MLM-001													Y																				
	Alanine	AXYS MLM-001	MLM-001													Y																				
	alpha-Aminoadipic acid	AXYS MLM-001	MLM-001													Y																				
	Arginine	AXYS MLM-001	MLM-001													Y																				
	Asparagine	AXYS MLM-001	MLM-001													Y																				
	Aspartate	AXYS MLM-001	MLM-001													Y																				
	Asymmetric dimethylarginine	AXYS MLM-001	MLM-001													Y																				
	Butenylcarnitine	AXYS MLM-001	MLM-001													Y																				
	Butyrylcarnitine	AXYS MLM-001	MLM-001													Y																				
	C22:5 ISOMER 1 (tentatively all-cis-4, 8, 12, 15, 19-docosapentaenoic acid)	AXYS MLM-001	MLM-001													Y																				
	C22:5 ISOMER 2 (all-cis-7,10,13,16,19-docosapentaenoic acid (DPA)	AXYS MLM-001	MLM-001													Y																				
	C22:5 ISOMER 3 (tentatively all-cis-4, 7, 10, 13, 16-docosapentaenoic acid)	AXYS MLM-001	MLM-001													Y																				
	Carnitine	AXYS MLM-001	MLM-001													Y																				
	Carnosine	AXYS MLM-001	MLM-001													Y																				
	chenodeoxycholic acid	AXYS MLM-001	MLM-001													Y																				

Accreditation Scope

AXYS Analytical Services Ltd.
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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	cholic acid	AXYS MLM-001	MLM-001													Y																					
	Citrulline	AXYS MLM-001	MLM-001													Y																					
	Creatinine	AXYS MLM-001	MLM-001													Y																					
	Decadienylcarnitine	AXYS MLM-001	MLM-001													Y																					
	decanoic acid (capric acid)	AXYS MLM-001	MLM-001													Y																					
	Decanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Decenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	deoxycholic acid	AXYS MLM-001	MLM-001													Y																					
	docosahexaenoic acid (DHA)	AXYS MLM-001	MLM-001													Y																					
	docosatetraenoic acid (adrenic acid)	AXYS MLM-001	MLM-001													Y																					
	Dodecanedioylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Dodecanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Dodecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Dopamine	AXYS MLM-001	MLM-001													Y																					
	eicosapentaenoic acid (EPA)	AXYS MLM-001	MLM-001													Y																					
	Eicosatetraenoic acid (arachidonic acid)	AXYS MLM-001	MLM-001													Y																					
	eicosatrienoic acid (dihomo-γ-linolenic acid)	AXYS MLM-001	MLM-001													Y																					
	Glutaconylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Glutamate	AXYS MLM-001	MLM-001													Y																					
	Glutamine	AXYS MLM-001	MLM-001													Y																					
	Glutarylcarnitine (Hydroxyhexanoylcarnitine)	AXYS MLM-001	MLM-001													Y																					
	Glycine	AXYS MLM-001	MLM-001													Y																					
	glycochenodeoxycholic acid	AXYS MLM-001	MLM-001													Y																					
	glycocholic acid	AXYS MLM-001	MLM-001													Y																					
	glycodeoxycholic acid	AXYS MLM-001	MLM-001													Y																					
	Hexadecadienylcarnitine	AXYS MLM-001	MLM-001													Y																					
	hexadecanoic acid (palmitic acid)	AXYS MLM-001	MLM-001													Y																					
	Hexadecanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	hexadecenoic acid (palmitoleic acid)	AXYS MLM-001	MLM-001													Y																					
	Hexadecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hexanoylcarnitine (Fumarylcarnitine)	AXYS MLM-001	MLM-001													Y																					
	Hexenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hexose (sum isomers)	AXYS MLM-001	MLM-001													Y																					
	Histamine	AXYS MLM-001	MLM-001													Y																					
	Histidine	AXYS MLM-001	MLM-001													Y																					
	Hydroxyhexadecadienylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxyhexadecanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxyhexadecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxylbutyrylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxyoctadecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxyproline	AXYS MLM-001	MLM-001													Y																					
	Hydroxypropionylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxysphingomyeline C14:1	AXYS MLM-001	MLM-001													Y																					
	Hydroxysphingomyeline C16:1	AXYS MLM-001	MLM-001													Y																					
	Hydroxysphingomyeline C22:1	AXYS MLM-001	MLM-001													Y																					
	Hydroxysphingomyeline C22:2	AXYS MLM-001	MLM-001													Y																					
	Hydroxysphingomyeline C24:1	AXYS MLM-001	MLM-001													Y																					
	Hydroxytetradecadienylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxytetradecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Hydroxyvalerylcarnitine (Methylmalonylcarnitine)	AXYS MLM-001	MLM-001													Y																					

Accreditation Scope

AXYS Analytical Services Ltd.
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				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	Isoleucine	AXYS MLM-001	MLM-001													Y																					
	Kynurenine	AXYS MLM-001	MLM-001													Y																					
	Leucine	AXYS MLM-001	MLM-001													Y																					
	lithocholic acid	AXYS MLM-001	MLM-001													Y																					
	Lysine	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C14:0	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C16:0	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C16:1	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C17:0	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C18:0	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C18:1	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C18:2	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C20:3	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C20:4	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C24:0	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C26:1	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C28:0	AXYS MLM-001	MLM-001													Y																					
	lysoPhosphatidylcholine acyl C28:1	AXYS MLM-001	MLM-001													Y																					
	Methionine	AXYS MLM-001	MLM-001													Y																					
	Methioninesulfoxide	AXYS MLM-001	MLM-001													Y																					
	Methylglutarylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Nitrotyrosine	AXYS MLM-001	MLM-001													Y																					
	Nonaylcarnitine	AXYS MLM-001	MLM-001													Y																					
	octadecadienoic acid (linoleic acid)	AXYS MLM-001	MLM-001													Y																					
	Octadecadienylcarnitine	AXYS MLM-001	MLM-001													Y																					
	octadecanoic acid (stearic acid)	AXYS MLM-001	MLM-001													Y																					
	Octadecanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	octadecatrienoic acid (γ-linolenic acid)	AXYS MLM-001	MLM-001													Y																					
	Octadecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Octanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Ornithine	AXYS MLM-001	MLM-001													Y																					
	Phenylalanine	AXYS MLM-001	MLM-001													Y																					
	Phenylethylamine	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C30:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C30:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C30:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C32:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C32:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C34:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C34:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C34:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C34:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C36:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C36:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C36:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C36:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C36:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C36:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C38:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C38:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C38:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C38:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C38:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C38:6	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C40:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C40:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C40:3	AXYS MLM-001	MLM-001													Y																					

Accreditation Scope

AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev.23

				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	Phosphatidylcholine acyl-alkyl C40:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C40:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C40:6	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C42:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C42:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C42:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C42:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C42:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C42:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C44:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C44:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C44:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine acyl-alkyl C44:6	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C24:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C26:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C28:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C30:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C30:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C32:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C32:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C32:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C32:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C34:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C34:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C34:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C34:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C36:6	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C38:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C38:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C38:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C38:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C38:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C38:6	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C40:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C40:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C40:3	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C40:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C40:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C40:6	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C42:0	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C42:1	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C42:2	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C42:4	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C42:5	AXYS MLM-001	MLM-001													Y																					
	Phosphatidylcholine diacyl C42:6	AXYS MLM-001	MLM-001													Y																					
	Pimelylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Proline	AXYS MLM-001	MLM-001													Y																					
	Propenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Propionylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Putrescine	AXYS MLM-001	MLM-001													Y																					
	Sarcosine	AXYS MLM-001	MLM-001													Y																					
	Serine	AXYS MLM-001	MLM-001													Y																					

Accreditation Scope

AXYS Analytical Services Ltd.
file ref.: ACC-101 Rev.23

				Pulp	Serum	Solids										Tissue						Urine	Water	Water, Drinking				Water, Non-Potable								
Compound Class	Compound	Accredited Method ID	AXYS Method ID	CALA	CALA	CALA	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	Maine DOH	ANAB	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	ANAB	CALA	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	ANAB	California DPH	Florida DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE*	Maine DOH	ANAB	Pennsylvania DEP
	Serotonin	AXYS MLM-001	MLM-001													Y																					
	Spermidine	AXYS MLM-001	MLM-001													Y																					
	Spermine	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C16:0	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C16:1	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C18:0	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C18:1	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C20:2	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C22:3	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C24:0	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C24:1	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C26:0	AXYS MLM-001	MLM-001													Y																					
	Sphingomyeline C26:1	AXYS MLM-001	MLM-001													Y																					
	Symmetric dimethylarginine	AXYS MLM-001	MLM-001													Y																					
	Taurine	AXYS MLM-001	MLM-001													Y																					
	taurochenodeoxycholic acid	AXYS MLM-001	MLM-001													Y																					
	taurocholic acid	AXYS MLM-001	MLM-001													Y																					
	taurodeoxycholic acid	AXYS MLM-001	MLM-001													Y																					
	taurolithocholic acid	AXYS MLM-001	MLM-001													Y																					
	tauroursodexoycholic acid	AXYS MLM-001	MLM-001													Y																					
	Tetradecadienylcarnitine	AXYS MLM-001	MLM-001													Y																					
	tetradecanoic acid (myristic acid)	AXYS MLM-001	MLM-001													Y																					
	Tetradecanoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Tetradecenoylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Threonine	AXYS MLM-001	MLM-001													Y																					
	Tiglylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Total dimethylarginine	AXYS MLM-001	MLM-001													Y																					
	Tryptophan	AXYS MLM-001	MLM-001													Y																					
	Tyrosine	AXYS MLM-001	MLM-001													Y																					
	ursodexoycholic acid	AXYS MLM-001	MLM-001													Y																					
	Valerylcarnitine	AXYS MLM-001	MLM-001													Y																					
	Valine	AXYS MLM-001	MLM-001													Y																					
TBBPA	Tetrabromobisphenol A	AXYS MLA-079	MLA-079		Y																																

Note*
Analysis of pesticides and PCBs in non-potable water samples by AXYS method MLA-007, with the exception of NPDES or State permitted discharges and Stormwater applications, may fall within the scope of Washington State Department of Ecology solids matrix accreditation, subject to approval of the Ecology Project Manager.

Legend

BPA and mPE	Bisphenol A and mono-Phthalate Esters
HBCDD	Hexabromocyclododecane
OC Pesticides	Organochlorine Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PBDPE	Polybrominated diphenylethers
PCB	Polychlorinated Biphenyls
PCDDF	Polychlorinated dibenzodioxins/furans
PFC	Perfluorinated Compounds
PPCP	Pharmaceutical and Personal Care Products
TBBPA	Tetrabromobisphenol A
California DPH	California Department of Public Health, Lab ID 2911
Florida DOH	Florida Department of Health, Lab ID E871007, (NELAC Standard)
Pennsylvania DEP	Pennsylvania Departmnent of Environmental Protection
Minnesota DOH	Minnesota Department of Health, Lab ID 232-999-430, (NELAC Standard)
New Jersey DEP	New Jersey Department of Environmental Protection, Lab ID CANA005, (NELAC Standard)
New York DOH	New York Department of Health, Lab ID 11674, (NELAC Standard)
Washington DE	Washington Department of Ecology, Lab ID C404
Virginia DGS	Virginia Department of General Services, Division of Consolidated Laboratory Services, Lab ID 460224, (NELAC Standard)
Maine DOH	Maine Center for Disease Control and Prevention, Department of Health and Human Services, Lab ID CN00003
CALA	Canadian Association for Laboratory Accreditation Inc., Lab ID A2637, (ISO/IEC 17025:2005 Standard)
ANAB	ANSI-ASQ National Accreditation Board, certificate AT-1861, (ISO/IEC 17025:2005 Standard)

Appendix D

AXYS Urine Analytical Reports

Appendix D

PAH Metabolite Concetrations in Urine Samples from Laredo AFB PAH Bioavailability Pilot Study

SAMPLE_NO	AXYS_ID	ANALYSIS_DATE	COMPOUND	CAS_NO	LAB_F	CONC_F	DETECTIO	UNIT
Day 7 Group 1	L22965-21 Wi2	17-Jul-15 22:48:43	3-OH-Chrysene	63019-39-6	U		900	pg/mL (wet weight basis)
Day 7 Group 1	L22965-21 Wi2	17-Jul-15 22:48:43	3-OH-Benzo[a]pyrene	13345-21-6	U		68	pg/mL (wet weight basis)
Day 7 Group 1	L22965-21 Wi2	17-Jul-15 22:48:43	9-OH-Benzo[a]pyrene	17573-21-6	K	649	53.5	pg/mL (wet weight basis)
Day 7 Group 1	L22965-21 Wi2	17-Jul-15 22:48:43	3-OH-Benz[a]anthracene	4834-35-9	U		777	pg/mL (wet weight basis)
Day 7 Group 1	L22965-21 Wi2	17-Jul-15 22:48:43	13C6-3-OH-Chrysene			78.3		% Recovery
Day 7 Group 1	L22965-21 Wi2	17-Jul-15 22:48:43	13C6-1-OH-Benz[a]anthracene			82.8		% Recovery
Day 7 Group 1	L22965-21 Wi2	17-Jul-15 22:48:43	d11-3-OH-Benzo[a]pyrene			107		% Recovery
Day 7 Group 2	L22965-22 Wi2	18-Jul-15 03:21:32	3-OH-Chrysene	63019-39-6	U		936	pg/mL (wet weight basis)
Day 7 Group 2	L22965-22 Wi2	18-Jul-15 03:21:32	3-OH-Benzo[a]pyrene	13345-21-6		7440	93.3	pg/mL (wet weight basis)
Day 7 Group 2	L22965-22 Wi2	18-Jul-15 03:21:32	9-OH-Benzo[a]pyrene	17573-21-6		3260	63.8	pg/mL (wet weight basis)
Day 7 Group 2	L22965-22 Wi2	18-Jul-15 03:21:32	3-OH-Benz[a]anthracene	4834-35-9	U		801	pg/mL (wet weight basis)
Day 7 Group 2	L22965-22 Wi2	18-Jul-15 03:21:32	13C6-3-OH-Chrysene			86.7		% Recovery
Day 7 Group 2	L22965-22 Wi2	18-Jul-15 03:21:32	13C6-1-OH-Benz[a]anthracene			91.1		% Recovery
Day 7 Group 2	L22965-22 Wi2	18-Jul-15 03:21:32	d11-3-OH-Benzo[a]pyrene			106		% Recovery
Day 7 Group 3	L22965-23 Wi2	17-Jul-15 23:56:54	3-OH-Chrysene	63019-39-6	U		894	pg/mL (wet weight basis)
Day 7 Group 3	L22965-23 Wi2	17-Jul-15 23:56:54	3-OH-Benzo[a]pyrene	13345-21-6	K	453	97.2	pg/mL (wet weight basis)
Day 7 Group 3	L22965-23 Wi2	17-Jul-15 23:56:54	9-OH-Benzo[a]pyrene	17573-21-6	K	545	68.1	pg/mL (wet weight basis)
Day 7 Group 3	L22965-23 Wi2	17-Jul-15 23:56:54	3-OH-Benz[a]anthracene	4834-35-9	U		745	pg/mL (wet weight basis)
Day 7 Group 3	L22965-23 Wi2	17-Jul-15 23:56:54	13C6-3-OH-Chrysene			102		% Recovery
Day 7 Group 3	L22965-23 Wi2	17-Jul-15 23:56:54	13C6-1-OH-Benz[a]anthracene			112		% Recovery
Day 7 Group 3	L22965-23 Wi2	17-Jul-15 23:56:54	d11-3-OH-Benzo[a]pyrene			125		% Recovery
Day 7 Group 4	L22965-24 Wi2	18-Jul-15 02:13:19	3-OH-Chrysene	63019-39-6		767	311	pg/mL (wet weight basis)
Day 7 Group 4	L22965-24 Wi2	18-Jul-15 02:13:19	3-OH-Benzo[a]pyrene	13345-21-6		954	93.8	pg/mL (wet weight basis)
Day 7 Group 4	L22965-24 Wi2	18-Jul-15 02:13:19	9-OH-Benzo[a]pyrene	17573-21-6	K	715	52.9	pg/mL (wet weight basis)
Day 7 Group 4	L22965-24 Wi2	18-Jul-15 02:13:19	3-OH-Benz[a]anthracene	4834-35-9	U		257	pg/mL (wet weight basis)
Day 7 Group 4	L22965-24 Wi2	18-Jul-15 02:13:19	13C6-3-OH-Chrysene			63.3		% Recovery
Day 7 Group 4	L22965-24 Wi2	18-Jul-15 02:13:19	13C6-1-OH-Benz[a]anthracene			68.9		% Recovery
Day 7 Group 4	L22965-24 Wi2	18-Jul-15 02:13:19	d11-3-OH-Benzo[a]pyrene			69.5		% Recovery
Day 14 Group 1	L22965-49 i2	17-Jul-15 21:06:24	3-OH-Chrysene	63019-39-6	U		1120	pg/mL (wet weight basis)
Day 14 Group 1	L22965-49 i2	17-Jul-15 21:06:24	3-OH-Benzo[a]pyrene	13345-21-6	U		40.1	pg/mL (wet weight basis)
Day 14 Group 1	L22965-49 i2	17-Jul-15 21:06:24	9-OH-Benzo[a]pyrene	17573-21-6	K	169	26.9	pg/mL (wet weight basis)
Day 14 Group 1	L22965-49 i2	17-Jul-15 21:06:24	3-OH-Benz[a]anthracene	4834-35-9	U		858	pg/mL (wet weight basis)

Appendix D

PAH Metabolite Concetrations in Urine Samples from Laredo AFB PAH Bioavailability Pilot Study

Day 14 Group 1	L22965-49 i2	17-Jul-15 21:06:24	13C6-3-OH-Chrysene			57.7		% Recovery
Day 14 Group 1	L22965-49 i2	17-Jul-15 21:06:24	13C6-1-OH-Benz[a]anthracene			68.3		% Recovery
Day 14 Group 1	L22965-49 i2	17-Jul-15 21:06:24	d11-3-OH-Benzo[a]pyrene			65.7		% Recovery
Day 14 Group 2	L22965-50 i2	18-Jul-15 05:03:44	3-OH-Chrysene	63019-39-6	U		335	pg/mL (wet weight basis)
Day 14 Group 2	L22965-50 i2	18-Jul-15 05:03:44	3-OH-Benzo[a]pyrene	13345-21-6		4190	34.6	pg/mL (wet weight basis)
Day 14 Group 2	L22965-50 i2	18-Jul-15 05:03:44	9-OH-Benzo[a]pyrene	17573-21-6		1650	21.4	pg/mL (wet weight basis)
Day 14 Group 2	L22965-50 i2	18-Jul-15 05:03:44	3-OH-Benz[a]anthracene	4834-35-9	U		260	pg/mL (wet weight basis)
Day 14 Group 2	L22965-50 i2	18-Jul-15 05:03:44	13C6-3-OH-Chrysene			51.2		% Recovery
Day 14 Group 2	L22965-50 i2	18-Jul-15 05:03:44	13C6-1-OH-Benz[a]anthracene			60.6		% Recovery
Day 14 Group 2	L22965-50 i2	18-Jul-15 05:03:44	d11-3-OH-Benzo[a]pyrene			55.1		% Recovery
Day 14 Group 3	L22965-51 i2	17-Jul-15 21:40:30	3-OH-Chrysene	63019-39-6	U		429	pg/mL (wet weight basis)
Day 14 Group 3	L22965-51 i2	17-Jul-15 21:40:30	3-OH-Benzo[a]pyrene	13345-21-6		183	27.2	pg/mL (wet weight basis)
Day 14 Group 3	L22965-51 i2	17-Jul-15 21:40:30	9-OH-Benzo[a]pyrene	17573-21-6	K	140	15.4	pg/mL (wet weight basis)
Day 14 Group 3	L22965-51 i2	17-Jul-15 21:40:30	3-OH-Benz[a]anthracene	4834-35-9	U		348	pg/mL (wet weight basis)
Day 14 Group 3	L22965-51 i2	17-Jul-15 21:40:30	13C6-3-OH-Chrysene			50.7		% Recovery
Day 14 Group 3	L22965-51 i2	17-Jul-15 21:40:30	13C6-1-OH-Benz[a]anthracene			57.7		% Recovery
Day 14 Group 3	L22965-51 i2	17-Jul-15 21:40:30	d11-3-OH-Benzo[a]pyrene			49.1		% Recovery
Day 14 Group 4	L22965-52 Wi2	18-Jul-15 00:31:01	3-OH-Chrysene	63019-39-6	U		877	pg/mL (wet weight basis)
Day 14 Group 4	L22965-52 Wi2	18-Jul-15 00:31:01	3-OH-Benzo[a]pyrene	13345-21-6		1030	94.7	pg/mL (wet weight basis)
Day 14 Group 4	L22965-52 Wi2	18-Jul-15 00:31:01	9-OH-Benzo[a]pyrene	17573-21-6	K	786	62.8	pg/mL (wet weight basis)
Day 14 Group 4	L22965-52 Wi2	18-Jul-15 00:31:01	3-OH-Benz[a]anthracene	4834-35-9	U		750	pg/mL (wet weight basis)
Day 14 Group 4	L22965-52 Wi2	18-Jul-15 00:31:01	13C6-3-OH-Chrysene			77		% Recovery
Day 14 Group 4	L22965-52 Wi2	18-Jul-15 00:31:01	13C6-1-OH-Benz[a]anthracene			81.8		% Recovery
Day 14 Group 4	L22965-52 Wi2	18-Jul-15 00:31:01	d11-3-OH-Benzo[a]pyrene			93.9		% Recovery

Appendix E

RBAF and PCL Calculations

Appendix E

Relative Bioavailability Factor (RBAF) Calculation Summary

Former Laredo Air Force Base, Laredo, Texas

	Food Day 6 (g/day)	Food Day 7 (g/day)	Ave Food per cage (g/day)	Diet Conc. (mg/kg)	COC Dose (ug/day)	Molecular Weight (ug/umole)	COC Dose (umole/day)		Urine Day 7 (mL/day)	Urine Conc. (ug/mL)	COC Dose (ug/day)	Molecular Weight (ug/umole)	COC Dose (umole/day)	Percent Dose Excreted in Urine (%)	RBA
Soil Diet Day 7															
10% Diet															
Benzo(a)pyrene	3.93	3.85	15.56	0.162	2.5	252.3	0.0100	3OH-BaP	10.9	0.000453	0.0049377	268.3	0.000018	0.184	0.27
Benzo(a)pyrene	3.93	3.85	15.56	0.162	2.5	252.3	0.0100	9OH-BaP	10.9	0.000545	0.0059405	268.3	0.000022	0.222	0.43
Benzo(a)anthracene	3.93	3.85	15.56	0.164	2.6	228	0.0112	3OH-BaA	10.9	0	0	244	0.000000	0.000	#DIV/0!
Chrysene	3.93	3.85	15.56	0.178	2.8	228	0.0121	3OH-CHR	10.9	0.000849	0.0092541	244	0.000038	0.312	0.59
Extract Diet Day 7															
Benzo(a)pyrene	3.95	3.7	15.30	0.155	2.4	252.3	0.0094	3OH-BaP	18.2	0.000954	0.0173628	268.3	0.000065	0.688	
Benzo(a)pyrene	3.95	3.7	15.30	0.155	2.4	252.3	0.0094	9OH-BaP	18.2	0.000715	0.013013	268.3	0.000049	0.516	
Benzo(a)anthracene	3.95	3.7	15.30	0.127	1.9	228	0.0085	3OH-BaA	18.2	0	0	244	0.000000	0.000	
Chrysene	3.95	3.7	15.30	0.162	2.5	228	0.0109	3OH-CHR	18.2	0.000767	0.0139594	244	0.000057	0.526	
BaP Diet Day 7															
Benzo(a)pyrene	3.58	3.8	14.76	0.644	9.5	252.3	0.0377	3OH-BaP	10.4	0.00744	0.077376	268.3	0.000288	0.765	
Benzo(a)pyrene	3.58	3.8	14.76	0.644	9.5	252.3	0.0377	9OH-BaP	10.4	0.00326	0.033904	268.3	0.000126	0.335	
Benzo(a)anthracene	3.58	3.8	14.76		0.0	228	0.0000	3OH-BaA	10.4		0	244	0.000000	#DIV/0!	
Chrysene	3.58	3.8	14.76		0.0	228	0.0000	3OH-CHR	10.4		0	244	0.000000	#DIV/0!	
Soil Diet Day 13	Food Day 12 (g/day)	Food Day 13 (g/day)							Urine Day 13 (mL/day)						
10% Diet															
Benzo(a)pyrene	3.78	3.53	14.62	0.162	2.4	252.3	0.0094	3OH-BaP	17.2	0.000183	0.0031476	268.3	0.000012	0.125	0.20
Benzo(a)pyrene	3.78	3.53	14.62	0.162	2.4	252.3	0.0094	9OH-BaP	17.2	0.00014	0.002408	268.3	0.000009	0.096	0.20
Benzo(a)anthracene	3.78	3.53	14.62	0.164	2.4	228	0.0105	3OH-BaA	17.2		0	244	0.000000	0.000	#DIV/0!
Chrysene	3.78	3.53	14.62	0.178	2.6	228	0.0114	3OH-CHR	17.2		0	244	0.000000	0.000	#DIV/0!
Extract Diet Day 14															
Benzo(a)pyrene	3.43	3.53	13.92	0.155	2.2	252.3	0.0086	3OH-BaP	14.2	0.00103	0.014626	268.3	0.000055	0.637	
Benzo(a)pyrene	3.43	3.53	13.92	0.155	2.2	252.3	0.0086	9OH-BaP	14.2	0.000786	0.0111612	268.3	0.000042	0.486	
Benzo(a)anthracene	3.43	3.53	13.92	0.127	1.8	228	0.0078	3OH-BaA	14.2		0	244	0.000000	0.000	
Chrysene	3.43	3.53	13.92	0.162	2.3	228	0.0099	3OH-CHR	14.2		0	244	0.000000	0.000	
BaP Diet Day 14															
Benzo(a)pyrene	3.55	3.8	14.70	0.644	9.5	252.3	0.0375	3OH-BaP	19.1	0.00419	0.080029	268.3	0.000298	0.795	
Benzo(a)pyrene	3.55	3.8	14.70	0.644	9.5	252.3	0.0375	9OH-BaP	19.1	0.00165	0.031515	268.3	0.000117	0.313	
Benzo(a)anthracene			0.00		0.0	228	0.0000	3OH-BaA	19.1		0	244	0.000000	#DIV/0!	
Chrysene			0.00		0.0	228	0.0000	3OH-CHR	19.1		0	244	0.000000	#DIV/0!	

Appendix F

Revised Technical Memorandum, Details of Regression Analyses to Determine RBAFs for Use at Laredo AFB

TECHNICAL MEMO

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From:

Drs. Brian Magee and Norm Forsberg

Date:

October 6, 2017

Arcadis Project No.:

04285081.0000

Subject:

Determination of Conservative Estimate for the Relative Bioavailability Factor for Benzo(a)pyrene for use at the former Laredo Air Force Base

---

This memorandum details the determination of a reasonable maximum estimate for the relative bioavailability factor (RBAF) statistic for benzo(a)pyrene (BaP) from soils collected from the former Laredo Air Force Base (LAFB). The data used for the analysis include the day 7 and day 14 BaP metabolite urinary excretion rates for mice treated daily with soil amended or soil extract amended diets based on soils samples collected at the LAFB and the former Foster Air Force Bases (FAFB). Regression analyses were performed using the approach described by Casteel et al. (2001, 2003) on 1) the combined LAFB and FAFB day 7 and 14 dataset, 2) the combined LAFB and FAFB day 7 dataset, 3) the combined LAFB and FAFB 14 dataset, and 4) the combined LAFB and FAFB day 7 and 14 dataset excluding the high-dose group to account for potential impact of enzyme induction (if it were occurring). These analyses provide 95% upper confidence limits (UCL) on the RBAF for BaP that range from 9% to 21%. The 95% UCL for the RBAF determined from the full data set (i.e., day 7 and 14 combined) is 13%. These values are also within 20% of best-fit RBA estimates. Included in this memorandum are regression plots depicting the relationship between the rate of BaP metabolite excretion [micromoles per day (µmole/d) and dosing rate (µmole/d)] for soil amended and soil extract amended diets, statistical results from regression analyses, summary tables of key regression results, and a description of the Monte Carlo procedure used to estimate 95% UCLs on the RBAF for each regression analysis. This evaluation provides the basis for Arcadis' use of the term "conservative" when discussing the use of a 20% RBAF in calculating revised Tier 2 PCLs and use in human health risk assessments for the former Laredo Air Force Base shotgun range. Additionally, the correlation coefficients and standard errors of slopes shows that the effect of potential fecal contamination, use of Nalgene metabolic cages, and enzyme induction (if they were occurring) had

minimal impacts on the RBAF estimate. Thus, the RBAF of 20% for BaP is a reasonable maximum estimate and is appropriate for calculating Tier 2 PCLs for use at the Former Laredo Air Force Base.

1. **Regression analysis for combined LAFB and FAFB datasets in mice treated for up to 14 days with soils or soil extracts.**

Table 1. Daily dose and urinary excretion of BaP and its metabolites in mice treated for up to 14 days with former LAFB or FAFB soil amended diets.

Group	BaP Dose (µmol/d)	3-OH Urine (µmol/d)	9-OH Urine (µmol/d)	Sum Urine (µmol/d)	Study	Day	Test Article/ Duration
Animal 1	1.96E-02	2.32E-05	1.40E-05	3.72E-05	Foster	7	GS-1 Day 7
Animal 1	2.18E-02	3.26E-05	3.92E-06	3.65E-05	Foster	14	GS-1 Day 14
Animal 1	1.03E+00	8.28E-04	4.95E-04	1.32E-03	Foster	7	GS-2 Day 7
Animal 1	1.07E+00	2.14E-03	1.16E-03	3.30E-03	Foster	14	GS-2 Day 14
Animal 1	1.39E-01	1.46E-04	7.11E-05	2.17E-04	Foster	7	GS-3 Day 7
Animal 1	1.41E-01	2.20E-04	5.57E-05	2.75E-04	Foster	14	GS-3 Day 14
Animal 1	2.19E-03	9.25E-06	6.19E-06	1.54E-05	Foster	7	GS-4 Day 7
Animal 1	2.19E-03	9.89E-06	0.00E+00	9.89E-06	Foster	14	GS-4 Day 14
Animal 1	2.91E-04	0.00E+00	1.56E-06	1.56E-06	Foster	14	GS-5 Day 14
Animal 2	2.12E-02	2.13E-05	1.26E-05	3.39E-05	Foster	7	GS-1 Day 7
Animal 2	2.27E-02	4.98E-05	2.28E-05	7.26E-05	Foster	14	GS-1 Day 14
Animal 2	1.07E+00	1.12E-03	6.27E-04	1.74E-03	Foster	7	GS-2 Day 7
Animal 2	8.41E-01	2.56E-03	3.34E-04	2.90E-03	Foster	14	GS-2 Day 14
Animal 2	1.44E-01	1.73E-04	7.40E-05	2.47E-04	Foster	7	GS-3 Day 7
Animal 2	1.45E-01	2.70E-04	7.86E-05	3.49E-04	Foster	14	GS-3 Day 14
Animal 2	2.33E-03	8.84E-06	3.96E-06	1.28E-05	Foster	7	GS-4 Day 7
Animal 2	2.41E-03	1.17E-05	1.88E-06	1.36E-05	Foster	14	GS-4 Day 14
Animal 2	2.85E-04	2.72E-06	1.16E-05	1.43E-05	Foster	7	GS-5 Day 7
Animal 2	3.31E-04	0.00E+00	1.60E-06	1.60E-06	Foster	14	GS-5 Day 14
Day 7	1.00E-02	1.80E-05	2.20E-05	4.00E-05	Laredo	7	Day 7
Day 14	9.40E-03	1.20E-05	9.00E-06	2.10E-05	Laredo	14	Day 14

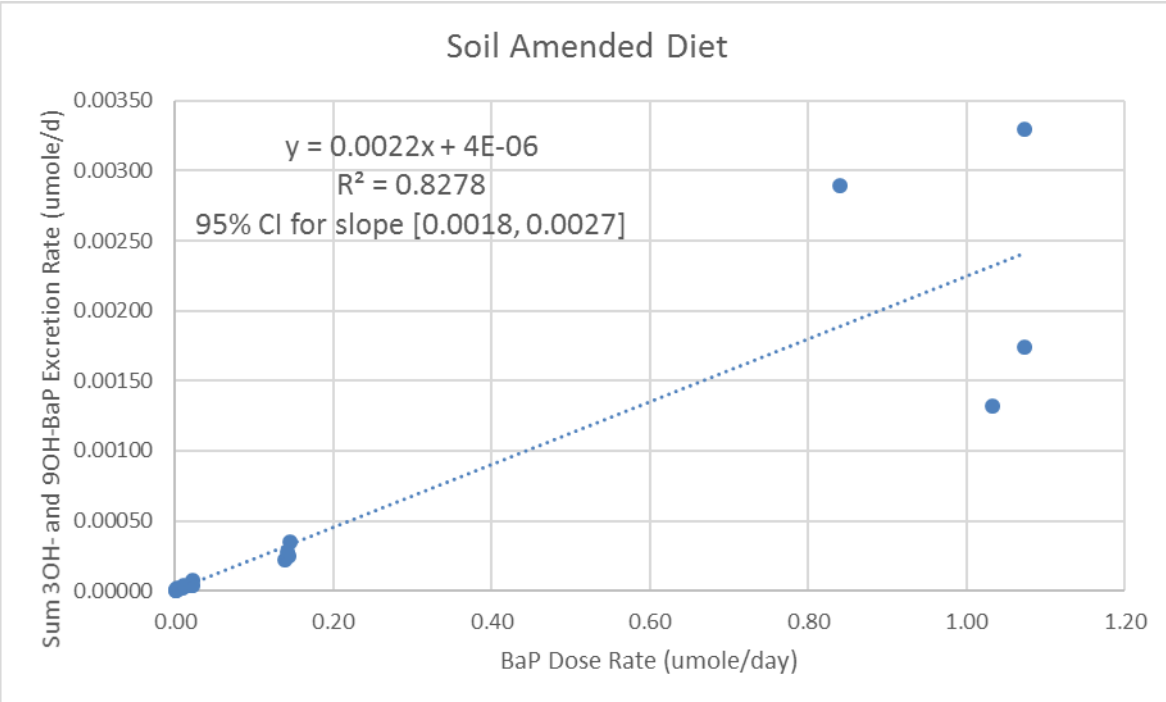
*Note that cells shaded grey are non-detects and the GS-5 Day 14 sample from FAFB was not included in the analysis because levels of 3-OH and 9-OH BaP were non-detect.

Table 2. Daily dose and urinary excretion of BaP and its metabolites in mice treated for up to 14 days with former LAFB or FAFB soil extract amended diets.

Group	BaP Dose (µmol/d)	3-OH Urine (µmol/d)	9-OH Urine (µmol/d)	Sum Urine (µmol/d)	Study	Day	Test Article/ Duration
Animal 1	1.66E-02	1.18E-04	6.37E-05	1.82E-04	Foster	7	GS-1 Day 7
Animal 1	1.66E-02	1.25E-04	5.46E-05	1.79E-04	Foster	14	GS-1 Day 14
Animal 1	5.40E-01	7.37E-03	2.43E-03	9.80E-03	Foster	7	GS-2 Day 7
Animal 1	5.40E-01	8.97E-03	3.79E-03	1.28E-02	Foster	14	GS-2 Day 14
Animal 1	1.22E-01	8.66E-04	3.07E-04	1.17E-03	Foster	7	GS-3 Day 7
Animal 1	1.24E-01	9.66E-04	3.17E-04	1.28E-03	Foster	14	GS-3 Day 14
Animal 1	1.60E-03	1.76E-05	1.44E-05	3.21E-05	Foster	7	GS-4 Day 7
Animal 1	1.58E-03	1.81E-05	1.69E-05	3.51E-05	Foster	14	GS-4 Day 14
Animal 1	3.52E-04	4.14E-06	1.46E-05	1.87E-05	Foster	7	GS-5 Day 7
Animal 1	3.48E-04	0.00E+00	1.44E-05	1.44E-05	Foster	14	GS-5 Day 14
Animal 2	1.66E-02	1.27E-04	5.34E-05	1.81E-04	Foster	7	GS-1 Day 7
Animal 2	1.77E-02	1.57E-04	7.34E-05	2.31E-04	Foster	14	GS-1 Day 14
Animal 2	5.23E-01	7.31E-03	2.25E-03	9.56E-03	Foster	7	GS-2 Day 7
Animal 2	5.29E-01	9.50E-03	1.85E-03	1.14E-02	Foster	14	GS-2 Day 14
Animal 2	1.13E-01	7.52E-04	2.56E-04	1.01E-03	Foster	7	GS-3 Day 7
Animal 2	1.14E-01	1.12E-03	3.93E-04	1.51E-03	Foster	14	GS-3 Day 14
Animal 2	1.72E-03	1.75E-05	1.37E-05	3.12E-05	Foster	7	GS-4 Day 7
Animal 2	1.57E-03	1.47E-05	4.54E-06	1.92E-05	Foster	14	GS-4 Day 14
Animal 2	3.66E-04	3.88E-06	1.90E-05	2.29E-05	Foster	7	GS-5 Day 7
Animal 2	3.38E-04	4.16E-06	1.11E-05	1.53E-05	Foster	14	GS-5 Day 14
Day7	9.40E-03	6.50E-05	4.90E-05	1.14E-04	Laredo	7	Day7
Day14	8.60E-03	5.50E-05	4.20E-05	9.70E-05	Laredo	14	Day14

Figure 1. Regression plot (A) and statistical results (B) for mice treated for up to 14 days with former LAFB or FAFB soil amended diets (day 7 and day 14 combined).

(A)

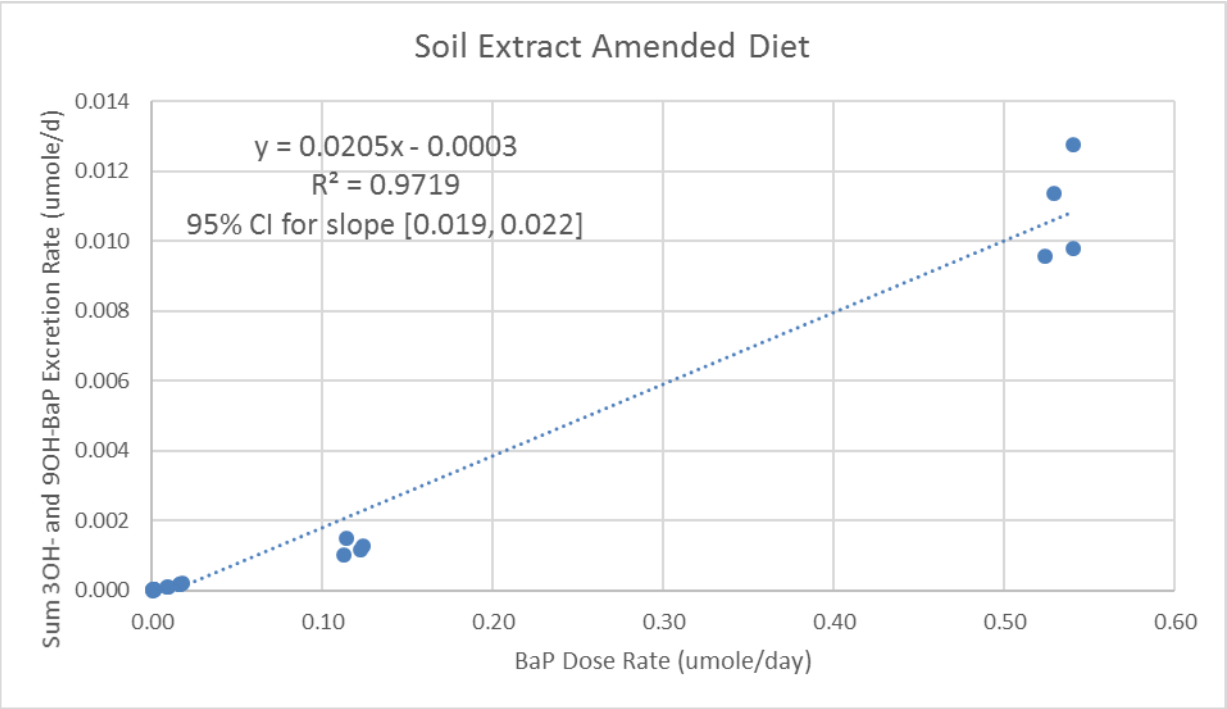


(B)

Soil Amended Diet						
Regression Statistics						
Multiple R	0.909854384					
R Square	0.827834999					
Adjusted R Square	0.818773683					
Standard Error	0.000414498					
Observations	21					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	1.56963E-05	1.57E-05	91.35924787	1.08429E-08	
Residual	19	3.26437E-06	1.72E-07			
Total	20	1.89607E-05				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	4.02686E-06	0.000104671	0.038472	0.969712987	-0.000215052	0.000223105
X Variable 1	0.002247062	0.000235092	9.558203	1.08429E-08	0.001755007	0.002739116

Figure 2. Regression plot (A) and statistical results (B) for mice treated for up to 14 days with former LAFB or FAFB soil extract amended diets (day 7 and day 14 combined)..

(A)



(B)

Soil Extract Amended Diet

Regression Statistics	
Multiple R	0.985852414
R Square	0.971904982
Adjusted R Square	0.970500232
Standard Error	0.000724577
Observations	22

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.00036324	0.000363	691.8699937	5.46904E-17
Residual	20	1.05002E-05	5.25E-07		
Total	21	0.00037374			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-0.000261143	0.000181707	-1.43717	0.166130935	-0.000640177	0.00011789
X Variable 1	0.020512283	0.000779833	26.30342	5.46904E-17	0.018885579	0.022138986

Table 3. Regression Analysis of Excretion Rates of BaP Metabolites (µmole/d) vs. PAH Dose (µmole/d) Associated with Soil Samples from LAFB or FAFB (day 7 and day 14 combined).

Metabolite/Sample Type (*n*)	Slope [95% Confidence Interval]	R^2
Σ 3-OH and 9-OH BaP, Soil Test Article (21)	0.0022 [0.0018, 0.0027]	0.8278
Σ 3-OH and 9-OH BaP, Extract (22)	0.021 [0.019, 0.022]	0.9719

The 95% UCL on the RBAF for BaP Based on Combined LAFB and FAFB Datasets

The following equation shows the calculation of the mean BaP RBAF based on comparison of metabolite urinary excretion rates from mice treated with diets amended with soil or soil extracts collected from former FAFB and LAFBs.

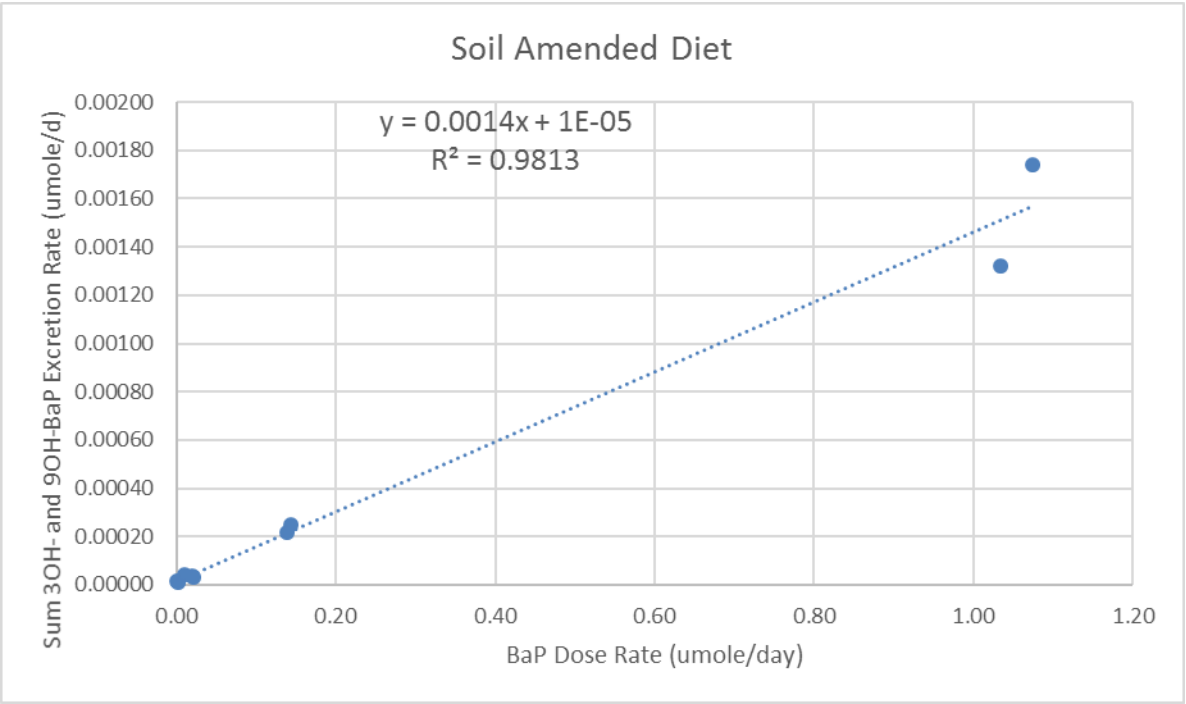
$$RBAF = \frac{Slope\ from\ soil\ amended\ diet}{Slope\ from\ soil\ extract\ amended\ diet} = \frac{0.0022}{0.021} = 0.11$$

As shown above, the RBAF is calculated as the ratio of two slopes, each of which is estimated using linear regression through a set of data points from the combined LAFB and FAFB oral bioavailability studies. However, there is uncertainty in each slope estimate owing to natural variability in the data. Given the central tendency estimate and the standard error of the slope statistic for each regression, the uncertainty in the ratio may be estimated using a Monte Carlo simulation. The probability density function (PDF) describing the confidence around each slope term (UEF) was assumed to be characterized by a t-distribution with n-2 degrees of freedom. Using this approach, a Monte Carlo simulation was run for the RBAF calculation and the 97.5th percentile value from the simulated distribution of RBAF values was taken to be the upper 95% UCL for the RBAF. This procedure yielded a 95% UCL for the BaP RBAF of 0.13, or 13%.

2. **Regression analysis for combined LAFB and FAFB datasets in mice treated for up to 7 days with soils or soil extracts.**

Figure 3. Regression plot (A) and statistical results (B) for mice treated for up to 7 days with former LAFB or FAFB soil amended diets.

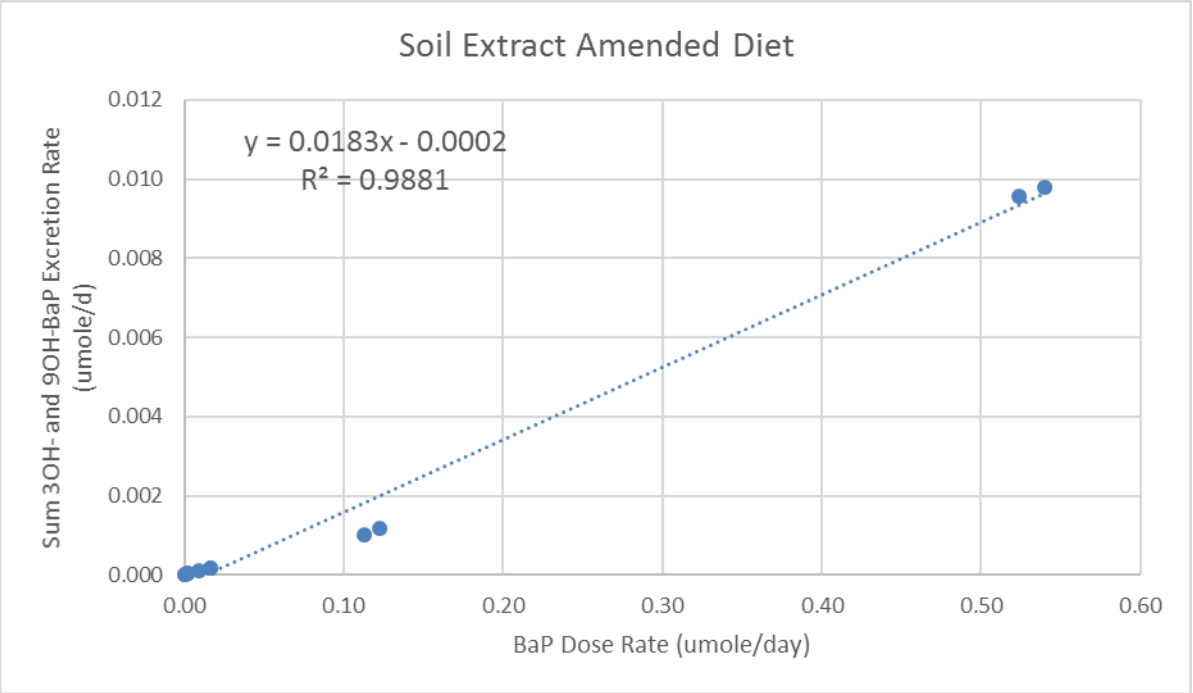
(A)



(B)

Soil Amended Diet						
Regression Statistics						
Multiple R	0.99061098					
R Square	0.98131011					
Adjusted R Square	0.97897387					
Standard Error	9.096E-05					
Observations	10					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	3.47528E-06	3.5E-06	420.038812	3.36169E-08	
Residual	8	6.61898E-08	8.3E-09			
Total	9	3.54147E-06				
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	1.4792E-05	3.35372E-05	0.44106	0.67084616	-6.2545E-05	9.2129E-05
X Variable 1	0.00144548	7.05288E-05	20.4948	3.3617E-08	0.001282837	0.00160812

Figure 4. Regression plot (A) and statistical results (B) for mice treated for up to 7 days with former LAFB or FAFB soil extract amended diets.



(B)

Extract Amended Diet

Regression Statistics	
Multiple R	0.99401866
R Square	0.9880731
Adjusted R Square	0.98674789
Standard Error	0.00043891
Observations	11

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.000143633	0.00014	745.596709	5.74492E-10
Residual	9	1.73378E-06	1.9E-07		
Total	10	0.000145367			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-0.00022608	0.000155641	-1.4526	0.18030181	-0.00057816	0.00012601
X Variable 1	0.01828827	0.000669762	27.3056	5.7449E-10	0.016773161	0.01980338

Table 4. Regression Analysis of Excretion Rates of BaP Metabolites (µmole/d) vs. PAH Dose (µmole/d) Associated with Soil Samples from LAFB or FAFB Day 7 Urine Samples.

Metabolite/Sample Type (*n*)	Slope [95% Confidence Interval]	R^2
Σ 3-OH and 9-OH BaP, Soil Test Article (10)	0.0014 [0.0013, 0.0016]	0.98
Σ 3-OH and 9-OH BaP, Extract (11)	0.018 [0.017, 0.02]	0.99

The 95% UCL on the RBAF for BaP Based on Combined LAFB and FAFB Day 7 Datasets

The following equation shows the calculation of the mean BaP RBAF based on comparison of metabolite urinary excretion rates from mice treated with diets amended with soil or soil extracts collected from former FAFB and LAFBs.

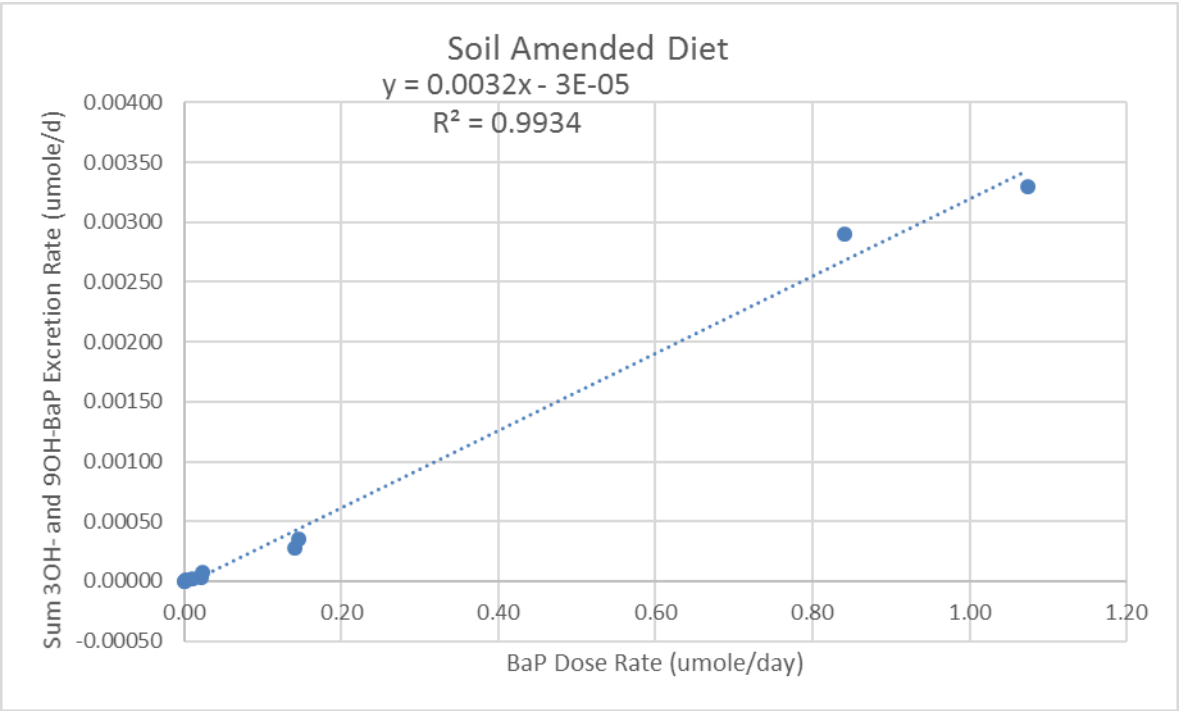
$$RBAF = \frac{Slope\ from\ soil\ amended\ diet}{Slope\ from\ soil\ extract\ amended\ diet} = \frac{0.0014}{0.018} = 0.08$$

As shown above, the RBAF is calculated as the ratio of two slopes, each of which is estimated using linear regression through a set of data points from the combined LAFB and FAFB oral bioavailability studies. Using the Monte Carlo simulation procedure discussed previously yielded a 95% UCL for the BaP RBAF of 0.09, or 9%.

3. **Regression analysis for combined LAFB and FAFB datasets in mice treated for 14 days with soils or soil extracts (Day 7 results excluded).**

Figure 5. Regression plot (A) and statistical results (B) for mice treated for 14 days with former LAFB or FAFB soil amended diets (Day 7 results excluded).

(A)

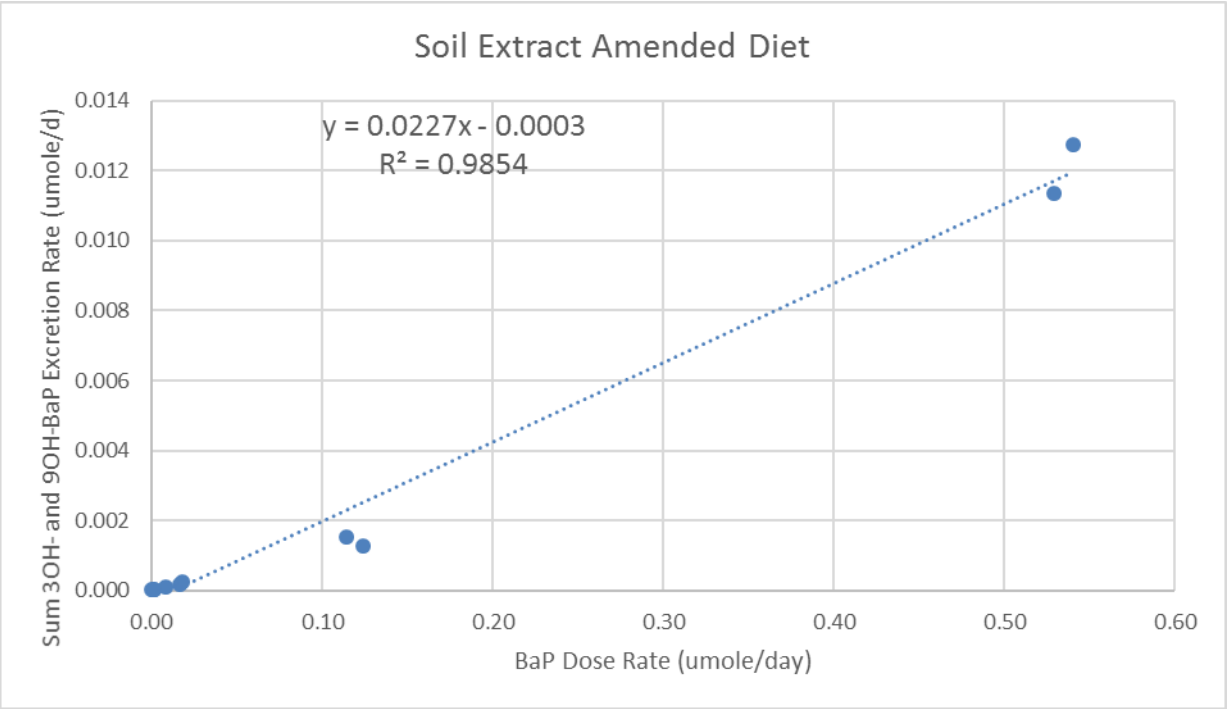


(B)

Soil Amended Diet						
Regression Statistics						
Multiple R	0.996671488					
R Square	0.993354054					
Adjusted R Square	0.992615616					
Standard Error	0.000105417					
Observations	11					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	1.49488E-05	1.49E-05	1345.209099	4.12543E-11	
Residual	9	1.00014E-07	1.11E-08			
Total	10	1.50488E-05				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-2.85154E-05	3.65602E-05	-0.77996	0.455436889	-0.00011122	5.41895E-05
X Variable 1	0.003224941	8.79279E-05	36.67709	4.12543E-11	0.003026035	0.003423848

Figure 6. Regression plot (A) and statistical results (B) for mice treated for up to 14 days with former LAFB or FAFB soil extract amended diets (Day 7 results excluded).

(A)



(B)

Soil Extract Amended Diet						
SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.992678229					
R Square	0.985410066					
Adjusted R Square	0.983788962					
Standard Error	0.0006067					
Observations	11					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	0.000223746	0.000224	607.863653	1.42439E-09	
Residual	9	3.31277E-06	3.68E-07			
Total	10	0.000227058				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-0.000294514	0.000215193	-1.3686	0.204310344	-0.000781313	0.000192286
X Variable 1	0.022709288	0.000921087	24.65489	1.42439E-09	0.020625646	0.024792931

Table 5. Regression Analysis of Excretion Rates of BaP Metabolites (µmole/d) vs. PAH Dose (µmole/d) Associated with Soil Samples from LAFB or FAFB Day 14 Urine Samples (Day 7 results excluded).

Metabolite/Sample Type (*n*)	Slope [95% Confidence Interval]	R^2
Σ 3-OH and 9-OH BaP, Soil Test Article (11)	0.0032 [0.003, 0.0034]	0.99
Σ 3-OH and 9-OH BaP, Extract (11)	0.023 [0.021, 0.025	0.99

The 95% UCL on the RBAF for BaP Based on Combined LAFB and FAFB Day 14 Datasets

The following equation shows the calculation of the mean BaP RBAF based on comparison of metabolite urinary excretion rates from mice treated with diets amended with soil or soil extracts collected from former FAFB and LAFBs.

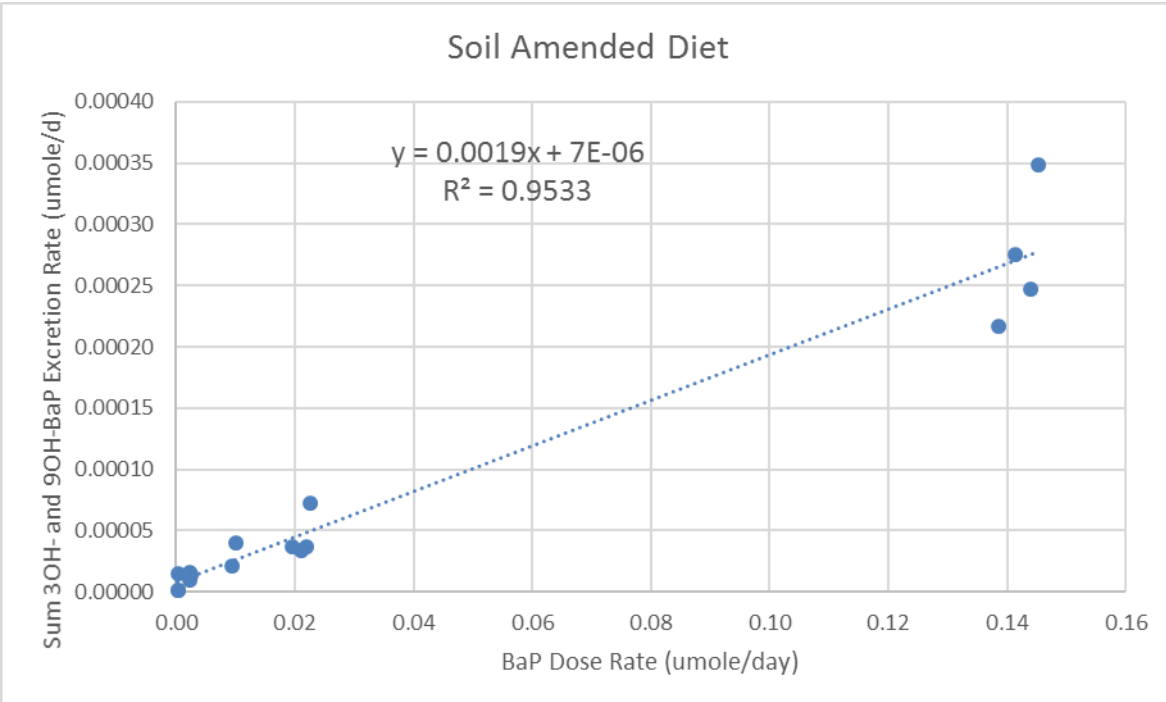
$$RBAF = \frac{Slope\ from\ soil\ amended\ diet}{Slope\ from\ soil\ extract\ amended\ diet} = \frac{0.0032}{0.023} = 0.14$$

As shown above, the RBAF is calculated as the ratio of two slopes, each of which is estimated using linear regression through a set of data points from the combined LAFB and FAFB oral bioavailability studies. Using the Monte Carlo simulation procedure discussed previously yielded a 95% UCL for the BaP RBAF of 0.16, or 16%.

4. **Regression analysis for combined LAFB and FAFB datasets in mice treated for up to 14 days with soils or soil extracts (high-dose excluded).**

Figure 7. Regression plot (A) and statistical results (B) for mice treated for up to 14 days with former LAFB or FAFB soil amended diets (high-dose excluded).

(A)



(B)

Soil Amended Diet

Regression Statistics	
Multiple R	0.976391701
R Square	0.953340753
Adjusted R Square	0.950230136
Standard Error	2.50958E-05
Observations	17

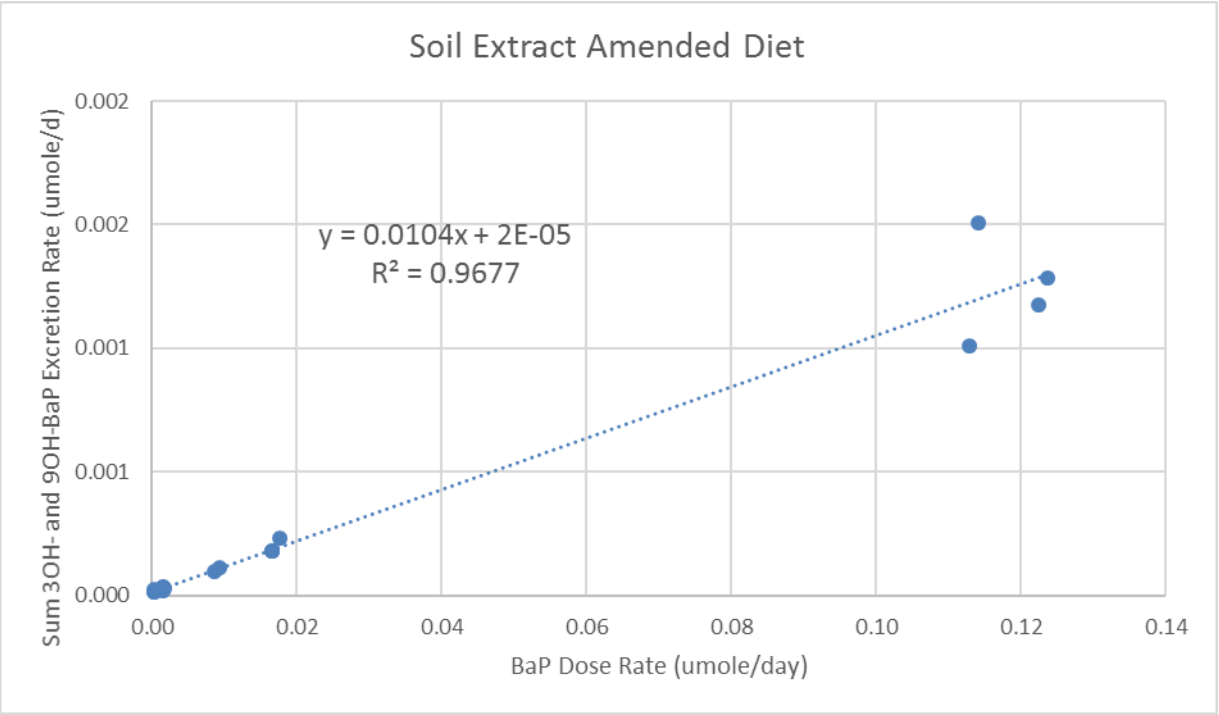
ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.93021E-07	1.93021E-07	306.4796834	2.15193E-11
Residual	15	9.44702E-09	6.29801E-10		
Total	16	2.02468E-07			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	7.25348E-06	7.44293E-06	0.974546858	0.345240383	-8.61074E-06	2.31177E-05
X Variable 1	0.001863872	0.000106467	17.50656115	2.15193E-11	0.001636943	0.002090801

Figure 8. Regression plot (A) and statistical results (B) for mice treated for up to 14 days with former LAFB or FAFB soil extract amended diets (high-dose excluded).

(A)



(B)

Soil Extract Amended Diet

Regression Statistics	
Multiple R	0.983723981
R Square	0.967712871
Adjusted R Square	0.965694925
Standard Error	9.41762E-05
Observations	18

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	4.25324E-06	4.25324E-06	479.5535007	2.3532E-13
Residual	16	1.41907E-07	8.86916E-09		
Total	17	4.39514E-06			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	1.50299E-05	2.67366E-05	0.562146019	0.581807129	-4.16492E-05	7.1709E-05
X Variable 1	0.010368809	0.000473489	21.89871002	2.3532E-13	0.009365056	0.011372562

Table 6. Regression Analysis of Excretion Rates of BaP Metabolites (µmole/d) vs. PAH Dose (µmole/d) Associated with Soil Samples from LAFB or FAFB Day 7 and 14 Urine Samples (high-dose excluded).

Metabolite/Sample Type (*n*)	Slope [95% Confidence Interval]	R^2
Σ 3-OH and 9-OH BaP, Soil Test Article (17)	0.0019 [0.0016, 0.0021]	0.95
Σ 3-OH and 9-OH BaP, Extract (18)	0.010 [0.009, 0.011]	0.97

The 95% UCL on the RBAF for BaP Based on Combined LAFB and FAFB Datasets (high-dose excluded).

The following equation shows the calculation of the mean BaP RBAF based on comparison of metabolite urinary excretion rates from mice treated with diets amended with soil or soil extracts collected from former FAFB and LAFBs.

$$RBAF = \frac{Slope\ from\ soil\ amended\ diet}{Slope\ from\ soil\ extract\ amended\ diet} = \frac{0.0019}{0.01} = 0.19$$

As shown above, the RBAF is calculated as the ratio of two slopes, each of which is estimated using linear regression through a set of data points from the combined LAFB and FAFB oral bioavailability studies. Using the Monte Carlo simulation procedure discussed previously yielded a 95% UCL for the BaP RBAF of 0.21, or 21%.

References:

Casteel, S.W., Evans, T., Dunsmore, M.E., Weis, C.P., Brattin W.J. 2001. Final report: Relative bioavailability of arsenic in soils from the VB170 Site. U.S. EPA- Region 8. Denver, Colorado. January.

Casteel, S.W., Evans, T., Morris, S., Griffin, S., Brattin W.J., Wahlquist, A.M. 2003. Report: Relative bioavailability of arsenic in soils from Butte, Montana. U.S. EPA- Region 8. Denver, Colorado. March.

ENCLOSURE 2

Detailed Responses to Comments Received from U.S. EPA's OSTRI Technical Review Workgroup Bioavailability Committee (TRW BAC) Concerning the Laredo AFB PAH Bioavailability Study, Dated May 22, 2017

Detailed Responses to Comments Received from U.S. EPA's OSTRI Technical Review Workgroup Bioavailability Committee (TRW BAC) Concerning the Laredo AFB PAH Bioavailability Study, Dated May 22, 2017

<table>
<tr><th>Comment Number/Section</th><th>Comment</th><th>EPA Response</th><th>Arcadis Response</th></tr>
<tr><td colspan="3">1.0. Response to Comments on PAH Bioavailability Pilot Study for the Former Laredo Air Force Base Shotgun Range, Laredo, Texas, dated January 12, 2016, from the Texas Commission of Environmental Quality (04/03/17)</td><td></td></tr>
<tr><td>1.1. Comment No. 1(a).
Section 5.1</td><td>Additional discussion and justification (e.g., perhaps statistical) should be provided for the RBAFs proposed. For example, this Former Laredo AFB report refers to results for the Former Foster AFB, but this supporting information is not provided and the document should be sufficient to stand on its own.</td><td>Response addresses BAC comment.</td><td>No further response required.</td></tr>
<tr><td>1.2. Comment No. 1(b)</td><td>Also, although referred to as conservative, it is not readily apparent that the RBAFs proposed for benzo(a)pyrene and chrysene are conservative given the ranges calculated, and supporting documentation for benz(a)anthracene was not provided.</td><td>The response notes that the term conservative was used based on: (1) the combined results of the Laredo and Foster studies and; (2) supplemental analyses that estimated RBA by combining metabolites into a single regression model. If these data form the basis for the conclusion that the value is conservative, then the combined data from the two studies should be presented. My understanding is that the BaP RBA estimates from the 2 studies (14 day) are:

<table><tr><th></th><th>3OH-BaP</th><th>9OH-BaP</th></tr><tr><td>Laredo</td><td>0.2</td><td>0.2</td></tr><tr><td>Foster</td><td>0.23</td><td>0.16</td></tr><tr><td>Foster</td><td>0.14</td><td>0.15</td></tr><tr><td>Foster</td><td>0.20</td><td>0.16</td></tr><tr><td>Mean±SD</td><td>0.19±0.04</td><td>0.17±0.02</td></tr><tr><td>Foster (regression of FUE for 3OH + 9OH)</td><td colspan="2">0.11</td></tr></table>
The response reports a 95% UCL on the RBA for BaP from the combined 3OH+9OH regression model to be 0.15; however, the UCL is not calculated correctly. The reported value is the ratio of the 95%UCLs of the soil/extracted; when it should be the 95%UCL for the ratio of the slopes, based on the uncertainty on the estimates of the slopes for the numerator and denominator. There are a variety of procedures for making this estimate (e.g. Fieller's). Given that the response states that the regression of total metabolites is a more robust way to calculate the RBA; then why do they not use this approach to estimate all RBAs? This approach would also address the uncertainties related to possible induction of metabolism of BaP (see response to Comment No. 3.1).</td><td>The combined results of the two studies using the summed 3OH+9OH regression approach were provided previously in the supplemental memorandum (dated February 12). To address the current comments, however, we revised the memorandum to show the input data used for the regression analysis as well as the results. This revised technical memorandum is included as Appendix F in the Revised Final PAH Bioavailability Pilot Study Report for the Former Laredo Air Force Base Shotgun Site. Additionally, since preparing the original comments, we have used a more sophisticated method that represents the state of the art in bioavailability science to calculate the 95UCL of the ratio of two slopes (i.e., the RBAF). This, too, is presented in the revised technical memorandum. The regression evaluation supports the conclusion that using a RBAF of 20% for BaP is a conservative approach. Additionally, the correlation coefficients and standard errors of slopes shows that the effect of potential fecal contamination, use of Nalgene metabolic cages, and enzyme induction (if they were occurring) had minimal impacts on the RBAF estimate.</td></tr>
</table>

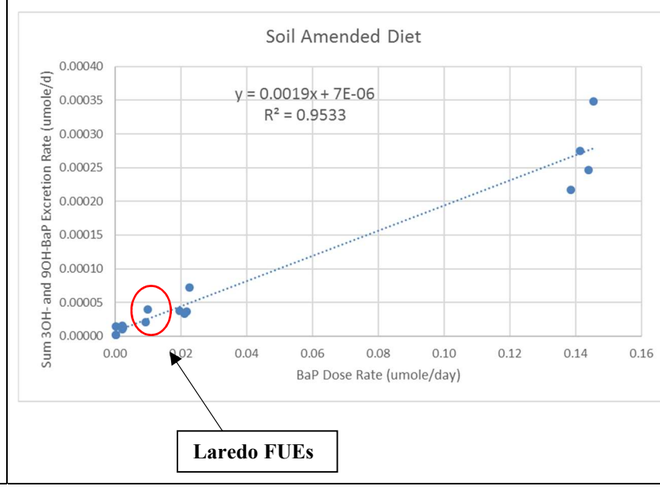
Detailed Responses to Comments Received from U.S. EPA's OSTRI Technical Review Workgroup Bioavailability Committee (TRW BAC) Concerning the Laredo AFB PAH Bioavailability Study, Dated May 22, 2017			
Comment Number/Section	**Comment**	**EPA Response**	**Arcadis Response**
1.3. Comment No. 1(c)	*Similarly, the justification for surrogates should be more robust and elaborated upon in regard to chemical-physical properties making certain PAHs good toxicity surrogates for other PAHs.*	Response addresses BAC. Note: Arcadis proposed using the RBA for benzo(a)pyrene a surrogate for beno(b)fluoranthene, benzo(k)fluorathene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. The rationale for this is provided in their response to comments and is largely based on similarity of K_{ow} and importance of K_{ow} in determining bioavailability of lipophilic chemicals. Their rationale (importance of K_{ow}) agrees with the dioxin-PAH committee draft report on animal models for assessing RBA of dioxins. The response to the BAC comment does address toxicity surrogates in terms of relative potency, based on EPA 2010 (EPA/635/R-08/012A).	No further response required.
1.4. Comment No. 2(a). ***Section 5.2***	*The PCL calculation is missing the air inhalation component, which for PAH exposure is primarily through particulates (e.g., see Tables 1and 6 of PCL tables).*	Response addresses BAC comment.	No further response required.
1.5. Comment No. 2(b).	*This section again refers to results for the Former Foster AFB, but this supporting information is not provided and the document should be sufficient to stand on its own (I don't even recall having seen the Former Foster AFB report referred to).*	Response addresses BAC comment.	No further response required.
1.6. ***Comment No. 3. Appendix E:***	*The Excel spreadsheet should be submitted electronically.*	Response addresses BAC comment.	No further response required.
3.0. Response to Comments "FINAL PAH Bioavailability Pilot Study Report, Former Laredo Air Force Base Shotgun, dated March 29, 2016.			
3.1. Comment No. 1	*BaP induces aryl hydrocarbon hydroxylase (AHH, Nebert et al., 2016). As a result, differences in absorbed doses between the soil and extract groups (at the same administered doses of BaP) could give rise to differences in metabolic clearance BaP (fraction of absorbed BaP eliminated). Differences in BaP clearance between the soil and extract groups could introduce error into the estimate of RBA, which is based on the*	The response provides evidence of induction, which may have resulted in an underestimate of RBA; however, the response does not address an alternative design that would account for the effects of induction in the estimation of RBA and, therefore, support the 0.2 value as being conservative. One approach (included in the BAC comment) would be to re-estimate RBA based on a regression analysis of the dose-urinary metabolite data. These analyses have been done and are reported in the responses to other comments (e.g. see regression analysis reported on pages 3/5-3/7 of response to comments of	As noted by the reviewer, the regression analysis was reported elsewhere in our previous responses to comments (i.e., response to comment No. 5 and 11d) as well as others. Additionally, a secondary memorandum with details of the regression analysis were provided to support the response-to-comments submission package (i.e., Memo from Brian Magee and Norm Forsberg to Kip Haney, Dated February 10, 2017, Subject: Determination of Conservative Estimate for the Relative Bioavailability Factor for benzo(a)pyrene for use at the former Foster and Laredo Air Force Bases). To address the commenter's concern, we have also included a revised technical memorandum as Appendix F in the Revised Final PAH Bioavailability Pilot Study Report for the Former Laredo Air Force Base Shotgun Site that shows the input data used for the regression analyses as well as the results. This response requires no further action.

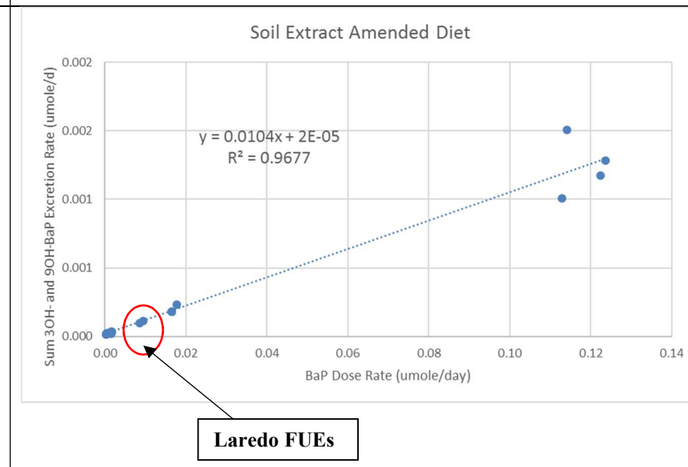
Detailed Responses to Comments Received from U.S. EPA's OSTRI Technical Review Workgroup Bioavailability Committee (TRW BAC) Concerning the Laredo AFB PAH Bioavailability Study, Dated May 22, 2017			
Comment Number/Section	**Comment**	**EPA Response**	**Arcadis Response**
	ratio of the urinary excretion fractions (FUEs). For example, if metabolic clearance in the extract group exceeded that of the soil group (e.g.as a result of a higher absorbed dose), RBA may have been underestimated from the ratio of FUEs. *A test of this possibility would be to compare the RBAs calculated from FUEs for different administered doses of the extracted PAH. If RBA is shown to be dependent on administered PAH dose, then the assay design would need to be reconsidered. The assay could be run with multiple dose levels for the soil PAH and extracted PAH and the RBA calculated from comparison of the dose-UEF relationships for soil and extract. An alternative design would be to administer doses of soil PAH and extracted PAH that yield equivalent induction of AHH.*	Laredo study). It is not clear why this was not included in the response.	
3.2 Comment No. 2	*It is not clear why the RBAs were calculated based urinary PAH and administered dose measured on a single day (day 7 or day 14). This design removes variability in the daily PUE from the calculation of RBA. An alternative design, if feasible, would be to base the PUE on the cumulative administered dose and urinary excretion.*	Response addresses BAC comment.	No further response required.
3.3. Comment No. 3	*The FUEs for 30H-BaP and 90H-BaP were lower when measured on day 14 compared to day 7, which resulted in a lower estimate for RBA for BaP. This suggests that the RBA estimate is not stable across the exposure durations explored in the pilot study. Consideration should be given to exploring longer durations to achieve a stable estimate of RBA that is not dependent on exposure duration.*	The response discusses differences in urinary metabolite concentrations and does not address the differences in FUEs at day 7 and day 14, which determine the RBAs. Leaking water bottles will inflate the estimate of urine volume but will not affect the estimate of total amount secreted or FUE. Therefore, the problem remains that FUEs were dependent on exposure duration.	Detailed results for regression analyses are presented in a revised technical memorandum that is included as Appendix F in the Revised Final PAH Bioavailability Pilot Study Report for the Former Laredo Air Force Base Shotgun Site, including independent analyses for the individual day 7 and day 14 datasets. The slope of the relationship between the summed excretion rate of 3-OH+9-OH BaP (µmole metabolite/day) and the BaP dosing rate (µmole BaP/day) is the FUE. Comparing the day 7 and day 14 FUEs from the regression analyses shows that FUEs are higher on day 14 compared to day 7 for both treatments (soil vs. soil-extract amended diets) and that the RBA estimate based on the day 14 dataset is higher than the day 7 dataset. However, the values differ by less than a factor of 2 and both RBA estimates are below the value of 0.2 that we propose using to derive Tier 2 PCLs.

<table>
<tr><th colspan="4">Detailed Responses to Comments Received from U.S. EPA's OSTRI Technical Review Workgroup Bioavailability Committee (TRW BAC) Concerning the Laredo AFB PAH Bioavailability Study, Dated May 22, 2017</th></tr>
<tr><th>Comment Number/Section</th><th>Comment</th><th>EPA Response</th><th>Arcadis Response</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><th>FUEs based on regressions</th><th>Day 7</th><th>Day 14</th></tr>
<tr><td>Soil Amended Diet</td><td>0.0014 [95% CI: 0.0013, 0.0016]</td><td>0.0032 [95% CI: 0.003, 0.034]</td></tr>
<tr><td>Soil-Extract Amended Diet</td><td>0.018 [95% CI: 0.017, 0.020]</td><td>0.023 [95% CI: 0.021, 0.025]</td></tr>
<tr><td>RBA</td><td>0.08 [90% CI: 0.07, 0.09]</td><td>0.14 [90% CI: 0.13, 0.15]</td></tr>
</table>
</td></tr>
<tr><td>3.4. Comment No. 4</td><td>PAH concentrations are many times greater in feces compared to urine. Therefore, contact of urine with fecal matter could contaminate urine with fecal PAH, leading to a possible overestimate of the urinary excretion fraction of PAH and errors in the estimate of RBA</td><td>The response argues that fecal contamination would give rise to variability in BaP metabolite concentrations in measured urine (...This consistency in urine concentrations of 3OH-BaP does not support the hypothesis that fecal contact with urine samples have significantly impacted PAH metabolites in urine samples from the Laredo AFB and Foster AFB studies). However, as noted in the response, other factors, including spilled drinking water, could affect variability in concentrations. The metric that should be considered is variability in amount of metabolite in urine, not variability in concentration. However, to evaluate this variability, a sensitivity analysis is needed to explore the possible magnitude of the effect of fecal contamination on the RBA. Nevertheless, fecal contamination would result in an overprediction of the RBA and would therefore, be a conservative error for risk assessment.</td><td>We agree with the commenter that the "amount of metabolite in urine" is a better metric for making this evaluation. To this end, we prepared a revised technical memorandum that details regression analyses based on the summed excretion rate of 3-OH+9-OH BaP (µmole metabolite/day) and the BaP dosing rate (µmole BaP/day). This technical memorandum is provided as Appendix F to the Revised Final PAH Bioavailability Pilot Study Report for the Former Laredo Air Force Base Shotgun Site. Considering that levels of PAH metabolites in feces can be many times larger than those in urine and the variable nature of fecal contact with urine, if fecal contamination of urine were occurring to an appreciable extent, then one would expect to see substantial scatter of the FUE regressions, wide confidence intervals, and coefficients of determination (r^2) that reflect this variation. However, as shown in the summary table below, there is no evidence that fecal contamination of urine (if occurring) had a significant impact on modeling results or RBA estimates.
<table>
<tr><th>FUEs based on regressions</th><th>FUE [95% CI]</th><th>r^2</th></tr>
<tr><td>Soil Amended Diet, Day 7+14</td><td>0.0022 [0.0018, 0.0027]</td><td>0.83</td></tr>
<tr><td>Soil Amended Diet, Day 7</td><td>0.0014 [0.0013, 0.0016]</td><td>0.98</td></tr>
<tr><td>Soil Amended Diet, Day 14</td><td>0.0032 [0.003, 0.034]</td><td>0.99</td></tr>
<tr><td>Soil Amended Diet, Day 7+14 (high-dose excluded)</td><td>0.0019 [0.0016, 0.0021]</td><td>0.95</td></tr>
<tr><td>Soil-Extract Amended Diet, Day 7+14</td><td>0.021 [0.019, 0.022]</td><td>0.97</td></tr>
<tr><td>Soil-Extract Amended Diet, Day 7</td><td>0.018 [0.017, 0.020]</td><td>0.99</td></tr>
<tr><td>Soil-Extract Amended Diet, Day 14</td><td>0.023 [0.021, 0.025]</td><td>0.99</td></tr>
<tr><td>Soil-Extract Amended Diet, Day 7+14 (high-dose excluded)</td><td>0.010 [0.009, 0.011]</td><td>0.97</td></tr>
</table>
</td></tr>
<tr><td>3.5. Comment No. 5</td><td>Cages used in this study were made of Nalgene. PAHs/metabolites can adhere to Nalgene vessels and markedly reduce recovery of PAHs/metabolites excreted in urine.</td><td>The response argues that adherence to surfaces was not a significant factor because; (1) this error, if it occurred, would be systematic and, therefore, would affect the estimated FUE for the numerator (soil) and denominator (extract) identically and not introduce error into the RBA and; (2) the urinary metabolite excretion was a linear function of dose, whereas, adherence would be expected to produce a non-linear dose-urinary metabolite relationship.

Neither of the above arguments are necessarily valid. If a constant fraction of the urinary metabolite adhered to surfaces, this would result in an overestimation of RBA, because the adherence fraction is subtracted from the numerator and denominator and the denominator is larger than the numerator. If the metabolite partitions into the lipophilic Nalgene, then the containers could serve as a nearly infinite sink and saturation may not occur; in which case, non-linearity in the dose-urine metabolite relationship</td><td>If PAH metabolite adherence to metabolism cages were occurring to an appreciable extent, it would be expected to increase variation in FUE regressions, yielding wide confidence intervals and coefficients of determination (r^2) reflective of this increased variation. However, as discussed in the previous comment response, the correlation coefficients show that a linear model fit the data nearly perfectly. As a result, confidence intervals around the slope estimates differ at most by 20% from best-fit estimates, and in many cases, by less than 15%. Considering the many sources of variability inherent in this bioassay study (soil sample homogenization, doses from soil and soil-amended diets, differences in feeding rates, pharmacokinetic differences, collection errors, potential fecal contamination, and measurement errors) and the wide range of dose levels tested, the bioavailability data are remarkably well correlated. Thus, there is no evidence that metabolite adherence to cages had a significant impact on modeling results or RBA estimates.</td></tr>
</table>

Detailed Responses to Comments Received from U.S. EPA's OSTRI Technical Review Workgroup Bioavailability Committee (TRW BAC) Concerning the Laredo AFB PAH Bioavailability Study, Dated May 22, 2017			
Comment Number/Section	**Comment**	**EPA Response**	**Arcadis Response**
		might not be indicative of adherence. For future assays, an analytic evaluation of adherence to the Nalgene containers is recommended (e.g. a recovery study).	
3.6. Comment No. 6	*The test soils were always administered with food. Please state the effect of administration of PAHs with food on bioavailability. If no information is available, please indicate this in the report.*	Response addresses BAC comment. Note: In the draft BAC report on animal models for assessing RBA of dioxins, the literature on effect of lipid on bioaccessibility is reviewed and it supports the arguments made in the response that the presence of lipid in the GI tract is likely to increase bioavailability of PAH.	No further response required.
3.7. Comment No. 7	*We suggest review of the following publications:*	Response addresses BAC comment.	No further response required.
3.8. Comment No. 8	*The report should include greater detail on the soil sampling procedure and how the soils were processed. The current soil sampling procedure is inadequate to properly document either the presence or quantity of PAH' s at the site. The authors state that the "purpose of this pilot study is to present results of bioavailability testing on soil samples from the former Laredo AFB to generate site specific data that will be applied to Tier 2 PCL calculations that account for the bioavailability of PAHs in the coal tar pitch/limestone matrix of the clay target fragments".*	Sample handling and processing in the field and by the laboratory can impact the results of an RBA study. The response describes that samples were sieved (250 um), which generated a <250 um fraction and a >250 um fraction. Samples were also pulverized and then sieved to 250 um. These details should be included in the bioavailability report. The report should also include the sample collection method, whether soils were homogenized prior to sieving, and any other sample handling prior to extraction.	All details from our previous response to comments (dated April 3, 2017) are presented in section 2 (Sample Collection and test Article Preparation) of our revised PAH Bioavailability Pilot Study Report. Note that only the target fragment test article was pulverized. Preparation of soil test articles did not involve pulverizing the samples.
3.9. Comment No. 9	*No evidence is provided to demonstrate that the coal tar pitch/limestone matrix of the clay targets that were bioassayed represent those that were actually used at the shotgun range over the time span that the range was used (from 1942 through the 1960's). No evidence is provided that the clay targets used at the site were purchased from a single manufacturing company, or from a*	Response addresses BAC comment. Xia et al. 2016 demonstrates well that PAHs have higher affinity for tar based skeet targets fragments than sorption sites from minerals soils (properties like natural organic matter, clay content, but not black carbon which was not measured). However, this study also demonstrates the importance of adequate sampling of the site to ensure that the all PAHs present in the fragments across the site were represented in the model. Xia demonstrates that without adequate sampling risk of exposure to PAHs may be greater than	We agree with the commenter that thorough evaluation of the nature and extent of PAH source materials is a key component of site characterization and design of useful bioavailability studies. No further response required.

Detailed Responses to Comments Received from U.S. EPA's OSTRI Technical Review Workgroup Bioavailability Committee (TRW BAC) Concerning the Laredo AFB PAH Bioavailability Study, Dated May 22, 2017			
Comment Number/Section	**Comment**	**EPA Response**	**Arcadis Response**
	single source of coal tar. In the absence of evidence demonstrating that the clay targets were similar in contents over the 20+ years, heterogeneity of PAH's present from the source materials (clay targets) across the shotgun range must be assumed.	model suggest and may therefore suggest expanding uncertainties estimates.	
3.10. Comment No. 10	*The area of concern, 52.l acres, is too large to assume homogeneity of soil properties across the site. Therefore, sampling across the site must take into account the possible heterogeneity of the soil chemical and physical properties as well as the heterogeneity of the source materials (clay targets) as factors controlling the bioavailability of PAH's in the soil matrix. The pilot study only collected soil samples from two locations with clay target fragments in the upper 6 inches. No description is provided on how the samples were collected, e.g. incremental sampling or random scoops of soil 6 inches deep from some defined area. The pilot study should explain how a sample area is defined (e.g. residential yard, 1 acre plots, soil units based on NRCS soil survey data) and use the standard operating procedure for incremental soil sampling.*	Xia et al. 2016 demonstrates well that PAHs have higher affinity for tar based skeet targets than for natural organic matter or clay minerals and suggest that when the source of PAHs are from shooting targets that soil properties are less likely to affect the sorption and release of PAHs. However, this study used soil samples from two locations, which is inadequate for understanding the variability of the RBA and the TRW believes this justifies expanding the uncertainty bounds, or the remedial project manager should consider asking for additional evidence that samples used for this study adequately represent the presence and concentrations of PAHs present at the sites	The RBAs developed for Laredo reflect clay target fragments from two former Air Force bases (i.e., the former Laredo and Foster Air force bases). The profile of PAHs in target fragments and soil samples collected from areas with visible target fragments are the same across the entire fall zones across the two sites. Importantly, the FUE estimates for Laredo soil and soil-extract amended diets fall nearly perfectly on the best-fit regression line from the combined LAFB and FAFB datasets (plots with high-dose excluded are shown here to more clearly show LAFB FUEs). Additionally, we recommend using an RBA of 0.2 to derive Tier 2 PCLs for BaP. This recommendation is based on upper confidence intervals determined using a Monte Carlo approach (refer to revised technical memorandum included as Appendix F in the Revised Final PAH Bioavailability Pilot Study Report for the Former Laredo Air Force Base Shotgun Site). Thus, our proposed RBA includes an additional margin of safety.  	

Detailed Responses to Comments Received from U.S. EPA's OSTRI Technical Review Workgroup Bioavailability Committee (TRW BAC) Concerning the Laredo AFB PAH Bioavailability Study, Dated May 22, 2017			
Comment Number/Section	**Comment**	**EPA Response**	**Arcadis Response**
			
3.11. Comments No. 11a,b,c	*Please note the following editorial comments and clarifications.*	Response addresses BAC comments.	No further response required.
3.12. Comment No. 11d Page 5-2, 1st paragraph	Is this use of the term "conservatively" appropriate here. The values referred to as conservative (e.g. BaP -20%) are lower than those shown in Table 6.	See response to Comment No 1.1.	We demonstrate that the BaP RBA of 20% is a conservative (reasonable maximum) estimate and is appropriate for use in calculating Tier 2 PCLs. Please refer to our previous responses presented herein and the revised technical memorandum included as Appendix F in the Revised Final PAH Bioavailability Pilot Study Report for the Former Laredo Air Force Base Shotgun Site for additional details.
3.13. Comment No. 11e Page 5-2, last sentence	The reference to "dermal absorption analysis" here is unclear. Mentioning dermal exposure here is a bit confusing because the entire discussion until now has focused on diet alone.	Response addresses BAC comments.	No further response required.
3.14. Comment No. 11f Page 5-3, paragraph before equation:	To be complete, it would be helpful to provide the equation where the RBAF is applied before showing the equation below.	Response addresses BAC comments.	No further response required.
3.15. Comment No. 11g Page 5-3, equation	Should there be a '+' symbol between the 2nd and 3rd terms in the denominator.	Response addresses BAC comments.	No further response required.

ENCLOSURE 3

Response to Comments Received from TCEQ (September 29 and October 4, 2017) and Observations Received from the TRW BAC (September 29, 2017)

MEMO

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Dr. Brian Magee, Arcadis

From:

Alex Walter, Arcadis

Date:

October 11, 2017

Subject:

Responses to TCEQ Comments for the Foster and Laredo Bioavailability Studies

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This memorandum provides responses to comments received from the Texas Commission on Environmental Quality (TCEQ) regarding the Bioavailability Reports prepared for the Former Skeet Ranges associated with the Foster and Laredo Air Force Bases. This memorandum addresses TCEQ comments provided the U.S. Army Corps of Engineers (USACE) in email correspondence dated September 29 and October 4, 2017. The comments and associated revisions addressed below have been applied to Appendix F for the Former Laredo Air Force Base site and Appendix K for the Former Foster Air Force Base site. Additional comments from the U.S. Environmental Protection Agency (USEPA) TRW, which were also included in the September 29, 2017 email, are addressed in a separate memorandum.

TCEQ Comments

September 29, 2017 Email

TCEQ Comment: The heading of Figure 6 in Appendix K may be incorrect (e.g., should be 14 instead of 7 days? If so, this should be changed in the Laredo document Appendix F also).

USACE Response: The heading has been revised as indicated.

TCEQ Comment: Clarification requested for the Foster submittal. Please clarify what is meant by, or the implication of, the statement that central estimates of RBAFs …were not linearly related to dose range (p. 18/19 of Appendix K). Perhaps Arcadis meant (more plainly) that central estimate RBAFs were not dependent upon dose (i.e., they were dose-independent).

USACE Response: TCEQ is correct in their understanding and the central estimate of the RBAFs were dose-independent. The text has been revised in Appendices F and K for the Laredo and Foster sites, respectively.

October 4, 2017 Email

TCEQ Comment: Verify if the method used to calculate the 97.5th and 99th percentiles in the 3 page memorandum of Oct. 4, 2017 is the same as that suggested by EPA

USACE Response: Yes, the method used to calculate the percentiles is the same as that suggested by EPA. We updated the header in the table included in the memo and added footnotes to clarify this (see below). As per EPA's recommendation, the 97.5th percentile of the MCA distribution would be equivalent to the 95% UCL, while that 99.5th percentile of the MCA distribution would be equivalent to the 99% UCL.

TCEQ Comment: How/why that methodology differs from the calculations in the Appendices of the Foster and Laredo reports.

USACE Response: The methodology does not differ from the calculations in the appendices of the Foster and Laredo reports, which present the 95th percentile results. In yesterday's memorandum we also present the 97.5 and 99.5th percentile results (using the same methodology) as requested by EPA.

MEMO

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Drs. Norm Forsberg and Brian Magee

Date:

October 5, 2017

Subject:

Discussion Points for the Laredo and Foster Bioavailability Studies

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This memorandum provides points of discussion regarding the remaining comments expressed by USEPA TRW in their email to the TCEQ and US Army Corps of Engineers (email from Matthew Lambert, dated September 29, 2017). Arcadis has reviewed these comments and provides below our perspective and recommendation for using a relative bioavailability (RBA) factor of 20% for benzo(a)pyrene (BaP), as previously proposed. Using the RBA factor of 20% for BaP adequately addresses the TRW's remaining comments and provides a health protective estimate for use in calculating Tier 2 PCLs and human health risks at the Former Foster and Laredo Air Force Bases.

EPA TRW Comment:

> "We've reviewed the reports for both Laredo and Foster and we're satisfied that the majority of our concerns and comments have been addressed. We have two remaining concerns and believe that some additional uncertainty should be factored in to the RBA because of them. The first concern is the potential for the PAH metabolites to sorb to the plastic of the cages. Unfortunately, we have no empirical evidence to evaluate whether this is a concern and if so, how large a magnitude of concern it might be. We understand that Dr. Steve Roberts has several experiments running that might elucidate this issue. However, at this time, the results are not available and given what is known about the sorption of PAHs to plastic, there is reason to think it could affect the results of the study. The second concern is the low number of soil samples that were tested. We understand

the limitations of such RBA studies, but a small sample number is likely to underestimate the variability in the RBA at the site.

As a way to incorporate this additional uncertainty, the TRW recommends using the 99UCL as the RBA, rather than the 95UCL. We note that in the reports the 95UCL was defined as the 95th percentile of the ratios from the MCA. However, typically we recommend that the 95UCL on the mean RBA for the samples be estimated as the 97.5th percentile (i.e., 2.5% on each tail of the distribution). Given the uncertainty due to the potential for sorption to plastic and the low sample number, the TRW recommends using the 99UCL as a conservative estimate of RBA for the site (estimated as the 99.5th percentile of the MCA distribution)."

Response:

There is no information available in the published literature indicating that water/urine soluble polycyclic aromatic hydrocarbon (PAH) metabolites sorb to plastic metabolic cages under any experimental conditions. Unpublished observations by Dr. Stephen Roberts of the University of Florida reported that 3OH-BaP metabolites spiked in synthetic urine had lower recovery following contact with the plastic Nalgene surface compared to the recovery of parent BaP, which has a much lower solubility than the 3-OH metabolite. However, the 3OH-BaP metabolite has been documented as being unstable with reported loss of 3OH-BaP in urine samples to photo-degradation and auto-oxidation (Woudneh et al. 2016). The experiments that yielded Dr. Roberts' observations did not control for loss from these oxidation mechanisms. Thus, Dr. Roberts' observed low recoveries of 3OH-BaP probably occurred because it was photo-degraded and auto-oxidized during the course of his experiment, not because it sorbed to the plastic metabolism cages.

The 20% RBA was initially proposed based on a preliminary evaluation of the data and prior to completing the regression analyses, as requested by the TRW. Several regression analyses were performed to evaluate if urine collection time-point or dose range affected the RBA estimate. These analyses, provided previously for review as Appendix F and Appendix K in the Laredo and Foster bioavailability reports, respectively, showed that neither yielded RBAs as conservative as the 20% value initially proposed. The most appropriate regression analysis for estimating the RBA factor is the one that includes all of the data. The RBA factors resulting from the entire Foster dataset and for the Foster data + the Laredo data (i.e., Day 7 + 14) yield RBAs between 13 and 14%, depending on choice of UCL (see table below). Thus, the proposed RBA factor of 20% remains a conservative estimate for use at the Former Foster and Laredo Air Force Bases.

TRW is also concerned that a "low number" of soil samples was tested and that this likely under estimated the variability in the RBA at the site. The sites share a common source of PAHs, the World War II-era coal tar pitch/limestone skeet targets, and have PAHs profiles that are indistinguishable from the target fragments themselves. The sampling plans and sample preparation procedures employed at the former Foster and Laredo Air Force Bases were developed with, and agreed to by, USEPA and TCEQ. The sampling plans yielded 5 soil samples for Foster and 1 soil sample for Laredo at benzo(a)pyrene doses that ranged 3,800 to 1,600-fold for soil and soil-extract amended diets, respectively. The soil samples were collected from locations with varying densities of visible target fragments. All samples met data quality objectives. For these reasons, the samples used to estimate relative bioavailability factors capture the range of PAH concentrations at these sites, and the regression analysis accounts for this variability as well as the variability stemming from procedures used in the bioassay itself. Thus, using the 95 UCLs already affords an adequate margin of conservatism beyond the site variability. Regardless, UCLs were calculated at the 97.5 and 99th percentiles as requested by TRW. As shown, doing so has a minimal effect

on the RBA estimate and collectively supports an RBA factor of 20% for BaP. For these reasons, we conclude that the RBA of 20% for BaP appropriately accounts for uncertainties in the assessment in a health protective manner.

Regression Analyses	RBA Estimates at Several Percentiles (%)			
	Mean [90% CI]	95th	97.5th [a]	99.5th [b]
Foster				
Day 7 + 14	11 [9, 13]	13	14	14
Day 7	8 [7, 9]	9	9	9
Day 14	14 [13, 15]	15	16	16
Laredo + Foster				
Day 7 + 14	11 [9, 13]	13	13	14
Day 7	8 [7, 9]	9	9	9
Day 14	14 [13, 15]	15	16	16

[a] Equivalent to the 95% upper confidence limit on the mean, as per EPA TRW recommendations.

[b] Equivalent to the 99% upper confidence limit on the mean, as per EPA TRW recommendations.

TABLES

Table 1. Tier 2 30 Acre Residential $^{Tot}Soil_{Comb}$ PCLs for PAHs
Former Laredo Air Force Base Shot Gun Range, Laredo (Webb County), Texas

	Non-Carcinogenic							Carcinogenic							Tier 2
Constituent	$^{Soil}RBEL_{Derm}$	$^{Soil}RBEL_{Ing}$	$^{bgVeg}RBEL_{Ing}$	$^{Air}RBEL_{Inh}$	$^{Air}Soil_{Inh-VP}$	$^{Veg}Soil_{Ing-org}$	$^{Tot}Soil_{Comb}$	$^{Soil}RBEL_{Derm}$	$^{Soil}RBEL_{Ing}$	$^{bgVeg}RBEL_{Ing}$	$^{Air}RBEL_{Inh}$	$^{Air}Soil_{Inh-VP}$	$^{Veg}Soil_{Ing-org}$	$^{Tot}Soil_{Comb}$	$^{Tot}Soil_{Comb}$
Benzo(a)pyrene	1523.65	122.85	4.69	0.0000021	31.8	520.9	23.71	296.59	30.42	0.61	0.000041	618.1	67.5	18.98	18.98
Benzo(a)anthracene	NC	NC	NC	NC	–	–	NA	2965.87	264.49	6.08	0.0004	2784.0	710.8	170.0	170.0
Benzo-b-fluoranthene	NC	NC	NC	NC	–	–	NA	1887.37	304.17	6.08	0.0004	4525.7	850.0	191.8	191.8
Benzo(k)fluoranthene	NC	NC	NC	NC	–	–	NA	59317.44	3041.67	60.83	0.0041	108294.2	8698.0	2128	2128.4
Chrysene	NC	NC	NC	NC	–	–	NA	768929.82	21726.19	608.33	0.0406	435616.1	61909.0	15203	15203.1
Dibenz(a,h)anthracene	NC	NC	NC	NC	–	–	NA	364.23	30.42	0.61	0.00004	1374.1	47.5	17.42	17.4
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	–	–	NA	1887.37	304.17	6.08	0.0004	17224.7	864.6	198.7	198.7

Constituent	RCF	VFSS1	DA	VFSS2	PEF	RFDo	RFC	SF	URF
Benzo(a)pyrene	6883.515411	6.35236E-08	1.7927E-11	0.00013154	2.0949E-09	0.0003	0.000002	1	0.0006
Benzo(a)anthracene	2429.281245	1.4358E-07	9.1583E-11	0.00013154	2.0949E-09	–	–	0.1	0.00006
Benzo-b-fluoranthene	6883.515411	8.75168E-08	3.4026E-11	0.00013154	2.0949E-09	–	–	0.1	0.00006
Benzo(k)fluoranthene	6883.515411	3.53545E-08	5.5529E-12	0.00013154	2.0949E-09	–	–	0.01	0.000006
Chrysene	2429.281245	9.10044E-08	3.6792E-11	0.00013154	2.0949E-09	–	–	0.001	0.0000006
Dibenz(a,h)anthracene	19517.27787	2.742E-08	3.3401E-12	0.00013154	2.0949E-09	–	–	1	0.0006
Indeno(1,2,3-cd)pyrene	19517.27787	2.14501E-08	2.044E-12	0.00013154	2.0949E-09	–	–	0.1	0.00006

PCLs are adjusted using the following site-specific parameters:

	RBAF	ABS.d
Benz(a)anthracene	0.23	0.007
Benzo(a)pyrene	0.2	0.007
Benzo(b)fluoranthene	0.2	0.011
Benzo(k)fluoranthene	0.2	0.0035
Chrysene	0.28	0.0027
Dibenz(a,h)anthracene	0.2	0.0057
Indeno(1,2,3-cd)pyrene	0.2	0.011

Equations are provided in the Calculator.

Table 2. Tier 2 30 Acre Residential $^{Tot}Soil_{Comb}$ PCL Calculation for Benzo(a)pyrene
Former Laredo Air Force Base Shot Gun Range, Laredo (Webb County), Texas

		COC Specific Parameters			
CAS#	Constituent	H'	Dwat	Dair	Kd
50-32-8	Benzo(a)pyrene	4.69741E-05	9E-06	0.043	7639.941024

Inhalation RBEL

$$^{Air}RBEL_{Inh\text{-}noncarc}\ (mg/m^3) = \frac{RfC \times HQ \times AT.A.res \times 365\ days/yr}{EF.res \times ED.A.res}$$

$$^{Air}RBEL_{Inh\text{-}carc}\ (mg/m^3) = \frac{RL \times ATc \times 365\ days/yr}{URF \times 1000\ ug/mg \times EF.res \times ED.A.res}$$

$^{Air}RBEL_{Inh\text{-}noncarc}\ (mg/m^3) =$ 2.09E-06

$^{Air}RBEL_{Inh\text{-}carc}\ (mg/m^3) =$ 4.06E-05

$$^{Air}Soil_{Inh\text{-}VP} = \frac{^{Air}RBEL_{Inh}}{VF_{ss} + PEF}$$

$$VF_{ss}\left[\frac{mg/m^3 - air}{mg/kg - Soil}\right] = \frac{2\rho_b D_A}{(Q/C)\left[3.14 D_A \tau\right]^{\frac{1}{2}}} \cdot \left(\frac{10^4 cm^2}{m^2}\right)$$

$$D_A = \left[\frac{\theta_{az}^{3.33} D^{air} H' + \theta_{wz}^{3.33} D^{wat}}{\left[\theta_{wz} + K_d \rho_b + \theta_{az} H'\right]\theta_T^2}\right]$$

$$PEF\left[\frac{mg/m^3 - air}{mg/kg - soil}\right] = \frac{(0.036)(1-V)\left(\frac{U_m}{U_1}\right)^3 F(x)}{(Q/C)(3600 s/hr)}$$

$$VF_{ss}\left[\frac{mg/m^3 - air}{mg/kg - soil}\right] = \frac{\rho_b d_s}{(Q/C)\tau} \cdot \left(\frac{10^4 cm^2}{m^2}\right)$$

VF_{SS1}	D_A	VF_{SS2}	PEF	$^{Air}Soil_{Inh\text{-}VP\_noncarc}$	$^{Air}Soil_{Inh\text{-}VP\_carc}$
6.35236E-08	1.79267E-11	0.00013154	2.09492E-09	31.8	618.1

Dermal RBEL

$$^{Soil}RBEL_{Derm\text{-}noncarc} = \frac{HQ \times RfDd \times BW.C \times AT.C.res \times 365\ days/yr}{10\text{-}6\ kg/mg \times ED.C.res \times EF.res \times SA.C.res \times AF.C.res \times ABS.d} = 1523.65$$

$$^{Soil}RBEL_{Derm\text{-}c} = \frac{RL \times AT_c \times 365\ days/year}{SFd \times MF \times 10\text{-}6\ kg/mg \times EF.res \times DF.adj \times ABS.d} = 296.59$$

Ingestion RBEL

$$^{Soil}RBEL_{Ing\text{-}noncarc} = \frac{HQ \times BW.C \times RfD \times AT.C.res \times 365\ days/yr}{10\text{-}6\ kg/mg \times EF.res \times ED.C.res \times IRsoil.C.res \times RBAF} = 122.85$$

$$^{Soil}RBEL_{Ing\text{-}carc} = \frac{RL \times ATc \times 365\ days/yr}{SF \times MF \times 10\text{-}6\ kg/mg \times EF.res \times IRsoil.AgeAdj.res \times RBAF} = 30.42$$

Ingestion of Below Ground Vegetables RBEL

$$^{BgVeg}RBEL_{Ing\text{-}noncarc} = \frac{HQ \times BW.C \times RfD \times AT.C.res \times 365\ days/yr}{EF.res \times ED.C.res \times IRbg.C.res} = 4.69$$

$$^{BgVeg}RBEL_{Ing\text{-}carc} = \frac{RL \times ATc \times 365\ days/yr}{SF \times EF.res \times MF \times IRbg.AgeAdj.res} = 0.61$$

$$^{Veg}Soil_{Ing\text{-}Org} = \frac{(^{BgVeg}RBEL_{Ing})(Ks_{Veg})}{(RCF)(VG_{bg})}$$

$^{Veg}Soil_{Ing\text{-}org\_noncarc}$	$^{Veg}Soil_{Ing\text{-}org\_carc}$
520.86	67.52

$^{Tot}Soil_{Comb}$ PCL

$$^{Tot}Soil_{Comb}\ PCL = \frac{1}{(^{Air}Soil_{Inh\text{-}VP})^{-1} + (^{Soil}Soil_{Derm})^{-1} + (^{Soil}Soil_{Ing})^{-1} + [(^{Veg}Soil_{Ing\text{-}Inorg}) \text{ or } (^{Veg}Soil_{Ing\text{-}org})]^{-1}}$$

$^{Tot}Soil_{Comb\_noncarc}$	$^{Tot}Soil_{Comb\_carc}$
23.71	**18.98**

Tier 2 $^{Tot}Soil_{Comb}$ PCL

18.98

Tier 2 $^{Tot}Soil_{Comb}$ PCL is the minimum of the $^{Tot}Soil_{Comb\_noncarc}$ and $^{Tot}Soil_{Comb\_carc}$ PCLs

Parameters

0.37	θ_T	Total soil porosity
0.16	θ_{ws}	Volumetric water content of vadose zone soils (TRRP default)
0.21	θ_{as}	Volumetric air content of vadose zone soils (TRRP default)
1.67	ρ_b	Soil bulk density (g/cm^3)
40.76	Q/C	Inverse of mean concentration in air at the center of affected soil area (default for 30 acre)
305	d_s	Thickness of affected surficial soil (cm)
9.5E+08	τ	Exposure interval (TRRP default)
0.5	V	Fraction vegetative cover (unitless)
4.8	Um	Mean annual windspeed at 7m height (m/s)
11.32	Ut	Equivalent threshold value of windspeed at 7m height (m/s)
0.224	F(x)	Function dependent on (Ut/Um) derived using Cowherd et. Al (1985) (unitless)
0.007	ABSd	Dermal Absorption Fraction (unitless)
0.2	AF.C.res	Soil-to-Skin Adherence Factor (mg/cm^2-event) - Child
0.2	AF0<6	Age-Specific Adherence Factor (mg/cm^2-event)
0.1	AF6<18	Age-Specific Adherence Factor (mg/cm^2-event)
0.1	AF18<30	Age-Specific Adherence Factor (mg/cm^2-event)
70	ATc	Averaging Time - carcinogens (yr)
30	AT.A.res	Averaging Time - noncarcinogens (yr) - Adult
6	AT.C.res	Averaging Time - noncarcinogens (yr) - Child
15	BW.C	Body weight (kg) - Child
15	BW0<6	Age-Specific Body Weight (kg)
45	BW6<18	Age-Specific Body Weight (kg)
70	BW18<30	Age-Specific Body Weight (kg)
351.6	DF.adj	Dermal Adjustment Factor (mg-yr/kg-event)
30	ED.A.res	Exposure Duration (yr) - Adult
6	ED.C.res	Exposure Duration (yr) - Child
6	ED0<6	Age-Specific Exposure Duration (yr)
12	ED6<18	Age-Specific Exposure Duration (yr)
12	ED18<30	Age-Specific Exposure Duration (yr)
350	EF.res	Exposure Frequency (days/yr)
1	HQ	Hazard Quotient
120	IRsoil.AgeAdj.res	Age-Adjusted Soil Ingestion Rate (mg-yr/kg-day)
191	IRsoil.C.res	Soil Ingestion Rate (mg/day) - Child
2200	SA.C.res	Skin Surface Area (cm^2) - Child
2200	SA0<6	Age-Specific Skin Surface Area (cm^2)
3500	SA6<18	Age-Specific Skin Surface Area (cm^2)
4800	SA18<30	Age-Specific Skin Surface Area (cm^2)
0.0012	IRbg.AgeAdj.res	Below-Ground Vegetables Ingestion Rate (kg-day) - Age Adjusted
0.001	IRbg.C.res	Below-Ground Vegetables Ingestion Rate (kg-day) - Child
1	MF	Modifying Factor for SF (unitless)
0.2	RBAF	Relative Bioavailability Factor (unitless)
0.00001	RL	Acceptable Risk Level
7640	Ksveg	Soil-water partition coefficient (mL/g) = Koc x foc
6883.5	RCF	Ratio of concentration in roots to concentration in soil pore water (mg/kg) (µg/ml) = $(10^{(0.77 \times \log Kow)-1.52)}+0.82)/0.222$
0.010	VGbg	Below ground vegetable correction factor (unitless)
954993	koc	Soil organic carbon-water partition coefficient (cm^3-water/g-carbon)
0.008	foc	Fraction of organic carbon in soil (g-carbon/g-soil)
6.1	log Kow	Octanol-water partition coefficient

Toxicity Factors

0.0003	RFDo	Oral Reference Dose (mg/kg-day)
0.000002	RFC	Reference Concentration (mg/m^3)
1	SF	Slope Factor (mg/kg-day)$^{-1}$
0.0006	URF	Inhalation Unit Risk Factor (µg/m^3)$^{-1}$

Notes:

COC specific parameters were obtained from TRRP Tables (March 2016).

ATTACHMENT A

Electronic submittal of Tier 2 PCL calculators and Entire October 11, 2017 Submittal