Department of Natural Resources
MARYLAND GEOLOGICAL SURVEY
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COASTAL AND ESTUARINE GEOLOGY
FILE REPORT NO. 15-05

Potomac Industrial Dam Sediments Study
Allegany County, Maryland

Reconnaissance Survey of Sediments
At Potomac Industrial Dam, Potomac River

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Prepared For

American Rivers

June 2015

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Acronyms and Abbreviations used in this report

Abbreviation	*Description*
LOD	Limit of Detection
MGS	Maryland Geological Survey
NAD83	North America [Horizontal] Datum of 1983
ND	Not Detected
NIST	National Institute of Standards and Technology
PCDD	Polychlorinated dibenzo-p-dioxins
PCDF	Polychlorinated dibenzofurans
PCB	Polychlorinated biphenyls
TCDD	Tetrachlorodibenzo-p-dioxin
TEF	Toxic Equivalency Factor
TEQ	Toxicity Equivalent
OCDD	Octachlorodibenzodioxin
OCDF	Octachlorodibenzofuran
RL	Reporting Limit
SBAS	Satellite Based Augmentation System (GPS)
SRM	Standard Reference Material
TCLP	Toxicity Characteristic Leaching Procedure
USGS	United States Geological Survey
UTM	Universal Transverse Mercator (coordinate system)

EXECUTIVE SUMMARY

In response to a request by American Rivers, Maryland Geological Survey (MGS) was contracted to study the sediments within the Potomac Industrial Dam impoundment located in Cumberland Maryland. The dam is located beneath Bridge Street in the North Branch Potomac River. The sediments required dioxins analysis to determine the vertical distribution of contaminants in response to dioxins being documented in surficial samples collected by Princeton Hydro in 2009 (Wildman, 2010). Cores were collected at ten locations to quantify the physical and chemical properties of the sediment, and to test for the presence of dioxins. The fieldwork for this study occurred in October 2014.

The physical properties of the sediments accumulated behind Potomac Industrial Dam are dominated by gravelly sands with fine muddy sand to mud sediments accumulating in low energy areas close to the shore upriver and river left just above the dam. The underlying sediments contain increased gravel and cobbles indicative of the pre dam high energy streambed. The TCLP analyses shows non-detectable concentrations of TCLP metals for most samples with low levels of Arsenic, Barium and Lead among seven of the tested samples. For all samples where TCLP metals were detected, the concentrations were far below the TCLP limit.

Dioxins were found in all of the sediment samples collected from above the Potomac Industrial Dam. There were no 2,3,7,8-TCDD dioxins detected in the pre-dam sediments of Cores 5 and 6 and in the two upper intervals in Core 10. With a range of 0.085-5.5 pg/g, the TEQ dioxin concentrations in the sand and gravelly sand samples were below or just above the level of low risk to sensitive mammalian wildlife of 2.5 pg/g. The highest of 5.5 pg/g was found at the base of Core 1, which was collected from river right closest the dam. The TEQ concentrations increased with the increase in finer sediments and organic matter with concentrations highest in the very muddy sediments of Core 2 along the left bank just above the dam where a very thick deposit of fine sediments has accumulated. Two samples tested from Core 2, at depth, contained TEQ values above the 210 pg/g which is the EPA level of high risk for sensitive avian wildlife (EPA 1993). The dioxins levels generally decreased in the pre-dam sediments dominated by gravelly sands and cobbles. Dioxins concentrations were generally lower farther upriver from the dam as seen in Cores 9 and 10 with the exception of Core 8 which was taken the furthest upriver of the dam in a finer sediment accumulated near the river right bank edge.

INTRODUCTION

Background

The Potomac Industrial Dam impoundment is located in Cumberland Maryland beneath Bridge Street in the North Branch Potomac River. The impoundment is approximately 1.9 miles long with an estimated accumulated sediment volume of 142,000 cubic yards (Wildman, 2010).

Dioxins area a group of 210 chemical compounds that are organized into two main groups, polychlorinated dibenzo-p-dioxins (PCDDs or dioxins) and polychlorinated dibenzofurans (PCDFs or furans), and a third related group of dioxin like polychlorinated biphenyls (dioxin-like PCBs). Dioxins bind strongly to organic matter because they are hydrophobic chemicals with low water solubility and thus they tend to accumulate in sediments. Toxicity of the individual dioxins varies widely, but since they have a similar mode-of-action, a method has been created to consider the group together. This is important because a collection of different dioxins is typically found together. The Toxicity Equivalency Factor (TEF) approach standardizes the toxicity of the individual dioxin compounds to a reference dioxin, 2,3,7,8-TCDD which is the most toxic individual dioxin. Its TEF is set at one while the least toxic congeners (OCDD and OCDF) are three orders of magnitude less toxic with TEF values of 0.001. The TEF results are then added together to generate a toxic equivalency (TEQ).

The Potomac River upstream of the impoundment was studied in the late 1980s for potential dioxin contamination in relation to the Westvaco pulp/paper processing facility in Luke, MD. This study found that fish tissues contained elevated concentrations of dioxins. However, no information on the stream bed sediments were available. Due to the presence of dioxins found in the surficial sediments within the impoundment by Princeton Hydro in 2009, cores were needed to document the vertical distribution and magnitude of dioxins within the impounded sediments.

Previous Sediment Studies

Princeton Hydro collected three surficial sediment samples from the within the impoundment in 2009 as part of the Phase 1 Industrial Dam Removal Feasibility Study. The tests of all three samples detected dioxin and dioxin-like compounds collected from the top 0.5 feet of impounded sediment. The 2,3,7,8-TCDD dioxin concentrations detected ranged from 0.57 to 0.93 pg/g (equivalent to ppt) (Wildman, 2010). This study confirmed the presence of dioxins and dioxin like compounds in the surficial sediments at levels that may present risks to ecological receptors.

STUDY OBJECTIVES

The objective of this study was to document the impounded sediments behind Potomac Industrial Dam and to conduct Dioxin analysis to assist in disposal of the sediment to include:

1. Collect 10 cores using vibracoring, push coring, and soil auger techniques. A maximum penetration of 3 meters will be achieved using these techniques. Cores will show stratigraphy of the deposit and will provide *in-situ* sampling of sediments at depth for

analysis.

2. Split, document, photograph, and sub-sample collected cores.

3. Analyze a sub-set of the sediments for physical properties (bulk density, water content, grain size) based on strata changes within the cores.

4. Process selected physical property samples for total elemental analysis (49 elements).

5. Analyze cores for dioxins using homogenized channel samples from the identified sediment deposits within the collected core.

METHODS

Sediment Coring

MGS collected ten sediment cores for this study. All ten cores were selected to document the sediment which is currently captured behind the Potomac Industrial Dam (Figure 1).

Figure 1. Map of the sediment cores locations.

Each of the sediment cores were collected in aluminum liners attached to a vibracore head supplemented with 113 kilograms [250 pounds] of added weight. The vibration speed was varied to obtain the greatest penetration. Cores were driven to refusal then capped, labeled, and retrieved. Horizontal control was provided through a Thales Navigation ProMark 3 GPS supplemented with satellite-based augmentation system (SBAS) differential corrections providing a real-time horizontal accuracy of 2-5 meters [6-15 feet]. Horizontal positions were recorded in the Universal Transverse Mercator (UTM) system Zone 17 based upon the North American Datum of 1983 (NAD83). The maximum water depth for core collection was limited to less than 9 feet due to the height of the tripod used for core retrieval. The majority of the deeper water depths within the impoundment upriver of the area immediately behind the dam were in the thalweg and did not contain significant sediment. Core locations and penetration depths are listed in Table 2.

Table 1. Collected core locations and depths

Core	Northing UTM (m)	Easting UTM (m)	Compaction (Meters)	Penetration (Meters)	Comment
1	4391117	691616	0.58	1.36	Right bank; upstream of dam; about 20' offshore; ~150' upstream of dam
2	4391171	691596	0.49	3.39	Left bank; very soft sediment
3	4391015	691454	1.10	2.20	Left bank; ~20' offshore; soft but firmer than core 2
4	4391000	691479	0.79	1.79	Middle
5	4390839	691213	0.73	2.37	Right bank; ~10' offshore
6	4390801	690852	1.04	1.70	Slightly right of middle; Followed point bar deposit out from bank to limit of tripod
7	4390338	690646	0.50	1.06	Slightly right of middle; ~50' from right bank
8	4389953	689625	0.88	1.42	At right bank ~4' from shoreline
9	4389840	690122	0.55	1.03	Slightly left of middle; ~75' from left bank
10	4389882	690417	1.66	2.58	Slightly left of middle;~50' from left bank

Laboratory Analyses

Core Processing

Upon collection, cores were stored in a sample refrigerator at four degrees centigrade until they were split. Cores were split and sediment was sampled within 48 hours of collection. Cores in aluminum liners were opened using a circular saw, the blade of which was set to cut the core liner only. Each coreliner was cut lengthwise on the front and back. Using stainless steel spatulas, the core was carefully split to minimize any disturbance of sediment structure, dividing

the sediment between the coreliner halves. Immediately upon splitting the core, the core was described, photographed, and sampled for analysis. The core description logs are included in Appendix A.

Samples to be tested for dioxins were collected from each core by taking set of samples were taken from each core at specific intervals based on lithologic changes in sediments. These samples were placed in sealed glass jars with Teflon lids, stored in ice, and transported to Phase Separation Science laboratories. These samples were also analyzed for textural and elemental components.

TCLP Metals and Dioxin Analysis

TCLP samples of unprepared sediment were taken to Phase Separation Science Laboratories in Catonsville, MD to be analyzed for a suite of pollutant metals. The metals were prepared using the EPA Method 3010A and analyzed using EPA SE-846/6020A. Dioxin sediment samples were taken to Phase Separation Science laboratories in Catonsville, MD where they were then sent to SGS North America for analysis. The samples were tested for the entire suite of dioxins using EPA Method 8290A.

Reported TCLP metals and dioxin results, units, reporting limits, and regulatory threshold limit are summarized in Appendix F along with the associated laboratory certificate of analysis, chain of custody, and quality assurance documentation.

Textural Analyses

Thirty sediment samples were analyzed for water content, bulk density, and grain size (sand, silt, clay contents, as well as gravel, when present). Two homogeneous splits of each sample are processed, one for bulk property analyses and the other for grain-size characterization. Analyses were performed as soon as possible after sample collection, and all samples were refrigerated in sealed Whirl-Pak™ plastic bags prior to analysis.

Water content was calculated as the percentage of water weight to the weight of the wet sediment using Equation 1.

$$\%Water = \frac{W_w}{W_t} * 100 \qquad \text{Equation 1}$$

where: W_w is the weight of water; and
W_t is the weight of wet sediment.

Water content was determined by weighing 20-30 g of sediment; the sediment was dried at 65°C, and then re-weighing the dried sediment. Dried sediments were saved for elemental analyses (see **Elemental Analyses** section).

Bulk density (ρ_B) is calculated from water content utilizing Equation 2 by assuming an average grain density (ρ_s) of 2.72 g/cm^3 and saturation of voids with water of density ρ_w = 1.0 g/cm³. This method was adopted from the work of Bennett and Lambert (1971):

$$\rho_B = \frac{W_t}{W_d / 2.72 + W_w} \qquad \text{Equation 2}$$

where W_d is the weight of dry sediment.

Sand, silt and clay contents were determined using the textural analysis detailed in Kerhin and others, (1988). Grain size analysis consists of cleaning the samples in solutions of 10 percent hydrochloric acid and 6 or 15 percent hydrogen peroxide (determined by water content) with subsequent rinsing with deionized water. This process removed soluble salts, carbonates, and organic matter that could interfere with the disaggregation of the individual grains. The samples are then treated with a 0.26 percent solution of the dispersant sodium hexametaphosphate ($(NaPO_3)_6$) to ensure that individual grains did not re-aggregate during analysis.

The separation of the gravel-sand (coarse) fraction and the silty-clay or mud (fine) fraction of the sample was accomplished by wet-sieving through a 4-phi mesh sieve (0.0625 mm, U.S. Standard Sieve #230). The coarse fraction was dried, weighed, and dry-sieved through 2mm mesh sieve (U.S. Standard Sieve #10), separating gravel and sand-sized particles.

The finer silt and clay-sized particles are suspended in a 1000 ml cylinder in a solution of 0.26 percent sodium hexametaphosphate. The suspension is agitated and, at specified times thereafter; 20 ml pipette withdrawals are made (Carver, 1971; Folk, 1974). The rationale behind this process is that larger particles settle faster than smaller ones (Stoke's Law). By calculating the settling velocities for different sized particles, times for withdrawal can be determined at which all particles of a specified size will have settled past the point of withdrawal. Sampling times are calculated to permit the determination of the amount of silt (4 phi) and clay sized (8 phi) particles in the suspension. Withdrawn samples are dried at 65°C and weighed. From these data the percentages by dry weight of gravel, sand, and mud (silt and clay) are calculated for each sample and classified according to Folk's nomenclature (Figure 2).

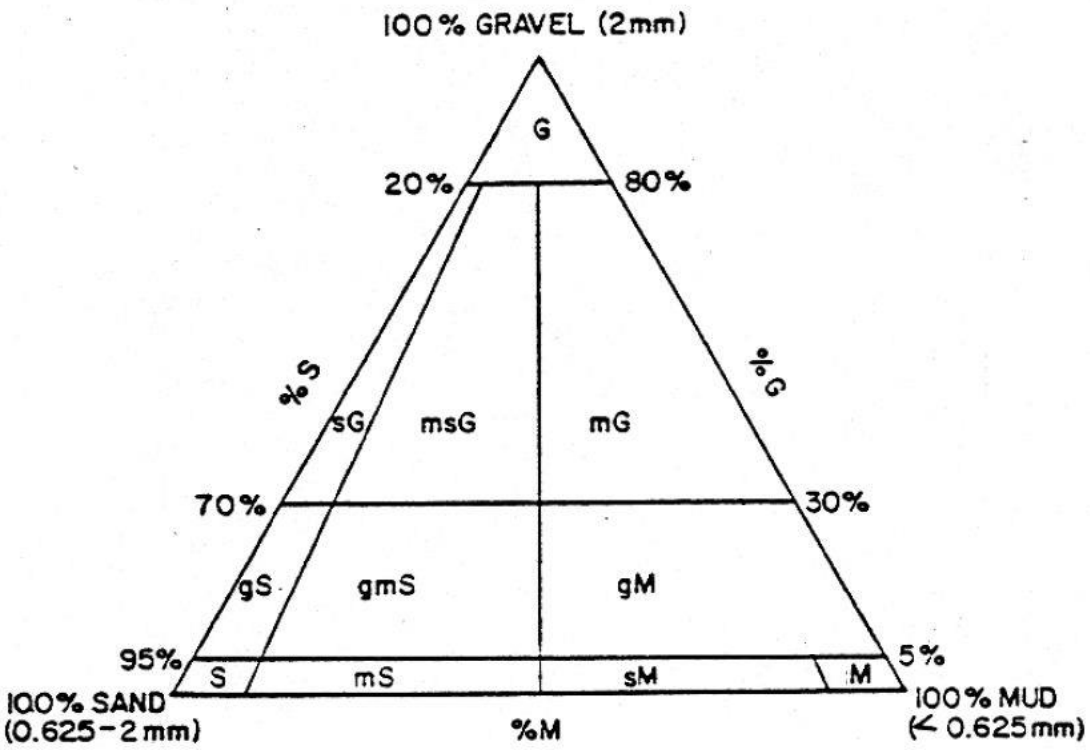

Figure 2. Folk classification of sediment types

Although the techniques used to determine grain size are based on traditional analytical methods developed for the sedimentology lab, some analytical error is inherent to the techniques. For example, results can be affected by level of technician skill and/or changes in laboratory conditions (such as sudden temperature changes). Furthermore, there is no standard reference material available that includes the broad range of particle sizes and shapes contained in natural sediment. To maximize consistency of textural analysis, several "checks" are used to monitor results. The calculated sand, silt, clay and gravel (when present) percentages are checked against 1) sample field descriptions; 2) calculated water contents; and 3) calculated weight loss of sample during processing. These comparisons are made to determine if the size components match the visual description of the sample and/or fall within an expected classification with respect to water content and weight loss. Any discrepancy is "flagged" and the results are reviewed further to determine if re-analysis is warranted.

Elemental Analyses

Thirty splits of dried sediment samples were shipped to Activation Laboratories, Ltd. (Actlabs) in Ontario, Canada to be analyzed for 49 elements. Prior to elemental analyses, Actlabs ground the samples to the point where 95% of the sample passed 200-mesh sieve (0.074 mm screen opening). Elemental concentrations were determined by one of two techniques depending on the particular element. Splits of the ground samples were digested using a four-acid "near total" digestion technique, which employed

perchloric ($HClO_4$), hydrochloric (HCl), nitric (HNO_3), and hydrofluoric (HF) acids. The digested samples were then analyzed using an Inductively Coupled Argon Plasma Spectrometer - Optical emission spectrometry (ICAP-OES), also referred to as inductively coupled plasma - atomic emission spectrometry (ICP-AES).

The four-acid digestion is considered the most vigorous digestion method using in geochemistry. However, certain refractory or resistant minerals, such as barite, chromite, and cassiterite, still may not be completely dissolved. Also, even with total dissolution, as with most silicates, some elements may be volatilized, including Si, As, Sb, Cr, U, Au and most rare earth elements (REEs). These elements are determined by a second method. Untreated splits of the ground samples were analyzed using Neutron Activation Analysis (INAA).

Detection limit and analytical method used for each element are listed in Appedix C Table C-1. As part of their QA/QC protocol, Actlabs analyzed a series of blanks, replicates and standard reference materials (SRM). Analytical results are presented in Appendix C Table C-2 of SRMs.

RESULTS AND DISCUSSION

TCLP Analysis

TCLP analyses were run on the post dam depositional sediment portions of all ten collected cores.

Table 2. TCLP results. Values are mg/L and sample increments are in centimeters.

	TCLP Metals	**As**	**Ba**	**Cd**	**Cr**	**Pb**	**Hg**	**Se**	**Ag**
	Reporting Limit	**0.05**	**1**	**0.05**	**0.05**	**0.05**	**0.002**	**0.05**	**0.05**
Core and Sample Interval	**TCLP Limit**	**5**	**100**	**1**	**5**	**5**	**0.2**	**1**	**5**
Core #1 0-25 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #1 25-55 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #1 55-78 cm	Result	ND	ND	ND	ND	**0.09**	ND	ND	ND
Core #2 0-20 cm	Result	**0.051**	ND	ND	ND	**0.05**	ND	ND	ND
Core #2 20-98 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #2 98-150 cm	Result	**0.053**	ND	ND	ND	ND	ND	ND	ND
Core #2 150-249 cm	Result	ND	**1.1**	ND	ND	ND	ND	ND	ND
Core #2 249-272 cm	Result	ND	**1**	ND	ND	ND	ND	ND	ND
Core #2 272-290 cm	Result	ND	ND	ND	ND	**0.31**	ND	ND	ND
Core #3 0-25 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #3 61-70 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #3 70-100 cm	Result	ND	ND	ND	ND	**0.051**	ND	ND	ND
Core #4 0-25 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #4 25-68 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #4 68-100 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #5 0-24 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #5 27-76 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #5 76-122 cm	Result	ND	**1.2**	ND	ND	**0.12**	ND	ND	ND
Core #5 122-141 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #6 0-25 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #6 25-53 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #7 0-37 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #7 37-56 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #8 0-42 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #8 47-54 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #9 0-22 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #9 22-38 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #10 0-26 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND
Core #10 26-60 cm	Result	ND	ND	ND	ND	ND	ND	ND	ND

Most of the samples tested for TCLP metals were below the detection limit. Eight of the samples contained metals above the reporting limit for either Arsenic, Barium, or Lead. All of the detected metals concentrations were far below the TCLP limit. There is no concern with TCLP metals in the depositional sediments within the impoundment.

Dioxin Analysis

Laboratory results for all dioxins are located in Appendix F and broken out by core in Appendix D. The most toxic 2,3,7.8-TCDD, highest concentration with lower toxicity OCDD, and overall TEQ values for each sample are shown in relation to the core depth on the sample results core log in Appendix E.

The dioxin concentrations were found to be much higher in the fine grained sediments of Cores 2, 5, and 8, which contained higher organic material for accumulation within the sediments. The coarser sand and gravelly sand samples contain 2,3,7,8-TCDD concentrations ranging from below detection in Core 10, to 1.98 pg/g near the bottom of Core 1. The majority of these coarser sediments contained 2,3,7,8-TCDD concentrations below 0.6 pg/g. In contrast, the muddy sand in Core 8 contained 1.39 pg/g 2,3,7,9-TCDD, which increased to as high as 2.47 pg/g in the sandy mud of Core 5, and ranged from 26.6 and 86.7 pg/g in the surface muds in Core 2. The pre-dam sediments in Core 1 from 55-78 cm depth contained 1.98 pg/g 2,3,7,8-TCDD, which may be associated with the close proximity to the dam post construction. The 2,3,7,8-TCDD sampled from other pre-dam sediment locations was not detected in Cores 5 and 6, but ranged from 0.21 pg/g in Core 9 to 0.65 pg/g in Core 7. There was also a fine grained muddy sand deposit in the middle portion of Core 3 which contained a 2,3,7,8-TCDD concentration of 14.7 pg/g while the coarser sediments above and below this deposit were less than 0.51 pg/g.

The OCDD's concentrations showed similar relationships to grain size in all cores but were detected in all samples. The OCDD concentrations ranged from 106 pg/g in the pre-dam sediments of Core 5 to 146,000 pg/g in the organic muds of Core 2. OCDD's toxicity is about 3000 times weaker than 2,3,7.8-TCDD. As described above in the introduction, the total concentrations of all dioxins and dioxin-like compounds are given a weighted value based on their toxicity to calculate the overall Toxicity Equivalence (TEQ) for each sample. The U.S. Environmental Protection Agency (EPA) determined that sediment TEQ of 60 pg/g or less present a low risk to fish (EPA 1993). Due to bioaccumulation potential for aquatic dependent wildlife, the TEQ representing a low level of risk to sensitive mammalian and avian wildlife are lower than for fish, at 2.5 and 21 pg/g respectively (EPA 1993). Looking at only the sand and gravelly core deposits, which excludes Cores 2, 5, 8 and the muddy vein in the middle of Core 3, three of seventeen samples have a TEQ below 2.5 pg/g. Two of these three samples were in the surface and base of Core 1 near the dam with TEQ's of 3.2 and 5.5 pg/g respectively. The third sand and gravel sample above the low level threshold was the bottom of Core 7 with a TEQ of 2.62. Note that the 2,3,7,8-TCDD concentrations for all coarse sediments was less than 2.5 pg/g.

A high level of risk is achieved for sensitive species of fish when sediment concentrations of dioxins reach or exceed a TEQ of 100 pg/g (EPA 1993). The high risk level in sediments for sensitive mammalian wildlife is a TEQ of 25 pg/g and for sensitive avian wildlife is 210 pg/g (EPA 1993). The muddy sand in the upper portion of Core 8 collected close to the river right bank near the upriver extent of the impoundment contained a higher TEQ value than the cleaner, coarser sands due to increased fines and organic material. This sample was above the low limit of 2.5 pg/g but also below the 25 pg/g high risk concentration for sensitive mammalian wildlife with at TEQ of 5.9 pg/g. This TEQ decreased to 1.3 pg/g in the gravelly sands sampled below 47

cm with a 2,3,7,8-TCDD concentration of 0.59 pg/g.

The TEQ values increased further with the increased fine sediments in the sandy muds of Core 5. The post-dam impoundment sediments of Core 5 had TEQ's ranging from 8.62 pg/g at the surface to 77.3 pg/g. Two of the three post-dam deposit samples from this core were above TEQ 25.5 pg/g. The TEQ decreased significantly in the pre-dam sediments sampled below 122 cm of Core 5, to the lowest TEQ value of all core samples at 0.085 pg/g. The finest grained, highest organic content samples were found in Core 2 collected near the dam just off of the river left bank. Core 2 penetrated through 3.39 meters (~11 feet) of very soft, highly organic and gassy mud which change to muddy sand at the very bottom of the retrieved core sample. Five of the six samples from Core 2 contained samples with a TEQ above the 100 pg/g high risk level for sensitive fish species with two of these samples collected at depth being above the 210 pg/g high risk level for avian wildlife with concentrations of 294 and 508 pg/g. However, these high TEQ concentrations are associated with the very high OCDD concentrations of 97,900 and 146,000 pg/g respectively. The 2,3,7,8-TCDD concentration of these two samples was 26.6 and 45.9 pg/g respectively while the surface sample with a lower TEQ of 150 pg/g had a higher 2,3,3.8-TCDD concentration of 86.7 pg/g. The coarser muddy sand at the base of Core 2 contained a drastic decrease in both TEQ and 2,3,7,8-TCDD to 84.8 and 5.03 pg/g respectively.

Dioxins were found in all of the sediment samples collected from above the Potomac Industrial Dam. There were no 2,3,7,8-TCDD dioxins detected at depth in Cores 5 and 6 and in the two upper intervals in core 10. The TEQ dioxin concentrations in the sand and gravelly sand samples were below or just above the level of low risk to sensitive mammalian wildlife of 2.5 pg/g with the highest of 5.5 pg/g in the base of Core 1 from river right near the dam. The TEQ concentrations increased with the increase in finer sediments and organic matter with concentrations highest in the very muddy sediments of Core 2 along the left bank just above the dam where a very thick deposit of fine sediments has accumulated. Two samples tested from depth of Core 2 contained TEQ values above the 210 pg/g which is the EPA level of high risk for sensitive avian wildlife.

Physical Properties

Laboratory results are located in Appendix B.

The physical properties of the deposited sediment contained behind the dam was predominately sands and sandy gravel with increasing coarseness associated with water depth and higher energies in the thalweg. Cores 1, 2, 5, and 8 were collected near the shoreline. Core 1 contained gravelly sands throughout, while Cores 2, 5, and 8 contained more fines ranging from muddy sands in Core 8 to very fine silty clays in Core 2. All cores except Core 2 penetrated into gravelly sands with some cobbles that would indicate pre dam depositional sediments along the original streambed. The large cobbles were noted in the descriptions and are visible in the core log photos but were not included in grain size classifications. The delineation between the post dam depositional sediments and pre dam streambed is particularly clear in the bottom section of Core 5, below 122 cm. The fine sediments in Cores 2 and 5 had average water contents above 60% with wet bulk densities of approximately 1.2 g/cm3. In contrast, the coarser sediments had

water contents around 9% with higher bulk densities of approximately 2.3 g/cm3.

Elemental Analysis

Laboratory results are located in Table 3.

In general, reported total concentrations of the elements for the core samples fell within the ranges expected for the type of sediments found in the study area. The primary goal of this study was to determine the dioxins concentrations. Elemental analysis was performed to expand on the data catalog of dam impoundment sediments from similar projects for comparison and to provide background data if needed for future projects.

Table 3. Elemental Properties of Core Samples

Core	Core Depth (cm)		FOLK CLASS	Ag	Al (%)	As	Au	Ba	Be	Bi	Br	Ca	Cd	Ce	Co	Cr	Cs	Cu	Eu	Fe	Hf	Hg	Ir	K	La	Li	Mg	Mn
	Top	Bottom		ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppb	%	ppm	ppm	%	ppm
Core #1	0	25	Gravelly Sand	< 0.3	4.17	13.5	< 2	370	3	< 2	8.4	0.74	< 0.3	66	26	224	10	30	0.7	4.81	4	< 1	< 5	0.66	29.1	59	0.13	447
Core #1	25	55	Gravelly Sand	< 0.3	4.11	11.8	< 2	< 50	3	< 2	< 0.5	1.1	< 0.3	61	27	103	4	31	0.9	5.3	5	< 1	< 5	0.69	27.9	51	0.14	429
Core #1	55	78	Gravelly Sand	< 0.3	4.96	11.7	< 2	< 50	3	< 2	11.7	0.39	< 0.3	50	25	292	< 1	37	1.1	3.79	4	< 1	< 5	0.66	26.1	53	0.18	339
Core #2	0	20	Sandy Mud	0.5	9.02	21.2	< 2	990	7	< 2	12	0.39	1.6	91	38	133	< 1	97	2.8	5.75	8	< 1	< 5	1.44	45.3	60	0.37	498
Core #2	20	98	Mud	0.8	10.1	37.5	< 2	< 50	9	2	11.7	0.32	1.8	11	32	192	< 1	154	3.2	6.35	8	< 1	< 5	1.25	45.4	55	0.35	385
Core #2	98	150	Mud	1.1	10.6	62	< 2	710	9	3	13	0.37	2.8	101	40	218	< 1	228	3.4	6.15	4	< 1	< 5	1.12	44.4	56	0.41	379
Core #2	150	249	Mud	1.1	9.89	48.9	< 2	490	8	< 2	14.1	0.9	2.1	101	41	214	5	212	2.9	6.15	4	2	< 5	1.12	44.4	56	0.35	393
Core #2	249	272	Sandy Mud	0.6	9.51	31.9	< 2	< 50	8	< 2	15.1	0.47	2.2	105	37	161	5	211	2.5	5.45	6	4	< 5	1.08	46.6	54	0.34	402
Core #2	272	290	Muddy Sand	0.4	5.93	21.1	100	520	5	< 2	< 0.5	0.85	0.7	65	30	434	< 1	132	2.2	4.76	7	< 1	< 5	0.92	33.6	45	0.28	460
Core #3	0	25	Gravelly Sand	< 0.3	5.75	9.1	< 2	270	3	< 2	< 0.5	1.36	< 0.3	59	29	79	< 1	31	0.8	6.15	5	< 1	< 5	0.84	30.2	60	0.29	514
Core #3	61	70	Muddy Sand	< 0.3	5.81	18.1	< 2	380	5	< 2	< 0.5	0.69	0.9	66	29	396	< 1	105	1.5	5.33	4	2	< 5	0.69	30.9	43	0.21	488
Core #3	70	100	Sandy Gravel	< 0.3	4.01	11.1	< 2	170	2	< 2	< 0.5	0.4	< 0.3	33	19	261	3	46	0.4	3.67	3	< 1	< 5	0.55	19.9	47	0.17	336
Core #4	0	25	Gravelly Sand	< 0.3	4.59	16	< 2	< 50	3	< 2	8.8	0.42	< 0.3	52	27	66	< 1	27	1.3	4.72	4	< 1	< 5	0.73	26.4	55	0.17	537
Core #4	25	68	Gravelly Sand	< 0.3	4.8	12.4	< 2	< 50	3	< 2	6.5	0.58	< 0.3	49	33	359	3	34	0.8	5.42	5	< 1	< 5	0.68	24.5	53	0.2	554
Core #4	68	100	Sandy Gravel	< 0.3	4.96	11.5	< 2	< 50	3	< 2	9.1	1.76	< 0.3	53	23	56	< 1	28	0.9	3.91	3	< 1	< 5	0.7	25.2	56	0.19	452
Core #5	0	24	Sandy Mud	0.3	6.63	17.2	14	< 50	4	< 2	18.8	0.73	1	78	67	258	7	54	1.6	4.05	8	< 1	< 5	1.3	37.2	57	0.41	1660
Core #5	27	76	Sandy Mud	0.4	6.95	24.7	< 2	420	5	< 2	21.7	0.76	1.4	91	88	307	< 1	83	1.7	4.65	9	< 1	< 5	1.29	38.8	57	0.43	1860
Core #5	76	122	Sandy Mud	0.3	6.51	22.8	< 2	< 50	6	< 2	< 0.5	0.57	1.4	71	63	66	5	103	1.8	4.62	8	< 1	< 5	1.17	37.3	48	0.39	1030
Core #5	122	144	Gravelly Muddy Sand	< 0.3	1.86	5.4	< 2	< 50	< 1	< 2	< 0.5	0.06	< 0.3	22	8	181	< 1	15	0.4	2.01	5	< 1	< 5	0.36	11.9	16	0.09	135
Core #6	0	25	Gravelly Sand	< 0.3	5.45	12.8	< 2	300	3	< 2	8.1	0.48	< 0.3	56	30	79	7	31	0.8	5.17	4	< 1	< 5	0.78	27.9	58	0.21	626
Core #6	25	53	Gravelly Sand	< 0.3	5.2	16.3	< 2	270	3	< 2	< 0.5	0.5	< 0.3	52	33	381	< 1	38	0.3	6.05	5	< 1	< 5	0.75	27.7	54	0.21	645
Core #7	0	37	Sandy Gravel	< 0.3	4.68	13.2	< 2	270	3	< 2	< 0.5	0.51	< 0.3	60	29	71	< 1	29	0.9	6.71	4	< 1	< 5	0.83	33.5	66	0.18	552
Core #7	37	56	Sandy Gravel	< 0.3	6.43	10.7	< 2	370	3	< 2	< 0.5	0.64	< 0.3	73	32	213	8	32	1.4	5.64	4	< 1	< 5	1.02	35.3	70	0.29	539
Core #8	0	42	Muddy Sand	< 0.3	4.13	11.6	< 2	< 50	3	< 2	< 0.5	0.25	0.3	58	42	465	< 1	43	0.8	4.27	7	< 1	< 5	0.74	26.1	36	0.19	780
Core #8	47	54	Gravelly Muddy Sand	< 0.3	3.69	9.3	< 2	210	2	< 2	< 0.5	0.22	< 0.3	47	26	47	2	23	0.7	4.61	8	< 1	< 5	0.61	22.5	32	0.16	366
Core #9	0	22	Gravelly Sand	< 0.3	6.02	19.4	< 2	< 50	3	< 2	< 0.5	0.46	< 0.3	56	35	62	6	27	1.2	5.85	3	< 1	< 5	1.04	28.6	62	0.29	775
Core #9	22	38	Sandy Gravel	< 0.3	5.55	11.3	< 2	630	3	< 2	< 0.5	0.85	< 0.3	52	27	343	< 1	39	0.8	4.91	6	< 1	< 5	1	29.7	54	0.26	428
Core #10	0	26	Gravelly Sand	< 0.3	5.19	14	< 2	490	3	< 2	< 0.5	0.44	< 0.3	58	39	74	< 1	28	1.2	5.64	3	< 1	< 5	0.84	27.8	53	0.22	919
Core #10	26	60	Gravelly Sand	< 0.3	5.03	13.6	< 2	< 50	3	< 2	5.1	0.46	< 0.3	55	36	76	< 1	36	0.7	5.84	4	< 1	< 5	0.8	26.3	52	0.22	881
Core #10	60	92	Gravelly Sand	< 0.3	5.47	14.4	< 2	540	3	< 2	< 0.5	1.17	< 0.3	53	34	343	6	45	1.1	6.26	3	< 1	< 5	0.83	27.8	62	0.23	773

Core	Core Depth (cm)		FOLK CLASS	Mo	Na	Nd	Ni	P	Pb	Rb	S	Sb	Sc	Se	Sm	Sn	Sr	Ta	Th	Ti	U	V	W	Y	Zn
	Top	Bottom		ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
Core #1	0	25	Gravelly Sand	4	0.13	51	61	0.056	15	76	0.33	0.8	11	< 3	4.6	< 0.01	198	< 0.5	9.6	0.34	2.1	82	< 1	12	108
Core #1	25	55	Gravelly Sand	3	0.12	17	55	0.043	17	< 15	0.21	1	9.4	< 3	4.5	< 0.01	134	< 0.5	11	0.31	2	71	< 1	14	121
Core #1	55	78	Gravelly Sand	4	0.1	< 5	58	0.048	55	100	0.39	2.1	9.5	< 3	4.3	< 0.01	150	< 0.5	8.4	0.32	1.7	74	< 1	21	123
Core #2	0	20	Sandy Mud	3	0.13	56	88	0.131	47	< 15	0.4	2	16.8	< 3	9.7	< 0.01	110	< 0.5	12.9	0.67	3.6	122	< 1	53	412
Core #2	20	98	Mud	5	0.13	23	77	0.135	56	< 15	0.45	2.4	19.7	< 3	0.9	< 0.01	112	< 0.5	15.1	0.77	6.9	113	< 1	55	397
Core #2	98	150	Mud	6	0.13	50	99	0.181	55	< 15	0.78	2.4	23.1	< 3	11.8	< 0.01	132	< 0.5	15.5	0.85	4.7	114	< 1	54	530
Core #2	150	249	Mud	6	0.13	42	96	0.159	61	< 15	0.64	3.3	19.6	< 3	10.3	< 0.01	145	< 0.5	18	0.78	6.9	114	< 1	47	531
Core #2	249	272	Sandy Mud	5	0.13	44	97	0.149	74	113	0.6	2.8	18	< 3	9.7	< 0.01	143	< 0.5	19.1	0.68	3.7	115	< 1	47	521
Core #2	272	290	Muddy Sand	5	0.13	34	73	0.085	117	< 15	0.35	2.5	12.2	< 3	6.5	< 0.01	132	< 0.5	11.1	0.41	1.7	86	< 1	32	273
Core #3	0	25	Gravelly Sand	3	0.14	14	68	0.055	17	< 15	0.17	0.8	10.3	< 3	4.8	< 0.01	163	< 0.5	9.5	0.36	2.1	84	< 1	22	135
Core #3	61	70	Muddy Sand	5	0.1	40	71	0.082	34	104	0.35	1.6	10.6	< 3	6.4	< 0.01	115	< 0.5	9.5	0.41	1.5	78	< 1	31	264
Core #3	70	100	Sandy Gravel	4	0.14	14	48	0.042	20	< 15	0.48	0.9	7.4	< 3	3.7	< 0.01	133	< 0.5	5.5	0.24	1.2	61	< 1	17	90
Core #4	0	25	Gravelly Sand	3	0.13	11	65	0.05	29	< 15	0.22	2	9.9	< 3	4.9	< 0.01	137	< 0.5	9.5	0.33	2.2	81	< 1	18	132
Core #4	25	68	Gravelly Sand	4	0.12	28	76	0.048	29	< 15	0.13	1.4	8.7	< 3	4.6	< 0.01	127	< 0.5	8.9	0.31	1.4	75	< 1	20	144
Core #4	68	100	Sandy Gravel	3	0.11	22	55	0.048	14	42	0.31	1	9.2	< 3	4.6	< 0.01	169	< 0.5	8.1	0.31	2.8	74	< 1	20	117
Core #5	0	24	Sandy Mud	3	0.14	23	140	0.107	32	153	0.53	0.9	11.9	< 3	8.2	< 0.01	104	< 0.5	11.5	0.6	2.2	94	< 1	34	357
Core #5	27	76	Sandy Mud	3	0.16	28	156	0.109	57	156	0.35	1.9	12.3	< 3	9	< 0.01	105	< 0.5	14.3	0.61	5.8	95	< 1	39	486
Core #5	76	122	Sandy Mud	2	0.16	23	122	0.095	85	< 15	0.32	1.6	11.9	< 3	9	< 0.01	96	< 0.5	11.8	0.44	7.3	83	< 1	42	481
Core #5	122	144	Gravelly Muddy Sand	1	0.06	22	22	0.022	9	< 15	0.03	0.4	3.2	< 3	2.5	< 0.01	36	< 0.5	2.5	0.17	1.4	32	< 1	10	57
Core #6	0	25	Gravelly Sand	3	0.13	33	67	0.05	28	< 15	0.26	0.8	9.8	< 3	5	< 0.01	164	< 0.5	10.3	0.35	3.8	82	< 1	22	139
Core #6	25	53	Gravelly Sand	4	0.13	26	77	0.049	24	< 15	0.08	1.5	9.6	< 3	5.3	< 0.01	147	< 0.5	8.6	0.33	< 0.5	81	< 1	22	149
Core #7	0	37	Sandy Gravel	4	0.22	46	62	0.064	19	< 15	0.09	1.2	11.8	< 3	6	< 0.01	225	< 0.5	11.3	0.39	3.2	95	< 1	16	118
Core #7	37	56	Sandy Gravel	4	0.18	35	60	0.05	14	< 15	0.28	1	13.3	< 3	5.3	< 0.01	200	< 0.5	12.1	0.41	5.5	99	< 1	24	101
Core #8	0	42	Muddy Sand	4	0.09	20	92	0.061	31	39	0.34	1.2	7.8	< 3	4.3	< 0.01	80	< 0.5	8.7	0.36	2.9	66	< 1	22	218
Core #8	47	54	Gravelly Muddy Sand	2	0.12	24	55	0.039	17	111	0.25	0.8	7.2	< 3	3.5	< 0.01	81	< 0.5	6.7	0.28	2.9	55	< 1	16	139
Core #9	0	22	Gravelly Sand	2	0.12	< 5	71	0.052	37	102	0.09	1.3	10.4	< 3	4.7	< 0.01	143	< 0.5	10.1	0.36	< 0.5	84	< 1	21	157
Core #9	22	38	Sandy Gravel	4	0.14	13	53	0.045	34	51	0.17	1	9.8	< 3	4.4	< 0.01	151	< 0.5	9.5	0.35	5	85	< 1	20	91
Core #10	0	26	Gravelly Sand	3	0.12	39	81	0.07	63	< 15	0.09	1	9.5	< 3	4.5	< 0.01	133	< 0.5	8.9	0.33	3	77	< 1	20	168
Core #10	26	60	Gravelly Sand	3	0.13	29	76	0.053	21	110	0.13	3	9.5	< 3	4.4	< 0.01	133	< 0.5	7.2	0.32	< 0.5	79	< 1	21	161
Core #10	60	92	Gravelly Sand	4	0.09	14	75	0.052	35	109	0.16	1	9.6	< 3	4.4	< 0.01	176	< 0.5	7.7	0.33	4.8	79	< 1	22	145

CONCLUSION

The physical properties of the sediments accumulated behind Potomac Industrial Dam are dominated by gravelly sands with fine muddy sand to mud sediments accumulating in low energy areas close to the shore upriver and river left just above the dam. The underlying sediments contain increased gravel and cobbles indicative of the pre dam high energy streambed.

The TCLP analyses shows non-detectable concentrations of TCLP metals for most samples with low levels of Arsenic, Barium and Lead among seven of the tested samples. For all samples where TCLP metals were detected, the concentrations were far below the TCLP limit.

Dioxins were found in all of the sediment samples collected from above the Potomac Industrial Dam. There were no 2,3,7,8-TCDD dioxins detected at depth in Cores 5 and 6 or in the two upper intervals in Core 10. With a range of 0.085-5.5 pg/g, the TEQ dioxin concentrations in the sand and gravelly sand samples were below or just above the level of low risk to sensitive mammalian wildlife of 2.5 pg/g. The highest of 5.5 pg/g was found at the base of Core 1, which was collected from river right closest the dam. The TEQ concentrations increased with the increase in finer sediments and organic matter with concentrations highest in the very muddy sediments of Core 2 along the left bank just above the dam where a very thick deposit of fine sediments has accumulated. Two samples tested from at depth of Core 2 contained TEQ values above the 210 pg/g which is the EPA level of high risk for sensitive avian wildlife. The dioxins levels generally decreased in the pre-dam sediments dominated by gravelly sands and cobbles. Dioxins concentrations were generally lower farther upriver from the dam as seen in Cores 9 and 10 with the exception of Core 8 which was taken the furthest upriver of the dam in a finer sediment accumulated near the river right bank edge.

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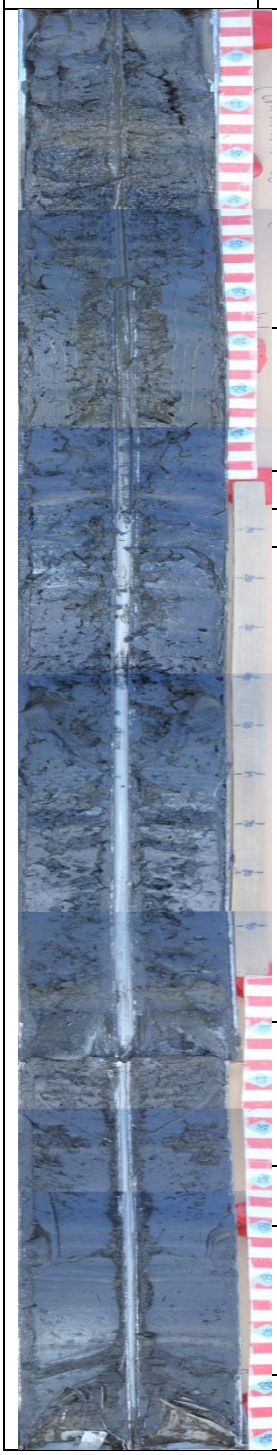
Appendix A: Core Description Logs

Core ID: Cumberland Dam Core #1 Final Length: 78 cm
Date Collected: 10/20/2014 Date Opened: 10/29/2014
Notes:

Photograph	Interval (cm)	Color (Munsell Color Standard, GSA, 1991)	Description
	0-2	N1	Small to medium, smooth/well rounded, black gravel and pebbles
	2-48	10YR 4/2 dominant	Slightly silty, dark yellowish brown medium to coarse grained sand with some gravel and some heavy minerals throughout; very firm
	48-62	5Y 2/1 With N1	Similar texture as above, but olive black color (slightly darker than above) and with a few bands of black heavy minerals
	62-78	N1	Very coarse sand with gravel and small cobbles; one large piece of slag; mostly black pebbles and rocks

Core ID: Cumberland Dam Core #2 Final Length: 290 cm
Date Collected: 10/20/2014 Date Opened: 10/28/2014
Notes: Petroleum odor

Photograph	Interval (cm)	Color (Munsell Color Standard, GSA, 1991)	Description
	0-65	N2 to 5Y 4/1 With 5Y 2/1 and 5Y 4/1 laminations	Very watery, gassy, and clayey grayish black to olive gray mud with multiple olive black (0-4 cm, and 9-22 cm) and olive gray (4-9 cm and 22-29 cm) laminations throughout
	65-98		Soft, very smooth, not gritty, clayey mud with gas pockets throughout; slightly firmer with depth
	98-105	N1	
	105-107	5Y 4/1	
	107-205	N1 grading to 5Y 2/1	
	205-234	5Y 3/1	
	234-249	N2.5	
	249-272	Laminations from 5Y 5/1 to 5Y 2/1	Firm, more consolidated and fewer gas pockets than above; laminations range from light olive gray and olive gray to olive black, and are between 0.25 and 0.50 cm long
	272-290	5Y 3/1	Very firm, no gas, very gritty olive black to olive gray silty sand with few gravel

Core ID: Cumberland Dam Core #3 Final Length: 110 cm
Date Collected: 10/21/2014 Date Opened: 10/29/2014
Notes:

Photograph	Interval (cm)	Color (Munsell Color Standard, GSA, 1991)	Description
	0-2	5Y 2/1	Soft, slightly gritty, olive black silty mud
	2-61	10YR 2/2	Very firm, medium to coarse grained, dusky yellowish brown slightly silty sand with few small gravel throughout
	61-67	N1	Very soft, smooth, not gritty, black silty mud
	67-70	10YR 3/2	Dark yellowish brown to dusky yellowish brown fine, silty sand
	70-90	N2 grading to 5Y 4/1	Very coarse; grayish black gravelly coarse sand; several pieces of slag throughout
	90-110		More sand than above, medium to very coarse olive gray sand with gravel and small cobbles; few pieces of slag

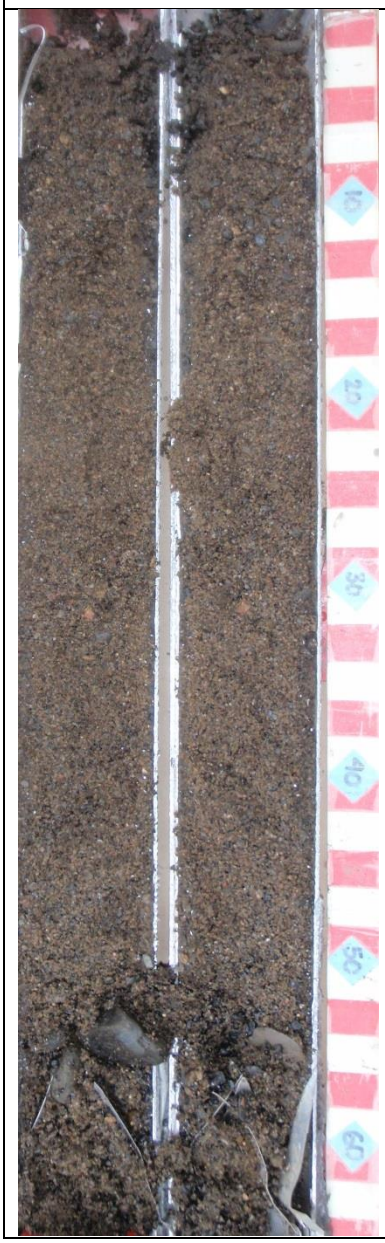
Core ID: Cumberland Dam Core #4 Final Length: 100 cm
Date Collected: 10/21/2014 Date Opened: 10/29/2014
Notes:

Photograph	Interval (cm)	Color (Munsell Color Standard, GSA, 1991)	Description
	0-3	5Y 4/1	Fine, olive gray silty mud with organics and few very small grains of gravel
	3-68	10YR 4/2 with 10YR 2/2	Very firm, medium to coarse dark yellowish brown with dusky yellowish brown very slightly silty sand; 16-18 cm one side of the core has a lump/vein of silty mud; concentration of dark black pebbles between 18-24 cm and mixed with sand; large piece of slag at 64 cm
	68-89	10YR 2/2	Very firm, medium to coarse dusky yellow brown silty sand; darker color due to increase in small black pebbles; some gravel, few pieces of slag; small cobble at 86 cm
	89-100	N2	Predominately small pebbles, mostly black with slightly silty very coarse sand throughout

Core ID: Cumberland Dam Core #5 Final Length: 164 cm
Date Collected: 10/22/2014 Date Opened: 10/29/2014
Notes:

Photograph	Interval (cm)	Color (Munsell Color Standard, GSA, 1991)	Description
	0-15	N1	Very soft, smooth, very slightly gritty black silty mud with organics and leaf litter
	15-24	5Y 4/1	Slightly firmer than above, smooth, olive gray silty mud with few small gas pockets
	24-27	N2	Grayish black, organics- 95% leaf litter
	27-34	5Y 4/1	Very soft, similar to 15-24 cm
	34-76	5Y 4/1, N2, and 5Y 2/1	Laminates throughout, from 0.25-6 cm thick, that vary in color from olive gray to grayish black to olive black; slightly firmer with depth and gas throughout; predominately silty mud; few of the laminates are slightly sandier
	76-122	N2 grading to 5Y 4/1	Laminates continue; grayish black grading to olive gray slightly sandy, very fine, silty mud with several large wood chunks between 76-84 cm and 96-102 cm; 102-122 cm is very firm, slightly gritty, silty mud; very few to no gas pockets below 113 cm
	122-141	10YR 4/2 grading to 10YR 2/2	Fine to medium dark yellowish brown grading to dusky yellowish brown silty sand; very firm, few small grains of gravel
	141-164	10YR 4/2	Medium to coarse dark yellowish brown silty sand with gravel and cobbles throughout

Core ID: Cumberland Dam Core #6 Final Length: 66 cm
Date Collected: 10/22/2014 Date Opened: 10/29/2014
Notes:

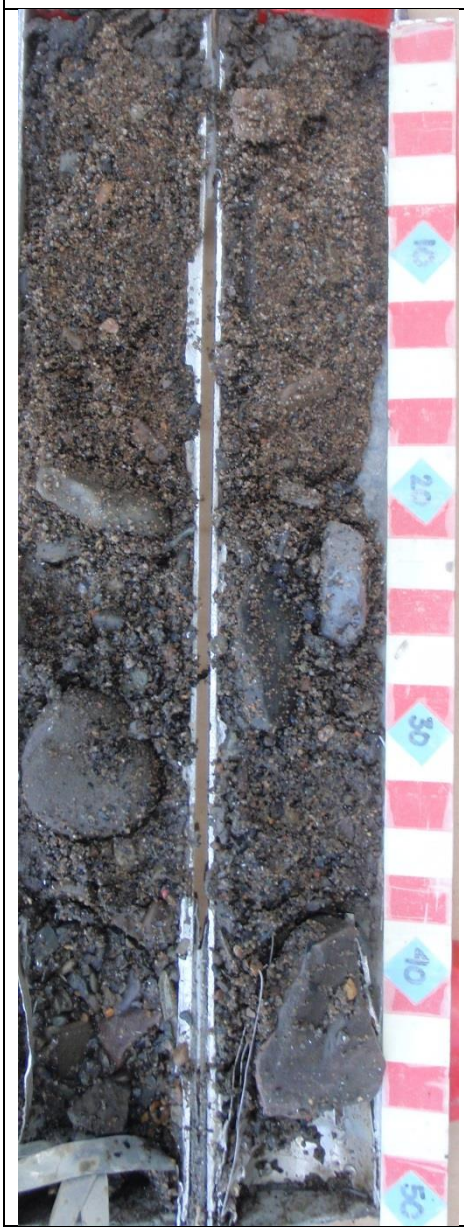
Photograph	Interval (cm)	Color (Munsell Color Standard, GSA, 1991)	Description
	0-1	5Y 4/1	Olive gray silty sand with few grains of gravel; organics, including sticks and leaf litter
	1-53	10YR 4/2 dominant	Medium to coarse grained dark yellowish brown slightly silty sand with less gravel than the immediate surface; very firm throughout
	53-66	10YR 4/2	Medium to coarse grained dark yellowish brown slightly silty sand with gravel and cobbles

Core ID: Cumberland Dam Core #7 Final Length: 56 cm
Date Collected: 10/22/2014 Date Opened: 10/29/2014
Notes: Cobbles smaller than the ones in Core #9

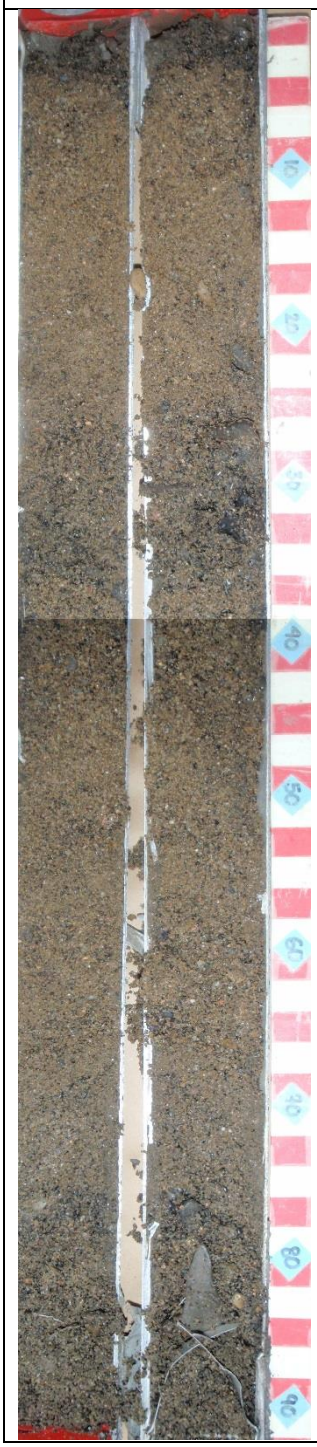
Photograph	Interval (cm)	Color (Munsell Color Standard, GSA, 1991)	Description
	0-1	5Y 2/1	Olive black muddy sand with small gravel; mussels
	1-37	10YR 4/2	Medium to coarse grained dark yellowish brown slightly silty sand with small gravel throughout
	37-56	10YR 2/2	Dusky yellowish brown very slightly silty, very slightly coarse sand and gravel; couple very small cobbles (none larger than 4 cm)

Core ID: Cumberland Dam Core #8	Final Length: 54 cm		
Date Collected: 10/23/2014	Date Opened: 10/29/2014		
Notes:			
Photograph	Interval (cm)	Color (Munsell Color Standard, GSA, 1991)	Description
	0-5	5Y 2/1 grading to 5Y 3/1	Soft, smooth, silty mud
	5-10		High organics, slightly firm, very fine olive black silty sand
	10-42		Very firm, some organics, couple thin laminates present, very fine olive gray to olive black silty sand
	42-47	5Y 2/1	90% organics, including leaf litter (oak leaves), stems, twigs; olive black mud
	47-54	5Y 4/1	Very firm, fine to medium olive gray silty sand and gravel

Core ID: Cumberland Dam Core #9 Final Length: 48 cm
Date Collected: 10/23/2014 Date Opened: 10/29/2014
Notes:

Photograph	Interval (cm)	Color (Munsell Color Standard, GSA, 1991)	Description
	0-2	5Y 2/1	Soft, slightly gritty, olive black silty mud; mussels
	2-22	10YR 4/2 dominant	Dark yellowish brown, very slightly silty medium to coarse grained sand with some gravel; one medium sized cobble near 22 cm
	22-38	10YR 2/2	Dusky yellowish brown, gravelly, coarse angular sand with cobbles throughout
	38-48		Gravel and cobbles; 1 large cobble measuring 8cm x 5cm x 3cm

Core ID: Cumberland Dam Core #10 Final Length: 92 cm
Date Collected: 10/23/2014 Date Opened: 10/29/2014
Notes:

Photograph	Interval (cm)	Color (Munsell Color Standard, GSA, 1991)	Description
	1-3	5Y 4/1	Olive gray soft, silty mud; mussels
	3-26	10YR 4/2	Very firm, medium to coarse grained, dark yellowish brown very slightly silty sand with some gravel throughout
	26-76	10YR 2/2 grading to 10YR 5/4	Similar to above; concentration of organic matter, including bark and sticks, between 26-36 cm; slightly more heavy minerals present than above
	76-92	10YR 2/2	Very coarse, dusky yellowish brown slightly silty sand and gravel with cobbles

Appendix B: Physical Properties of Core Samples

Table B-1. Physical properties of core samples. Grain size is in % by weight. Core Depth is the actual interval measurement on the collected core.

Core	Core Depth (cm)		Water	Bulk Density	Gravel	Sand	Silt	Clay	Mud	Folk Classification
	Top	Bottom	%	g/cm3	%	%	%	%	%	
Core #1	0	25	9.62	2.33	28.19	68.84	2.26	0.72	2.98	Gravelly Sand
Core #1	25	55	9.81	2.33	17.89	78.41	2.80	0.89	3.69	Gravelly Sand
Core #1	55	78	18.82	2.05	24.49	71.94	2.65	0.92	3.57	Gravelly Sand
Core #2	0	20	60.31	1.34	0.00	18.01	38.49	43.50	81.99	Sandy Mud
Core #2	20	98	69.73	1.24	0.00	9.14	40.09	50.77	90.86	Mud
Core #2	98	150	72.34	1.21	0.00	9.28	38.51	52.21	90.72	Mud
Core #2	150	249	66.32	1.27	0.00	8.25	42.03	49.72	91.75	Mud
Core #2	249	272	60.96	1.33	0.00	10.40	45.87	43.73	89.60	Sandy Mud
Core #2	272	290	37.40	1.66	0.97	60.12	24.44	14.47	38.91	Muddy Sand
Core #3	0	25	9.85	2.33	13.69	77.84	5.83	2.64	8.47	Gravelly Sand
Core #3	61	70	42.48	1.57	3.20	66.04	16.71	14.04	30.75	Muddy Sand
Core #3	70	100	18.69	2.06	57.89	38.45	2.62	1.04	3.66	Sandy Gravel
Core #4	0	25	11.06	2.29	23.93	71.53	3.01	1.52	4.54	Gravelly Sand
Core #4	25	68	6.83	2.43	14.31	81.24	3.15	1.30	4.45	Gravelly Sand
Core #4	68	100	13.24	2.22	39.65	57.21	2.19	0.94	3.14	Sandy Gravel
Core #5	0	24	58.49	1.36	0.00	30.24	36.91	32.85	69.76	Sandy Mud
Core #5	27	76	60.39	1.33	0.00	24.62	40.93	34.45	75.38	Sandy Mud
Core #5	76	122	56.21	1.38	0.53	34.97	34.66	29.84	64.50	Sandy Mud
Core #5	122	144	19.58	2.03	10.80	78.60	5.89	4.71	10.61	Gravelly Muddy Sand
Core #6	0	25	9.16	2.35	23.18	72.24	3.10	1.48	4.58	Gravelly Sand
Core #6	25	53	9.21	2.35	12.12	83.93	2.94	1.01	3.95	Gravelly Sand
Core #7	0	37	7.40	2.41	33.31	63.39	2.50	0.80	3.29	Sandy Gravel
Core #7	37	56	10.30	2.31	52.87	44.74	1.94	0.45	2.39	Sandy Gravel
Core #8	0	42	34.46	1.71	0.04	76.42	13.90	9.64	23.54	Muddy Sand
Core #8	47	54	22.39	1.96	9.31	77.88	8.24	4.57	12.82	Gravelly Muddy Sand
Core #9	0	22	8.66	2.37	19.73	75.10	3.34	1.83	5.17	Gravelly Sand

Table B-1. Physical properties of core samples. Grain size is in % by weight. Core Depth is the actual interval measurement on the collected core.

Core	Core Depth (cm)		Water	Bulk Density	Gravel	Sand	Silt	Clay	Mud	Folk Classification
	Top	Bottom	%	g/cm3	%	%	%	%	%	
Core #9	22	38	10.25	2.31	60.61	36.53	2.12	0.75	2.87	Sandy Gravel
Core #10	0	26	8.03	2.39	8.50	84.84	4.15	2.52	6.66	Gravelly Sand
Core #10	26	60	6.75	2.44	19.68	77.25	1.12	1.94	3.07	Gravelly Sand
Core #10	60	92	11.05	2.29	13.36	83.28	2.57	0.80	3.36	Gravelly Sand

Appendix C: Elemental Properties of Core Samples

Table C-1. Elements (analytes) reported in this study include 49 elements analyzed by Actlabs. TAL metals are indicated by shading; Thallium (Tl) was not included in the Actlabs suite. Methods abbreviations: High Temp. Combustion-GC: High Temperature combustion, following by Gas Chromatography; TD-ICP: Total Digestion followed by Inductively Coupled Plasma Spectrometry; INAA: Instrumental Neutron Activation Analysis.

Element	Symbol	Reporting Unit	Detection Limit	Analysis Method	Element	Symbol	Reporting Unit	Detection Limit	Analysis Method
Aluminum	Al	%	0.01	TD-ICP	Molybdenum	Mo	ppm	1	TD-ICP
Antimony	Sb	ppm	0.1	INAA	Neodymium	Nd	ppm	5	INAA
Arsenic	As	ppm	0.5	INAA	Nickel	Ni	ppm	1	INAA / TD-ICP
Barium	Ba	ppm	50	INAA	Phosphorus	P	%	0.001	TD-ICP
Beryllium	Be	ppm	1	TD-ICP	Potassium	K	%	0.01	TD-ICP
Bismuth	Bi	ppm	2	TD-ICP	Rubidium	Rb	ppm	15	INAA
Bromine	Br	ppm	0.5	INAA	Samarium	Sm	ppm	0.1	INAA
Cadmium	Cd	ppm	0.3	TD-ICP	Scandium	Sc	ppm	0.1	INAA
Calcium	Ca	%	0.01	TD-ICP	Selenium	Se	ppm	3	INAA
Cerium	Ce	ppm	3	INAA	Silver	Ag	ppm	0.3	INAA / TD-ICP
Cesium	Cs	ppm	1	INAA	Sodium	Na	%	0.01	INAA
Chromium	Cr	ppm	2	INAA	Strontium	Sr	ppm	1	TD-ICP
Cobalt	Co	ppm	1	INAA	Sulfur	S	%	0.01	TD-ICP
Copper	Cu	ppm	1	TD-ICP	Tantalum	Ta	ppm	0.5	INAA
Europium	Eu	ppm	0.2	INAA	Terbium	Tb	ppm	0.5	INAA
Gold	Au	ppb	2	INAA	Thorium	Th	ppm	0.2	INAA
Hafnium	Hf	ppm	1	INAA	Tin	Sn	%	0.01	INAA
Iridium	Ir	ppb	5	INAA	Titanium	Ti	%	0.01	TD-ICP
Iron	Fe	%	0.01	INAA	Tungsten	W	ppm	1	INAA
Lanthanum	La	ppm	0.5	INAA	Uranium	U	ppm	0.5	INAA
Lead	Pb	ppm	3	TD-ICP	Vanadium	V	ppm	2	TD-ICP
Lutetium	Lu	ppm	0.05	INAA	Ytterbium	Yb	ppm	0.2	INAA
Magnesium	Mg	%	0.01	TD-ICP	Yttrium	Y	ppm	1	TD-ICP

Table C-1. Elements (analytes) reported in this study include 49 elements analyzed by Actlabs. TAL metals are indicated by shading; Thallium (Tl) was not included in the Actlabs suite. Methods abbreviations: High Temp. Combustion-GC: High Temperature combustion, following by Gas Chromatography; TD-ICP: Total Digestion followed by Inductively Coupled Plasma Spectrometry; INAA: Instrumental Neutron Activation Analysis.

Element	Symbol	Reporting Unit	Detection Limit	Analysis Method	Element	Symbol	Reporting Unit	Detection Limit	Analysis Method
Manganese	Mn	ppm	1	TD-ICP	Zinc	Zn	ppm	1	INAA / TD-ICP
Mercury	Hg	ppm	1	INAA					

Table C-2. Results of Actlabs analyses of Reference material for the TD-ICP method. Actlabs' measure values compared to the certified values. Reference materials include USGS geochemical exploration references and Canadian SRMs

			USGS GXR -1: Jasperoid		USGS GXR-4: CopperMill Head		USGS SDC-1: Mica Schist		
Analyte Symbol	**Unit Symbol**	**Detection Limit**	**Measured value**	**Certified value**	**Measured value**	**Certified value**	**Measured value**	**Certified value**	**Method Blank**
Ag	ppm	0.3	29	31	3.5	4	< 0.3	0.041	< 0.3
Cu	ppm	1	1100	1110	6440	6520	31	30	< 1
Cd	ppm	0.3	3.3	3.3	0.4	0.86	< 0.3	0.08	< 0.3
Mo	ppm	1	14	18	310	310	< 1	0.25	< 1
Pb	ppm	3	684	730	45	52	22	25	< 3
Ni	ppm	1	43	41	41	42	37	38	< 1
Zn	ppm	1	708	760	74	73	104	103	< 1
S	%	0.01	0.23	0.257	1.8	1.77	0.07	0.065	< 0.01
Al	%	0.01	3.48	3.52	4.7	7.2	5.93	8.34	< 0.01
Be	ppm	1	1	1.22	2	1.9	3	3	< 1
Bi	ppm	2	1280	1380	10	19	< 2	2.6	< 2
Ca	%	0.01	0.98	0.96	1.17	1.01	1.22	1	< 0.01
K	%	0.01	0.06	0.05	3.27	4.01	2.77	2.72	< 0.01
Li	ppm	1	12	8.2	11	11.1	36	34	< 1
Mg	%	0.01	0.33	0.217	1.75	1.66	1.04	1.02	< 0.01
Mn	ppm	1	900	852	147	155	926	880	13
P	%	0.001	0.055	0.065	0.133	0.12	0.053	0.069	< 0.001
Sr	ppm	1	286	275	218	221	182	180	< 1
Ti	%	0.01					0.27	0.606	< 0.01
V	ppm	2	84	80	91	87	61	102	< 2
Y	ppm	1	27	32	14	14	34	40	< 1

Table C-2 (cont.). Results of Actlabs analyses of reference material for the TD-ICP method. Actlabs' measure values compared to the certified values. Reference materials include USGS geochemical exploration references and Canadian SRMs.

Analyte Symbol	Unit Symbol	Detection Limit	USGS SCO-1: Shale		USGS GXR-6: Powdered Soil		USGS DNC-1a: Dolerite		Method Blank
			Measured value	Certified value	Measured value	Certified value	Measured value	Certified value	
Ag	ppm	0.3	< 0.3	0.134	0.4	1.3			< 0.3
Cu	ppm	1	31	29	68	66	100	100	< 1
Cd	ppm	0.3	< 0.3	0.14	0.7	1			< 0.3
Mo	ppm	1	< 1	1.4	2	2.4			< 1
Pb	ppm	3	31	31	76	101			< 3
Ni	ppm	1	29	27	22	27	260	247	< 1
Zn	ppm	1	103	100	115	118	60	70	< 1
S	%	0.01	0.07	0.063	0.02	0.016			< 0.01
Al	%	0.01	5.23	7.24	13.8	17.7			< 0.01
Be	ppm	1	2	1.8	1	1.4			< 1
Bi	ppm	2	< 2	0.37	< 2	0.29			< 2
Ca	%	0.01	2.28	1.87	0.31	0.18			< 0.01
K	%	0.01	2.33	2.3	1.81	1.87			< 0.01
Li	ppm	1	46	45	42	32	5	5.2	< 1
Mg	%	0.01	1.69	1.64	0.85	0.609			< 0.01
Mn	ppm	1	410	410	990	1010			6
P	%	0.001	0.086	0.09	0.043	0.035			< 0.001
Sr	ppm	1	169	170	57	35	139	144	< 1
Ti	%	0.01	0.36	0.38					< 0.01
V	ppm	2	141	130	188	186	152	148	< 2
Y	ppm	1	20	26	17	14	16	18	< 1

Appendix D: Dioxin Results Summary

	Core #1 0-25 cm					Core #1 25-55 cm					Core #1 55-78 cm				
Analyte	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**
Units	pg/g	pg/g	pg/g			pg/g	pg/g	pg/g			pg/g	pg/g	pg/g		
2378-TCDD	EMPC		0.635	ES 2378-TCDD	93	0.773			ES 2378-TCDD	92.9	EMPC		1.98	ES 2378-TCDD	93.7
12378-PeCDD	0.86			ES 12378-PeCDD	81	ND	0.47		ES 12378-PeCDD	81.6	ND	0.451		ES 12378-PeCDD	79.8
123478-HxCDD	2.87			ES 123478-HxCDD	79.6	ND	0.506		ES 123478-HxCDD	76.3	2.06			ES 123478-HxCDD	79.4
123678-HxCDD	1.54			ES 123678-HxCDD	86.4	0.537			ES 123678-HxCDD	82.8	3.14			ES 123678-HxCDD	86.9
123789-HxCDD	EMPC		0.736	ES 123789-HxCDD	84.8	ND	0.576		ES 123789-HxCDD	80.2	1.56			ES 123789-HxCDD	83.7
1234678-HpCDD	28.1			ES 1234678-HpCDD	76.8	18.8			ES 1234678-HpCDD	72.6	82.5			ES 1234678-HpCDD	79.1
OCDD	229			ES OCDD	57.2	177			ES OCDD	50.8	725			ES OCDD	58.3
2378-TCDF	4.57			ES 2378-TCDF	89.8	5.31			ES 2378-TCDF	91	11.6			ES 2378-TCDF	91.1
12378-PeCDF	EMPC		0.29	ES 12378-PeCDF	82.5	ND	0.278		ES 12378-PeCDF	86.7	ND	0.237		ES 12378-PeCDF	87.5
23478-PeCDF	1.08			ES 23478-PeCDF	74.7	ND	0.366		ES 23478-PeCDF	76.1	0.915			ES 23478-PeCDF	78.1
123478-HxCDF	ND	0.277		ES 123478-HxCDF	83.3	ND	0.311		ES 123478-HxCDF	79.4	1.32			ES 123478-HxCDF	81
123678-HxCDF	ND	0.266		ES 123678-HxCDF	86.4	ND	0.283		ES 123678-HxCDF	84.2	EMPC		0.412	ES 123678-HxCDF	86.5
234678-HxCDF	0.374			ES 234678-HxCDF	85.7	ND	0.332		ES 234678-HxCDF	83.4	0.456			ES 234678-HxCDF	86.6
123789-HxCDF	ND	0.387		ES 123789-HxCDF	78.2	ND	0.422		ES 123789-HxCDF	71.1	ND	0.438		ES 123789-HxCDF	84.2
1234678-HpCDF	1.74			ES 1234678-HpCDF	89.1	1.83			ES 1234678-HpCDF	86.4	8.7			ES 1234678-HpCDF	87.6
1234789-HpCDF	ND	0.565		ES 1234789-HpCDF	71.1	ND	0.673		ES 1234789-HpCDF	69	2.32			ES 1234789-HpCDF	76.9
OCDF	EMPC		2.54	ES OCDF	56	4.02			ES OCDF	51	21.8			ES OCDF	59.7
Totals				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**
				CS 37Cl-2378-TCDD	86				CS 37Cl-2378-TCDD	88.4				CS 37Cl-2378-TCDD	88.2
Total TCDD	6.36		9.32	CS 12347-PeCDD	76.9	4.5		5.17	CS 12347-PeCDD	82.1	13		15.5	CS 12347-PeCDD	81.2
Total PeCDD	9.3		12.9	CS 12346-PeCDF	84.6	3.87		4.38	CS 12346-PeCDF	81.2	12.2		13.5	CS 12346-PeCDF	85.6
Total HxCDD	24.6		28.6	CS 123469-HxCDF	83.4	10.2		11.3	CS 123469-HxCDF	82.8	44.3		44.3	CS 123469-HxCDF	84
Total HpCDD	83.7		83.7	CS 1234689-HpCDF	80.1	46.5		46.5	CS 1234689-HpCDF	78.5	172		172	CS 1234689-HpCDF	83.4
				AS 1368-TCDD	93.7				AS 1368-TCDD	96.6				AS 1368-TCDD	94.9
Total TCDF	14.2		19.2	AS 1368-TCDF	94.1	8.58		9.11	AS 1368-TCDF	96.5	25.7		28.8	AS 1368-TCDF	92.9
Total PeCDF	14.1		15.4			0.456		1.54			7.36		7.36		
Total HxCDF	6.1		6.1			1.6		2.73			12.6		14.7		
Total HpCDF	4.98		4.98			1.83		4.75			30.3		30.3		
Total PCDD/Fs	392		411			259		267			1060		1070		
WHO-2005 TEQs															
TEQ: ND=0	2.49		3.2			1.62		1.62			3.45		5.47		
TEQ: ND=DL/2	2.75	0.568	3.25			2.04	0.716	2.04			3.88	0.62	5.72		
TEQ: ND=DL	3.01	1.14	3.3			2.46	1.43	2.46			4.32	1.24	5.98		

	Core #2 0-20 cm					Core #2 20-98 cm					Core #2 98-150 cm				
Analyte	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**
Units	pg/g	pg/g	pg/g			pg/g	pg/g	pg/g			pg/g	pg/g	pg/g		
2378-TCDD	86.7			ES 2378-TCDD	85.3	64.1			ES 2378-TCDD	97.7	30.7			ES 2378-TCDD	95.2
12378-PeCDD	2.38			ES 12378-PeCDD	84.3	4.83			ES 12378-PeCDD	88.9	15.7			ES 12378-PeCDD	95.6
123478-HxCDD	2.54			ES 123478-HxCDD	77	6.27			ES 123478-HxCDD	81.7	23.3			ES 123478-HxCDD	89.1
123678-HxCDD	17.8			ES 123678-HxCDD	77.8	32.3			ES 123678-HxCDD	91.6	132			ES 123678-HxCDD	96.2
123789-HxCDD	7.48			ES 123789-HxCDD	74.5	13.2			ES 123789-HxCDD	87.5	51.1			ES 123789-HxCDD	95.8
1234678-HpCDD	265			ES 1234678-HpCDD	72.6	599			ES 1234678-HpCDD	81.5	2410			ES 1234678-HpCDD	92.3
OCDD	4060			ES OCDD	56.6	7280			ES OCDD	65.4	20600			ES OCDD	79.5
2378-TCDF	502			ES 2378-TCDF	84	541			ES 2378-TCDF	92.8	139			ES 2378-TCDF	92.9
12378-PeCDF	3.78			ES 12378-PeCDF	80.8	5.68			ES 12378-PeCDF	85.3	11.4			ES 12378-PeCDF	88.4
23478-PeCDF	7.99			ES 23478-PeCDF	85	12.7			ES 23478-PeCDF	90.1	24.3			ES 23478-PeCDF	93.7
123478-HxCDF	5.03			ES 123478-HxCDF	71.9	9.73			ES 123478-HxCDF	80.5	30.5			ES 123478-HxCDF	85.3
123678-HxCDF	EMPC		1.79	ES 123678-HxCDF	75.4	4.06			ES 123678-HxCDF	82.7	12			ES 123678-HxCDF	90.1
234678-HxCDF	2.95			ES 234678-HxCDF	73.2	6.66			ES 234678-HxCDF	79.4	19.1			ES 234678-HxCDF	88.3
123789-HxCDF	ND	0.592		ES 123789-HxCDF	68	ND	0.84		ES 123789-HxCDF	72.3	ND	0.332		ES 123789-HxCDF	81.1
1234678-HpCDF	35.9			ES 1234678-HpCDF	68.4	82.8			ES 1234678-HpCDF	77	285			ES 1234678-HpCDF	82.4
1234789-HpCDF	2.59			ES 1234789-HpCDF	67.5	6.15			ES 1234789-HpCDF	73.6	16.1			ES 1234789-HpCDF	83.3
OCDF	94			ES OCDF	54	204			ES OCDF	62.7	532			ES OCDF	71.9
Totals				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**
				CS 37Cl-2378-TCDD	91.9				CS 37Cl-2378-TCDD	97.3				CS 37Cl-2378-TCDD	91.8
Total TCDD	107		109	CS 12347-PeCDD	94.1	94.2		99.5	CS 12347-PeCDD	98.9	97.7		100	CS 12347-PeCDD	93.9
Total PeCDD	24.9		24.9	CS 12346-PeCDF	97.1	50.5		54.1	CS 12346-PeCDF	95.2	155		159	CS 12346-PeCDF	98.5
Total HxCDD	138		141	CS 123469-HxCDF	80.8	227		227	CS 123469-HxCDF	81.2	860		860	CS 123469-HxCDF	87.5
Total HpCDD	544		544	CS 1234689-HpCDF	76.8	1180		1180	CS 1234689-HpCDF	78.4	4560		4560	CS 1234689-HpCDF	79.5
				AS 1368-TCDD	84.7				AS 1368-TCDD	92				AS 1368-TCDD	84.9
Total TCDF	967		1010	AS 1368-TCDF	87.4	1020		1020	AS 1368-TCDF	89.7	337		352	AS 1368-TCDF	87.7
Total PeCDF	47.1		50.6			103		108			266		267		
Total HxCDF	59.4		62.3			178		178			655		655		
Total HpCDF	131		131			300		300			928		928		
Total PCDD/Fs	6170		6220			10600		10700			29000		29000		
WHO-2005 TEQs															
TEQ: ND=0	150		150			143		143			128		128		
TEQ: ND=DL/2	150	0.726	150			143	0.863	143			128	0.646	128		
TEQ: ND=DL	150	1.45	150			143	1.73	143			128	1.29	128		

	Core #2 150-249 cm					Core #2 249-272 cm					Core #2 272-290 cm				
Analyte	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**
Units	pg/g	pg/g	pg/g			pg/g	pg/g	pg/g			pg/g	pg/g	pg/g		
2378-TCDD	26.6			ES 2378-TCDD	96.7	45.9			ES 2378-TCDD	91.8	5.03			ES 2378-TCDD	78.8
12378-PeCDD	32.2			ES 12378-PeCDD	92.5	68			ES 12378-PeCDD	89.4	11.6			ES 12378-PeCDD	93.3
123478-HxCDD	58.3			ES 123478-HxCDD	82.8	79.2			ES 123478-HxCDD	82	33.7			ES 123478-HxCDD	77.4
123678-HxCDD	372			ES 123678-HxCDD	88.1	656			ES 123678-HxCDD	80.3	112			ES 123678-HxCDD	48.9
123789-HxCDD	127			ES 123789-HxCDD	85	238			ES 123789-HxCDD	78	46.8			ES 123789-HxCDD	51.2
1234678-HpCDD	10400			ES 1234678-HpCDD	89.1	19700			ES 1234678-HpCDD	90.9	2620			ES 1234678-HpCDD	70.7
OCDD	97900			ES OCDD	92.1	146000			ES OCDD	101	22100			ES OCDD	65.1
2378-TCDF	60.1			ES 2378-TCDF	94.7	39.7			ES 2378-TCDF	92.2	10.2			ES 2378-TCDF	68.6
12378-PeCDF	9.91			ES 12378-PeCDF	89.6	6.06			ES 12378-PeCDF	84.2	3.09			ES 12378-PeCDF	90.7
23478-PeCDF	28.2			ES 23478-PeCDF	93.9	17.9			ES 23478-PeCDF	87	15			ES 23478-PeCDF	92.5
123478-HxCDF	60.7			ES 123478-HxCDF	78.6	62.6			ES 123478-HxCDF	72.7	19.2			ES 123478-HxCDF	57
123678-HxCDF	27.8			ES 123678-HxCDF	82.5	30.4			ES 123678-HxCDF	77.1	9.32			ES 123678-HxCDF	61
234678-HxCDF	47.2			ES 234678-HxCDF	81.2	63.9			ES 234678-HxCDF	75.7	17.3			ES 234678-HxCDF	61.7
123789-HxCDF	ND	1.3		ES 123789-HxCDF	75.1	ND	1.68		ES 123789-HxCDF	71.7	ND	0.438		ES 123789-HxCDF	50.5
1234678-HpCDF	1540			ES 1234678-HpCDF	76.2	2620			ES 1234678-HpCDF	76.1	534			ES 1234678-HpCDF	60.6
1234789-HpCDF	112			ES 1234789-HpCDF	81.3	192			ES 1234789-HpCDF	76.9	32			ES 1234789-HpCDF	62.3
OCDF	4800			ES OCDF	80.3	8290			ES OCDF	83.9	1150			ES OCDF	63.5
Totals				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**
				CS 37Cl-2378-TCDD	95.8				CS 37Cl-2378-TCDD	92.5				CS 37Cl-2378-TCDD	80.4
Total TCDD	376		376	CS 12347-PeCDD	95.3	466		477	CS 12347-PeCDD	89.8	36.3		41.4	CS 12347-PeCDD	80.8
Total PeCDD	464		464	CS 12346-PeCDF	103	650		650	CS 12346-PeCDF	97	105		105	CS 12346-PeCDF	86.9
Total HxCDD	2910		2910	CS 123469-HxCDF	82.1	4840		4840	CS 123469-HxCDF	77	921		921	CS 123469-HxCDF	56.7
Total HpCDD	21000		21000	CS 1234689-HpCDF	69.3	38600		38600	CS 1234689-HpCDF	75.2	5630		5630	CS 1234689-HpCDF	63.4
				AS 1368-TCDD	94.7				AS 1368-TCDD	91.5				AS 1368-TCDD	39.7
Total TCDF	234		246	AS 1368-TCDF	90.6	203		213	AS 1368-TCDF	88	82		88.4	AS 1368-TCDF	65.5
Total PeCDF	366		367			334		341			171		172		
Total HxCDF	2100		2100			3280		3280			635		636		
Total HpCDF	6500		6500			11900		11900			2130		2130		
Total PCDD/Fs	137000		137000			214000		214000			32900		32900		
WHO-2005 TEQs															
TEQ: ND=0	294		294			508		508			84.8		84.8		
TEQ: ND=DL/2	294	1.82	294			508	1.77	508			84.9	1.07	84.9		
TEQ: ND=DL	294	3.65	294			508	3.54	508			84.9	2.15	84.9		

	Core #3 0-25 cm					Core #3 61-70 cm					Core #3 70-100 cm				
Analyte	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**
Units	pg/g	pg/g	pg/g			pg/g	pg/g	pg/g			pg/g	pg/g	pg/g		
2378-TCDD	0.508			ES 2378-TCDD	87.4	14.7			ES 2378-TCDD	87.9	ND	0.407		ES 2378-TCDD	88.1
12378-PeCDD	ND	0.509		ES 12378-PeCDD	81.6	25.1			ES 12378-PeCDD	80	ND	0.65		ES 12378-PeCDD	76.8
123478-HxCDD	ND	0.409		ES 123478-HxCDD	77.6	35.6			ES 123478-HxCDD	78.8	ND	0.735		ES 123478-HxCDD	80.8
123678-HxCDD	1.39			ES 123678-HxCDD	85.1	198			ES 123678-HxCDD	87	2.8			ES 123678-HxCDD	90.8
123789-HxCDD	EMPC		0.758	ES 123789-HxCDD	82.5	81.9			ES 123789-HxCDD	83.3	1.19			ES 123789-HxCDD	84
1234678-HpCDD	42.6			ES 1234678-HpCDD	73	6330			ES 1234678-HpCDD	87.6	93.8			ES 1234678-HpCDD	75.2
OCDD	433			ES OCDD	52.2	50800			ES OCDD	89.9	822			ES OCDD	45.4
2378-TCDF	3.46			ES 2378-TCDF	86.8	12.3			ES 2378-TCDF	89.4	EMPC		0.87	ES 2378-TCDF	87.5
12378-PeCDF	ND	0.252		ES 12378-PeCDF	82.1	1.92			ES 12378-PeCDF	84.8	ND	0.284		ES 12378-PeCDF	81.4
23478-PeCDF	EMPC		0.462	ES 23478-PeCDF	76	6.26			ES 23478-PeCDF	76.2	0.615			ES 23478-PeCDF	74.4
123478-HxCDF	EMPC		0.349	ES 123478-HxCDF	79.3	19.5			ES 123478-HxCDF	79.8	EMPC		0.455	ES 123478-HxCDF	83.5
123678-HxCDF	ND	0.261		ES 123678-HxCDF	86	11.2			ES 123678-HxCDF	89.5	ND	0.364		ES 123678-HxCDF	90.6
234678-HxCDF	EMPC		0.342	ES 234678-HxCDF	84.9	20.5			ES 234678-HxCDF	88	0.634			ES 234678-HxCDF	88
123789-HxCDF	ND	0.362		ES 123789-HxCDF	74.3	ND	1.8		ES 123789-HxCDF	76.4	ND	0.535		ES 123789-HxCDF	76.6
1234678-HpCDF	6.91			ES 1234678-HpCDF	82	785			ES 1234678-HpCDF	87.5	16			ES 1234678-HpCDF	87.4
1234789-HpCDF	ND	0.583		ES 1234789-HpCDF	72.4	57.5			ES 1234789-HpCDF	78	ND	0.957		ES 1234789-HpCDF	70.5
OCDF	15.1			ES OCDF	56.4	2560			ES OCDF	77	41			ES OCDF	47.9
Totals				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**
				CS 37Cl-2378-TCDD	82.7				CS 37Cl-2378-TCDD	83.2				CS 37Cl-2378-TCDD	84.2
Total TCDD	3.7		4.71	CS 12347-PeCDD	77.3	191		193	CS 12347-PeCDD	79.9	1.83		1.83	CS 12347-PeCDD	75
Total PeCDD	3.83		3.83	CS 12346-PeCDF	80.1	329		329	CS 12346-PeCDF	84.2	ND		3.76	CS 12346-PeCDF	81.9
Total HxCDD	17.2		18.8	CS 123469-HxCDF	84.7	2030		2030	CS 123469-HxCDF	88.2	34.7		34.7	CS 123469-HxCDF	88.3
Total HpCDD	92		92	CS 1234689-HpCDF	78	12800		12800	CS 1234689-HpCDF	91.9	209		209	CS 1234689-HpCDF	82.6
				AS 1368-TCDD	88.5				AS 1368-TCDD	90.9				AS 1368-TCDD	91.2
Total TCDF	6.95		8.33	AS 1368-TCDF	89	64.2		77.2	AS 1368-TCDF	93.8	3.55		4.42	AS 1368-TCDF	92.5
Total PeCDF	2.79		4.14			131		136			1.16		5.39		
Total HxCDF	8.46		9.15			1060		1060			20.5		21		
Total HpCDF	24.5		24.5			4000		4000			63.6		63.6		
Total PCDD/Fs	607		613			73900		74000			1200		1210		
WHO-2005 TEQs															
TEQ: ND=0	1.62		1.91			167		167			2		2.14		
TEQ: ND=DL/2	2.03	0.62	2.22			167	1.39	167			2.66	0.817	2.76		
TEQ: ND=DL	2.43	1.24	2.53			168	2.78	168			3.32	1.63	3.38		

	Core #4 0-25 cm					Core #4 25-68 cm					Core #4 68-100 cm				
Analyte	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**
Units	pg/g	pg/g	pg/g			pg/g	pg/g	pg/g			pg/g	pg/g	pg/g		
2378-TCDD	EMPC		0.681	ES 2378-TCDD	83.7	0.902			ES 2378-TCDD	81.5	EMPC		0.584	ES 2378-TCDD	92.1
12378-PeCDD	ND	0.654		ES 12378-PeCDD	76.1	ND	0.531		ES 12378-PeCDD	71.3	ND	0.477		ES 12378-PeCDD	82.7
123478-HxCDD	ND	0.671		ES 123478-HxCDD	78.3	ND	0.494		ES 123478-HxCDD	75.4	ND	0.504		ES 123478-HxCDD	77.7
123678-HxCDD	EMPC		0.957	ES 123678-HxCDD	88.2	0.651			ES 123678-HxCDD	79.5	1.85			ES 123678-HxCDD	81.6
123789-HxCDD	ND	0.71		ES 123789-HxCDD	82.6	ND	0.559		ES 123789-HxCDD	75.1	ND	0.541		ES 123789-HxCDD	77.4
1234678-HpCDD	29.9			ES 1234678-HpCDD	75.5	17.6			ES 1234678-HpCDD	74.7	72			ES 1234678-HpCDD	76.5
OCDD	339			ES OCDD	59.5	148			ES OCDD	60.9	332			ES OCDD	58.9
2378-TCDF	4.29			ES 2378-TCDF	84.8	4.67			ES 2378-TCDF	80.7	4.88			ES 2378-TCDF	87.8
12378-PeCDF	ND	0.399		ES 12378-PeCDF	83.3	ND	0.251		ES 12378-PeCDF	78.7	ND	0.267		ES 12378-PeCDF	86.9
23478-PeCDF	ND	0.484		ES 23478-PeCDF	71.4	ND	0.317		ES 23478-PeCDF	67.2	0.346			ES 23478-PeCDF	77
123478-HxCDF	ND	0.424		ES 123478-HxCDF	77	ND	0.344		ES 123478-HxCDF	71.1	ND	0.285		ES 123478-HxCDF	75.5
123678-HxCDF	ND	0.408		ES 123678-HxCDF	83.6	ND	0.305		ES 123678-HxCDF	80.3	ND	0.276		ES 123678-HxCDF	83.2
234678-HxCDF	ND	0.404		ES 234678-HxCDF	87.2	ND	0.351		ES 234678-HxCDF	75.5	ND	0.336		ES 234678-HxCDF	76.6
123789-HxCDF	ND	0.622		ES 123789-HxCDF	72.2	ND	0.48		ES 123789-HxCDF	63.9	ND	0.346		ES 123789-HxCDF	81.3
1234678-HpCDF	3.98			ES 1234678-HpCDF	88.7	1.95			ES 1234678-HpCDF	90.3	2.52			ES 1234678-HpCDF	85.1
1234789-HpCDF	ND	0.907		ES 1234789-HpCDF	73.8	ND	0.693		ES 1234789-HpCDF	65.2	ND	0.551		ES 1234789-HpCDF	74.3
OCDF	10.7			ES OCDF	58.5	4.55			ES OCDF	53.2	EMPC		4.51	ES OCDF	60.2
Totals				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**
				CS 37Cl-2378-TCDD	81.8				CS 37Cl-2378-TCDD	82.3				CS 37Cl-2378-TCDD	82.1
Total TCDD	3.12		5.39	CS 12347-PeCDD	76.2	0.902		3.24	CS 12347-PeCDD	75.7	4.64		5.68	CS 12347-PeCDD	79.6
Total PeCDD	3.12		4.34	CS 12346-PeCDF	77.8	2.4		2.4	CS 12346-PeCDF	81.2	2.09		3.9	CS 12346-PeCDF	90
Total HxCDD	10.7		11.7	CS 123469-HxCDF	80.2	5.31		7.62	CS 123469-HxCDF	79.5	18.3		18.3	CS 123469-HxCDF	79.6
Total HpCDD	61.8		61.8	CS 1234689-HpCDF	81	36.1		36.1	CS 1234689-HpCDF	79.8	137		137	CS 1234689-HpCDF	76.9
				AS 1368-TCDD	91				AS 1368-TCDD	87.8				AS 1368-TCDD	90
Total TCDF	7.59		7.59	AS 1368-TCDF	92	6.86		8.52	AS 1368-TCDF	91.1	11		11.9	AS 1368-TCDF	93
Total PeCDF	2.33		2.33			0.978		0.978			0.852		2.12		
Total HxCDF	5.16		5.16			3.11		3.11			0.473		3.32		
Total HpCDF	11		11			5.71		5.71			7.59		7.59		
Total PCDD/Fs	455		459			214		220			514		526		
WHO-2005 TEQs															
TEQ: ND=0	0.873		1.65			1.68		1.68			1.62		2.21		
TEQ: ND=DL/2	1.71	0.876	2.22			2.12	0.816	2.12			2.16	0.63	2.57		
TEQ: ND=DL	2.55	1.75	2.79			2.57	1.63	2.57			2.69	1.26	2.93		

	Core #5 0-24 cm					Core #5 27-76 cm					Core #5 76-122 cm				
Analyte	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**
Units	pg/g	pg/g	pg/g			pg/g	pg/g	pg/g			pg/g	pg/g	pg/g		
2378-TCDD	1.38			ES 2378-TCDD	88.6	2.47			ES 2378-TCDD	92.5	0.165			ES 2378-TCDD	79.7
12378-PeCDD	0.983			ES 12378-PeCDD	84.1	1.91			ES 12378-PeCDD	88.2	0.355			ES 12378-PeCDD	76.4
123478-HxCDD	3.93			ES 123478-HxCDD	79.9	10			ES 123478-HxCDD	84.5	0.529			ES 123478-HxCDD	71.1
123678-HxCDD	6.17			ES 123678-HxCDD	82.6	13			ES 123678-HxCDD	89.3	0.838			ES 123678-HxCDD	70.7
123789-HxCDD	3.96			ES 123789-HxCDD	82.7	5.97			ES 123789-HxCDD	92.9	0.832			ES 123789-HxCDD	67.5
1234678-HpCDD	175			ES 1234678-HpCDD	83.1	330			ES 1234678-HpCDD	91.3	31.9			ES 1234678-HpCDD	71.5
OCDD	3370			ES OCDD	70.8	4010			ES OCDD	83.1	1990			ES OCDD	60.2
2378-TCDF	5.84			ES 2378-TCDF	93.5	26.1			ES 2378-TCDF	94.2	78.4			ES 2378-TCDF	73.7
12378-PeCDF	0.989			ES 12378-PeCDF	89.9	89.4			ES 12378-PeCDF	88.3	72.6			ES 12378-PeCDF	79.1
23478-PeCDF	2.11			ES 23478-PeCDF	90.5	25.6			ES 23478-PeCDF	92.2	50.7			ES 23478-PeCDF	72.4
123478-HxCDF	2.33			ES 123478-HxCDF	75.9	386			ES 123478-HxCDF	80.8	95.9			ES 123478-HxCDF	71.4
123678-HxCDF	1.45			ES 123678-HxCDF	81.6	99.4			ES 123678-HxCDF	85.6	25.3			ES 123678-HxCDF	74.6
234678-HxCDF	1.86			ES 234678-HxCDF	79.9	20.3			ES 234678-HxCDF	85.7	10.6			ES 234678-HxCDF	57.7
123789-HxCDF	ND	0.358		ES 123789-HxCDF	72.1	ND	0.409		ES 123789-HxCDF	82.1	ND	0.373		ES 123789-HxCDF	55.3
1234678-HpCDF	24.5			ES 1234678-HpCDF	77	145			ES 1234678-HpCDF	81.7	72.6			ES 1234678-HpCDF	72.3
1234789-HpCDF	1.5			ES 1234789-HpCDF	73.9	40.6			ES 1234789-HpCDF	81	45.6			ES 1234789-HpCDF	66.4
OCDF	66.6			ES OCDF	65.5	278			ES OCDF	75.4	1300			ES OCDF	61.3
Totals				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**
				CS 37Cl-2378-TCDD	86				CS 37Cl-2378-TCDD	88.4				CS 37Cl-2378-TCDD	76.6
Total TCDD	16.9		18	CS 12347-PeCDD	87.9	27.2		27.6	CS 12347-PeCDD	89.8	6.09		6.09	CS 12347-PeCDD	69.9
Total PeCDD	13.5		14.6	CS 12346-PeCDF	96.8	33.9		33.9	CS 12346-PeCDF	97.6	4.08		5.04	CS 12346-PeCDF	79
Total HxCDD	55.4		56.6	CS 123469-HxCDF	79.4	114		114	CS 123469-HxCDF	84.5	8.19		11	CS 123469-HxCDF	63.1
Total HpCDD	347		347	CS 1234689-HpCDF	76.7	595		595	CS 1234689-HpCDF	85.2	69.1		69.1	CS 1234689-HpCDF	68.5
				AS 1368-TCDD	86.1				AS 1368-TCDD	90.2				AS 1368-TCDD	80.7
Total TCDF	24.2		28	AS 1368-TCDF	91.6	81.6		86.5	AS 1368-TCDF	91.5	219		220	AS 1368-TCDF	88.6
Total PeCDF	21.6		21.9			211		212			229		230		
Total HxCDF	35.5		35.5			645		645			191		191		
Total HpCDF	71		71.7			338		338			318		318		
Total PCDD/Fs	4020		4030			6340		6340			4340		4350		
WHO-2005 TEQs															
TEQ: ND=0	8.62		8.62			77.3		77.3			41.6		41.6		
TEQ: ND=DL/2	8.64	0.441	8.64			77.3	0.468	77.3			41.7	0.361	41.7		
TEQ: ND=DL	8.66	0.881	8.66			77.4	0.935	77.4			41.7	0.723	41.7		

	Core #5 122-141 cm					Core #6 0-25 cm					Core #6 25-53 cm				
Analyte	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**
Units	pg/g	pg/g	pg/g			pg/g	pg/g	pg/g			pg/g	pg/g	pg/g		
2378-TCDD	ND	0.43		ES 2378-TCDD	90.2	EMPC		0.563	ES 2378-TCDD	85.5	ND	0.553		ES 2378-TCDD	88.1
12378-PeCDD	ND	0.571		ES 12378-PeCDD	82.1	ND	0.635		ES 12378-PeCDD	75	ND	0.702		ES 12378-PeCDD	77.2
123478-HxCDD	ND	0.471		ES 123478-HxCDD	77.9	EMPC		0.724	ES 123478-HxCDD	76.9	ND	0.679		ES 123478-HxCDD	77.7
123678-HxCDD	ND	0.467		ES 123678-HxCDD	89.8	1.14			ES 123678-HxCDD	81.5	ND	0.642		ES 123678-HxCDD	81.7
123789-HxCDD	ND	0.477		ES 123789-HxCDD	81.2	ND	0.696		ES 123789-HxCDD	75.7	ND	0.729		ES 123789-HxCDD	77.6
1234678-HpCDD	4.8			ES 1234678-HpCDD	73.2	18.8			ES 1234678-HpCDD	73.2	11.6			ES 1234678-HpCDD	74.2
OCDD	106			ES OCDD	54.2	177			ES OCDD	58.2	126			ES OCDD	48.5
2378-TCDF	ND	0.397		ES 2378-TCDF	88.3	3.13			ES 2378-TCDF	86.5	3.68			ES 2378-TCDF	81.5
12378-PeCDF	ND	0.313		ES 12378-PeCDF	86.5	ND	0.352		ES 12378-PeCDF	84.4	ND	0.404		ES 12378-PeCDF	84
23478-PeCDF	ND	0.366		ES 23478-PeCDF	77.3	ND	0.409		ES 23478-PeCDF	74.3	ND	0.481		ES 23478-PeCDF	73.6
123478-HxCDF	ND	0.347		ES 123478-HxCDF	82.7	ND	0.419		ES 123478-HxCDF	77.9	ND	0.427		ES 123478-HxCDF	75.6
123678-HxCDF	ND	0.323		ES 123678-HxCDF	88.2	ND	0.344		ES 123678-HxCDF	84.3	ND	0.339		ES 123678-HxCDF	85.9
234678-HxCDF	ND	0.35		ES 234678-HxCDF	86.3	ND	0.455		ES 234678-HxCDF	78.4	ND	0.402		ES 234678-HxCDF	84.2
123789-HxCDF	ND	0.528		ES 123789-HxCDF	73.5	ND	0.577		ES 123789-HxCDF	73.2	ND	0.524		ES 123789-HxCDF	73.2
1234678-HpCDF	EMPC		0.39	ES 1234678-HpCDF	86.2	1.76			ES 1234678-HpCDF	81.5	1.11			ES 1234678-HpCDF	84.7
1234789-HpCDF	ND	0.697		ES 1234789-HpCDF	68.8	ND	0.713		ES 1234789-HpCDF	72.8	ND	0.939		ES 1234789-HpCDF	65.1
OCDF	3.18			ES OCDF	55.4	EMPC		2.29	ES OCDF	60.8	ND	2.55		ES OCDF	49.6
Totals				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**
				CS 37Cl-2378-TCDD	84.2				CS 37Cl-2378-TCDD	82.9				CS 37Cl-2378-TCDD	83.1
Total TCDD	4.31		4.81	CS 12347-PeCDD	80.1	16.1		17.3	CS 12347-PeCDD	75.1	ND		1.74	CS 12347-PeCDD	75.9
Total PeCDD	2.03		2.03	CS 12346-PeCDF	84.8	17.3		17.3	CS 12346-PeCDF	79.9	ND		0.888	CS 12346-PeCDF	79.9
Total HxCDD	7.76		7.76	CS 123469-HxCDF	82.1	15.3		16	CS 123469-HxCDF	81.4	ND		4.53	CS 123469-HxCDF	83.1
Total HpCDD	15.4		15.4	CS 1234689-HpCDF	80.3	40.8		40.8	CS 1234689-HpCDF	79.7	25.1		25.1	CS 1234689-HpCDF	80.2
				AS 1368-TCDD	92.4				AS 1368-TCDD	90.9				AS 1368-TCDD	91.1
Total TCDF	ND	0.397	ND	AS 1368-TCDF	94.9	5.06		5.06	AS 1368-TCDF	93.5	5.43		5.43	AS 1368-TCDF	89.7
Total PeCDF	ND	0.338	ND			ND		0.782			ND	0.44	ND		
Total HxCDF	ND	0.377	ND			ND		1.78			ND		1.24		
Total HpCDF	ND		0.39			4.88		4.88			3.6		3.6		
Total PCDD/Fs	138		139			277		283			160		169		
WHO-2005 TEQs															
TEQ: ND=0	0.081		0.085			0.685		1.32			0.533		0.533		
TEQ: ND=DL/2	0.814	0.739	0.817			1.46	0.841	1.83			1.43	0.931	1.43		
TEQ: ND=DL	1.55	1.48	1.55			2.24	1.68	2.35			2.33	1.86	2.33		

	Core #7 0-37 cm					Core #7 37-56 cm				
Analyte	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**
Units	pg/g	pg/g	pg/g			pg/g	pg/g	pg/g		
2378-TCDD	0.504			ES 2378-TCDD	82.5	EMPC		0.647	ES 2378-TCDD	90.8
12378-PeCDD	ND	0.428		ES 12378-PeCDD	79.1	EMPC		0.397	ES 12378-PeCDD	90.6
123478-HxCDD	ND	0.377		ES 123478-HxCDD	81.6	4.18			ES 123478-HxCDD	82.2
123678-HxCDD	0.537			ES 123678-HxCDD	77.6	EMPC		1.2	ES 123678-HxCDD	80.6
123789-HxCDD	ND	0.444		ES 123789-HxCDD	81.1	0.961			ES 123789-HxCDD	81.6
1234678-HpCDD	16.3			ES 1234678-HpCDD	78.3	47.9			ES 1234678-HpCDD	79.9
OCDD	211			ES OCDD	61.8	422			ES OCDD	64.6
2378-TCDF	EMPC		1.54	ES 2378-TCDF	84.8	2.8			ES 2378-TCDF	90.3
12378-PeCDF	ND	0.197		ES 12378-PeCDF	82.3	ND	0.131		ES 12378-PeCDF	93.1
23478-PeCDF	ND	0.211		ES 23478-PeCDF	79.7	ND	0.147		ES 23478-PeCDF	89.9
123478-HxCDF	ND	0.223		ES 123478-HxCDF	74.1	ND	0.188		ES 123478-HxCDF	73.9
123678-HxCDF	ND	0.214		ES 123678-HxCDF	82.4	ND	0.171		ES 123678-HxCDF	83.5
234678-HxCDF	ND	0.246		ES 234678-HxCDF	76.4	ND	0.209		ES 234678-HxCDF	75.6
123789-HxCDF	ND	0.352		ES 123789-HxCDF	67	ND	0.27		ES 123789-HxCDF	67.7
1234678-HpCDF	2.34			ES 1234678-HpCDF	78.9	4.99			ES 1234678-HpCDF	81.9
1234789-HpCDF	ND	0.545		ES 1234789-HpCDF	67.4	ND	0.423		ES 1234789-HpCDF	66.4
OCDF	7.1			ES OCDF	55.3	24.2			ES OCDF	56.4
Totals				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**
				CS 37Cl-2378-TCDD	92.5				CS 37Cl-2378-TCDD	95.1
Total TCDD	0.884		2.71	CS 12347-PeCDD	86.2	5.01		7.51	CS 12347-PeCDD	95.2
Total PeCDD	1.17		2.39	CS 12346-PeCDF	95.2	8.24		10.8	CS 12346-PeCDF	102
Total HxCDD	7.18		7.18	CS 123469-HxCDF	85.1	24.7		26.4	CS 123469-HxCDF	82.4
Total HpCDD	37.9		37.9	CS 1234689-HpCDF	79.3	90.4		90.4	CS 1234689-HpCDF	77.9
				AS 1368-TCDD	88.2				AS 1368-TCDD	89.1
Total TCDF	ND		2.65	AS 1368-TCDF	95.5	5.29		6.78	AS 1368-TCDF	95.9
Total PeCDF	ND		0.615			1.28		1.28		
Total HxCDF	2.54		2.87			2.63		4.61		
Total HpCDF	7.54		7.54			18.3		18.3		
Total PCDD/Fs	276		282			603		613		
WHO-2005 TEQs										
TEQ: ND=0	0.809		0.963			1.46		2.62		
TEQ: ND=DL/2	1.17	0.483	1.31			1.77	0.361	2.69		
TEQ: ND=DL	1.52	0.967	1.65			2.09	0.722	2.76		

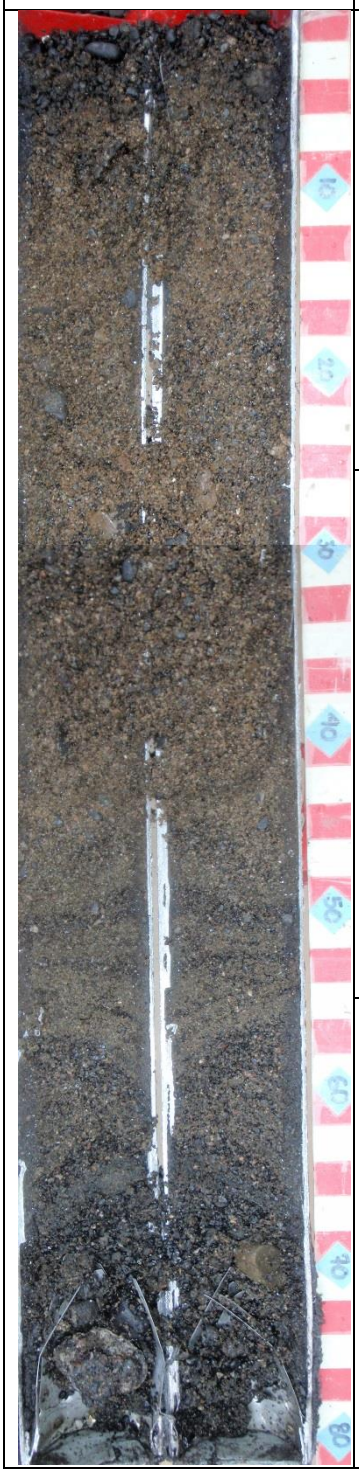
	Core #8 0-42 cm					Core #8 47-54 cm				
Analyte	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**
Units	pg/g	pg/g	pg/g			pg/g	pg/g	pg/g		
2378-TCDD	1.39			ES 2378-TCDD	96.6	0.591			ES 2378-TCDD	91.3
12378-PeCDD	0.664			ES 12378-PeCDD	87.2	ND	0.222		ES 12378-PeCDD	88.9
123478-HxCDD	2.43			ES 123478-HxCDD	86.9	0.412			ES 123478-HxCDD	83.8
123678-HxCDD	3.6			ES 123678-HxCDD	88.2	0.846			ES 123678-HxCDD	86.7
123789-HxCDD	1.97			ES 123789-HxCDD	89.3	EMPC		0.371	ES 123789-HxCDD	86.5
1234678-HpCDD	101			ES 1234678-HpCDD	84.4	16.1			ES 1234678-HpCDD	88.6
OCDD	1030			ES OCDD	72.4	216			ES OCDD	69.8
2378-TCDF	7.43			ES 2378-TCDF	97	EMPC		2.39	ES 2378-TCDF	92
12378-PeCDF	0.914			ES 12378-PeCDF	91.8	ND	0.138		ES 12378-PeCDF	93.8
23478-PeCDF	1.52			ES 23478-PeCDF	88.7	ND	0.144		ES 23478-PeCDF	92.7
123478-HxCDF	1.68			ES 123478-HxCDF	82.9	0.398			ES 123478-HxCDF	80.9
123678-HxCDF	0.985			ES 123678-HxCDF	84.8	ND	0.161		ES 123678-HxCDF	85.8
234678-HxCDF	1.09			ES 234678-HxCDF	84.1	EMPC		0.25	ES 234678-HxCDF	82.6
123789-HxCDF	ND	0.395		ES 123789-HxCDF	78.5	ND	0.254		ES 123789-HxCDF	77
1234678-HpCDF	13.5			ES 1234678-HpCDF	80.7	3.15			ES 1234678-HpCDF	82.5
1234789-HpCDF	0.936			ES 1234789-HpCDF	78.5	ND	0.476		ES 1234789-HpCDF	78.7
OCDF	33.5			ES OCDF	67.9	6.72			ES OCDF	65.9
Totals				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**
				CS 37Cl-2378-TCDD	94.8				CS 37Cl-2378-TCDD	94
Total TCDD	15.3		15.3	CS 12347-PeCDD	87.6	3.11		3.11	CS 12347-PeCDD	91.8
Total PeCDD	11.7		12.1	CS 12346-PeCDF	96	2.26		2.26	CS 12346-PeCDF	101
Total HxCDD	37.5		37.5	CS 123469-HxCDF	83.2	4.19		6.62	CS 123469-HxCDF	86
Total HpCDD	207		207	CS 1234689-HpCDF	80.3	33.3		33.3	CS 1234689-HpCDF	84.1
				AS 1368-TCDD	95.3				AS 1368-TCDD	81.4
Total TCDF	29.5		31.8	AS 1368-TCDF	97	3.71		7.03	AS 1368-TCDF	93.6
Total PeCDF	12		15.1			1.26		2.07		
Total HxCDF	20.7		20.7			3.87		4.12		
Total HpCDF	39.7		39.7			8.75		8.75		
Total PCDD/Fs	1430		1440			283		290		
WHO-2005 TEQs										
TEQ: ND=0	5.93		5.93			1.02		1.32		
TEQ: ND=DL/2	5.95	0.409	5.95			1.2	0.309	1.47		
TEQ: ND=DL	5.97	0.818	5.97			1.39	0.619	1.63		

	Core #9 0-22 cm					Core #9 22-38 cm				
Analyte	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**
Units	pg/g	pg/g	pg/g			pg/g	pg/g	pg/g		
2378-TCDD	0.343			ES 2378-TCDD	89.4	0.209			ES 2378-TCDD	88.1
12378-PeCDD	ND	0.29		ES 12378-PeCDD	89.8	ND	0.249		ES 12378-PeCDD	88
123478-HxCDD	ND	0.344		ES 123478-HxCDD	89.3	ND	0.294		ES 123478-HxCDD	71
123678-HxCDD	0.57			ES 123678-HxCDD	81.2	ND	0.303		ES 123678-HxCDD	75.1
123789-HxCDD	0.376			ES 123789-HxCDD	88.3	ND	0.315		ES 123789-HxCDD	72.7
1234678-HpCDD	18.5			ES 1234678-HpCDD	86.7	9.51			ES 1234678-HpCDD	73
OCDD	358			ES OCDD	69.2	112			ES OCDD	61.1
2378-TCDF	2.03			ES 2378-TCDF	80.4	1.21			ES 2378-TCDF	86.9
12378-PeCDF	ND	0.164		ES 12378-PeCDF	92	ND	0.113		ES 12378-PeCDF	88.7
23478-PeCDF	ND	0.183		ES 23478-PeCDF	90.9	ND	0.127		ES 23478-PeCDF	87
123478-HxCDF	EMPC		0.196	ES 123478-HxCDF	80.7	ND	0.173		ES 123478-HxCDF	68.7
123678-HxCDF	ND	0.169		ES 123678-HxCDF	88.4	ND	0.157		ES 123678-HxCDF	76.2
234678-HxCDF	0.248			ES 234678-HxCDF	82.4	ND	0.184		ES 234678-HxCDF	72.1
123789-HxCDF	ND	0.284		ES 123789-HxCDF	77.9	ND	0.292		ES 123789-HxCDF	60.3
1234678-HpCDF	2.38			ES 1234678-HpCDF	82.8	1.78			ES 1234678-HpCDF	73.2
1234789-HpCDF	ND	0.55		ES 1234789-HpCDF	76.4	ND	0.495		ES 1234789-HpCDF	62.9
OCDF	5.08			ES OCDF	63.7	2.12			ES OCDF	53.4
Totals				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**
				CS 37Cl-2378-TCDD	90.9				CS 37Cl-2378-TCDD	89.4
Total TCDD	2.03		2.03	CS 12347-PeCDD	93.9	1.36		1.36	CS 12347-PeCDD	90.3
Total PeCDD	2.08		2.08	CS 12346-PeCDF	99.1	1.58		1.58	CS 12346-PeCDF	93.2
Total HxCDD	6.21		6.68	CS 123469-HxCDF	85.2	3.96		5.77	CS 123469-HxCDF	73.9
Total HpCDD	45		45	CS 1234689-HpCDF	83.3	22.6		22.6	CS 1234689-HpCDF	69.1
				AS 1368-TCDD	71.9				AS 1368-TCDD	89.6
Total TCDF	3.98		4.92	AS 1368-TCDF	87.4	1.92		2.19	AS 1368-TCDF	91.4
Total PeCDF	1.15		1.52			0.666		0.666		
Total HxCDF	3.02		3.21			1.21		1.9		
Total HpCDF	6.66		6.66			4.26		4.26		
Total PCDD/Fs	434		436			151		154		
WHO-2005 TEQs										
TEQ: ND=0	0.983		1			0.477		0.477		
TEQ: ND=DL/2	1.21	0.382	1.22			0.71	0.333	0.71		
TEQ: ND=DL	1.44	0.764	1.44			0.944	0.665	0.944		

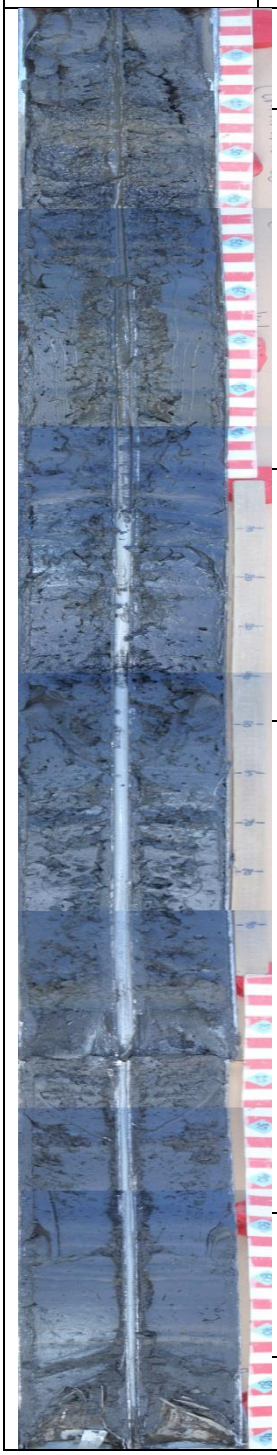
	Core #10 0-26 cm					Core #10 26-60 cm					Core #10 60-92 cm				
Analyte	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**	**Conc.**	**DL**	**EMPC**	**Standard**	**ES Recoveries**
Units	pg/g	pg/g	pg/g			pg/g	pg/g	pg/g			pg/g	pg/g	pg/g		
2378-TCDD	ND	0.353		ES 2378-TCDD	89.1	ND	0.496		ES 2378-TCDD	83.8	0.482			ES 2378-TCDD	88.4
12378-PeCDD	ND	0.526		ES 12378-PeCDD	77.1	ND	0.569		ES 12378-PeCDD	78.3	ND	0.553		ES 12378-PeCDD	82.2
123478-HxCDD	0.898			ES 123478-HxCDD	79.5	ND	0.532		ES 123478-HxCDD	78.2	ND	0.375		ES 123478-HxCDD	79.1
123678-HxCDD	ND	0.496		ES 123678-HxCDD	83	ND	0.566		ES 123678-HxCDD	85.7	0.512			ES 123678-HxCDD	87.6
123789-HxCDD	EMPC		0.575	ES 123789-HxCDD	76	ND	0.571		ES 123789-HxCDD	86	ND	0.409		ES 123789-HxCDD	85
1234678-HpCDD	16.6			ES 1234678-HpCDD	66.3	23.1			ES 1234678-HpCDD	76.7	8.22			ES 1234678-HpCDD	78.6
OCDD	231			ES OCDD	43.7	232			ES OCDD	59.9	112			ES OCDD	56.7
2378-TCDF	1.55			ES 2378-TCDF	87.7	1.48			ES 2378-TCDF	85.3	EMPC		2.34	ES 2378-TCDF	84.9
12378-PeCDF	ND	0.285		ES 12378-PeCDF	85.8	ND	0.277		ES 12378-PeCDF	84.8	ND	0.299		ES 12378-PeCDF	84.6
23478-PeCDF	ND	0.326		ES 23478-PeCDF	75.4	ND	0.341		ES 23478-PeCDF	74.4	ND	0.36		ES 23478-PeCDF	77.3
123478-HxCDF	ND	0.344		ES 123478-HxCDF	82.1	ND	0.367		ES 123478-HxCDF	79.7	ND	0.28		ES 123478-HxCDF	78.1
123678-HxCDF	ND	0.325		ES 123678-HxCDF	89	ND	0.318		ES 123678-HxCDF	85.7	ND	0.266		ES 123678-HxCDF	85.2
234678-HxCDF	ND	0.369		ES 234678-HxCDF	82.4	ND	0.386		ES 234678-HxCDF	85.3	ND	0.3		ES 234678-HxCDF	81.4
123789-HxCDF	ND	0.507		ES 123789-HxCDF	72.3	ND	0.561		ES 123789-HxCDF	71.9	ND	0.397		ES 123789-HxCDF	70.5
1234678-HpCDF	2.78			ES 1234678-HpCDF	80.4	3.16			ES 1234678-HpCDF	91.2	EMPC		0.914	ES 1234678-HpCDF	92.7
1234789-HpCDF	ND	0.606		ES 1234789-HpCDF	63.7	ND	0.774		ES 1234789-HpCDF	68.1	ND	0.752		ES 1234789-HpCDF	68.7
OCDF	4.81			ES OCDF	43.3	12.7			ES OCDF	53.4	EMPC		1.52	ES OCDF	52.9
Totals				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**				**Standard**	**CS/AS Recoveries**
				CS 37Cl-2378-TCDD	81.2				CS 37Cl-2378-TCDD	79.3				CS 37Cl-2378-TCDD	82.4
Total TCDD	1.6		2.54	CS 12347-PeCDD	76.8	1.66		1.66	CS 12347-PeCDD	74	2.11		2.11	CS 12347-PeCDD	78.3
Total PeCDD	1.67		1.67	CS 12346-PeCDF	82.3	0.759		1.64	CS 12346-PeCDF	78.9	ND		0.621	CS 12346-PeCDF	82
Total HxCDD	7.41		7.98	CS 123469-HxCDF	82.6	6.68		8.2	CS 123469-HxCDF	84.4	3.26		4.34	CS 123469-HxCDF	85.6
Total HpCDD	41.2		41.2	CS 1234689-HpCDF	74.8	48.8		48.8	CS 1234689-HpCDF	79.5	17.6		17.6	CS 1234689-HpCDF	81.2
				AS 1368-TCDD	94.2				AS 1368-TCDD	90.4				AS 1368-TCDD	90.6
Total TCDF	2.31		2.31	AS 1368-TCDF	95.1	1.48		2.14	AS 1368-TCDF	90.3	1.37		4.17	AS 1368-TCDF	92.1
Total PeCDF	1.09		1.09			ND		0.453			0.46		0.46		
Total HxCDF	1.27		2.56			3.56		3.56			2.03		2.03		
Total HpCDF	6.46		6.46			11.6		11.6			1.71		2.62		
Total PCDD/Fs	299		302			319		322			140		147		
WHO-2005 TEQs															
TEQ: ND=0	0.509		0.566			0.484		0.484			0.649		0.893		
TEQ: ND=DL/2	1.13	0.673	1.16			1.24	0.787	1.24			1.11	0.644	1.33		
TEQ: ND=DL	1.76	1.35	1.76			2	1.57	2			1.57	1.29	1.77		

Appendix E: Sediment Sample Data Results Core Logs

Core ID: Cumberland Dam Core #1 Final Length: 78 cm
Notes: EMPC = Estimated Maximum Possible Concentration

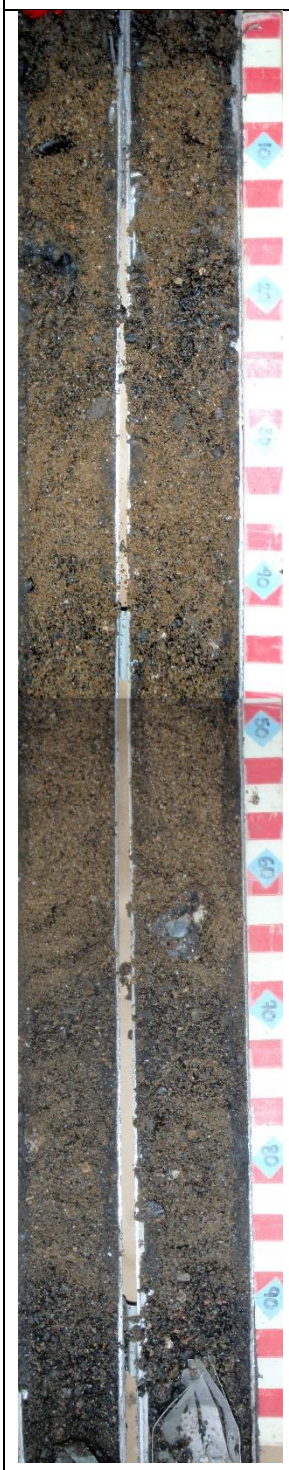
Photograph	Sample Interval (cm)	Folk Classification	2378-TCDD (pg/g)	OCDD (pg/g)	TEQ: ND=0
	0-25	Gravelly Sand	0.635 EMPC	229	3.2
	25-55	Gravelly Sand	0.773	177	1.62
	55-78	Gravelly Sand	1.98 EMPC	725	5.47

Core ID: Cumberland Dam Core #2 Final Length: 290 cm
Notes: Petroleum odor

Photograph	Sample Interval (cm)	Folk Classification	2378-TCDD (pg/g)	OCDD (pg/g)	TEQ: ND=0
	0-20	Sandy Mud	86.7	4060	150
	20-98	Mud	64.1	7280	143
	98-150	Mud	30.7	20600	128
	150-249	Mud	26.6	97900	294
	249-272	Sandy Mud	45.9	146000	508
	272-290	Muddy Sand	5.03	22100	84.8

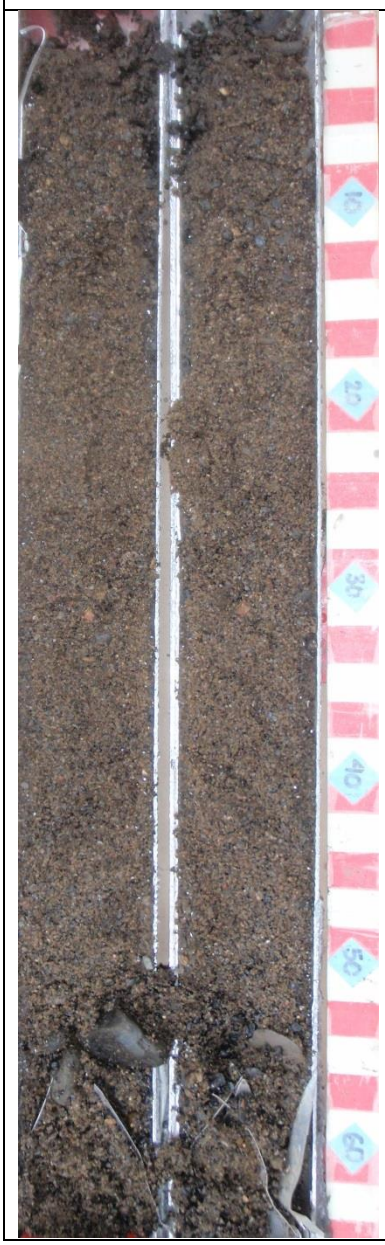
Core ID: Cumberland Dam Core #3 Final Length: 110 cm Notes:					
Photograph	Sample Interval (cm)	Folk Classification	2378-TCDD (pg/g)	OCDD (pg/g)	TEQ: ND=0
	0-25	Gravelly Sand	0.508	433	1.91
	61-70	Muddy Sand	14.7	50800	167
	70-100	Sandy Gravel	0.407	822	2.14

Core ID: Cumberland Dam Core #4 Final Length: 100 cm
Notes: EMPC = Estimated Maximum Possible Concentration

Photograph	Sample Interval (cm)	Folk Classification	2378-TCDD (pg/g)	OCDD (pg/g)	TEQ: ND=0
	0-25	Gravelly Sand	0.681 EMPC	339	1.65
	25-68	Gravelly Sand	0.902	148	1.68
	68-100	Sandy Gravel	0.584 EMPC	332	2.21

Core ID: Cumberland Dam Core #5 Final Length: 164 cm Notes:					
Photograph	Sample Interval (cm)	Folk Classification	2378-TCDD (pg/g)	OCDD (pg/g)	TEQ: ND=0
	0-24	Sandy Mud	1.38	3370	8.62
	27-76	Sandy Mud	2.47	4010	77.3
	76-122	Sandy Mud	0.165	1990	41.6
	122-144	Gravelly Muddy Sand	ND	106	0.085

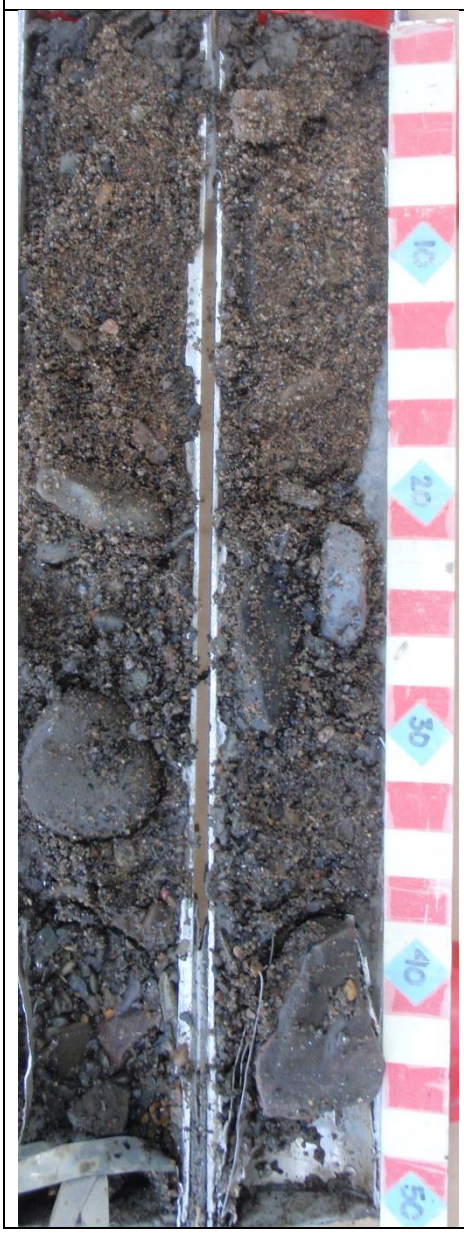
Core ID: Cumberland Dam Core #6 Final Length: 66 cm
Notes: EMPC = Estimated Maximum Possible Concentration

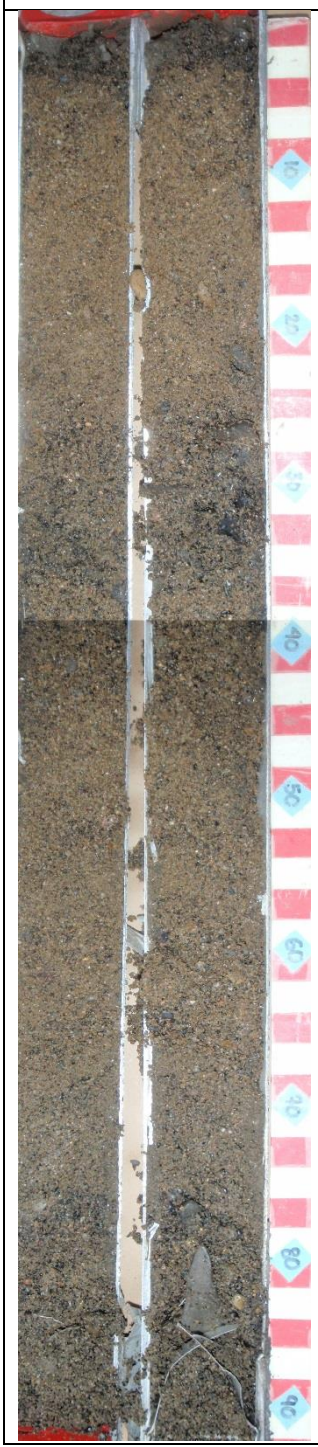
Photograph	Sample Interval (cm)	Folk Classification	2378-TCDD (pg/g)	OCDD (pg/g)	TEQ: ND=0
	0-25	Gravelly Sand	0.563 EMPC	177	1.32
	25-53	Gravelly Sand	ND	126	0.533

Core ID: Cumberland Dam Core #7 Final Length: 56 cm
Notes: EMPC = Estimated Maximum Possible Concentration

Photograph	Sample Interval (cm)	Folk Classification	2378-TCDD (pg/g)	OCDD (pg/g)	TEQ: ND=0
	0-37	Sandy Gravel	0.504	211	0.963
	37-56	Sandy Gravel	0.647 EMPC	422	2.62

Core ID: Cumberland Dam Core #8 Notes:		Final Length: 54 cm			
Photograph	Sample Interval (cm)	Folk Classification	2378-TCDD (pg/g)	OCDD (pg/g)	TEQ: ND=0
	0-42	Muddy Sand	1.39	1030	5.93
	47-54	Gravelly Muddy Sand	0.591	216	1.32

Core ID: Cumberland Dam Core #9 Final Length: 48 cm Notes:					
Photograph	Sample Interval (cm)	Folk Classification	2378-TCDD (pg/g)	OCDD (pg/g)	TEQ: ND=0
	0-22	Gravelly Sand	0.34	358	1
	22-38	Sandy Gravel	0.21	112	0.48

Core ID: Cumberland Dam Core #10 Final Length: 92 cm Notes:					
Photograph	Sample Interval (cm)	Folk Classification	2378-TCDD (pg/g)	OCDD (pg/g)	TEQ: ND=0
	0-26	Gravelly Sand	ND	231	0.57
	26-60	Gravelly Sand	ND	232	0.48
	60-92	Gravelly Sand	0.48	112	0.89

Appendix F: TCLP and Dioxins Laboratory Documents

Analytical Report for

American Rivers

Certificate of Analysis No.: 14110332

Project Manager: Serena McClain

Project Name : Cumberland Dam

Project Location: Cumberland, MD

December 8, 2014

Phase Separation Science, Inc.

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Fax: (410) 788-8723

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PHASE SEPARATION SCIENCE, INC.

December 8, 2014

Serena McClain
American Rivers
1101 14th Street
Suite 1400
Washington, DC 20005

Reference: PSS Work Order(s) No: **14110332**
Project Name: Cumberland Dam
Project Location: Cumberland, MD

Dear Serena McClain :

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Work Order(s) numbered **14110332**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on December 8, 2014. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt , the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Dan Prucnal
Laboratory Manager

Sample Summary

Client Name: American Rivers

Project Name: Cumberland Dam

Work Order Number(s): 14110332

The following samples were received under chain of custody by Phase Separation Science (PSS) on 11/03/2014 at 04:10 pm

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
14110332-001	Core#2 0-20cm	SOIL	10/28/14 13:00
14110332-002	Core#2 20-98cm	SOIL	10/28/14 13:00
14110332-003	Core#2 98-150cm	SOIL	10/28/14 13:00
14110332-004	Core#2 150-249cm	SOIL	10/28/14 13:00
14110332-005	Core#2 249-272cm	SOIL	10/28/14 13:00
14110332-006	Core#2 272-290cm	SOIL	10/28/14 13:00
14110332-007	Core#8 0-42cm	SOIL	10/29/14 10:00
14110332-008	Core#8 47-54cm	SOIL	10/29/14 10:00
14110332-009	Core#9 0-22cm	SOIL	10/29/14 10:30
14110332-010	Core#9 22-38cm	SOIL	10/29/14 10:30
14110332-011	Core#7 0-37cm	SOIL	10/29/14 11:15
14110332-012	Core#7 37-56cm	SOIL	10/29/14 11:15
14110332-013	Core#5 0-24cm	SOIL	10/29/14 13:30
14110332-014	Core#5 27-76cm	SOIL	10/29/14 13:30
14110332-015	Core#5 76-122cm	SOIL	10/29/14 13:30
14110332-016	Core#5 122-141cm	SOIL	10/29/14 13:30
14110332-017	Core#6 0-25cm	SOIL	10/29/14 14:30
14110332-018	Core#6 25-53cm	SOIL	10/29/14 14:30
14110332-019	Core#1 0-25cm	SOIL	10/29/14 15:15
14110332-020	Core#1 25-55cm	SOIL	10/29/14 15:15
14110332-021	Core#1 55-78cm	SOIL	10/29/14 15:15
14110332-022	Core#10 0-26cm	SOIL	10/29/14 15:45
14110332-023	Core#10 26-60cm	SOIL	10/29/14 15:45
14110332-024	Core#10 60-92cm	SOIL	10/29/14 15:45
14110332-025	Core#3 0-25cm	SOIL	10/29/14 16:30
14110332-026	Core#3 61-70cm	SOIL	10/29/14 16:30
14110332-027	Core#3 70-100cm	SOIL	10/29/14 16:30
14110332-028	Core#4 0-25cm	SOIL	10/29/14 17:30
14110332-029	Core#4 25-68cm	SOIL	10/29/14 17:30
14110332-030	Core#4 68-100cm	SOIL	10/29/14 17:30

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Sample Summary

Client Name: American Rivers

Project Name: Cumberland Dam

Work Order Number(s): 14110332

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. Unless otherwise noted in the case narrative, results are reported on a dry weight basis with the exception of pH, flashpoint, moisture, and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminates, and part 141.3, for the secondary drinking water contaminates.
5. Sample prepared under EPA 3550C with concentrations greater than 20 mg/Kg should employ the microtip extraction procedure if required to meet data quality objectives.
6. The analysis of acrolein by EPA 624 must be analyzed within three days of sampling unless pH is adjusted to 4-5 units [40 CFR part 136.3(e)].

Standard Flags/Abbreviations:

B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
C Results Pending Final Confirmation.
E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
Fail The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
J The target analyte was positively identified below the reporting limit but greater than the LOD.
LOD Limit of Detection. An estimate of the minimum amount of a substance that an analytical process can reliably detect**.** An LOD is analyte and matrix specific.
ND Not Detected at or above the reporting limit.
RL PSS Reporting Limit.
U Not detected.

Certifications:

NELAP Certifications: PA 68-03330, VA 460156
State Certifications: MD 179, WV 303
Regulated Soil Permit: P330-12-00268
NSWC USCG Accepted Laboratory
LDBE MWAA LD1997-0041-2015

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#2 0-20cm **Date/Time Sampled: 10/28/2014 13:00** **PSS Sample ID: 14110332-001**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	**0.051**	mg/L	0.050		1	5	11/14/14	11/14/14 13:25	1034
Barium	ND	mg/L	1.0		1	100	11/14/14	11/14/14 13:25	1034
Cadmium	ND	mg/L	0.050		1	1	11/14/14	11/14/14 13:25	1034
Chromium	ND	mg/L	0.050		1	5	11/14/14	11/14/14 13:25	1034
Lead	**0.050**	mg/L	0.050		1	5	11/14/14	11/14/14 13:25	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/14/14	11/14/14 13:25	1034
Selenium	ND	mg/L	0.050		1	1	11/14/14	11/14/14 13:25	1034
Silver	ND	mg/L	0.050		1	5	11/14/14	11/14/14 13:25	1034

Sample ID: Core#2 20-98cm **Date/Time Sampled: 10/28/2014 13:00** **PSS Sample ID: 14110332-002**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/14/14	11/14/14 14:20	1034
Barium	ND	mg/L	1.0		1	100	11/14/14	11/14/14 14:20	1034
Cadmium	ND	mg/L	0.050		1	1	11/14/14	11/14/14 14:20	1034
Chromium	ND	mg/L	0.050		1	5	11/14/14	11/14/14 14:20	1034
Lead	ND	mg/L	0.050		1	5	11/14/14	11/14/14 14:20	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/14/14	11/14/14 14:20	1034
Selenium	ND	mg/L	0.050		1	1	11/14/14	11/14/14 14:20	1034
Silver	ND	mg/L	0.050		1	5	11/14/14	11/14/14 14:20	1034

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CERTIFICATE OF ANALYSIS

No: 14110332
American Rivers, Washington, DC
December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#2 98-150cm **Date/Time Sampled: 10/28/2014 13:00** **PSS Sample ID: 14110332-003**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	**0.053**	mg/L	0.050		1	5	11/14/14	11/14/14 16:07	1034
Barium	ND	mg/L	1.0		1	100	11/14/14	11/14/14 16:07	1034
Cadmium	ND	mg/L	0.050		1	1	11/14/14	11/14/14 16:07	1034
Chromium	ND	mg/L	0.050		1	5	11/14/14	11/14/14 16:07	1034
Lead	ND	mg/L	0.050		1	5	11/14/14	11/14/14 16:07	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/14/14	11/14/14 16:07	1034
Selenium	ND	mg/L	0.050		1	1	11/14/14	11/14/14 16:07	1034
Silver	ND	mg/L	0.050		1	5	11/14/14	11/14/14 16:07	1034

Sample ID: Core#2 150-249cm **Date/Time Sampled: 10/28/2014 13:00** **PSS Sample ID: 14110332-004**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/14/14	11/14/14 16:13	1034
Barium	**1.1**	mg/L	1.0		1	100	11/14/14	11/14/14 16:13	1034
Cadmium	ND	mg/L	0.050		1	1	11/14/14	11/14/14 16:13	1034
Chromium	ND	mg/L	0.050		1	5	11/14/14	11/14/14 16:13	1034
Lead	ND	mg/L	0.050		1	5	11/14/14	11/14/14 16:13	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/14/14	11/14/14 16:13	1034
Selenium	ND	mg/L	0.050		1	1	11/14/14	11/14/14 16:13	1034
Silver	ND	mg/L	0.050		1	5	11/14/14	11/14/14 16:13	1034

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CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#2 249-272cm **Date/Time Sampled: 10/28/2014 13:00** **PSS Sample ID: 14110332-005**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/14/14	11/14/14 16:19	1034
Barium	**1.0**	mg/L	1.0		1	100	11/14/14	11/14/14 16:19	1034
Cadmium	ND	mg/L	0.050		1	1	11/14/14	11/14/14 16:19	1034
Chromium	ND	mg/L	0.050		1	5	11/14/14	11/14/14 16:19	1034
Lead	ND	mg/L	0.050		1	5	11/14/14	11/14/14 16:19	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/14/14	11/14/14 16:19	1034
Selenium	ND	mg/L	0.050		1	1	11/14/14	11/14/14 16:19	1034
Silver	ND	mg/L	0.050		1	5	11/14/14	11/14/14 16:19	1034

Sample ID: Core#2 272-290cm **Date/Time Sampled: 10/28/2014 13:00** **PSS Sample ID: 14110332-006**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/18/14	11/18/14 13:32	1034
Barium	ND	mg/L	1.0		1	100	11/18/14	11/18/14 13:32	1034
Cadmium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 13:32	1034
Chromium	ND	mg/L	0.050		1	5	11/18/14	11/18/14 13:32	1034
Lead	**0.31**	mg/L	0.050		1	5	11/18/14	11/18/14 13:32	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/18/14	11/18/14 13:32	1034
Selenium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 13:32	1034
Silver	ND	mg/L	0.050		1	5	11/18/14	11/18/14 13:32	1034

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CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#8 0-42cm **Date/Time Sampled: 10/29/2014 10:00** **PSS Sample ID: 14110332-007**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:03	1034
Barium	ND	mg/L	1.0		1	100	11/18/14	11/18/14 14:03	1034
Cadmium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 14:03	1034
Chromium	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:03	1034
Lead	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:03	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/18/14	11/18/14 14:03	1034
Selenium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 14:03	1034
Silver	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:03	1034

Sample ID: Core#8 47-54cm **Date/Time Sampled: 10/29/2014 10:00** **PSS Sample ID: 14110332-008**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:09	1034
Barium	ND	mg/L	1.0		1	100	11/18/14	11/18/14 14:09	1034
Cadmium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 14:09	1034
Chromium	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:09	1034
Lead	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:09	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/18/14	11/18/14 14:09	1034
Selenium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 14:09	1034
Silver	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:09	1034

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CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#9 0-22cm **Date/Time Sampled: 10/29/2014 10:30** **PSS Sample ID: 14110332-009**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:39	1034
Barium	ND	mg/L	1.0		1	100	11/18/14	11/18/14 14:39	1034
Cadmium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 14:39	1034
Chromium	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:39	1034
Lead	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:39	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/18/14	11/18/14 14:39	1034
Selenium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 14:39	1034
Silver	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:39	1034

Sample ID: Core#9 22-38cm **Date/Time Sampled: 10/29/2014 10:30** **PSS Sample ID: 14110332-010**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:45	1034
Barium	ND	mg/L	1.0		1	100	11/18/14	11/18/14 14:45	1034
Cadmium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 14:45	1034
Chromium	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:45	1034
Lead	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:45	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/18/14	11/18/14 14:45	1034
Selenium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 14:45	1034
Silver	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:45	1034

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CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#7 0-37cm **Date/Time Sampled: 10/29/2014 11:15** **PSS Sample ID: 14110332-011**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:52	1034
Barium	ND	mg/L	1.0		1	100	11/18/14	11/18/14 14:52	1034
Cadmium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 14:52	1034
Chromium	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:52	1034
Lead	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:52	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/18/14	11/18/14 14:52	1034
Selenium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 14:52	1034
Silver	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:52	1034

Sample ID: Core#7 37-56cm **Date/Time Sampled: 10/29/2014 11:15** **PSS Sample ID: 14110332-012**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:58	1034
Barium	ND	mg/L	1.0		1	100	11/18/14	11/18/14 14:58	1034
Cadmium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 14:58	1034
Chromium	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:58	1034
Lead	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:58	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/18/14	11/18/14 14:58	1034
Selenium	ND	mg/L	0.050		1	1	11/18/14	11/18/14 14:58	1034
Silver	ND	mg/L	0.050		1	5	11/18/14	11/18/14 14:58	1034

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CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#5 0-24cm **Date/Time Sampled: 10/29/2014 13:30** **PSS Sample ID: 14110332-013**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/20/14	11/20/14 14:39	1034
Barium	ND	mg/L	1.0		1	100	11/20/14	11/20/14 14:39	1034
Cadmium	ND	mg/L	0.050		1	1	11/20/14	11/20/14 14:39	1034
Chromium	ND	mg/L	0.050		1	5	11/20/14	11/20/14 14:39	1034
Lead	ND	mg/L	0.050		1	5	11/20/14	11/20/14 14:39	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/20/14	11/20/14 14:39	1034
Selenium	ND	mg/L	0.050		1	1	11/20/14	11/20/14 14:39	1034
Silver	ND	mg/L	0.050		1	5	11/20/14	11/20/14 14:39	1034

Sample ID: Core#5 27-76cm **Date/Time Sampled: 10/29/2014 13:30** **PSS Sample ID: 14110332-014**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:34	1034
Barium	ND	mg/L	1.0		1	100	11/20/14	11/20/14 15:34	1034
Cadmium	ND	mg/L	0.050		1	1	11/20/14	11/20/14 15:34	1034
Chromium	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:34	1034
Lead	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:34	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/20/14	11/20/14 15:34	1034
Selenium	ND	mg/L	0.050		1	1	11/20/14	11/20/14 15:34	1034
Silver	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:34	1034

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CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#5 76-122cm **Date/Time Sampled: 10/29/2014 13:30** **PSS Sample ID: 14110332-015**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:40	1034
Barium	**1.2**	mg/L	1.0		1	100	11/20/14	11/20/14 15:40	1034
Cadmium	ND	mg/L	0.050		1	1	11/20/14	11/20/14 15:40	1034
Chromium	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:40	1034
Lead	**0.12**	mg/L	0.050		1	5	11/20/14	11/20/14 15:40	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/20/14	11/20/14 15:40	1034
Selenium	ND	mg/L	0.050		1	1	11/20/14	11/20/14 15:40	1034
Silver	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:40	1034

Sample ID: Core#5 122-141cm **Date/Time Sampled: 10/29/2014 13:30** **PSS Sample ID: 14110332-016**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:46	1034
Barium	ND	mg/L	1.0		1	100	11/20/14	11/20/14 15:46	1034
Cadmium	ND	mg/L	0.050		1	1	11/20/14	11/20/14 15:46	1034
Chromium	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:46	1034
Lead	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:46	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/20/14	11/20/14 15:46	1034
Selenium	ND	mg/L	0.050		1	1	11/20/14	11/20/14 15:46	1034
Silver	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:46	1034

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CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#6 0-25cm **Date/Time Sampled: 10/29/2014 14:30** **PSS Sample ID: 14110332-017**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:53	1034
Barium	ND	mg/L	1.0		1	100	11/20/14	11/20/14 15:53	1034
Cadmium	ND	mg/L	0.050		1	1	11/20/14	11/20/14 15:53	1034
Chromium	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:53	1034
Lead	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:53	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/20/14	11/20/14 15:53	1034
Selenium	ND	mg/L	0.050		1	1	11/20/14	11/20/14 15:53	1034
Silver	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:53	1034

Sample ID: Core#6 25-53cm **Date/Time Sampled: 10/29/2014 14:30** **PSS Sample ID: 14110332-018**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:59	1034
Barium	ND	mg/L	1.0		1	100	11/20/14	11/20/14 15:59	1034
Cadmium	ND	mg/L	0.050		1	1	11/20/14	11/20/14 15:59	1034
Chromium	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:59	1034
Lead	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:59	1034
Mercury	ND	mg/L	0.0020		1	0.2	11/20/14	11/20/14 15:59	1034
Selenium	ND	mg/L	0.050		1	1	11/20/14	11/20/14 15:59	1034
Silver	ND	mg/L	0.050		1	5	11/20/14	11/20/14 15:59	1034

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CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#1 0-25cm **Date/Time Sampled: 10/29/2014 15:15** **PSS Sample ID: 14110332-019**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:00	1034
Barium	ND	mg/L	1.0		1	100	12/02/14	12/02/14 15:00	1034
Cadmium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:00	1034
Chromium	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:00	1034
Lead	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:00	1034
Mercury	ND	mg/L	0.0020		1	0.2	12/02/14	12/02/14 15:00	1034
Selenium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:00	1034
Silver	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:00	1034

Sample ID: Core#1 25-55cm **Date/Time Sampled: 10/29/2014 15:15** **PSS Sample ID: 14110332-020**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:06	1034
Barium	ND	mg/L	1.0		1	100	12/02/14	12/02/14 15:06	1034
Cadmium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:06	1034
Chromium	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:06	1034
Lead	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:06	1034
Mercury	ND	mg/L	0.0020		1	0.2	12/02/14	12/02/14 15:06	1034
Selenium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:06	1034
Silver	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:06	1034

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CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#1 55-78cm **Date/Time Sampled: 10/29/2014 15:15** **PSS Sample ID: 14110332-021**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:12	1034
Barium	ND	mg/L	1.0		1	100	12/02/14	12/02/14 15:12	1034
Cadmium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:12	1034
Chromium	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:12	1034
Lead	**0.090**	mg/L	0.050		1	5	12/02/14	12/02/14 15:12	1034
Mercury	ND	mg/L	0.0020		1	0.2	12/02/14	12/02/14 15:12	1034
Selenium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:12	1034
Silver	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:12	1034

Sample ID: Core#10 0-26cm **Date/Time Sampled: 10/29/2014 15:45** **PSS Sample ID: 14110332-022**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:18	1034
Barium	ND	mg/L	1.0		1	100	12/02/14	12/02/14 15:18	1034
Cadmium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:18	1034
Chromium	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:18	1034
Lead	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:18	1034
Mercury	ND	mg/L	0.0020		1	0.2	12/02/14	12/02/14 15:18	1034
Selenium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:18	1034
Silver	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:18	1034

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CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#10 26-60cm **Date/Time Sampled: 10/29/2014 15:45** **PSS Sample ID: 14110332-023**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:24	1034
Barium	ND	mg/L	1.0		1	100	12/02/14	12/02/14 15:24	1034
Cadmium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:24	1034
Chromium	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:24	1034
Lead	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:24	1034
Mercury	ND	mg/L	0.0020		1	0.2	12/02/14	12/02/14 15:24	1034
Selenium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:24	1034
Silver	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:24	1034

Sample ID: Core#10 60-92cm **Date/Time Sampled: 10/29/2014 15:45** **PSS Sample ID: 14110332-024**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:30	1034
Barium	ND	mg/L	1.0		1	100	12/02/14	12/02/14 15:30	1034
Cadmium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:30	1034
Chromium	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:30	1034
Lead	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:30	1034
Mercury	ND	mg/L	0.0020		1	0.2	12/02/14	12/02/14 15:30	1034
Selenium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:30	1034
Silver	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:30	1034

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CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#3 0-25cm **Date/Time Sampled: 10/29/2014 16:30** **PSS Sample ID: 14110332-025**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:36	1034
Barium	ND	mg/L	1.0		1	100	12/02/14	12/02/14 15:36	1034
Cadmium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:36	1034
Chromium	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:36	1034
Lead	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:36	1034
Mercury	ND	mg/L	0.0020		1	0.2	12/02/14	12/02/14 15:36	1034
Selenium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:36	1034
Silver	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:36	1034

Sample ID: Core#3 61-70cm **Date/Time Sampled: 10/29/2014 16:30** **PSS Sample ID: 14110332-026**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:43	1034
Barium	ND	mg/L	1.0		1	100	12/02/14	12/02/14 15:43	1034
Cadmium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:43	1034
Chromium	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:43	1034
Lead	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:43	1034
Mercury	ND	mg/L	0.0020		1	0.2	12/02/14	12/02/14 15:43	1034
Selenium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:43	1034
Silver	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:43	1034

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#3 70-100cm **Date/Time Sampled: 10/29/2014 16:30** **PSS Sample ID: 14110332-027**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:49	1034
Barium	ND	mg/L	1.0		1	100	12/02/14	12/02/14 15:49	1034
Cadmium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:49	1034
Chromium	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:49	1034
Lead	**0.051**	mg/L	0.050		1	5	12/02/14	12/02/14 15:49	1034
Mercury	ND	mg/L	0.0020		1	0.2	12/02/14	12/02/14 15:49	1034
Selenium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 15:49	1034
Silver	ND	mg/L	0.050		1	5	12/02/14	12/02/14 15:49	1034

Sample ID: Core#4 0-25cm **Date/Time Sampled: 10/29/2014 17:30** **PSS Sample ID: 14110332-028**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	12/02/14	12/02/14 16:19	1034
Barium	ND	mg/L	1.0		1	100	12/02/14	12/02/14 16:19	1034
Cadmium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 16:19	1034
Chromium	ND	mg/L	0.050		1	5	12/02/14	12/02/14 16:19	1034
Lead	ND	mg/L	0.050		1	5	12/02/14	12/02/14 16:19	1034
Mercury	ND	mg/L	0.0020		1	0.2	12/02/14	12/02/14 16:19	1034
Selenium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 16:19	1034
Silver	ND	mg/L	0.050		1	5	12/02/14	12/02/14 16:19	1034

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 14110332

American Rivers, Washington, DC

December 8, 2014

Project Name: Cumberland Dam
Project Location: Cumberland, MD

Sample ID: Core#4 25-68cm **Date/Time Sampled: 10/29/2014 17:30** **PSS Sample ID: 14110332-029**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	12/02/14	12/02/14 16:25	1034
Barium	ND	mg/L	1.0		1	100	12/02/14	12/02/14 16:25	1034
Cadmium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 16:25	1034
Chromium	ND	mg/L	0.050		1	5	12/02/14	12/02/14 16:25	1034
Lead	ND	mg/L	0.050		1	5	12/02/14	12/02/14 16:25	1034
Mercury	ND	mg/L	0.0020		1	0.2	12/02/14	12/02/14 16:25	1034
Selenium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 16:25	1034
Silver	ND	mg/L	0.050		1	5	12/02/14	12/02/14 16:25	1034

Sample ID: Core#4 68-100cm **Date/Time Sampled: 10/29/2014 17:30** **PSS Sample ID: 14110332-030**
Matrix: SOIL **Date/Time Received: 11/03/2014 16:10**

TCLP Metals — Analytical Method: SW-846 6020 A — Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	12/02/14	12/02/14 16:31	1034
Barium	ND	mg/L	1.0		1	100	12/02/14	12/02/14 16:31	1034
Cadmium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 16:31	1034
Chromium	ND	mg/L	0.050		1	5	12/02/14	12/02/14 16:31	1034
Lead	ND	mg/L	0.050		1	5	12/02/14	12/02/14 16:31	1034
Mercury	ND	mg/L	0.0020		1	0.2	12/02/14	12/02/14 16:31	1034
Selenium	ND	mg/L	0.050		1	1	12/02/14	12/02/14 16:31	1034
Silver	ND	mg/L	0.050		1	5	12/02/14	12/02/14 16:31	1034

FINAL LAB REPORT

Prepared by

SGS NORTH AMERICA

Prepared for

This report is approved by

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PROJECT INFORMATION SUMMARY *(When applicable, see QC Annotations for details)*

Client Project
SGS Project #
Analytical Protocol(s)
No. Samples Submitted
Additional QC Sample(s)
No. Laboratory Method Blanks
No. OPRs / Batch CS3
Date Received
Condition Received
Temperature upon Receipt (ºC)
Extraction within Holding Time
Analysis within Holding Time

QC ANNOTATIONS:

1. Please see Appendices attached for data qualifier/attribute and lab identifier descriptions which may be contained in the project.

APPENDIX A: GENERAL DATA QUALIFIERS / DATA ATTRIBUTES

B	The analyte was found in the method blank, at a concentration that was at least 10% of the concentration in the sample.
C	Two or more congeners co-elute. In EDDs, C denotes the lowest IUPAC congener in a co-elution group and additional co-eluters for the group are shown with the number of the lowest IUPAC co-eluter.
E	The reported concentration exceeds the calibration range (upper point of the calibration curve) and is an estimated value.
EMPC	Represents an Estimated Maximum Possible Concentration. EMPCs arise in cases where the signal/noise ratio is not sufficient for peak identification (the determined ion-abundance ratio is outside the allowed theoretical range), or where there is a co-eluting interference.
H/h	If the standard recovery is below the method or SOP specified value “H” is assigned. If the obtained value is less than half the specified value “h” is assigned.
J	Indicates that an analyte has a concentration below the reporting limit (lowest point of the calibration curve) and is an estimated value.
ND	Indicates a non-detect.
NR or R	Indicates a value that is not reportable.
PR	Due to interference, the associated congener is poorly resolved.
QI	Indicates the presence of a quantitative interference.
SI	Denotes “Single Ion Mode” and is utilized for PCBs where the secondary ion trace has a significantly elevated noise level due to background PFK. Responses for such peaks are calculated using an EMPC approach based solely on the primary ion area(s) and may be considered estimates.
U	The analyte was not detected. The estimated detection limit (EDL) may be reported for this analyte.
V	The labeled standard recovery was found to be outside of the method control limits.

APPENDIX B: DRBC/TMDL SPECIFIC DATA QUALIFIERS / DATA ATTRIBUTES

J	The reported result is an estimate. The value is less than the minimum calibration level but greater than the estimated detection limit (EDL).
U	The analyte was not detected in the sample at the estimated detection limit (EDL).
E	The reported concentration is an estimate. The value exceeds the upper calibration range (upper point of the calibration curve).
D	Dilution Data. Result was obtained from the analysis of a dilution.
B	Analyte found in the sample and associated method blank.
C	Co-eluting congener
Cxx	Co-elutes with the indicated congener, data is reported under the lowest IUPAC congener. 'Xx' denotes the IUPAC number with the lowest numerical designated congener.
NR	Analyte is not reportable because of problems in sample preparation or analysis.
V	Labeled standard recovery is not within method control limits.
X	Results from re-injection/repeat/second-column analysis.
EMPC	Estimated maximum possible concentration. Indicates that a peak is identified but did not meet the method specified ion-abundance ratio.

APPENDIX C: LAB IDENTIFIERS

AR	Indicates use of the archived portion of the sample extract.
CU	Indicates a sample that required additional clean-up prior to MS injection/processing.
D	Indicates a dilution of the sample extract. The number that follows the "D" indicates the dilution factor.
DE	Indicates a dilution performed with the addition of ES (extraction standard) solution.
DUP	Designation for a duplicate sample.
MS	Designation for a matrix spike.
MSD	Designation for a matrix spike duplicate.
RJ	Indicates a reinjection of the sample extract.
S	Indicates a sample split. The number that follows the "S" indicates the split factor.

SGS CERTIFICATIONS

Arkansas	88-0682
California (ELAP)	Interim ELAP Cert #2914
CLIA	34D1013708
Connecticut	PH-0258
USDA Soil Permit	P330-14-00135
DoD	2726.01
Florida (Primary NELAP)	E87634
ISO 17025/IEC	2726.01
Louisiana	4115
Maine	#2014020
Massachusetts	M-NC919
Minnesota (Primary NELAP For Method 23)	Lab #037-999-459 Cert #688823
New Jersey	NC100
New York	11685
North Carolina DWR	481
North Dakota	R-197
Oregon	NC200002
Pennsylvania	68-03675
South Carolina	Lab #99029 Cert #99029002
Texas	T104704260-13-5
US Coast Guard	16714/159.317/SGS
Virginia	Lab #460214 Cert #3006
Washington	C913
West Virginia	293

Rev. 04-Sep-2014

Sample ID: 14110332-001 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.01 g	Lab Sample ID	A7312_12752_DF_001-D5	Date Extracted:	11-Nov-2014
Date Collected:	28-Oct-2014	% Solid:	37.9 %	QC Batch No:	12752	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	16:57:18

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	86.7				ES 2378-TCDD	85.3	
12378-PeCDD	2.38			J	ES 12378-PeCDD	84.3	
123478-HxCDD	2.54				ES 123478-HxCDD	77	
123678-HxCDD	17.8				ES 123678-HxCDD	77.8	
123789-HxCDD	7.48				ES 123789-HxCDD	74.5	
1234678-HpCDD	265				ES 1234678-HpCDD	72.6	
OCDD	4060				ES OCDD	56.6	
2378-TCDF	502				ES 2378-TCDF	84	
12378-PeCDF	3.78				ES 12378-PeCDF	80.8	
23478-PeCDF	7.99				ES 23478-PeCDF	85	
123478-HxCDF	5.03				ES 123478-HxCDF	71.9	
123678-HxCDF	EMPC		1.79	J	ES 123678-HxCDF	75.4	
234678-HxCDF	2.95				ES 234678-HxCDF	73.2	
123789-HxCDF	ND	0.592			ES 123789-HxCDF	68	
1234678-HpCDF	35.9				ES 1234678-HpCDF	68.4	
1234789-HpCDF	2.59				ES 1234789-HpCDF	67.5	
OCDF	94				ES OCDF	54	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	91.9	
Total TCDD	107		109		CS 12347-PeCDD	94.1	
Total PeCDD	24.9		24.9		CS 12346-PeCDF	97.1	
Total HxCDD	138		141		CS 123469-HxCDF	80.8	
Total HpCDD	544		544		CS 1234689-HpCDF	76.8	
					AS 1368-TCDD	84.7	
Total TCDF	967		1010		AS 1368-TCDF	87.4	
Total PeCDF	47.1		50.6				
Total HxCDF	59.4		62.3				
Total HpCDF	131		131				
Total PCDD/Fs	**6170**		**6220**				
WHO-2005 TEQs							
TEQ: ND=0	150		150				
TEQ: ND=DL/2	150	0.726	150				
TEQ: ND=DL	150	1.45	150				

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Sample ID: 14110332-002 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	8.99 g	Lab Sample ID	A7312_12752_DF_002-D5	Date Extracted:	11-Nov-2014
Date Collected:	28-Oct-2014	% Solid:	30.0 %	QC Batch No:	12752	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	17:50:36

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	64.1				ES 2378-TCDD	97.7	
12378-PeCDD	4.83				ES 12378-PeCDD	88.9	
123478-HxCDD	6.27				ES 123478-HxCDD	81.7	
123678-HxCDD	32.3				ES 123678-HxCDD	91.6	
123789-HxCDD	13.2				ES 123789-HxCDD	87.5	
1234678-HpCDD	599				ES 1234678-HpCDD	81.5	
OCDD	7280				ES OCDD	65.4	
2378-TCDF	541				ES 2378-TCDF	92.8	
12378-PeCDF	5.68				ES 12378-PeCDF	85.3	
23478-PeCDF	12.7				ES 23478-PeCDF	90.1	
123478-HxCDF	9.73				ES 123478-HxCDF	80.5	
123678-HxCDF	4.06				ES 123678-HxCDF	82.7	
234678-HxCDF	6.66				ES 234678-HxCDF	79.4	
123789-HxCDF	ND	0.84			ES 123789-HxCDF	72.3	
1234678-HpCDF	82.8				ES 1234678-HpCDF	77	
1234789-HpCDF	6.15				ES 1234789-HpCDF	73.6	
OCDF	204				ES OCDF	62.7	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	97.3	
Total TCDD	94.2		99.5		CS 12347-PeCDD	98.9	
Total PeCDD	50.5		54.1		CS 12346-PeCDF	95.2	
Total HxCDD	227		227		CS 123469-HxCDF	81.2	
Total HpCDD	1180		1180		CS 1234689-HpCDF	78.4	
					AS 1368-TCDD	92	
Total TCDF	1020		1020		AS 1368-TCDF	89.7	
Total PeCDF	103		108				
Total HxCDF	178		178				
Total HpCDF	300		300				
Total PCDD/Fs	**10600**		**10700**				
WHO-2005 TEQs							
TEQ: ND=0	143		143				
TEQ: ND=DL/2	143	0.863	143				
TEQ: ND=DL	143	1.73	143				

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Sample ID: 14110332-003 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	8.09 g	Lab Sample ID	A7312_12752_DF_003-D2	Date Extracted:	11-Nov-2014
Date Collected:	28-Oct-2014	% Solid:	26.9 %	QC Batch No:	12752	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	18:43:57

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	30.7				ES 2378-TCDD	95.2	
12378-PeCDD	15.7				ES 12378-PeCDD	95.6	
123478-HxCDD	23.3				ES 123478-HxCDD	89.1	
123678-HxCDD	132				ES 123678-HxCDD	96.2	
123789-HxCDD	51.1				ES 123789-HxCDD	95.8	
1234678-HpCDD	2410				ES 1234678-HpCDD	92.3	
OCDD	20600			E	ES OCDD	79.5	
2378-TCDF	139				ES 2378-TCDF	92.9	
12378-PeCDF	11.4				ES 12378-PeCDF	88.4	
23478-PeCDF	24.3				ES 23478-PeCDF	93.7	
123478-HxCDF	30.5				ES 123478-HxCDF	85.3	
123678-HxCDF	12				ES 123678-HxCDF	90.1	
234678-HxCDF	19.1				ES 234678-HxCDF	88.3	
123789-HxCDF	ND	0.332			ES 123789-HxCDF	81.1	
1234678-HpCDF	285				ES 1234678-HpCDF	82.4	
1234789-HpCDF	16.1				ES 1234789-HpCDF	83.3	
OCDF	532				ES OCDF	71.9	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	91.8	
Total TCDD	97.7		100		CS 12347-PeCDD	93.9	
Total PeCDD	155		159		CS 12346-PeCDF	98.5	
Total HxCDD	860		860		CS 123469-HxCDF	87.5	
Total HpCDD	4560		4560		CS 1234689-HpCDF	79.5	
					AS 1368-TCDD	84.9	
Total TCDF	337		352		AS 1368-TCDF	87.7	
Total PeCDF	266		267				
Total HxCDF	655		655				
Total HpCDF	928		928				
Total PCDD/Fs	**29000**		**29000**				
WHO-2005 TEQs							
TEQ: ND=0	128		128				
TEQ: ND=DL/2	128	0.646	128				
TEQ: ND=DL	128	1.29	128				

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Sample ID: 14110332-004 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.00 g	Lab Sample ID	A7312_12752_DF_004-D5	Date Extracted:	11-Nov-2014
Date Collected:	28-Oct-2014	% Solid:	34.2 %	QC Batch No:	12752	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	19:37:15

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers
2378-TCDD	26.6			
12378-PeCDD	32.2			
123478-HxCDD	58.3			
123678-HxCDD	372			
123789-HxCDD	127			
1234678-HpCDD	10400			E
OCDD	97900			E
2378-TCDF	60.1			
12378-PeCDF	9.91			
23478-PeCDF	28.2			
123478-HxCDF	60.7			
123678-HxCDF	27.8			
234678-HxCDF	47.2			
123789-HxCDF	ND	1.3		
1234678-HpCDF	1540			
1234789-HpCDF	112			
OCDF	4800			
Totals				
Total TCDD	376		376	
Total PeCDD	464		464	
Total HxCDD	2910		2910	
Total HpCDD	21000		21000	
Total TCDF	234		246	
Total PeCDF	366		367	
Total HxCDF	2100		2100	
Total HpCDF	6500		6500	
Total PCDD/Fs	**137000**		**137000**	
WHO-2005 TEQs				
TEQ: ND=0	294		294	
TEQ: ND=DL/2	294	1.82	294	
TEQ: ND=DL	294	3.65	294	

Standard	ES Recoveries	Qualifiers
ES 2378-TCDD	96.7	
ES 12378-PeCDD	92.5	
ES 123478-HxCDD	82.8	
ES 123678-HxCDD	88.1	
ES 123789-HxCDD	85	
ES 1234678-HpCDD	89.1	
ES OCDD	92.1	
ES 2378-TCDF	94.7	
ES 12378-PeCDF	89.6	
ES 23478-PeCDF	93.9	
ES 123478-HxCDF	78.6	
ES 123678-HxCDF	82.5	
ES 234678-HxCDF	81.2	
ES 123789-HxCDF	75.1	
ES 1234678-HpCDF	76.2	
ES 1234789-HpCDF	81.3	
ES OCDF	80.3	

Standard	CS/AS Recoveries	
CS 37Cl-2378-TCDD	95.8	
CS 12347-PeCDD	95.3	
CS 12346-PeCDF	103	
CS 123469-HxCDF	82.1	
CS 1234689-HpCDF	69.3	
AS 1368-TCDD	94.7	
AS 1368-TCDF	90.6	

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Sample ID: 14110332-005 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.03 g	Lab Sample ID	A7312_12752_DF_005-D5	Date Extracted:	11-Nov-2014
Date Collected:	28-Oct-2014	% Solid:	36.4 %	QC Batch No:	12752	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	20:30:35

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	45.9				ES 2378-TCDD	91.8	
12378-PeCDD	68				ES 12378-PeCDD	89.4	
123478-HxCDD	79.2				ES 123478-HxCDD	82	
123678-HxCDD	656				ES 123678-HxCDD	80.3	
123789-HxCDD	238				ES 123789-HxCDD	78	
1234678-HpCDD	19700			E	ES 1234678-HpCDD	90.9	
OCDD-a	146000			E	ES OCDD	101	
2378-TCDF	39.7				ES 2378-TCDF	92.2	
12378-PeCDF	6.06				ES 12378-PeCDF	84.2	
23478-PeCDF	17.9				ES 23478-PeCDF	87	
123478-HxCDF	62.6				ES 123478-HxCDF	72.7	
123678-HxCDF	30.4				ES 123678-HxCDF	77.1	
234678-HxCDF	63.9				ES 234678-HxCDF	75.7	
123789-HxCDF	ND	1.68			ES 123789-HxCDF	71.7	
1234678-HpCDF	2620				ES 1234678-HpCDF	76.1	
1234789-HpCDF	192				ES 1234789-HpCDF	76.9	
OCDF	8290				ES OCDF	83.9	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	92.5	
Total TCDD	466		477		CS 12347-PeCDD	89.8	
Total PeCDD	650		650		CS 12346-PeCDF	97	
Total HxCDD	4840		4840		CS 123469-HxCDF	77	
Total HpCDD	38600		38600		CS 1234689-HpCDF	75.2	
					AS 1368-TCDD	91.5	
Total TCDF	203		213		AS 1368-TCDF	88	
Total PeCDF	334		341				
Total HxCDF	3280		3280				
Total HpCDF	11900		11900				
Total PCDD/Fs	**214000**		**214000**				
WHO-2005 TEQs							
TEQ: ND=0	508		508				
TEQ: ND=DL/2	508	1.77	508				
TEQ: ND=DL	508	3.54	508				

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Sample ID: 14110332-006 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	9.98 g	Lab Sample ID	A7312_12752_DF_006-D5	Date Extracted:	11-Nov-2014
Date Collected:	28-Oct-2014	% Solid:	57.5 %	QC Batch No:	12752	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	21:23:53

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	5.03				ES 2378-TCDD	78.8	
12378-PeCDD	11.6				ES 12378-PeCDD	93.3	
123478-HxCDD	33.7				ES 123478-HxCDD	77.4	
123678-HxCDD	112				ES 123678-HxCDD	48.9	
123789-HxCDD	46.8				ES 123789-HxCDD	51.2	
1234678-HpCDD	2620				ES 1234678-HpCDD	70.7	
OCDD	22100			E	ES OCDD	65.1	
2378-TCDF	10.2				ES 2378-TCDF	68.6	
12378-PeCDF	3.09				ES 12378-PeCDF	90.7	
23478-PeCDF	15				ES 23478-PeCDF	92.5	
123478-HxCDF	19.2				ES 123478-HxCDF	57	
123678-HxCDF	9.32				ES 123678-HxCDF	61	
234678-HxCDF	17.3				ES 234678-HxCDF	61.7	
123789-HxCDF	ND	0.438			ES 123789-HxCDF	50.5	
1234678-HpCDF	534				ES 1234678-HpCDF	60.6	
1234789-HpCDF	32				ES 1234789-HpCDF	62.3	
OCDF	1150				ES OCDF	63.5	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	80.4	
Total TCDD	36.3		41.4		CS 12347-PeCDD	80.8	
Total PeCDD	105		105		CS 12346-PeCDF	86.9	
Total HxCDD	921		921		CS 123469-HxCDF	56.7	
Total HpCDD	5630		5630		CS 1234689-HpCDF	63.4	
					AS 1368-TCDD	39.7	
Total TCDF	82		88.4		AS 1368-TCDF	65.5	
Total PeCDF	171		172				
Total HxCDF	635		636				
Total HpCDF	2130		2130				
Total PCDD/Fs	**32900**		**32900**				
WHO-2005 TEQs							
TEQ: ND=0	84.8		84.8				
TEQ: ND=DL/2	84.9	1.07	84.9				
TEQ: ND=DL	84.9	2.15	84.9				

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Sample ID: 14110332-007 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	9.99 g	Lab Sample ID	A7312_12752_DF_007-D2	Date Extracted:	11-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	62.0 %	QC Batch No:	12752	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	01:05:12

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	1.39				ES 2378-TCDD	96.6	
12378-PeCDD	0.664			J	ES 12378-PeCDD	87.2	
123478-HxCDD	2.43			J	ES 123478-HxCDD	86.9	
123678-HxCDD	3.6				ES 123678-HxCDD	88.2	
123789-HxCDD	1.97			J	ES 123789-HxCDD	89.3	
1234678-HpCDD	101				ES 1234678-HpCDD	84.4	
OCDD	1030				ES OCDD	72.4	
2378-TCDF	7.43				ES 2378-TCDF	97	
12378-PeCDF	0.914			J	ES 12378-PeCDF	91.8	
23478-PeCDF	1.52			J	ES 23478-PeCDF	88.7	
123478-HxCDF	1.68			J	ES 123478-HxCDF	82.9	
123678-HxCDF	0.985			J	ES 123678-HxCDF	84.8	
234678-HxCDF	1.09			J	ES 234678-HxCDF	84.1	
123789-HxCDF	ND	0.395			ES 123789-HxCDF	78.5	
1234678-HpCDF	13.5				ES 1234678-HpCDF	80.7	
1234789-HpCDF	0.936			J	ES 1234789-HpCDF	78.5	
OCDF	33.5				ES OCDF	67.9	

Totals					Standard	CS/AS Recoveries	
					CS 37Cl-2378-TCDD	94.8	
Total TCDD	15.3		15.3		CS 12347-PeCDD	87.6	
Total PeCDD	11.7		12.1		CS 12346-PeCDF	96	
Total HxCDD	37.5		37.5		CS 123469-HxCDF	83.2	
Total HpCDD	207		207		CS 1234689-HpCDF	80.3	
					AS 1368-TCDD	95.3	
Total TCDF	29.5		31.8		AS 1368-TCDF	97	
Total PeCDF	12		15.1				
Total HxCDF	20.7		20.7				
Total HpCDF	39.7		39.7				
Total PCDD/Fs	**1430**		**1440**				
WHO-2005 TEQs							
TEQ: ND=0	5.93		5.93				
TEQ: ND=DL/2	5.95	0.409	5.95				
TEQ: ND=DL	5.97	0.818	5.97				

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Sample ID: 14110332-008 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	9.99 g	Lab Sample ID	A7312_12752_DF_008-D2	Date Extracted:	11-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	73.4 %	QC Batch No:	12752	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	01:58:29

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers
2378-TCDD	0.591			
12378-PeCDD	ND	0.222		
123478-HxCDD	0.412			J
123678-HxCDD	0.846			J
123789-HxCDD	EMPC		0.371	J
1234678-HpCDD	16.1			
OCDD	216			
2378-TCDF	EMPC		2.39	
12378-PeCDF	ND	0.138		
23478-PeCDF	ND	0.144		
123478-HxCDF	0.398			J
123678-HxCDF	ND	0.161		
234678-HxCDF	EMPC		0.25	J
123789-HxCDF	ND	0.254		
1234678-HpCDF	3.15			
1234789-HpCDF	ND	0.476		
OCDF	6.72			
Totals				
Total TCDD	3.11		3.11	
Total PeCDD	2.26		2.26	
Total HxCDD	4.19		6.62	
Total HpCDD	33.3		33.3	
Total TCDF	3.71		7.03	
Total PeCDF	1.26		2.07	
Total HxCDF	3.87		4.12	
Total HpCDF	8.75		8.75	
Total PCDD/Fs	**283**		**290**	
WHO-2005 TEQs				
TEQ: ND=0	1.02		1.32	
TEQ: ND=DL/2	1.2	0.309	1.47	
TEQ: ND=DL	1.39	0.619	1.63	

Standard	ES Recoveries	Qualifiers
ES 2378-TCDD	91.3	
ES 12378-PeCDD	88.9	
ES 123478-HxCDD	83.8	
ES 123678-HxCDD	86.7	
ES 123789-HxCDD	86.5	
ES 1234678-HpCDD	88.6	
ES OCDD	69.8	
ES 2378-TCDF	92	
ES 12378-PeCDF	93.8	
ES 23478-PeCDF	92.7	
ES 123478-HxCDF	80.9	
ES 123678-HxCDF	85.8	
ES 234678-HxCDF	82.6	
ES 123789-HxCDF	77	
ES 1234678-HpCDF	82.5	
ES 1234789-HpCDF	78.7	
ES OCDF	65.9	

Standard	CS/AS Recoveries	
CS 37Cl-2378-TCDD	94	
CS 12347-PeCDD	91.8	
CS 12346-PeCDF	101	
CS 123469-HxCDF	86	
CS 1234689-HpCDF	84.1	
AS 1368-TCDD	81.4	
AS 1368-TCDF	93.6	

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Sample ID: 14110332-009

Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	9.97 g	Lab Sample ID	A7312_12752_DF_009-D2	Date Extracted:	11-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	91.0 %	QC Batch No:	12752	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	02:51:50

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	0.343			J	ES 2378-TCDD	89.4	
12378-PeCDD	ND	0.29			ES 12378-PeCDD	89.8	
123478-HxCDD	ND	0.344			ES 123478-HxCDD	89.3	
123678-HxCDD	0.57			J	ES 123678-HxCDD	81.2	
123789-HxCDD	0.376			J	ES 123789-HxCDD	88.3	
1234678-HpCDD	18.5				ES 1234678-HpCDD	86.7	
OCDD	358				ES OCDD	69.2	
2378-TCDF	2.03				ES 2378-TCDF	80.4	
12378-PeCDF	ND	0.164			ES 12378-PeCDF	92	
23478-PeCDF	ND	0.183			ES 23478-PeCDF	90.9	
123478-HxCDF	EMPC		0.196	J	ES 123478-HxCDF	80.7	
123678-HxCDF	ND	0.169			ES 123678-HxCDF	88.4	
234678-HxCDF	0.248			J	ES 234678-HxCDF	82.4	
123789-HxCDF	ND	0.284			ES 123789-HxCDF	77.9	
1234678-HpCDF	2.38			J	ES 1234678-HpCDF	82.8	
1234789-HpCDF	ND	0.55			ES 1234789-HpCDF	76.4	
OCDF	5.08				ES OCDF	63.7	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	90.9	
Total TCDD	2.03		2.03		CS 12347-PeCDD	93.9	
Total PeCDD	2.08		2.08		CS 12346-PeCDF	99.1	
Total HxCDD	6.21		6.68		CS 123469-HxCDF	85.2	
Total HpCDD	45		45		CS 1234689-HpCDF	83.3	
					AS 1368-TCDD	71.9	
Total TCDF	3.98		4.92		AS 1368-TCDF	87.4	
Total PeCDF	1.15		1.52				
Total HxCDF	3.02		3.21				
Total HpCDF	6.66		6.66				
Total PCDD/Fs	**434**		**436**				
WHO-2005 TEQs							
TEQ: ND=0	0.983		1				
TEQ: ND=DL/2	1.21	0.382	1.22				
TEQ: ND=DL	1.44	0.764	1.44				

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Sample ID: 14110332-010 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	9.97 g	Lab Sample ID	A7312_12752_DF_010-D2	Date Extracted:	11-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	92.4 %	QC Batch No:	12752	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	03:45:13

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	0.209			J	ES 2378-TCDD	88.1	
12378-PeCDD	ND	0.249			ES 12378-PeCDD	88	
123478-HxCDD	ND	0.294			ES 123478-HxCDD	71	
123678-HxCDD	ND	0.303			ES 123678-HxCDD	75.1	
123789-HxCDD	ND	0.315			ES 123789-HxCDD	72.7	
1234678-HpCDD	9.51				ES 1234678-HpCDD	73	
OCDD	112				ES OCDD	61.1	
2378-TCDF	1.21				ES 2378-TCDF	86.9	
12378-PeCDF	ND	0.113			ES 12378-PeCDF	88.7	
23478-PeCDF	ND	0.127			ES 23478-PeCDF	87	
123478-HxCDF	ND	0.173			ES 123478-HxCDF	68.7	
123678-HxCDF	ND	0.157			ES 123678-HxCDF	76.2	
234678-HxCDF	ND	0.184			ES 234678-HxCDF	72.1	
123789-HxCDF	ND	0.292			ES 123789-HxCDF	60.3	
1234678-HpCDF	1.78			J	ES 1234678-HpCDF	73.2	
1234789-HpCDF	ND	0.495			ES 1234789-HpCDF	62.9	
OCDF	2.12			J	ES OCDF	53.4	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	89.4	
Total TCDD	1.36		1.36		CS 12347-PeCDD	90.3	
Total PeCDD	1.58		1.58		CS 12346-PeCDF	93.2	
Total HxCDD	3.96		5.77		CS 123469-HxCDF	73.9	
Total HpCDD	22.6		22.6		CS 1234689-HpCDF	69.1	
					AS 1368-TCDD	89.6	
Total TCDF	1.92		2.19		AS 1368-TCDF	91.4	
Total PeCDF	0.666		0.666				
Total HxCDF	1.21		1.9				
Total HpCDF	4.26		4.26				
Total PCDD/Fs	**151**		**154**				
WHO-2005 TEQs							
TEQ: ND=0	0.477		0.477				
TEQ: ND=DL/2	0.71	0.333	0.71				
TEQ: ND=DL	0.944	0.665	0.944				

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Sample ID: 14110332-011 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.07 g	Lab Sample ID	A7312_12752_DF_011-D2	Date Extracted:	11-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	92.8 %	QC Batch No:	12752	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	04:38:35

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	0.504				ES 2378-TCDD	82.5	
12378-PeCDD	ND	0.428			ES 12378-PeCDD	79.1	
123478-HxCDD	ND	0.377			ES 123478-HxCDD	81.6	
123678-HxCDD	0.537			J	ES 123678-HxCDD	77.6	
123789-HxCDD	ND	0.444			ES 123789-HxCDD	81.1	
1234678-HpCDD	16.3				ES 1234678-HpCDD	78.3	
OCDD	211				ES OCDD	61.8	
2378-TCDF	EMPC		1.54		ES 2378-TCDF	84.8	
12378-PeCDF	ND	0.197			ES 12378-PeCDF	82.3	
23478-PeCDF	ND	0.211			ES 23478-PeCDF	79.7	
123478-HxCDF	ND	0.223			ES 123478-HxCDF	74.1	
123678-HxCDF	ND	0.214			ES 123678-HxCDF	82.4	
234678-HxCDF	ND	0.246			ES 234678-HxCDF	76.4	
123789-HxCDF	ND	0.352			ES 123789-HxCDF	67	
1234678-HpCDF	2.34			J	ES 1234678-HpCDF	78.9	
1234789-HpCDF	ND	0.545			ES 1234789-HpCDF	67.4	
OCDF	7.1				ES OCDF	55.3	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	92.5	
Total TCDD	0.884		2.71		CS 12347-PeCDD	86.2	
Total PeCDD	1.17		2.39		CS 12346-PeCDF	95.2	
Total HxCDD	7.18		7.18		CS 123469-HxCDF	85.1	
Total HpCDD	37.9		37.9		CS 1234689-HpCDF	79.3	
					AS 1368-TCDD	88.2	
Total TCDF	ND		2.65		AS 1368-TCDF	95.5	
Total PeCDF	ND		0.615				
Total HxCDF	2.54		2.87				
Total HpCDF	7.54		7.54				
Total PCDD/Fs	**276**		**282**				
WHO-2005 TEQs							
TEQ: ND=0	0.809		0.963				
TEQ: ND=DL/2	1.17	0.483	1.31				
TEQ: ND=DL	1.52	0.967	1.65				

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Sample ID: 14110332-012 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.07 g	Lab Sample ID	A7312_12752_DF_012-D2	Date Extracted:	11-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	90.2 %	QC Batch No:	12752	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	05:31:57

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	EMPC		0.647		ES 2378-TCDD	90.8	
12378-PeCDD	EMPC		0.397	J	ES 12378-PeCDD	90.6	
123478-HxCDD	4.18				ES 123478-HxCDD	82.2	
123678-HxCDD	EMPC		1.2	J	ES 123678-HxCDD	80.6	
123789-HxCDD	0.961			J	ES 123789-HxCDD	81.6	
1234678-HpCDD	47.9				ES 1234678-HpCDD	79.9	
OCDD	422				ES OCDD	64.6	
2378-TCDF	2.8				ES 2378-TCDF	90.3	
12378-PeCDF	ND	0.131			ES 12378-PeCDF	93.1	
23478-PeCDF	ND	0.147			ES 23478-PeCDF	89.9	
123478-HxCDF	ND	0.188			ES 123478-HxCDF	73.9	
123678-HxCDF	ND	0.171			ES 123678-HxCDF	83.5	
234678-HxCDF	ND	0.209			ES 234678-HxCDF	75.6	
123789-HxCDF	ND	0.27			ES 123789-HxCDF	67.7	
1234678-HpCDF	4.99				ES 1234678-HpCDF	81.9	
1234789-HpCDF	ND	0.423			ES 1234789-HpCDF	66.4	
OCDF	24.2				ES OCDF	56.4	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	95.1	
Total TCDD	5.01		7.51		CS 12347-PeCDD	95.2	
Total PeCDD	8.24		10.8		CS 12346-PeCDF	102	
Total HxCDD	24.7		26.4		CS 123469-HxCDF	82.4	
Total HpCDD	90.4		90.4		CS 1234689-HpCDF	77.9	
					AS 1368-TCDD	89.1	
Total TCDF	5.29		6.78		AS 1368-TCDF	95.9	
Total PeCDF	1.28		1.28				
Total HxCDF	2.63		4.61				
Total HpCDF	18.3		18.3				
Total PCDD/Fs	**603**		**613**				
WHO-2005 TEQs							
TEQ: ND=0	1.46		2.62				
TEQ: ND=DL/2	1.77	0.361	2.69				
TEQ: ND=DL	2.09	0.722	2.76				

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Sample ID: 14110332-013 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	9.99 g	Lab Sample ID	A7312_12752_DF_013-D2	Date Extracted:	11-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	39.9 %	QC Batch No:	12752	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	06:25:20

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	1.38				ES 2378-TCDD	88.6	
12378-PeCDD	0.983			J	ES 12378-PeCDD	84.1	
123478-HxCDD	3.93				ES 123478-HxCDD	79.9	
123678-HxCDD	6.17				ES 123678-HxCDD	82.6	
123789-HxCDD	3.96				ES 123789-HxCDD	82.7	
1234678-HpCDD	175				ES 1234678-HpCDD	83.1	
OCDD	3370				ES OCDD	70.8	
2378-TCDF	5.84				ES 2378-TCDF	93.5	
12378-PeCDF	0.989			J	ES 12378-PeCDF	89.9	
23478-PeCDF	2.11			J	ES 23478-PeCDF	90.5	
123478-HxCDF	2.33			J	ES 123478-HxCDF	75.9	
123678-HxCDF	1.45			J	ES 123678-HxCDF	81.6	
234678-HxCDF	1.86			J	ES 234678-HxCDF	79.9	
123789-HxCDF	ND	0.358			ES 123789-HxCDF	72.1	
1234678-HpCDF	24.5				ES 1234678-HpCDF	77	
1234789-HpCDF	1.5			J	ES 1234789-HpCDF	73.9	
OCDF	66.6				ES OCDF	65.5	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	86	
Total TCDD	16.9		18		CS 12347-PeCDD	87.9	
Total PeCDD	13.5		14.6		CS 12346-PeCDF	96.8	
Total HxCDD	55.4		56.6		CS 123469-HxCDF	79.4	
Total HpCDD	347		347		CS 1234689-HpCDF	76.7	
					AS 1368-TCDD	86.1	
Total TCDF	24.2		28		AS 1368-TCDF	91.6	
Total PeCDF	21.6		21.9				
Total HxCDF	35.5		35.5				
Total HpCDF	71		71.7				
Total PCDD/Fs	**4020**		**4030**				
WHO-2005 TEQs							
TEQ: ND=0	8.62		8.62				
TEQ: ND=DL/2	8.64	0.441	8.64				
TEQ: ND=DL	8.66	0.881	8.66				

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Sample ID: 14110332-014 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.04 g	Lab Sample ID	A7312_12752_DF_014-D2	Date Extracted:	11-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	34.8 %	QC Batch No:	12752	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	07:18:42

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	2.47				ES 2378-TCDD	92.5	
12378-PeCDD	1.91			J	ES 12378-PeCDD	88.2	
123478-HxCDD	10				ES 123478-HxCDD	84.5	
123678-HxCDD	13				ES 123678-HxCDD	89.3	
123789-HxCDD	5.97				ES 123789-HxCDD	92.9	
1234678-HpCDD	330				ES 1234678-HpCDD	91.3	
OCDD	4010				ES OCDD	83.1	
2378-TCDF	26.1				ES 2378-TCDF	94.2	
12378-PeCDF	89.4				ES 12378-PeCDF	88.3	
23478-PeCDF	25.6				ES 23478-PeCDF	92.2	
123478-HxCDF	386				ES 123478-HxCDF	80.8	
123678-HxCDF	99.4				ES 123678-HxCDF	85.6	
234678-HxCDF	20.3				ES 234678-HxCDF	85.7	
123789-HxCDF	ND	0.409			ES 123789-HxCDF	82.1	
1234678-HpCDF	145				ES 1234678-HpCDF	81.7	
1234789-HpCDF	40.6				ES 1234789-HpCDF	81	
OCDF	278				ES OCDF	75.4	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	88.4	
Total TCDD	27.2		27.6		CS 12347-PeCDD	89.8	
Total PeCDD	33.9		33.9		CS 12346-PeCDF	97.6	
Total HxCDD	114		114		CS 123469-HxCDF	84.5	
Total HpCDD	595		595		CS 1234689-HpCDF	85.2	
					AS 1368-TCDD	90.2	
Total TCDF	81.6		86.5		AS 1368-TCDF	91.5	
Total PeCDF	211		212				
Total HxCDF	645		645				
Total HpCDF	338		338				
Total PCDD/Fs	**6340**		**6340**				
WHO-2005 TEQs							
TEQ: ND=0	77.3		77.3				
TEQ: ND=DL/2	77.3	0.468	77.3				
TEQ: ND=DL	77.4	0.935	77.4				

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Sample ID: 14110332-015 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.03 g	Lab Sample ID	A7312_12752_DF_015-D2	Date Extracted:	11-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	43.4 %	QC Batch No:	12752	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	2	Time Analyzed:	08:12:05

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	0.165			J	ES 2378-TCDD	79.7	
12378-PeCDD	0.355			J	ES 12378-PeCDD	76.4	
123478-HxCDD	0.529			J	ES 123478-HxCDD	71.1	
123678-HxCDD	0.838			J	ES 123678-HxCDD	70.7	
123789-HxCDD	0.832			J	ES 123789-HxCDD	67.5	
1234678-HpCDD	31.9				ES 1234678-HpCDD	71.5	
OCDD	1990				ES OCDD	60.2	
2378-TCDF	78.4				ES 2378-TCDF	73.7	
12378-PeCDF	72.6				ES 12378-PeCDF	79.1	
23478-PeCDF	50.7				ES 23478-PeCDF	72.4	
123478-HxCDF	95.9				ES 123478-HxCDF	71.4	
123678-HxCDF	25.3				ES 123678-HxCDF	74.6	
234678-HxCDF	10.6				ES 234678-HxCDF	57.7	
123789-HxCDF	ND	0.373			ES 123789-HxCDF	55.3	
1234678-HpCDF	72.6				ES 1234678-HpCDF	72.3	
1234789-HpCDF	45.6				ES 1234789-HpCDF	66.4	
OCDF	1300				ES OCDF	61.3	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	76.6	
Total TCDD	6.09		6.09		CS 12347-PeCDD	69.9	
Total PeCDD	4.08		5.04		CS 12346-PeCDF	79	
Total HxCDD	8.19		11		CS 123469-HxCDF	63.1	
Total HpCDD	69.1		69.1		CS 1234689-HpCDF	68.5	
					AS 1368-TCDD	80.7	
Total TCDF	219		220		AS 1368-TCDF	88.6	
Total PeCDF	229		230				
Total HxCDF	191		191				
Total HpCDF	318		318				
Total PCDD/Fs	**4340**		**4350**				
WHO-2005 TEQs							
TEQ: ND=0	41.6		41.6				
TEQ: ND=DL/2	41.7	0.361	41.7				
TEQ: ND=DL	41.7	0.723	41.7				

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Sample ID: Method Blank A7312_12752 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7312	Date Received:	n/a
Project ID:	14110332	Weight/Volume:	10.00 g	Lab Sample ID	MB1_12752_DF_SDS	Date Extracted:	11-Nov-2014
Date Collected:	n/a	% Solid:	n/a	QC Batch No:	12752	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	-	Time Analyzed:	16:03:57

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	0.0556			ES 2378-TCDD	93.3	
12378-PeCDD	ND	0.0944			ES 12378-PeCDD	91.3	
123478-HxCDD	ND	0.0772			ES 123478-HxCDD	88.1	
123678-HxCDD	ND	0.085			ES 123678-HxCDD	86.5	
123789-HxCDD	ND	0.0907			ES 123789-HxCDD	90.2	
1234678-HpCDD	ND	0.11			ES 1234678-HpCDD	85.7	
OCDD	ND	0.219			ES OCDD	65.2	
2378-TCDF	ND	0.0612			ES 2378-TCDF	93.2	
12378-PeCDF	ND	0.0486			ES 12378-PeCDF	92.3	
23478-PeCDF	ND	0.0512			ES 23478-PeCDF	89.4	
123478-HxCDF	ND	0.042			ES 123478-HxCDF	78.8	
123678-HxCDF	ND	0.0379			ES 123678-HxCDF	88.9	
234678-HxCDF	ND	0.0432			ES 234678-HxCDF	81.1	
123789-HxCDF	ND	0.0672			ES 123789-HxCDF	74.3	
1234678-HpCDF	ND	0.0555			ES 1234678-HpCDF	87	
1234789-HpCDF	ND	0.105			ES 1234789-HpCDF	74.1	
OCDF	ND	0.249			ES OCDF	59.9	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	91.9	
Total TCDD	ND	0.0556	ND		CS 12347-PeCDD	90.9	
Total PeCDD	ND	0.0944	ND		CS 12346-PeCDF	95.8	
Total HxCDD	ND	0.0844	ND		CS 123469-HxCDF	86.2	
Total HpCDD	ND	0.11	ND		CS 1234689-HpCDF	80.9	
					AS 1368-TCDD	94.6	
Total TCDF	ND	0.0612	ND		AS 1368-TCDF	94.8	
Total PeCDF	ND	0.0498	ND				
Total HxCDF	ND	0.0463	ND				
Total HpCDF	ND	0.0755	ND				
Total PCDD/Fs	**ND**		**ND**				
WHO-2005 TEQs							
TEQ: ND=0	0		0				
TEQ: ND=DL/2	0.11	0.11	0.11				
TEQ: ND=DL	0.22	0.22	0.22				

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METHOD 8290A **PCDD/F ONGOING PRECISION AND RECOVERY (OPR)** **FORM 8A**

Lab Name:	SGS Environmental Services		
Initial Calibration:	ICAL: MM3_DF_01172014_23AUG2014		
Instrument ID:	MM3	GC Column ID:	ZB-5ms
VER Data Filename:	141125R04	Analysis Date:	25-NOV-2014 14:17:18
Lab ID:	OPR1_12752_DF		

NATIVE ANALYTES	SPIKE CONC.	CONC. FOUND	RANGE (ng/mL)			OK
2,3,7,8-TCDD	10	8.1	6.7	-	15.8	Y
1,2,3,7,8-PeCDD	50	42	35	-	71	Y
1,2,3,4,7,8-HxCDD	50	44.3	35	-	82	Y
1,2,3,6,7,8-HxCDD	50	46.3	38	-	67	Y
1,2,3,7,8,9-HxCDD	50	41.3	32	-	81	Y
1,2,3,4,6,7,8-HpCDD	50	44.5	35	-	70	Y
OCDD	100	87.6	78	-	144	Y
2,3,7,8-TCDF	10	8.83	7.5	-	15.8	Y
1,2,3,7,8-PeCDF	50	43.6	40	-	67	Y
2,3,4,7,8-PeCDF	50	44.6	34	-	80	Y
1,2,3,4,7,8-HxCDF	50	42	36	-	67	Y
1,2,3,6,7,8-HxCDF	50	43.8	42	-	65	Y
2,3,4,6,7,8-HxCDF	50	43.6	35	-	78	Y
1,2,3,7,8,9-HxCDF	50	43.1	39	-	65	Y
1,2,3,4,6,7,8-HpCDF	50	44.5	41	-	61	Y
1,2,3,4,7,8,9-HpCDF	50	43.7	39	-	69	Y
OCDF	100	91.5	63	-	170	Y

Contract-required concentration limits for OPR as specified in Table 6,
Method 1613. 10/94

Processed: 26 Nov 2014 11:15 Analyst: AC

METHOD 8290A **PCDD/F ONGOING PRECISION AND RECOVERY (OPR)** **FORM 8B**

Lab Name:	SGS Environmental Services		
Initial Calibration:	ICAL: MM3_DF_01172014_23AUG2014		
Instrument ID:	MM3	GC Column ID:	ZB-5ms
VER Data Filename:	141125R04	Analysis Date:	25-NOV-2014 14:17:18
Lab ID:	OPR1_12752_DF		

LABELED ANALYTES	SPIKE CONC.	CONC. FOUND	RANGE (ng/mL)			OK
13C-2,3,7,8-TCDD	100	90.3	20	-	175	Y
13C-1,2,3,7,8-PeCDD	100	87.6	21	-	227	Y
13C-1,2,3,4,7,8-HxCDD	100	83.1	21	-	193	Y
13C-1,2,3,6,7,8-HxCDD	100	85.9	25	-	163	Y
13C-1,2,3,7,8,9-HxCDD	100	88.3	26	-	166	Y
13C-1,2,3,4,6,7,8-HpCDD	100	81.7	26	-	166	Y
13C-OCDD	200	130	26	-	397	Y
13C-2,3,7,8-TCDF	100	91.7	22	-	152	Y
13C-1,2,3,7,8-PeCDF	100	92.2	21	-	192	Y
13C-2,3,4,7,8-PeCDF	100	89.2	13	-	328	Y
13C-1,2,3,4,7,8-HxCDF	100	77.5	19	-	202	Y
13C-1,2,3,6,7,8-HxCDF	100	86.4	21	-	159	Y
13C-2,3,4,6,7,8-HxCDF	100	82.5	22	-	176	Y
13C-1,2,3,7,8,9-HxCDF	100	70.3	17	-	205	Y
13C-1,2,3,4,6,7,8-HpCDF	100	86.6	21	-	158	Y
13C-1,2,3,4,7,8,9-HpCDF	100	68.7	20	-	186	Y
13C-OCDF	200	114	26	-	397	Y
CLEANUP STANDARD						
37Cl-2,3,7,8-TCDD	40	35.8	12.4	-	76.4	Y

Contract-required concentration limits for OPR as specified in Table 6, Method 1613. 10/94

Processed: 26 Nov 2014 11:15 Analyst: AC

Sample Receipt Notification

5500 Business Drive
Wilmington, NC 28405 USA
Tel: 910 794-1613
Toll Free: 866 846-8290
Fax: 910 794-3919

Project Manager:	*Amy Boehm*
Receipt Date & Time:	*05-Nov-14 at 09:50*
AP Project name:	*A7312*
Requested TAT:	*21 days*
Projected due date:	*26-Nov-14*
Matrix:	*Solid*
Phone#:	*910-794-1613*
Email Address:	*Amy.Boehm@sgs.com*

Company Contact:	*Amy Friedlander*
Company:	*Phase Separation Science, Inc.*
Project Name & Site:	*14110332*
Project PO#:	*N/A*
QAAP/Contract #:	*N/A*
Requested Analysis:	*Method 8290*
Phone#:	*410 747 8770*
Email Address:	*reporting@phaseonline.com*

Client Smp ID	AP Smp ID	Sample Condition & Notes	Quantity	Size	Sampling Date	Sampling Time	Received Temp	Container #	Shipping #
14110332-001	A7312_001	Core#2 0-20cm	1	4oz clear	28-Oct-14	13:00	1	1	1Z 231 3E4 01 5626 9992
14110332-002	A7312_002	Core#2 20-98cm	1	4oz clear	28-Oct-14	13:00	1	1	1Z 231 3E4 01 5626 9992
14110332-003	A7312_003	Core#2 98-150cm	1	4oz clear	28-Oct-14	13:00	1	1	1Z 231 3E4 01 5626 9992
14110332-004	A7312_004	Core#2 150-249cm	1	4oz clear	28-Oct-14	13:00	1	1	1Z 231 3E4 01 5626 9992
14110332-005	A7312_005	Core#2 249-272cm	1	4oz clear	28-Oct-14	13:00	1	1	1Z 231 3E4 01 5626 9992
14110332-006	A7312_006	Core#2 272-290cm	1	4oz clear	28-Oct-14	13:00	1	1	1Z 231 3E4 01 5626 9992
14110332-007	A7312_007	Core#8 0-42cm	1	4oz clear	29-Oct-14	10:00	1	1	1Z 231 3E4 01 5626 9992
14110332-008	A7312_008	Core#8 47-54cm	1	4oz clear	29-Oct-14	10:00	1	1	1Z 231 3E4 01 5626 9992
14110332-009	A7312_009	Core#9 0-22cm	1	4oz clear	29-Oct-14	10:30	1	1	1Z 231 3E4 01 5626 9992
14110332-010	A7312_010	Core#9 22-38cm	1	4oz clear	29-Oct-14	10:30	1	1	1Z 231 3E4 01 5626 9992
14110332-011	A7312_011	Core#7 0-37cm	1	4oz clear	29-Oct-14	11:15	1	1	1Z 231 3E4 01 5626 9992
14110332-012	A7312_012	Core#7 37-56cm	1	4oz clear	29-Oct-14	11:15	1	1	1Z 231 3E4 01 5626 9992
14110332-013	A7312_013	Core#5 0-24cm	1	4oz clear	29-Oct-14	13:30	1	1	1Z 231 3E4 01 5626 9992
14110332-014	A7312_014	Core#5 27-76cm	1	4oz clear	29-Oct-14	13:30	1	1	1Z 231 3E4 01 5626 9992
14110332-015	A7312_015	Core#5 76-122cm	1	4oz clear	29-Oct-14	13:30	1	1	1Z 231 3E4 01 5626 9992

Preservation Type: **Sample Seals:** No

Notes/Comments:

Samples received intact

Any un-extracted sample will be stored for 90 days from reporting date. Additional storage fees may apply for any samples stored longer than 90 days.

Received by: Barbara Hager *Logged in by: Barbara Hager* *QC'ed by:* AK 5 Nov 14

Chain of Custody Form for Subcontracted Analyses

07312

Phase Separation Science, Inc
6630 Baltimore National Pike
Baltimore, MD 21228
Phone: (410) 747-8770
Fax: (410) 788-8723

For Questions or issues please contact: Lynn Jackson

W.O. No. : **14110332**
P.O. No. :
Project Number : N/A
Report To LOD : No

Report Due On :12/04/14 05:00

Samples Transferred To:
SGS North America Inc - Wilmington
5500 Business Drive
Wilmington, NC 28405

Dioxins. Old Phone # 317-370-9644
Phone : 910-350-1903

Lab Sample ID	Field Sample ID	Date Sampled	Time Sampled	Matrix	Analyses Required	Method	Type of Container	Preservative
14110332-001	Core#2 0-20cm	10/28/14	13:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-002	Core#2 0-98cm	10/28/14	13:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-003	Core#2 98-150cm	10/28/14	13:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-004	Core#2 150-249cm	10/28/14	13:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-005	Core#2 249-272cm	10/28/14	13:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-006	Core#2 272-290cm	10/28/14	13:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-007	Core#8 0-42cm	10/29/14	10:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-008	Core#8 47-54cm	10/29/14	10:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-009	Core#9 0-22cm	10/29/14	10:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-010	Core#9 22-38cm	10/29/14	10:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-011	Core#7 0-37cm	10/29/14	11:15	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-012	Core#7 37-56cm	10/29/14	11:15	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-013	Core#5 0-24cm	10/29/14	13:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-014	Core#5 27-76cm	10/29/14	13:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-015	Core#5 76-122cm	10/29/14	13:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-016	Core#5 122-141cm	10/29/14	13:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-017	Core#6 0-25cm	10/29/14	14:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-018	Core#6 25-53cm	10/29/14	14:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-019	Core#1 0-25cm	10/29/14	15:15	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-020	Core#1 25-55cm	10/29/14	15:15	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-021	Core#1 55-78cm	10/29/14	15:15	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-022	Core#10 0-26cm	10/29/14	15:45	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-023	Core#10 26-60cm	10/29/14	15:45	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL

Final 1.000

Rec'd by: Barbara Hogan 5-NOV-14 0950 @ 1°

FINAL LAB REPORT

Prepared by

SGS NORTH AMERICA

Prepared for

This report is approved by

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PROJECT INFORMATION SUMMARY *(When applicable, see QC Annotations for details)*

Client Project
SGS Project #
Analytical Protocol(s)
No. Samples Submitted
Additional QC Sample(s)
No. Laboratory Method Blanks
No. OPRs / Batch CS3
Date Received
Condition Received
Temperature upon Receipt (ºC)
Extraction within Holding Time
Analysis within Holding Time

QC ANNOTATIONS:

1. Please see Appendices attached for data qualifier/attribute and lab identifier descriptions which may be contained in the project.

APPENDIX A: GENERAL DATA QUALIFIERS / DATA ATTRIBUTES

B	The analyte was found in the method blank, at a concentration that was at least 10% of the concentration in the sample.
C	Two or more congeners co-elute. In EDDs, C denotes the lowest IUPAC congener in a co-elution group and additional co-eluters for the group are shown with the number of the lowest IUPAC co-eluter.
E	The reported concentration exceeds the calibration range (upper point of the calibration curve) and is an estimated value.
EMPC	Represents an Estimated Maximum Possible Concentration. EMPCs arise in cases where the signal/noise ratio is not sufficient for peak identification (the determined ion-abundance ratio is outside the allowed theoretical range), or where there is a co-eluting interference.
H/h	If the standard recovery is below the method or SOP specified value “H” is assigned. If the obtained value is less than half the specified value “h” is assigned.
J	Indicates that an analyte has a concentration below the reporting limit (lowest point of the calibration curve) and is an estimated value.
ND	Indicates a non-detect.
NR or R	Indicates a value that is not reportable.
PR	Due to interference, the associated congener is poorly resolved.
QI	Indicates the presence of a quantitative interference.
SI	Denotes “Single Ion Mode” and is utilized for PCBs where the secondary ion trace has a significantly elevated noise level due to background PFK. Responses for such peaks are calculated using an EMPC approach based solely on the primary ion area(s) and may be considered estimates.
U	The analyte was not detected. The estimated detection limit (EDL) may be reported for this analyte.
V	The labeled standard recovery was found to be outside of the method control limits.

APPENDIX B: DRBC/TMDL SPECIFIC DATA QUALIFIERS / DATA ATTRIBUTES

J	The reported result is an estimate. The value is less than the minimum calibration level but greater than the estimated detection limit (EDL).
U	The analyte was not detected in the sample at the estimated detection limit (EDL).
E	The reported concentration is an estimate. The value exceeds the upper calibration range (upper point of the calibration curve).
D	Dilution Data. Result was obtained from the analysis of a dilution.
B	Analyte found in the sample and associated method blank.
C	Co-eluting congener
Cxx	Co-elutes with the indicated congener, data is reported under the lowest IUPAC congener. 'Xx' denotes the IUPAC number with the lowest numerical designated congener.
NR	Analyte is not reportable because of problems in sample preparation or analysis.
V	Labeled standard recovery is not within method control limits.
X	Results from re-injection/repeat/second-column analysis.
EMPC	Estimated maximum possible concentration. Indicates that a peak is identified but did not meet the method specified ion-abundance ratio.

APPENDIX C: LAB IDENTIFIERS

AR	Indicates use of the archived portion of the sample extract.
CU	Indicates a sample that required additional clean-up prior to MS injection/processing.
D	Indicates a dilution of the sample extract. The number that follows the "D" indicates the dilution factor.
DE	Indicates a dilution performed with the addition of ES (extraction standard) solution.
DUP	Designation for a duplicate sample.
MS	Designation for a matrix spike.
MSD	Designation for a matrix spike duplicate.
RJ	Indicates a reinjection of the sample extract.
S	Indicates a sample split. The number that follows the "S" indicates the split factor.

SGS CERTIFICATIONS

Arkansas	88-0682
California (ELAP)	Interim ELAP Cert #2914
CLIA	34D1013708
Connecticut	PH-0258
USDA Soil Permit	P330-14-00135
DoD	2726.01
Florida (Primary NELAP)	E87634
ISO 17025/IEC	2726.01
Louisiana	4115
Maine	#2014020
Massachusetts	M-NC919
Minnesota (Primary NELAP For Method 23)	Lab #037-999-459 Cert #688823
New Jersey	NC100
New York	11685
North Carolina DWR	481
North Dakota	R-197
Oregon	NC200002
Pennsylvania	68-03675
South Carolina	Lab #99029 Cert #99029002
Texas	T104704260-13-5
US Coast Guard	16714/159.317/SGS
Virginia	Lab #460214 Cert #3006
Washington	C913
West Virginia	293

Rev. 04-Sep-2014

Sample ID: 14110332-016 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	9.99 g	Lab Sample ID	A7313_12760_DF_001-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	76.5 %	QC Batch No:	12760	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	14:07:21

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	0.43			ES 2378-TCDD	90.2	
12378-PeCDD	ND	0.571			ES 12378-PeCDD	82.1	
123478-HxCDD	ND	0.471			ES 123478-HxCDD	77.9	
123678-HxCDD	ND	0.467			ES 123678-HxCDD	89.8	
123789-HxCDD	ND	0.477			ES 123789-HxCDD	81.2	
1234678-HpCDD	4.8				ES 1234678-HpCDD	73.2	
OCDD	106				ES OCDD	54.2	
2378-TCDF	ND	0.397			ES 2378-TCDF	88.3	
12378-PeCDF	ND	0.313			ES 12378-PeCDF	86.5	
23478-PeCDF	ND	0.366			ES 23478-PeCDF	77.3	
123478-HxCDF	ND	0.347			ES 123478-HxCDF	82.7	
123678-HxCDF	ND	0.323			ES 123678-HxCDF	88.2	
234678-HxCDF	ND	0.35			ES 234678-HxCDF	86.3	
123789-HxCDF	ND	0.528			ES 123789-HxCDF	73.5	
1234678-HpCDF	EMPC		0.39	J	ES 1234678-HpCDF	86.2	
1234789-HpCDF	ND	0.697			ES 1234789-HpCDF	68.8	
OCDF	3.18			J	ES OCDF	55.4	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	84.2	
Total TCDD	4.31		4.81		CS 12347-PeCDD	80.1	
Total PeCDD	2.03		2.03		CS 12346-PeCDF	84.8	
Total HxCDD	7.76		7.76		CS 123469-HxCDF	82.1	
Total HpCDD	15.4		15.4		CS 1234689-HpCDF	80.3	
					AS 1368-TCDD	92.4	
Total TCDF	ND	0.397	ND		AS 1368-TCDF	94.9	
Total PeCDF	ND	0.338	ND				
Total HxCDF	ND	0.377	ND				
Total HpCDF	ND		0.39				
Total PCDD/Fs	**138**		**139**				
WHO-2005 TEQs							
TEQ: ND=0	0.0807		0.0846				
TEQ: ND=DL/2	0.814	0.739	0.817				
TEQ: ND=DL	1.55	1.48	1.55				

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Sample ID: 14110332-017 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.03 g	Lab Sample ID	A7313_12760_DF_002-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	90.4 %	QC Batch No:	12760	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	15:00:56

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	EMPC		0.563		ES 2378-TCDD	85.5	
12378-PeCDD	ND	0.635			ES 12378-PeCDD	75	
123478-HxCDD	EMPC		0.724	J	ES 123478-HxCDD	76.9	
123678-HxCDD	1.14			J	ES 123678-HxCDD	81.5	
123789-HxCDD	ND	0.696			ES 123789-HxCDD	75.7	
1234678-HpCDD	18.8				ES 1234678-HpCDD	73.2	
OCDD	177				ES OCDD	58.2	
2378-TCDF	3.13				ES 2378-TCDF	86.5	
12378-PeCDF	ND	0.352			ES 12378-PeCDF	84.4	
23478-PeCDF	ND	0.409			ES 23478-PeCDF	74.3	
123478-HxCDF	ND	0.419			ES 123478-HxCDF	77.9	
123678-HxCDF	ND	0.344			ES 123678-HxCDF	84.3	
234678-HxCDF	ND	0.455			ES 234678-HxCDF	78.4	
123789-HxCDF	ND	0.577			ES 123789-HxCDF	73.2	
1234678-HpCDF	1.76			J	ES 1234678-HpCDF	81.5	
1234789-HpCDF	ND	0.713			ES 1234789-HpCDF	72.8	
OCDF	EMPC		2.29	J	ES OCDF	60.8	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	82.9	
Total TCDD	16.1		17.3		CS 12347-PeCDD	75.1	
Total PeCDD	17.3		17.3		CS 12346-PeCDF	79.9	
Total HxCDD	15.3		16		CS 123469-HxCDF	81.4	
Total HpCDD	40.8		40.8		CS 1234689-HpCDF	79.7	
					AS 1368-TCDD	90.9	
Total TCDF	5.06		5.06		AS 1368-TCDF	93.5	
Total PeCDF	ND		0.782				
Total HxCDF	ND		1.78				
Total HpCDF	4.88		4.88				
Total PCDD/Fs	**277**		**283**				
WHO-2005 TEQs							
TEQ: ND=0	0.685		1.32				
TEQ: ND=DL/2	1.46	0.841	1.83				
TEQ: ND=DL	2.24	1.68	2.35				

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Sample ID: 14110332-018 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.02 g	Lab Sample ID	A7313_12760_DF_003-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	91.7 %	QC Batch No:	12760	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	15:54:30

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	0.553			ES 2378-TCDD	88.1	
12378-PeCDD	ND	0.702			ES 12378-PeCDD	77.2	
123478-HxCDD	ND	0.679			ES 123478-HxCDD	77.7	
123678-HxCDD	ND	0.642			ES 123678-HxCDD	81.7	
123789-HxCDD	ND	0.729			ES 123789-HxCDD	77.6	
1234678-HpCDD	11.6				ES 1234678-HpCDD	74.2	
OCDD	126				ES OCDD	48.5	
2378-TCDF	3.68				ES 2378-TCDF	81.5	
12378-PeCDF	ND	0.404			ES 12378-PeCDF	84	
23478-PeCDF	ND	0.481			ES 23478-PeCDF	73.6	
123478-HxCDF	ND	0.427			ES 123478-HxCDF	75.6	
123678-HxCDF	ND	0.339			ES 123678-HxCDF	85.9	
234678-HxCDF	ND	0.402			ES 234678-HxCDF	84.2	
123789-HxCDF	ND	0.524			ES 123789-HxCDF	73.2	
1234678-HpCDF	1.11			J	ES 1234678-HpCDF	84.7	
1234789-HpCDF	ND	0.939			ES 1234789-HpCDF	65.1	
OCDF	ND	2.55			ES OCDF	49.6	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	83.1	
Total TCDD	ND		1.74		CS 12347-PeCDD	75.9	
Total PeCDD	ND		0.888		CS 12346-PeCDF	79.9	
Total HxCDD	ND		4.53		CS 123469-HxCDF	83.1	
Total HpCDD	25.1		25.1		CS 1234689-HpCDF	80.2	
					AS 1368-TCDD	91.1	
Total TCDF	5.43		5.43		AS 1368-TCDF	89.7	
Total PeCDF	ND	0.44	ND				
Total HxCDF	ND		1.24				
Total HpCDF	3.6		3.6				
Total PCDD/Fs	**160**		**169**				
WHO-2005 TEQs							
TEQ: ND=0	0.533		0.533				
TEQ: ND=DL/2	1.43	0.931	1.43				
TEQ: ND=DL	2.33	1.86	2.33				

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Sample ID: 14110332-019 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.03 g	Lab Sample ID	A7313_12760_DF_004-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	91.5 %	QC Batch No:	12760	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	16:48:00

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	EMPC		0.635		ES 2378-TCDD	93	
12378-PeCDD	0.86			J	ES 12378-PeCDD	81	
123478-HxCDD	2.87				ES 123478-HxCDD	79.6	
123678-HxCDD	1.54			J	ES 123678-HxCDD	86.4	
123789-HxCDD	EMPC		0.736	J B	ES 123789-HxCDD	84.8	
1234678-HpCDD	28.1				ES 1234678-HpCDD	76.8	
OCDD	229				ES OCDD	57.2	
2378-TCDF	4.57				ES 2378-TCDF	89.8	
12378-PeCDF	EMPC		0.29	J	ES 12378-PeCDF	82.5	
23478-PeCDF	1.08			J	ES 23478-PeCDF	74.7	
123478-HxCDF	ND	0.277			ES 123478-HxCDF	83.3	
123678-HxCDF	ND	0.266			ES 123678-HxCDF	86.4	
234678-HxCDF	0.374			J	ES 234678-HxCDF	85.7	
123789-HxCDF	ND	0.387			ES 123789-HxCDF	78.2	
1234678-HpCDF	1.74			J	ES 1234678-HpCDF	89.1	
1234789-HpCDF	ND	0.565			ES 1234789-HpCDF	71.1	
OCDF	EMPC		2.54	J	ES OCDF	56	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	86	
Total TCDD	6.36		9.32		CS 12347-PeCDD	76.9	
Total PeCDD	9.3		12.9		CS 12346-PeCDF	84.6	
Total HxCDD	24.6		28.6		CS 123469-HxCDF	83.4	
Total HpCDD	83.7		83.7		CS 1234689-HpCDF	80.1	
					AS 1368-TCDD	93.7	
Total TCDF	14.2		19.2		AS 1368-TCDF	94.1	
Total PeCDF	14.1		15.4				
Total HxCDF	6.1		6.1				
Total HpCDF	4.98		4.98				
Total PCDD/Fs	**392**		**411**				
WHO-2005 TEQs							
TEQ: ND=0	2.49		3.2				
TEQ: ND=DL/2	2.75	0.568	3.25				
TEQ: ND=DL	3.01	1.14	3.3				

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Sample ID: 14110332-020 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.04 g	Lab Sample ID	A7313_12760_DF_005-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	92.0 %	QC Batch No:	12760	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	17:41:30

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	0.773				ES 2378-TCDD	92.9	
12378-PeCDD	ND	0.47			ES 12378-PeCDD	81.6	
123478-HxCDD	ND	0.506			ES 123478-HxCDD	76.3	
123678-HxCDD	0.537			J	ES 123678-HxCDD	82.8	
123789-HxCDD	ND	0.576			ES 123789-HxCDD	80.2	
1234678-HpCDD	18.8				ES 1234678-HpCDD	72.6	
OCDD	177				ES OCDD	50.8	
2378-TCDF	5.31				ES 2378-TCDF	91	
12378-PeCDF	ND	0.278			ES 12378-PeCDF	86.7	
23478-PeCDF	ND	0.366			ES 23478-PeCDF	76.1	
123478-HxCDF	ND	0.311			ES 123478-HxCDF	79.4	
123678-HxCDF	ND	0.283			ES 123678-HxCDF	84.2	
234678-HxCDF	ND	0.332			ES 234678-HxCDF	83.4	
123789-HxCDF	ND	0.422			ES 123789-HxCDF	71.1	
1234678-HpCDF	1.83			J	ES 1234678-HpCDF	86.4	
1234789-HpCDF	ND	0.673			ES 1234789-HpCDF	69	
OCDF	4.02			J	ES OCDF	51	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	88.4	
Total TCDD	4.5		5.17		CS 12347-PeCDD	82.1	
Total PeCDD	3.87		4.38		CS 12346-PeCDF	81.2	
Total HxCDD	10.2		11.3		CS 123469-HxCDF	82.8	
Total HpCDD	46.5		46.5		CS 1234689-HpCDF	78.5	
					AS 1368-TCDD	96.6	
Total TCDF	8.58		9.11		AS 1368-TCDF	96.5	
Total PeCDF	0.456		1.54				
Total HxCDF	1.6		2.73				
Total HpCDF	1.83		4.75				
Total PCDD/Fs	**259**		**267**				
WHO-2005 TEQs							
TEQ: ND=0	1.62		1.62				
TEQ: ND=DL/2	2.04	0.716	2.04				
TEQ: ND=DL	2.46	1.43	2.46				

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Sample ID: 14110332-021 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	9.99 g	Lab Sample ID	A7313_12760_DF_006-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	81.6 %	QC Batch No:	12760	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	18:35:05

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	EMPC		1.98		ES 2378-TCDD	93.7	
12378-PeCDD	ND	0.451			ES 12378-PeCDD	79.8	
123478-HxCDD	2.06			J	ES 123478-HxCDD	79.4	
123678-HxCDD	3.14				ES 123678-HxCDD	86.9	
123789-HxCDD	1.56			J	ES 123789-HxCDD	83.7	
1234678-HpCDD	82.5				ES 1234678-HpCDD	79.1	
OCDD	725				ES OCDD	58.3	
2378-TCDF	11.6				ES 2378-TCDF	91.1	
12378-PeCDF	ND	0.237			ES 12378-PeCDF	87.5	
23478-PeCDF	0.915			J	ES 23478-PeCDF	78.1	
123478-HxCDF	1.32			J	ES 123478-HxCDF	81	
123678-HxCDF	EMPC		0.412	J	ES 123678-HxCDF	86.5	
234678-HxCDF	0.456			J	ES 234678-HxCDF	86.6	
123789-HxCDF	ND	0.438			ES 123789-HxCDF	84.2	
1234678-HpCDF	8.7				ES 1234678-HpCDF	87.6	
1234789-HpCDF	2.32			J	ES 1234789-HpCDF	76.9	
OCDF	21.8				ES OCDF	59.7	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	88.2	
Total TCDD	13		15.5		CS 12347-PeCDD	81.2	
Total PeCDD	12.2		13.5		CS 12346-PeCDF	85.6	
Total HxCDD	44.3		44.3		CS 123469-HxCDF	84	
Total HpCDD	172		172		CS 1234689-HpCDF	83.4	
					AS 1368-TCDD	94.9	
Total TCDF	25.7		28.8		AS 1368-TCDF	92.9	
Total PeCDF	7.36		7.36				
Total HxCDF	12.6		14.7				
Total HpCDF	30.3		30.3				
Total PCDD/Fs	**1060**		**1070**				
WHO-2005 TEQs							
TEQ: ND=0	3.45		5.47				
TEQ: ND=DL/2	3.88	0.62	5.72				
TEQ: ND=DL	4.32	1.24	5.98				

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Sample ID: 14110332-022 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.00 g	Lab Sample ID	A7313_12760_DF_007-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	86.1 %	QC Batch No:	12760	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	19:28:39

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	0.353			ES 2378-TCDD	89.1	
12378-PeCDD	ND	0.526			ES 12378-PeCDD	77.1	
123478-HxCDD	0.898			J	ES 123478-HxCDD	79.5	
123678-HxCDD	ND	0.496			ES 123678-HxCDD	83	
123789-HxCDD	EMPC		0.575	J B	ES 123789-HxCDD	76	
1234678-HpCDD	16.6				ES 1234678-HpCDD	66.3	
OCDD	231				ES OCDD	43.7	
2378-TCDF	1.55				ES 2378-TCDF	87.7	
12378-PeCDF	ND	0.285			ES 12378-PeCDF	85.8	
23478-PeCDF	ND	0.326			ES 23478-PeCDF	75.4	
123478-HxCDF	ND	0.344			ES 123478-HxCDF	82.1	
123678-HxCDF	ND	0.325			ES 123678-HxCDF	89	
234678-HxCDF	ND	0.369			ES 234678-HxCDF	82.4	
123789-HxCDF	ND	0.507			ES 123789-HxCDF	72.3	
1234678-HpCDF	2.78				ES 1234678-HpCDF	80.4	
1234789-HpCDF	ND	0.606			ES 1234789-HpCDF	63.7	
OCDF	4.81			J	ES OCDF	43.3	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	81.2	
Total TCDD	1.6		2.54		CS 12347-PeCDD	76.8	
Total PeCDD	1.67		1.67		CS 12346-PeCDF	82.3	
Total HxCDD	7.41		7.98		CS 123469-HxCDF	82.6	
Total HpCDD	41.2		41.2		CS 1234689-HpCDF	74.8	
					AS 1368-TCDD	94.2	
Total TCDF	2.31		2.31		AS 1368-TCDF	95.1	
Total PeCDF	1.09		1.09				
Total HxCDF	1.27		2.56				
Total HpCDF	6.46		6.46				
Total PCDD/Fs	**299**		**302**				
WHO-2005 TEQs							
TEQ: ND=0	0.509		0.566				
TEQ: ND=DL/2	1.13	0.673	1.16				
TEQ: ND=DL	1.76	1.35	1.76				

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Sample ID: 14110332-023 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.02 g	Lab Sample ID	A7313_12760_DF_008-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	93.0 %	QC Batch No:	12760	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	20:22:15

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	0.496			ES 2378-TCDD	83.8	
12378-PeCDD	ND	0.569			ES 12378-PeCDD	78.3	
123478-HxCDD	ND	0.532			ES 123478-HxCDD	78.2	
123678-HxCDD	ND	0.566			ES 123678-HxCDD	85.7	
123789-HxCDD	ND	0.571			ES 123789-HxCDD	86	
1234678-HpCDD	23.1				ES 1234678-HpCDD	76.7	
OCDD	232				ES OCDD	59.9	
2378-TCDF	1.48				ES 2378-TCDF	85.3	
12378-PeCDF	ND	0.277			ES 12378-PeCDF	84.8	
23478-PeCDF	ND	0.341			ES 23478-PeCDF	74.4	
123478-HxCDF	ND	0.367			ES 123478-HxCDF	79.7	
123678-HxCDF	ND	0.318			ES 123678-HxCDF	85.7	
234678-HxCDF	ND	0.386			ES 234678-HxCDF	85.3	
123789-HxCDF	ND	0.561			ES 123789-HxCDF	71.9	
1234678-HpCDF	3.16				ES 1234678-HpCDF	91.2	
1234789-HpCDF	ND	0.774			ES 1234789-HpCDF	68.1	
OCDF	12.7				ES OCDF	53.4	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	79.3	
Total TCDD	1.66		1.66		CS 12347-PeCDD	74	
Total PeCDD	0.759		1.64		CS 12346-PeCDF	78.9	
Total HxCDD	6.68		8.2		CS 123469-HxCDF	84.4	
Total HpCDD	48.8		48.8		CS 1234689-HpCDF	79.5	
					AS 1368-TCDD	90.4	
Total TCDF	1.48		2.14		AS 1368-TCDF	90.3	
Total PeCDF	ND		0.453				
Total HxCDF	3.56		3.56				
Total HpCDF	11.6		11.6				
Total PCDD/Fs	**319**		**322**				
WHO-2005 TEQs							
TEQ: ND=0	0.484		0.484				
TEQ: ND=DL/2	1.24	0.787	1.24				
TEQ: ND=DL	2	1.57	2				

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Sample ID: 14110332-024 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	9.98 g	Lab Sample ID	A7313_12760_DF_009-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	90.7 %	QC Batch No:	12760	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	00:12:28

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	0.482			J	ES 2378-TCDD	88.4	
12378-PeCDD	ND	0.553			ES 12378-PeCDD	82.2	
123478-HxCDD	ND	0.375			ES 123478-HxCDD	79.1	
123678-HxCDD	0.512			J	ES 123678-HxCDD	87.6	
123789-HxCDD	ND	0.409			ES 123789-HxCDD	85	
1234678-HpCDD	8.22				ES 1234678-HpCDD	78.6	
OCDD	112				ES OCDD	56.7	
2378-TCDF	EMPC		2.34		ES 2378-TCDF	84.9	
12378-PeCDF	ND	0.299			ES 12378-PeCDF	84.6	
23478-PeCDF	ND	0.36			ES 23478-PeCDF	77.3	
123478-HxCDF	ND	0.28			ES 123478-HxCDF	78.1	
123678-HxCDF	ND	0.266			ES 123678-HxCDF	85.2	
234678-HxCDF	ND	0.3			ES 234678-HxCDF	81.4	
123789-HxCDF	ND	0.397			ES 123789-HxCDF	70.5	
1234678-HpCDF	EMPC		0.914	J	ES 1234678-HpCDF	92.7	
1234789-HpCDF	ND	0.752			ES 1234789-HpCDF	68.7	
OCDF	EMPC		1.52	J	ES OCDF	52.9	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	82.4	
Total TCDD	2.11		2.11		CS 12347-PeCDD	78.3	
Total PeCDD	ND		0.621		CS 12346-PeCDF	82	
Total HxCDD	3.26		4.34		CS 123469-HxCDF	85.6	
Total HpCDD	17.6		17.6		CS 1234689-HpCDF	81.2	
					AS 1368-TCDD	90.6	
Total TCDF	1.37		4.17		AS 1368-TCDF	92.1	
Total PeCDF	0.46		0.46				
Total HxCDF	2.03		2.03				
Total HpCDF	1.71		2.62				
Total PCDD/Fs	**140**		**147**				
WHO-2005 TEQs							
TEQ: ND=0	0.649		0.893				
TEQ: ND=DL/2	1.11	0.644	1.33				
TEQ: ND=DL	1.57	1.29	1.77				

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Sample ID: 14110332-025 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	9.98 g	Lab Sample ID	A7313_12760_DF_010-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	87.8 %	QC Batch No:	12760	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	01:06:05

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	0.508				ES 2378-TCDD	87.4	
12378-PeCDD	ND	0.509			ES 12378-PeCDD	81.6	
123478-HxCDD	ND	0.409			ES 123478-HxCDD	77.6	
123678-HxCDD	1.39			J	ES 123678-HxCDD	85.1	
123789-HxCDD	EMPC		0.758	J B	ES 123789-HxCDD	82.5	
1234678-HpCDD	42.6				ES 1234678-HpCDD	73	
OCDD	433				ES OCDD	52.2	
2378-TCDF	3.46				ES 2378-TCDF	86.8	
12378-PeCDF	ND	0.252			ES 12378-PeCDF	82.1	
23478-PeCDF	EMPC		0.462	J	ES 23478-PeCDF	76	
123478-HxCDF	EMPC		0.349	J	ES 123478-HxCDF	79.3	
123678-HxCDF	ND	0.261			ES 123678-HxCDF	86	
234678-HxCDF	EMPC		0.342	J	ES 234678-HxCDF	84.9	
123789-HxCDF	ND	0.362			ES 123789-HxCDF	74.3	
1234678-HpCDF	6.91				ES 1234678-HpCDF	82	
1234789-HpCDF	ND	0.583			ES 1234789-HpCDF	72.4	
OCDF	15.1				ES OCDF	56.4	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	82.7	
Total TCDD	3.7		4.71		CS 12347-PeCDD	77.3	
Total PeCDD	3.83		3.83		CS 12346-PeCDF	80.1	
Total HxCDD	17.2		18.8		CS 123469-HxCDF	84.7	
Total HpCDD	92		92		CS 1234689-HpCDF	78	
					AS 1368-TCDD	88.5	
Total TCDF	6.95		8.33		AS 1368-TCDF	89	
Total PeCDF	2.79		4.14				
Total HxCDF	8.46		9.15				
Total HpCDF	24.5		24.5				
Total PCDD/Fs	**607**		**613**				
WHO-2005 TEQs							
TEQ: ND=0	1.62		1.91				
TEQ: ND=DL/2	2.03	0.62	2.22				
TEQ: ND=DL	2.43	1.24	2.53				

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Sample ID: 14110332-026 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.00 g	Lab Sample ID	A7313_12760_DF_011-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	54.8 %	QC Batch No:	12760	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	01:59:43

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	14.7				ES 2378-TCDD	87.9	
12378-PeCDD	25.1				ES 12378-PeCDD	80	
123478-HxCDD	35.6				ES 123478-HxCDD	78.8	
123678-HxCDD	198				ES 123678-HxCDD	87	
123789-HxCDD	81.9				ES 123789-HxCDD	83.3	
1234678-HpCDD	6330			E	ES 1234678-HpCDD	87.6	
OCDD	50800			E	ES OCDD	89.9	
2378-TCDF	12.3				ES 2378-TCDF	89.4	
12378-PeCDF	1.92			J	ES 12378-PeCDF	84.8	
23478-PeCDF	6.26				ES 23478-PeCDF	76.2	
123478-HxCDF	19.5				ES 123478-HxCDF	79.8	
123678-HxCDF	11.2				ES 123678-HxCDF	89.5	
234678-HxCDF	20.5				ES 234678-HxCDF	88	
123789-HxCDF	ND	1.8			ES 123789-HxCDF	76.4	
1234678-HpCDF	785				ES 1234678-HpCDF	87.5	
1234789-HpCDF	57.5				ES 1234789-HpCDF	78	
OCDF	2560				ES OCDF	77	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	83.2	
Total TCDD	191		193		CS 12347-PeCDD	79.9	
Total PeCDD	329		329		CS 12346-PeCDF	84.2	
Total HxCDD	2030		2030		CS 123469-HxCDF	88.2	
Total HpCDD	12800		12800		CS 1234689-HpCDF	91.9	
					AS 1368-TCDD	90.9	
Total TCDF	64.2		77.2		AS 1368-TCDF	93.8	
Total PeCDF	131		136				
Total HxCDF	1060		1060				
Total HpCDF	4000		4000				
Total PCDD/Fs	**73900**		**74000**				
WHO-2005 TEQs							
TEQ: ND=0	167		167				
TEQ: ND=DL/2	167	1.39	167				
TEQ: ND=DL	168	2.78	168				

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Sample ID: 14110332-027 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	9.98 g	Lab Sample ID	A7313_12760_DF_012-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	88.6 %	QC Batch No:	12760	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	02:53:20

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	0.407			ES 2378-TCDD	88.1	
12378-PeCDD	ND	0.65			ES 12378-PeCDD	76.8	
123478-HxCDD	ND	0.735			ES 123478-HxCDD	80.8	
123678-HxCDD	2.8				ES 123678-HxCDD	90.8	
123789-HxCDD	1.19			J	ES 123789-HxCDD	84	
1234678-HpCDD	93.8				ES 1234678-HpCDD	75.2	
OCDD	822				ES OCDD	45.4	
2378-TCDF	EMPC		0.87		ES 2378-TCDF	87.5	
12378-PeCDF	ND	0.284			ES 12378-PeCDF	81.4	
23478-PeCDF	0.615			J	ES 23478-PeCDF	74.4	
123478-HxCDF	EMPC		0.455	J	ES 123478-HxCDF	83.5	
123678-HxCDF	ND	0.364			ES 123678-HxCDF	90.6	
234678-HxCDF	0.634			J	ES 234678-HxCDF	88	
123789-HxCDF	ND	0.535			ES 123789-HxCDF	76.6	
1234678-HpCDF	16				ES 1234678-HpCDF	87.4	
1234789-HpCDF	ND	0.957			ES 1234789-HpCDF	70.5	
OCDF	41				ES OCDF	47.9	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	84.2	
Total TCDD	1.83		1.83		CS 12347-PeCDD	75	
Total PeCDD	ND		3.76		CS 12346-PeCDF	81.9	
Total HxCDD	34.7		34.7		CS 123469-HxCDF	88.3	
Total HpCDD	209		209		CS 1234689-HpCDF	82.6	
					AS 1368-TCDD	91.2	
Total TCDF	3.55		4.42		AS 1368-TCDF	92.5	
Total PeCDF	1.16		5.39				
Total HxCDF	20.5		21				
Total HpCDF	63.6		63.6				
Total PCDD/Fs	**1200**		**1210**				
WHO-2005 TEQs							
TEQ: ND=0	2		2.14				
TEQ: ND=DL/2	2.66	0.817	2.76				
TEQ: ND=DL	3.32	1.63	3.38				

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Sample ID: 14110332-028

Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.01 g	Lab Sample ID	A7313_12760_DF_013-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	84.4 %	QC Batch No:	12760	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	03:46:58

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	EMPC		0.681		ES 2378-TCDD	83.7	
12378-PeCDD	ND	0.654			ES 12378-PeCDD	76.1	
123478-HxCDD	ND	0.671			ES 123478-HxCDD	78.3	
123678-HxCDD	EMPC		0.957	J	ES 123678-HxCDD	88.2	
123789-HxCDD	ND	0.71			ES 123789-HxCDD	82.6	
1234678-HpCDD	29.9				ES 1234678-HpCDD	75.5	
OCDD	339				ES OCDD	59.5	
2378-TCDF	4.29				ES 2378-TCDF	84.8	
12378-PeCDF	ND	0.399			ES 12378-PeCDF	83.3	
23478-PeCDF	ND	0.484			ES 23478-PeCDF	71.4	
123478-HxCDF	ND	0.424			ES 123478-HxCDF	77	
123678-HxCDF	ND	0.408			ES 123678-HxCDF	83.6	
234678-HxCDF	ND	0.404			ES 234678-HxCDF	87.2	
123789-HxCDF	ND	0.622			ES 123789-HxCDF	72.2	
1234678-HpCDF	3.98				ES 1234678-HpCDF	88.7	
1234789-HpCDF	ND	0.907			ES 1234789-HpCDF	73.8	
OCDF	10.7				ES OCDF	58.5	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	81.8	
Total TCDD	3.12		5.39		CS 12347-PeCDD	76.2	
Total PeCDD	3.12		4.34		CS 12346-PeCDF	77.8	
Total HxCDD	10.7		11.7		CS 123469-HxCDF	80.2	
Total HpCDD	61.8		61.8		CS 1234689-HpCDF	81	
					AS 1368-TCDD	91	
Total TCDF	7.59		7.59		AS 1368-TCDF	92	
Total PeCDF	2.33		2.33				
Total HxCDF	5.16		5.16				
Total HpCDF	11		11				
Total PCDD/Fs	**455**		**459**				
WHO-2005 TEQs							
TEQ: ND=0	0.873		1.65				
TEQ: ND=DL/2	1.71	0.876	2.22				
TEQ: ND=DL	2.55	1.75	2.79				

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Sample ID: 14110332-029 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	10.03 g	Lab Sample ID	A7313_12760_DF_014-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	94.2 %	QC Batch No:	12760	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	04:40:36

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	0.902				ES 2378-TCDD	81.5	
12378-PeCDD	ND	0.531			ES 12378-PeCDD	71.3	
123478-HxCDD	ND	0.494			ES 123478-HxCDD	75.4	
123678-HxCDD	0.651			J	ES 123678-HxCDD	79.5	
123789-HxCDD	ND	0.559			ES 123789-HxCDD	75.1	
1234678-HpCDD	17.6				ES 1234678-HpCDD	74.7	
OCDD	148				ES OCDD	60.9	
2378-TCDF	4.67				ES 2378-TCDF	80.7	
12378-PeCDF	ND	0.251			ES 12378-PeCDF	78.7	
23478-PeCDF	ND	0.317			ES 23478-PeCDF	67.2	
123478-HxCDF	ND	0.344			ES 123478-HxCDF	71.1	
123678-HxCDF	ND	0.305			ES 123678-HxCDF	80.3	
234678-HxCDF	ND	0.351			ES 234678-HxCDF	75.5	
123789-HxCDF	ND	0.48			ES 123789-HxCDF	63.9	
1234678-HpCDF	1.95			J	ES 1234678-HpCDF	90.3	
1234789-HpCDF	ND	0.693			ES 1234789-HpCDF	65.2	
OCDF	4.55			J	ES OCDF	53.2	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	82.3	
Total TCDD	0.902		3.24		CS 12347-PeCDD	75.7	
Total PeCDD	2.4		2.4		CS 12346-PeCDF	81.2	
Total HxCDD	5.31		7.62		CS 123469-HxCDF	79.5	
Total HpCDD	36.1		36.1		CS 1234689-HpCDF	79.8	
					AS 1368-TCDD	87.8	
Total TCDF	6.86		8.52		AS 1368-TCDF	91.1	
Total PeCDF	0.978		0.978				
Total HxCDF	3.11		3.11				
Total HpCDF	5.71		5.71				
Total PCDD/Fs	**214**		**220**				
WHO-2005 TEQs							
TEQ: ND=0	1.68		1.68				
TEQ: ND=DL/2	2.12	0.816	2.12				
TEQ: ND=DL	2.57	1.63	2.57				

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5500 Business Drive
Wilmington, NC 28405, USA
www.us.sgs.com
Tel: +1 910 794-1613; Toll-Free 866 846-8290

Sample ID: 14110332-030 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	05-Nov-2014
Project ID:	14110332	Weight/Volume:	9.94 g	Lab Sample ID	A7313_12760_DF_015-D5	Date Extracted:	12-Nov-2014
Date Collected:	29-Oct-2014	% Solid:	87.1 %	QC Batch No:	12760	Date Analyzed:	26-Nov-2014
		Split:	-	Dilution:	5	Time Analyzed:	05:34:08

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	EMPC		0.584		ES 2378-TCDD	92.1	
12378-PeCDD	ND	0.477			ES 12378-PeCDD	82.7	
123478-HxCDD	ND	0.504			ES 123478-HxCDD	77.7	
123678-HxCDD	1.85			J	ES 123678-HxCDD	81.6	
123789-HxCDD	ND	0.541			ES 123789-HxCDD	77.4	
1234678-HpCDD	72				ES 1234678-HpCDD	76.5	
OCDD	332				ES OCDD	58.9	
2378-TCDF	4.88				ES 2378-TCDF	87.8	
12378-PeCDF	ND	0.267			ES 12378-PeCDF	86.9	
23478-PeCDF	0.346			J	ES 23478-PeCDF	77	
123478-HxCDF	ND	0.285			ES 123478-HxCDF	75.5	
123678-HxCDF	ND	0.276			ES 123678-HxCDF	83.2	
234678-HxCDF	ND	0.336			ES 234678-HxCDF	76.6	
123789-HxCDF	ND	0.346			ES 123789-HxCDF	81.3	
1234678-HpCDF	2.52				ES 1234678-HpCDF	85.1	
1234789-HpCDF	ND	0.551			ES 1234789-HpCDF	74.3	
OCDF	EMPC		4.51	J	ES OCDF	60.2	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	82.1	
Total TCDD	4.64		5.68		CS 12347-PeCDD	79.6	
Total PeCDD	2.09		3.9		CS 12346-PeCDF	90	
Total HxCDD	18.3		18.3		CS 123469-HxCDF	79.6	
Total HpCDD	137		137		CS 1234689-HpCDF	76.9	
					AS 1368-TCDD	90	
Total TCDF	11		11.9		AS 1368-TCDF	93	
Total PeCDF	0.852		2.12				
Total HxCDF	0.473		3.32				
Total HpCDF	7.59		7.59				
Total PCDD/Fs	**514**		**526**				
WHO-2005 TEQs							
TEQ: ND=0	1.62		2.21				
TEQ: ND=DL/2	2.16	0.63	2.57				
TEQ: ND=DL	2.69	1.26	2.93				

SGS
5500 Business Drive
Wilmington, NC 28405, USA
www.us.sgs.com
Tel: +1 910 794-1613; Toll-Free 866 846-8290

Sample ID: Method Blank A7313_12760 — Method 8290A

Client Data		Sample Data		Laboratory Data			
Name:	Phase Separation Science, Inc.	Matrix:	Solid	Lab Project ID:	A7313	Date Received:	n/a
Project ID:	14110332	Weight/Volume:	10.00 g	Lab Sample ID	MB1_12760_DF_SDS	Date Extracted:	12-Nov-2014
Date Collected:	n/a	% Solid:	n/a	QC Batch No:	12760	Date Analyzed:	25-Nov-2014
		Split:	-	Dilution:	-	Time Analyzed:	11:16:42

Analyte	Conc. (pg/g)	DL (pg/g)	EMPC (pg/g)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	0.0633			ES 2378-TCDD	88.8	
12378-PeCDD	ND	0.0695			ES 12378-PeCDD	80.9	
123478-HxCDD	ND	0.0666			ES 123478-HxCDD	77.5	
123678-HxCDD	ND	0.0628			ES 123678-HxCDD	86.8	
123789-HxCDD	0.0898			J	ES 123789-HxCDD	80.4	
1234678-HpCDD	ND	0.13			ES 1234678-HpCDD	75.8	
OCDD	ND	0.316			ES OCDD	61.5	
2378-TCDF	ND	0.0613			ES 2378-TCDF	86.2	
12378-PeCDF	ND	0.0492			ES 12378-PeCDF	86.8	
23478-PeCDF	ND	0.0563			ES 23478-PeCDF	77	
123478-HxCDF	ND	0.0524			ES 123478-HxCDF	76.2	
123678-HxCDF	ND	0.0481			ES 123678-HxCDF	87.2	
234678-HxCDF	ND	0.0556			ES 234678-HxCDF	82.5	
123789-HxCDF	ND	0.0731			ES 123789-HxCDF	70.9	
1234678-HpCDF	ND	0.0549			ES 1234678-HpCDF	90	
1234789-HpCDF	ND	0.101			ES 1234789-HpCDF	70.8	
OCDF	ND	0.206			ES OCDF	58.2	
Totals					**Standard**	**CS/AS Recoveries**	
					CS 37Cl-2378-TCDD	83	
Total TCDD	ND	0.0633	ND		CS 12347-PeCDD	78.9	
Total PeCDD	ND	0.0695	ND		CS 12346-PeCDF	83.6	
Total HxCDD	0.0898		0.0898		CS 123469-HxCDF	82.5	
Total HpCDD	ND	0.13	ND		CS 1234689-HpCDF	80.3	
					AS 1368-TCDD	89	
Total TCDF	ND	0.0613	ND		AS 1368-TCDF	90.5	
Total PeCDF	ND	0.0525	ND				
Total HxCDF	ND	0.056	ND				
Total HpCDF	ND	0.0732	ND				
Total PCDD/Fs	**0.0898**		**0.0898**				
WHO-2005 TEQs							
TEQ: ND=0	0.00898		0.00898				
TEQ: ND=DL/2	0.107	0.101	0.107				
TEQ: ND=DL	0.205	0.203	0.205				

SGS
5500 Business Drive
Wilmington, NC 28405, USA
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Tel: +1 910 794-1613; Toll-Free 866 846-8290

METHOD 8290A **PCDD/F ONGOING PRECISION AND RECOVERY (OPR)** **FORM 8A**

Lab Name:	SGS Environmental Services		
Initial Calibration:	ICAL: MM1_DF_01172014_18SEP2014		
Instrument ID:	MM1	GC Column ID:	ZB-5ms
VER Data Filename:	141125P02	Analysis Date:	25-NOV-2014 09:29:33
Lab ID:	OPR1_12760_DF		

NATIVE ANALYTES	SPIKE CONC.	CONC. FOUND	RANGE (ng/mL)			OK
2,3,7,8-TCDD	10	8.8	6.7	-	15.8	Y
1,2,3,7,8-PeCDD	50	43.1	35	-	71	Y
1,2,3,4,7,8-HxCDD	50	46.1	35	-	82	Y
1,2,3,6,7,8-HxCDD	50	47.9	38	-	67	Y
1,2,3,7,8,9-HxCDD	50	43.7	32	-	81	Y
1,2,3,4,6,7,8-HpCDD	50	46.2	35	-	70	Y
OCDD	100	91.6	78	-	144	Y
2,3,7,8-TCDF	10	9.97	7.5	-	15.8	Y
1,2,3,7,8-PeCDF	50	48.3	40	-	67	Y
2,3,4,7,8-PeCDF	50	51.1	34	-	80	Y
1,2,3,4,7,8-HxCDF	50	46.5	36	-	67	Y
1,2,3,6,7,8-HxCDF	50	47.4	42	-	65	Y
2,3,4,6,7,8-HxCDF	50	46.8	35	-	78	Y
1,2,3,7,8,9-HxCDF	50	46	39	-	65	Y
1,2,3,4,6,7,8-HpCDF	50	51.3	41	-	61	Y
1,2,3,4,7,8,9-HpCDF	50	50.5	39	-	69	Y
OCDF	100	96.6	63	-	170	Y

Contract-required concentration limits for OPR as specified in Table 6,
Method 1613. 10/94

Processed: 26 Nov 2014 09:24 Analyst: AC

METHOD 8290A **PCDD/F ONGOING PRECISION AND RECOVERY (OPR)** **FORM 8B**

Lab Name:	SGS Environmental Services		
Initial Calibration:	ICAL: MM1_DF_01172014_18SEP2014		
Instrument ID:	MM1	GC Column ID:	ZB-5ms
VER Data Filename:	141125P02	Analysis Date:	25-NOV-2014 09:29:33
Lab ID:	OPR1_12760_DF		

LABELED ANALYTES	SPIKE CONC.	CONC. FOUND	RANGE (ng/mL)			OK
13C-2,3,7,8-TCDD	100	87.3	20	-	175	Y
13C-1,2,3,7,8-PeCDD	100	79.5	21	-	227	Y
13C-1,2,3,4,7,8-HxCDD	100	80.2	21	-	193	Y
13C-1,2,3,6,7,8-HxCDD	100	87.1	25	-	163	Y
13C-1,2,3,7,8,9-HxCDD	100	82.8	26	-	166	Y
13C-1,2,3,4,6,7,8-HpCDD	100	76.5	26	-	166	Y
13C-OCDD	200	120	26	-	397	Y
13C-2,3,7,8-TCDF	100	85.2	22	-	152	Y
13C-1,2,3,7,8-PeCDF	100	82.4	21	-	192	Y
13C-2,3,4,7,8-PeCDF	100	73.9	13	-	328	Y
13C-1,2,3,4,7,8-HxCDF	100	78	19	-	202	Y
13C-1,2,3,6,7,8-HxCDF	100	87.1	21	-	159	Y
13C-2,3,4,6,7,8-HxCDF	100	84.9	22	-	176	Y
13C-1,2,3,7,8,9-HxCDF	100	74.3	17	-	205	Y
13C-1,2,3,4,6,7,8-HpCDF	100	87.9	21	-	158	Y
13C-1,2,3,4,7,8,9-HpCDF	100	67.3	20	-	186	Y
13C-OCDF	200	114	26	-	397	Y
CLEANUP STANDARD						
37Cl-2,3,7,8-TCDD	40	34	12.4	-	76.4	Y

Contract-required concentration limits for OPR as specified in Table 6, Method 1613. 10/94

Processed: 26 Nov 2014 09:24 Analyst: AC

Sample Receipt Notification

5500 Business Drive
Wilmington, NC 28405 USA
Tel: 910 794-1613
Toll Free: 866 846-8290
Fax: 910 794-3919

Project Manager:	*Amy Boehm*
Receipt Date & Time:	*05-Nov-14 at 09:50*
AP Project name:	*A7313*
Requested TAT:	*21 days*
Projected due date:	*26-Nov-14*
Matrix:	*Solid*
Phone#:	*910-794-1613*
Email Address:	*Amy.Boehm@sgs.com*

Company Contact:	*Amy Friedlander*
Company:	*Phase Separation Science, Inc.*
Project Name & Site:	*14110332*
Project PO#:	*N/A*
QAAP/Contract #:	*N/A*
Requested Analysis:	*Method 8290*
Phone#:	*410 747 8770*
Email Address:	*reporting@phaseonline.com*

Client Smp ID	AP Smp ID	Sample Condition & Notes	Quantity	Size	Sampling Date	Sampling Time	Received Temp	Container #	Shipping #
14110332-016	A7313_001	Core#5 122-141cm	1	4oz clear	29-Oct-14	13:30	1	1	1Z 231 3E4 01 5626 9992
14110332-017	A7313_002	Core#6 0-25cm	1	4oz clear	29-Oct-14	14:30	1	1	1Z 231 3E4 01 5626 9992
14110332-018	A7313_003	Core#6 25-53cm	1	4oz clear	29-Oct-14	14:30	1	1	1Z 231 3E4 01 5626 9992
14110332-019	A7313_004	Core#1 0-25cm	1	4oz clear	29-Oct-14	15:15	1	1	1Z 231 3E4 01 5626 9992
14110332-020	A7313_005	Core#1 25-55cm	1	4oz clear	29-Oct-14	15:15	1	1	1Z 231 3E4 01 5626 9992
14110332-021	A7313_006	Core#1 55-78cm	1	4oz clear	29-Oct-14	15:15	1	1	1Z 231 3E4 01 5626 9992
14110332-022	A7313_007	Core#10 0-26cm	1	4oz clear	29-Oct-14	15:45	1	1	1Z 231 3E4 01 5626 9992
14110332-023	A7313_008	Core#10 26-60cm	1	4oz clear	29-Oct-14	15:45	1	1	1Z 231 3E4 01 5626 9992
14110332-024	A7313_009	Core#10 60-92cm	1	4oz clear	29-Oct-14	15:45	1	1	1Z 231 3E4 01 5626 9992
14110332-025	A7313_010	Core#3 0-25cm	1	4oz clear	29-Oct-14	16:30	1	1	1Z 231 3E4 01 5626 9992
14110332-026	A7313_011	Core#3 61-70cm	1	4oz clear	29-Oct-14	16:30	1	1	1Z 231 3E4 01 5626 9992
14110332-027	A7313_012	Core#3 70-100cm	1	4oz clear	29-Oct-14	16:30	1	1	1Z 231 3E4 01 5626 9992
14110332-028	A7313_013	Core#4 0-25cm	1	4oz clear	29-Oct-14	17:30	1	1	1Z 231 3E4 01 5626 9992
14110332-029	A7313_014	Core #4 25-68cm	1	4oz clear	29-Oct-14	17:30	1	1	1Z 231 3E4 01 5626 9992
14110332-030	A7313_015	Core #4 68-100cm	1	4oz clear	29-Oct-14	17:30	1	1	1Z 231 3E4 01 5626 9992

Preservation Type: **Sample Seals:** No

Notes/Comments:

Samples received intact

Any un-extracted sample will be stored for 90 days from reporting date. Additional storage fees may apply for any samples stored longer than 90 days.

Received by: Barbara Hager *Logged in by: Barbara Hager* *QC'ed by:* AK 5 Nov 14

Chain of Custody Form for Subcontracted Analyses

Q7313

Phase Separation Science, Inc
6630 Baltimore National Pike
Baltimore, MD 21228
Phone: (410) 747-8770
Fax: (410) 788-8723

For Questions or issues please contact: Lynn Jackson

W.O. No. : **14110332**
P.O. No. :
Project Number : N/A
Report To LOD : No

COPY

Report Due On :12/04/14 05:00

Samples Transferred To:
SGS North America Inc - Wilmington
5500 Business Drive
Wilmington, NC 28405
Dioxins. Old Phone # 317-370-9644
Phone : 910-350-1903

Lab Sample ID	Field Sample ID	Date Sampled	Time Sampled	Matrix	Analyses Required	Method	Type of Container	Preservative
14110332-001	Core#2 0-20cm	10/28/14	13:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-002	Core#2 0-98cm	10/28/14	13:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-003	Core#2 98-150cm	10/28/14	13:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-004	Core#2 150-249cm	10/28/14	13:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-005	Core#2 249-272cm	10/28/14	13:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-006	Core#2 272-290cm	10/28/14	13:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-007	Core#8 0-42cm	10/29/14	10:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-008	Core#8 47-54cm	10/29/14	10:00	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-009	Core#9 0-22cm	10/29/14	10:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-010	Core#9 22-38cm	10/29/14	10:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-011	Core#7 0-37cm	10/29/14	11:15	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-012	Core#7 37-56cm	10/29/14	11:15	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-013	Core#5 0-24cm	10/29/14	13:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-014	Core#5 27-76cm	10/29/14	13:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-015	Core#5 76-122cm	10/29/14	13:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-016	Core#5 122-141cm	10/29/14	13:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-017	Core#6 0-25cm	10/29/14	14:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-018	Core#6 25-53cm	10/29/14	14:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-019	Core#1 0-25cm	10/29/14	15:15	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-020	Core#1 25-55cm	10/29/14	15:15	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-021	Core#1 55-78cm	10/29/14	15:15	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-022	Core#10 0-26cm	10/29/14	15:45	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-023	Core#10 26-60cm	10/29/14	15:45	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL

Q7313

Final 1.000

Rec'd by: Barbara Hogan

Chain of Custody Form for Subcontracted Analyses

A7313

Phase Separation Science, Inc
6630 Baltimore National Pike
Baltimore, MD 21228
Phone: (410) 747-8770
Fax: (410) 788-8723

W.O. No. : **14110332**
P.O. No. :
Project Number : N/A
Report To LOD : No

Samples Transferred To:
SGS North America Inc - Wilmington
5500 Business Drive
Wilmington, NC 28405
Dioxins. Old Phone # 317-370-9644
Phone : 910-350-1903

Lab Sample ID	Field Sample ID	Date Sampled	Time Sampled	Matrix	Analyses Required	Method	Type of Container	Preservative
14110332-024	Core#10 60-92cm	10/29/14	15:45	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-025	Core#3 0-25cm	10/29/14	16:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-026	Core#3 61-70cm	10/29/14	16:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-027	Core#3 70-100cm	10/29/14	16:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-028	Core#4 0-25cm	10/29/14	17:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-029	Core#4 25-68cm	10/29/14	17:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL
14110332-030	Core#4 68-100cm	10/29/14	17:30	Solid	Dioxins and Furans	SW8290	4 OZ WM GLASS	COOL

Data Deliverables Required: COA

Perform Q.C. on Sample :

Send Report Attn : reporting@phaseonline.com

Send InvoiceAttn : invoicing@phaseonline.com

Airbill No.: _____ Carrier : UPS

Condition Upon Receipt :

Comments :

Samples Relinquished By : OER Date : 11-04-14 Time: _____ Samples Received By : Barbara Hagen 5-NOV-14 0950 1°

Samples Relinquished By: _____ Date : _____ Time : _____ Samples Received By: _____

Samples Relinquished By: _____ Date: _____ Time: _____ Samples Received By: _____

Case Narrative Summary

Client Name: American Rivers

Project Name: Cumberland Dam

Work Order Number(s): 14110332

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

The analyses of chlorine, pH, dissolved oxygen, temperature and sulfite for drinking water and non-potable samples tested for compliance have a maximum holding time of 15 minutes. As such, all laboratory analyses for these analytes exceed holding times.

Sample Receipt:

All sample receipt conditions were acceptable.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.

Analytical Data Package Information Summary

Work Order(s): 14110332
Report Prepared For: American Rivers, Washington, DC
Project Name: Cumberland Dam
Project Manager: Serena McClain

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SW-846 6020 A	Core#2 0-20cm	Initial	14110332-001	1034	W	52973	118302	10/28/2014	11/14/2014 09:07	11/14/2014 13:25
	Core#2 20-98cm	Initial	14110332-002	1034	W	52973	118302	10/28/2014	11/14/2014 09:07	11/14/2014 14:20
	Core#2 98-150cm	Initial	14110332-003	1034	W	52973	118302	10/28/2014	11/14/2014 09:07	11/14/2014 16:07
	Core#2 150-249cm	Initial	14110332-004	1034	W	52973	118302	10/28/2014	11/14/2014 09:07	11/14/2014 16:13
	Core#2 249-272cm	Initial	14110332-005	1034	W	52973	118302	10/28/2014	11/14/2014 09:07	11/14/2014 16:19
	52973-1-BKS	Reanalysis	52973-1-BKS	1034	W	52973	118302	--------	11/14/2014 09:07	11/14/2014 16:01
	52973-1-BLK	Reanalysis	52973-1-BLK	1034	W	52973	118302	--------	11/14/2014 09:07	11/14/2014 15:55
	52973-1-BKS	BKS	52973-1-BKS	1034	W	52973	118302	--------	11/14/2014 09:07	11/14/2014 13:19
	52973-1-BLK	BLK	52973-1-BLK	1034	W	52973	118302	--------	11/14/2014 09:07	11/14/2014 13:13
	Core#2 0-20cm S	MS	14110332-001 S	1034	W	52973	118302	10/28/2014	11/14/2014 09:07	11/14/2014 13:55
	Core#2 0-20cm SD	MSD	14110332-001 SD	1034	W	52973	118302	10/28/2014	11/14/2014 09:07	11/14/2014 14:01
	Core#2 272-290cm	Initial	14110332-006	1034	W	53017	118382	10/28/2014	11/18/2014 09:05	11/18/2014 13:32
	Core#8 0-42cm	Initial	14110332-007	1034	W	53017	118382	10/29/2014	11/18/2014 09:05	11/18/2014 14:03
	Core#8 47-54cm	Initial	14110332-008	1034	W	53017	118382	10/29/2014	11/18/2014 09:05	11/18/2014 14:09
	Core#9 0-22cm	Initial	14110332-009	1034	W	53017	118382	10/29/2014	11/18/2014 09:05	11/18/2014 14:39
	Core#9 22-38cm	Initial	14110332-010	1034	W	53017	118382	10/29/2014	11/18/2014 09:05	11/18/2014 14:45
	Core#7 0-37cm	Initial	14110332-011	1034	W	53017	118382	10/29/2014	11/18/2014 09:05	11/18/2014 14:52
	Core#7 37-56cm	Initial	14110332-012	1034	W	53017	118382	10/29/2014	11/18/2014 09:05	11/18/2014 14:58
	53017-1-BKS	BKS	53017-1-BKS	1034	W	53017	118382	--------	11/18/2014 09:05	11/18/2014 13:26
	53017-1-BLK	BLK	53017-1-BLK	1034	W	53017	118382	--------	11/18/2014 09:05	11/18/2014 13:20
	Core#2 272-290cm S	MS	14110332-006 S	1034	W	53017	118382	10/28/2014	11/18/2014 09:05	11/18/2014 13:38
	Core#2 272-290cm SD	MSD	14110332-006 SD	1034	W	53017	118382	10/28/2014	11/18/2014 09:05	11/18/2014 13:44
	Core#5 0-24cm	Initial	14110332-013	1034	W	53065	118455	10/29/2014	11/20/2014 09:08	11/20/2014 14:39
	Core#5 27-76cm	Initial	14110332-014	1034	W	53065	118455	10/29/2014	11/20/2014 09:08	11/20/2014 15:34
	Core#5 76-122cm	Initial	14110332-015	1034	W	53065	118455	10/29/2014	11/20/2014 09:08	11/20/2014 15:40
	Core#5 122-141cm	Initial	14110332-016	1034	W	53065	118455	10/29/2014	11/20/2014 09:08	11/20/2014 15:46
	Core#6 0-25cm	Initial	14110332-017	1034	W	53065	118455	10/29/2014	11/20/2014 09:08	11/20/2014 15:53
	Core#6 25-53cm	Initial	14110332-018	1034	W	53065	118455	10/29/2014	11/20/2014 09:08	11/20/2014 15:59
	53065-1-BKS	BKS	53065-1-BKS	1034	W	53065	118455	--------	11/20/2014 09:08	11/20/2014 14:33

Analytical Data Package Information Summary

Work Order(s): **14110332**
Report Prepared For: American Rivers, Washington, DC
Project Name: Cumberland Dam
Project Manager: Serena McClain

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SW-846 6020 A	53065-1-BLK	BLK	53065-1-BLK	1034	W	53065	118455	--------	11/20/2014 09:08	11/20/2014 14:27
	Core#5 0-24cm S	MS	14110332-013 S	1034	W	53065	118455	10/29/2014	11/20/2014 09:08	11/20/2014 15:10
	Core#5 0-24cm SD	MSD	14110332-013 SD	1034	W	53065	118455	10/29/2014	11/20/2014 09:08	11/20/2014 15:16
	Core#1 0-25cm	Initial	14110332-019	1034	W	53214	118687	10/29/2014	12/02/2014 09:07	12/02/2014 15:00
	Core#1 25-55cm	Initial	14110332-020	1034	W	53214	118687	10/29/2014	12/02/2014 09:07	12/02/2014 15:06
	Core#1 55-78cm	Initial	14110332-021	1034	W	53214	118687	10/29/2014	12/02/2014 09:07	12/02/2014 15:12
	Core#10 0-26cm	Initial	14110332-022	1034	W	53214	118687	10/29/2014	12/02/2014 09:07	12/02/2014 15:18
	Core#10 26-60cm	Initial	14110332-023	1034	W	53214	118687	10/29/2014	12/02/2014 09:07	12/02/2014 15:24
	Core#10 60-92cm	Initial	14110332-024	1034	W	53214	118687	10/29/2014	12/02/2014 09:07	12/02/2014 15:30
	Core#3 0-25cm	Initial	14110332-025	1034	W	53214	118687	10/29/2014	12/02/2014 09:07	12/02/2014 15:36
	Core#3 61-70cm	Initial	14110332-026	1034	W	53214	118687	10/29/2014	12/02/2014 09:07	12/02/2014 15:43
	Core#3 70-100cm	Initial	14110332-027	1034	W	53214	118687	10/29/2014	12/02/2014 09:07	12/02/2014 15:49
	Core#4 0-25cm	Initial	14110332-028	1034	W	53214	118687	10/29/2014	12/02/2014 09:07	12/02/2014 16:19
	Core#4 25-68cm	Initial	14110332-029	1034	W	53214	118687	10/29/2014	12/02/2014 09:07	12/02/2014 16:25
	Core#4 68-100cm	Initial	14110332-030	1034	W	53214	118687	10/29/2014	12/02/2014 09:07	12/02/2014 16:31
	53214-1-BKS	BKS	53214-1-BKS	1034	W	53214	118687	--------	12/02/2014 09:07	12/02/2014 13:53
	53214-1-BLK	BLK	53214-1-BLK	1034	W	53214	118687	--------	12/02/2014 09:07	12/02/2014 13:47
	SB-1 S	MS	14120103-001 S	1034	W	53214	118687	11/21/2014	12/02/2014 09:07	12/02/2014 14:05
	SB-1 SD	MSD	14120103-001 SD	1034	W	53214	118687	11/21/2014	12/02/2014 09:07	12/02/2014 14:11

PHASE SEPARATION SCIENCE, INC.

QC Summary 14110332

American Rivers
Cumberland Dam

Analytical Method: SW-846 6020 A Prep Method: SW3010A
Seq Number: 118302 Matrix: Water Date Prep: 11/14/14
MB Sample Id: 52973-1-BLK LCS Sample Id: 52973-1-BKS

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Arsenic	<0.05000	0.4000	0.4037	101	80-120	mg/L	11/14/14 13:19	
Barium	<1.000	2.000	2.367	118	80-120	mg/L	11/14/14 13:19	
Cadmium	<0.05000	0.4000	0.3929	98	80-120	mg/L	11/14/14 13:19	
Chromium	<0.05000	0.4000	0.3778	94	80-120	mg/L	11/14/14 13:19	
Lead	<0.05000	0.4000	0.4120	103	80-120	mg/L	11/14/14 13:19	
Mercury	0.003500	10	10.7	107	80-120	mg/L	11/14/14 16:01	
Selenium	<0.05000	0.4000	0.3936	98	80-120	mg/L	11/14/14 13:19	
Silver	<0.05000	0.4000	0.4077	102	80-120	mg/L	11/14/14 13:19	

Analytical Method: SW-846 6020 A Prep Method: SW3010A
Seq Number: 118382 Matrix: Water Date Prep: 11/18/14
MB Sample Id: 53017-1-BLK LCS Sample Id: 53017-1-BKS

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Arsenic	<0.05000	0.4000	0.3982	100	80-120	mg/L	11/18/14 13:26	
Barium	<1.000	2.000	2.234	112	80-120	mg/L	11/18/14 13:26	
Cadmium	<0.05000	0.4000	0.3855	96	80-120	mg/L	11/18/14 13:26	
Chromium	<0.05000	0.4000	0.3621	91	80-120	mg/L	11/18/14 13:26	
Lead	<0.05000	0.4000	0.3942	99	80-120	mg/L	11/18/14 13:26	
Mercury	<0.002000	0.01000	0.009500	95	80-120	mg/L	11/18/14 13:26	
Selenium	<0.05000	0.4000	0.3823	96	80-120	mg/L	11/18/14 13:26	
Silver	<0.05000	0.4000	0.3878	97	80-120	mg/L	11/18/14 13:26	

Analytical Method: SW-846 6020 A Prep Method: SW3010A
Seq Number: 118455 Matrix: Water Date Prep: 11/20/14
MB Sample Id: 53065-1-BLK LCS Sample Id: 53065-1-BKS

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Arsenic	<0.05000	0.4000	0.3930	98	80-120	mg/L	11/20/14 14:33	
Barium	<1.000	2.000	2.184	109	80-120	mg/L	11/20/14 14:33	
Cadmium	<0.05000	0.4000	0.3716	93	80-120	mg/L	11/20/14 14:33	
Chromium	<0.05000	0.4000	0.3723	93	80-120	mg/L	11/20/14 14:33	
Lead	<0.05000	0.4000	0.3854	96	80-120	mg/L	11/20/14 14:33	
Mercury	<0.002000	0.01000	0.009600	96	80-120	mg/L	11/20/14 14:33	
Selenium	<0.05000	0.4000	0.3912	98	80-120	mg/L	11/20/14 14:33	
Silver	<0.05000	0.4000	0.3708	93	80-120	mg/L	11/20/14 14:33	

PHASE SEPARATION SCIENCE, INC.

QC Summary 14110332

American Rivers
Cumberland Dam

Analytical Method: SW-846 6020 A Prep Method: SW3010A
Seq Number: 118687 Matrix: Water Date Prep: 12/02/14
MB Sample Id: 53214-1-BLK LCS Sample Id: 53214-1-BKS

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Arsenic	<0.05000	0.4000	0.4022	101	80-120	mg/L	12/02/14 13:53	
Barium	<1.000	2.000	2.268	113	80-120	mg/L	12/02/14 13:53	
Cadmium	<0.05000	0.4000	0.3884	97	80-120	mg/L	12/02/14 13:53	
Chromium	<0.05000	0.4000	0.3682	92	80-120	mg/L	12/02/14 13:53	
Lead	<0.05000	0.4000	0.3990	100	80-120	mg/L	12/02/14 13:53	
Mercury	<0.002000	0.01000	0.01030	103	80-120	mg/L	12/02/14 13:53	
Selenium	<0.05000	0.4000	0.3995	100	80-120	mg/L	12/02/14 13:53	
Silver	<0.05000	0.4000	0.3856	96	80-120	mg/L	12/02/14 13:53	

Analytical Method: SW-846 6020 A Prep Method: SW3010A
Seq Number: 118302 Matrix: Soil Date Prep: 11/14/14
Parent Sample Id: 14110332-001 MS Sample Id: 14110332-001 S MSD Sample Id: 14110332-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Arsenic	0.05050	0.4000	0.4636	103	0.4457	99	75-125	4	25	mg/L	11/14/14 13:55	
Barium	<1.000	2.000	3.077	154	3.035	152	75-125	1	25	mg/L	11/14/14 13:55	X
Cadmium	<0.05000	0.4000	0.4225	106	0.4043	101	75-125	4	25	mg/L	11/14/14 13:55	
Chromium	<0.05000	0.4000	0.3997	100	0.3859	96	75-125	4	25	mg/L	11/14/14 13:55	
Lead	0.05040	0.4000	0.4708	105	0.4491	100	75-125	5	25	mg/L	11/14/14 13:55	
Mercury	<0.002000	0.01000	0.01100	110	0.01130	113	75-125	3	25	mg/L	11/14/14 13:55	
Selenium	<0.05000	0.4000	0.4092	102	0.4028	101	75-125	2	25	mg/L	11/14/14 13:55	
Silver	<0.05000	0.4000	0.4205	105	0.4061	102	75-125	3	25	mg/L	11/14/14 13:55	

Analytical Method: SW-846 6020 A Prep Method: SW3010A
Seq Number: 118382 Matrix: Soil Date Prep: 11/18/14
Parent Sample Id: 14110332-006 MS Sample Id: 14110332-006 S MSD Sample Id: 14110332-006 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Arsenic	<0.05000	0.4000	0.4143	104	0.4147	104	75-125	0	25	mg/L	11/18/14 13:38	
Barium	<1.000	2.000	3.135	157	3.175	159	75-125	1	25	mg/L	11/18/14 13:38	X
Cadmium	<0.05000	0.4000	0.3980	100	0.3926	98	75-125	1	25	mg/L	11/18/14 13:38	
Chromium	<0.05000	0.4000	0.3733	93	0.3706	93	75-125	1	25	mg/L	11/18/14 13:38	
Lead	0.3117	0.4000	0.6920	95	0.7138	101	75-125	3	25	mg/L	11/18/14 13:38	
Mercury	<0.002000	0.01000	0.009800	98	0.009800	98	75-125	0	25	mg/L	11/18/14 13:38	
Selenium	<0.05000	0.4000	0.3919	98	0.3808	95	75-125	3	25	mg/L	11/18/14 13:38	
Silver	<0.05000	0.4000	0.3903	98	0.3876	97	75-125	1	25	mg/L	11/18/14 13:38	

PHASE SEPARATION SCIENCE, INC.

QC Summary 14110332

American Rivers
Cumberland Dam

Analytical Method: SW-846 6020 A Prep Method: SW3010A
Seq Number: 118455 Matrix: Soil Date Prep: 11/20/14
Parent Sample Id: 14110332-013 MS Sample Id: 14110332-013 S MSD Sample Id: 14110332-013 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Arsenic	<0.05000	0.4000	0.4216	105	0.4355	109	75-125	3	25	mg/L	11/20/14 15:10	
Barium	<1.000	2.000	2.952	148	2.990	150	75-125	1	25	mg/L	11/20/14 15:10	X
Cadmium	<0.05000	0.4000	0.3769	94	0.3826	96	75-125	2	25	mg/L	11/20/14 15:10	
Chromium	<0.05000	0.4000	0.3724	93	0.3808	95	75-125	2	25	mg/L	11/20/14 15:10	
Lead	<0.05000	0.4000	0.4060	102	0.4121	103	75-125	1	25	mg/L	11/20/14 15:10	
Mercury	<0.002000	0.01000	0.009600	96	0.01000	100	75-125	4	25	mg/L	11/20/14 15:10	
Selenium	<0.05000	0.4000	0.3747	94	0.3847	96	75-125	3	25	mg/L	11/20/14 15:10	
Silver	<0.05000	0.4000	0.3688	92	0.3758	94	75-125	2	25	mg/L	11/20/14 15:10	

Analytical Method: SW-846 6020 A Prep Method: SW3010A
Seq Number: 118302 Matrix: Water Date Prep: 11/14/14
REBLK Sample Id: 52973-1-BLK LCS Sample Id: 52973-1-BKS

Parameter	REBLK Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Arsenic	<0.05000	0.4000	0.3996	100	75-125	mg/L	11/14/14 16:01	
Barium	<1.000	0.4000	2.337	584	75-125	mg/L	11/14/14 16:01	
Cadmium	<0.05000	0.4000	0.3967	99	75-125	mg/L	11/14/14 16:01	
Chromium	<0.05000	0.4000	0.3697	92	75-125	mg/L	11/14/14 16:01	
Lead	<0.05000	0.4000	0.4051	101	75-125	mg/L	11/14/14 16:01	
Selenium	<0.05000	0.4000	0.3905	98	75-125	mg/L	11/14/14 16:01	
Silver	<0.05000	0.4000	0.4048	101	75-125	mg/L	11/14/14 16:01	

F = RPD exceeded the laboratory control limits
X = Recovery of MS, MSD or both outside of QC Criteria
H= Recovery of BS,BSD or both exceeded the laboratory control limits
L = Recovery of BS,BSD or both below the laboratory control limits

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com
email: info@phaseonline.com

(1) *CLIENT: American Rivers *OFFICE LOC.: Washington, D.C.

*PROJECT MGR: Serena McClain *PHONE NO.: (202) 347-7550 ext. 7044
SMcClain@americanrivers.org
EMAIL: stephen.vanryswick@maryland.gov FAX NO.: ( )

*PROJECT NAME: Cumberland Dam PROJECT NO.:

SITE LOCATION: Cumberland, MD P.O. NO.:

SAMPLER(S): S. VanRyswick (MGS) DW CERT NO.:

PSS Work Order #: 1411033 2 PAGE 1 OF 3

Matrix Codes:
SW=Surface Wtr DW=Drinking Wtr GW=Ground Wtr WW=Waste Wtr O=Oil S=Soil L=Liquid SOL=Solid A=Air WI=Wipe

(2)

LAB NO.	*SAMPLE IDENTIFICATION	*DATE (SAMPLED)	*TIME (SAMPLED)	MATRIX (See Codes)	No. CONTAINERS	SAMPLE TYPE C=COMP G=GRAB	Preservatives Used		Analysis/ Method Required (3) * Complete Dioxins	TCL Pmetals	REMARKS
							4°C	4°C			
1	Core #2 0-20cm	10/28/14	1:00PM	S	2	C	X	X			
2	Core #2 20-98cm	10/28/14	1:00 PM	S	2	C	X	X			
3	Core #2 98-150cm	10/28/14	1:00PM	S	2	C	X	X			
4	Core #2 150-249cm	10/28/14	1:00 PM	S	2	C	X	X			
5	Core #2 249-272cm	10/28/14	1:00 PM	S	2	C	X	X			
6	Core #2 272-290cm	10/28/14	1:00 PM	S	2	C	X	X			
7	Core #8 0-42cm	10/29/14	10:00 AM	S	2	C	X	X			
8	Core #8 47-54cm	10/29/14	10:00 AM	S	2	C	X	X			
9	Core #9 0-22cm	10/29/14	10:30AM	S	2	C	X	X			
10	Core #9 22-38cm	10/29/14	10:30AM	S	2	C	X	X			

(5)

Relinquished By: (1)	Date	Time	Received By:
E. Sylvia (MGS)	11/3/14	1610	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

(4)

*Requested TAT (One TAT per COC)
☐ 5-Day ☐ 3-Day ☐ 2-Day
☐ Next Day ☐ Emergency ☐ Other

Data Deliverables Required:
COA ☐ QC SUMM ☐ CLP LIKE ☐ OTHER ____

# of Coolers: 1
Custody Seal: ABS
Ice Present: YES Temp: 1°C
Shipping Carrier: CLIENT

Special Instructions:

DW COMPLIANCE? YES ☐
EDD FORMAT TYPE: ____
STATE RESULTS REPORTED TO: MD ☐ DE ☐ PA ☐ VA ☐ WV ☐ OTHER ____

6630 Baltimore National Pike • Route 40 West • Baltimore, Maryland 21228 • (410) 747-8770 • (800) 932-9047 • Fax (410) 788-8723

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com
email: info@phaseonline.com

(1) *CLIENT: American Rivers *OFFICE LOC.: Washington, D.C.
*PROJECT MGR: Serena McClain *PHONE NO.: (202) 347-7550 ext. 7044
EMAIL: SMcClain@americanrivers.org Stephen.VanRysmick@maryland.gov FAX NO.: ( )
*PROJECT NAME: Cumberland Dam PROJECT NO.:
SITE LOCATION: Cumberland, MD P.O. NO.:
SAMPLER(S): S. VanRysmick (MGS) DW CERT NO.:

PSS Work Order #: 14110332 PAGE 2 OF 3

Matrix Codes: **SW**=Surface Wtr **DW**=Drinking Wtr **GW**=Ground Wtr **WW**=Waste Wtr **O**=Oil **S**=Soil **L**=Liquid **SOL**=Solid **A**=Air **WI**=Wipe

(2)

LAB NO.	*SAMPLE IDENTIFICATION	*DATE (SAMPLED)	*TIME (SAMPLED)	MATRIX (See Codes)	No. CONTAINERS	SAMPLE TYPE C = COMP G = GRAB	Preservatives Used	4°C	4°C										REMARKS
							(3) * Analysis/ Method Required	Complete Dioxins	TCLP metals										
11	Core #7 0-37cm	10/29/14	11:15AM	S	2	C		x	x										
12	Core #7 37-56cm	10/29/14	11:15AM	S	2	C		x	x										
13	Core #5 0-24cm	10/29/14	1:30 PM	S	2	C		x	x										
14	Core #5 27-76cm	10/29/14	1:30 pm	S	2	C		x	x										
15	Core #5 76-122cm	10/29/14	1:30PM	S	2	C		x	x										
16	Core #5 122-141cm	10/29/14	1:30 PM	S	2	C		x	x										
17	Core #6 0-25cm	10/29/14	2:30PM	S	2	C		x	x										
18	Core #6 25-53cm	10/29/14	2:30 PM	S	2	C		x	x										
19	Core #1 0-25cm	10/29/14	3:15 PM	S	2	C		x	x										
20	Core #1 25-55cm	10/29/14	3:15PM	S	2	C		x	x										

(5)

Relinquished By: (1)	Date	Time	Received By:
E. Sylvia (MGS)	11/3/14	1610	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

(4)

*Requested TAT (One TAT per COC)
☐ 5-Day ☐ 3-Day ☐ 2-Day
☐ Next Day ☐ Emergency ☐ Other

Data Deliverables Required:
COA QC SUMM CLP LIKE OTHER
☐ ☐ ☐ _____

# of Coolers: 1
Custody Seal: ABS
Ice Present: PLES Temp: 1 °C
Shipping Carrier: CLIENT

Special Instructions:

DW COMPLIANCE? YES ☐
EDD FORMAT TYPE: _____
STATE RESULTS REPORTED TO: MD ☐ DE ☐ PA ☐ VA ☐ WV ☐ OTHER _____

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SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com
email: info@phaseonline.com

(1) *CLIENT: American Rivers *OFFICE LOC.: Washington, D.C.
*PROJECT MGR: Serena McClain *PHONE NO.: (202) 347-7550 ext 7044
smcclain@americanrivers.org
EMAIL: Stephen.VanRysnick@maryland.gov FAX NO.: ( )
*PROJECT NAME: Cumberland Dam PROJECT NO.:
SITE LOCATION: Cumberland, MD P.O. NO.:
SAMPLER(S): S. VanRysnick (MGS) DW CERT NO.:

PSS Work Order #: 1411033 2 PAGE 3 OF 3

Matrix Codes: **SW**=Surface Wtr **DW**=Drinking Wtr **GW**=Ground Wtr **WW**=Waste Wtr **O**=Oil **S**=Soil **L**=Liquid **SOL**=Solid **A**=Air **WI**=Wipe

(2)

LAB NO.	*SAMPLE IDENTIFICATION	*DATE (SAMPLED)	*TIME (SAMPLED)	MATRIX (See Codes)	No. CONTAINERS	SAMPLE TYPE C = COMP G = GRAB	Preservatives Used		Analysis/ Method Required (3) * Complete Dioxins	TCLP metals	REMARKS
							4°C	4°C			
21	Core #1 55-78cm	10/29/14	3:15PM	S	2	C	X	X			
22	Core #10 0-26cm	10/29/14	3:45pm	S	2	C	X	X			
23	Core #10 26-60cm	10/29/14	3:45 PM	S	2	C	X	X			
24	Core #10 60-92cm	10/29/14	3:45PM	S	2	C	X	X			
25	Core #3 0-25cm	10/29/14	4:30PM	S	2	C	X	X			
26	Core #3 61-70cm	10/29/14	4:30PM	S	2	C	X	X			
27	Core #3 70-100cm	10/29/14	4:30PM	S	2	C	X	X			
28	Core #4 0-25cm	10/29/14	5:30PM	S	2	C	X	X			
29	Core #4 25-68cm	10/29/14	5:30PM	S	2	C	X	X			
30	Core #4 68-100cm	10/29/14	5:30PM	S	2	C	X	X			

(5)

Relinquished By: (1)	Date	Time	Received By:
E. Sylvia (MGS)	11/3/14	1610	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

(4)

*Requested TAT (One TAT per COC)
☐ 5-Day ☐ 3-Day ☐ 2-Day
☐ Next Day ☐ Emergency ☐ Other

Data Deliverables Required:
COA ☐ QC SUMM ☐ CLP LIKE ☐ OTHER ____

# of Coolers: 1
Custody Seal: ABS
Ice Present: YES Temp: 1°C
Shipping Carrier: CLIENT

Special Instructions:

DW COMPLIANCE? YES ☐
EDD FORMAT TYPE: ____
STATE RESULTS REPORTED TO: MD ☐ DE ☐ PA ☐ VA ☐ WV ☐ OTHER ____

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Phase Separation Science, Inc

Sample Receipt Checklist

Work Order #	14110332	**Received By**	Rachel Davis
Client Name	American Rivers	**Date Received**	11/03/2014 04:10:00 PM
Project Name	Cumberland Dam	**Delivered By**	Client
Disposal Date	12/08/2014	**Tracking No**	Not Applicable
		Logged In By	Rachel Davis

Shipping Container(s)

No. of Coolers 1

		Ice	Present
Custody Seal(s) Intact?	N/A	Temp (deg C)	1
Seal(s) Signed / Dated?	N/A	Temp Blank Present	No

Documentation

		Sampler Name	S. Van Ryswick
COC agrees with sample labels?	Yes	MD DW Cert. No.	N/A
Chain of Custody	Yes		

Sample Container

		Custody Seal(s) Intact?	Not Applicable
Appropriate for Specified Analysis?	Yes	Seal(s) Signed / Dated	Not Applicable
Intact?	Yes		
Labeled and Labels Legible?	Yes		

Total No. of Samples Received 30 Total No. of Containers Received 60

Preservation

Metals	(pH<2)	N/A
Cyanides	(pH>12)	N/A
Sulfide	(pH>9)	N/A
TOC, COD, Phenols	(pH<2)	N/A
TOX, TKN, NH3, Total Phos	(pH<2)	N/A
VOC, BTEX (VOA Vials Rcvd Preserved)	(pH<2)	N/A
Do VOA vials have zero headspace?		N/A
624 VOC (Rcvd at least one unpreserved VOA vial)		N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Samples Inspected/Checklist Completed By: Shirley D. Rivera Date: 11/04/2014

Shirley Rivera

PM Review and Approval: N L Jackson Date: 11/05/2014

Lynn Jackson