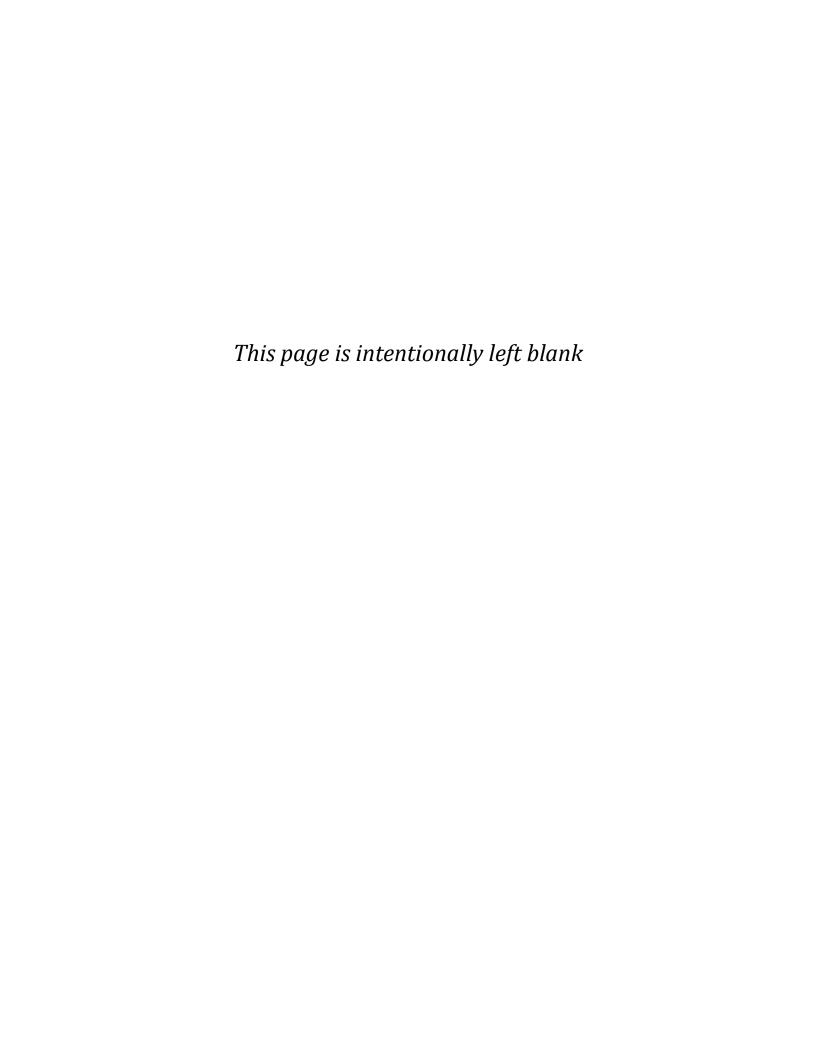
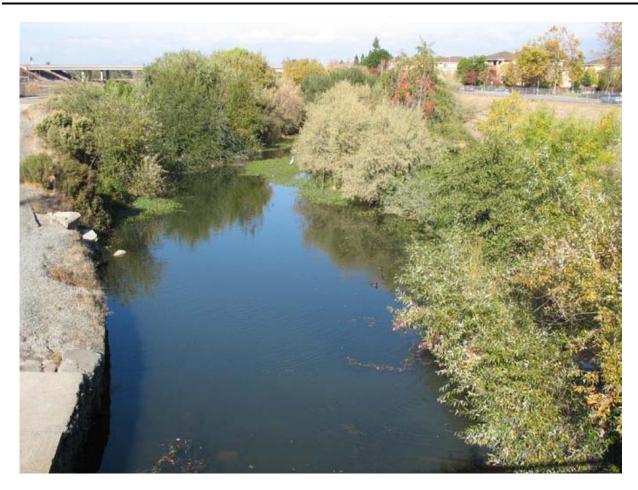
## Appendix A

Upper Guadalupe River Reach 12
Sampling and Analysis Report
(June 2013)



## UPPER GUADALUPE RIVER REACH 12 SAMPLING AND ANALYSIS REPORT (SAR)

#### **June 2013**





# U.S. Army Corps of Engineers San Francisco District Engineering and Technical Services Division Planning Branch Environmental Section A

#### **Table of Contents**

1. INTRODUCTION	4
1.1 Project Description	4
1.2 Purpose of Sampling Effort	6
1.3 Organization of this Document	6
2. FIELD SEDIMENT SAMPLE COLLECTION	7
2.1 Collection of Upper Guadalupe River Reach 12 Sediment Samples	7
2.2 Field Observations	
2.3 Field Equipment Decontamination Procedure	9
3. SAMPLE PROCESSING	12
3.1 Homogenization and Compositing of Sediments	12
3.2 Sample Shipping	12
3.3 Chain-of-Custody (COC) Protocol	12
4. ANALYTICAL AND TESTING METHODS	13
4.1 Sediment Analytical Chemistry Procedures	13
4.2 Data Analysis	
5. RESULTS OF LABORATORY ANALYSES	14
6. LABORATORY QUALITY CONTROL/QUALITY ASSURANCE	17
6.1. Composite Sample Analysis	17
6.2. Individual Sample Analysis	17
7. SUMMARY	19
7.1 Coventionals	19
7.7 Mercury	19
7.8 Conclusions	19
8. DEVIATIONS FROM SAP	21
9. REFERENCES	22

#### **Appendices**

Appendix A Laboratory Analytical Report

#### **List of Figures**

#### 1 INTRODUCTION

The US Army Corps of Engineers, San Francisco District (USACE) undertook a sampling effort from within Reach 12 of the Upper Guadalupe River Flood Control Project in October 2012. The purpose of this effort was to characterize existing conditions to evaluate the suitability of material for reuse within Reach 12. This sampling and analysis effort was conducted according to the procedures and requirements in the *Upper Guadalupe Reach 12*, *Sampling and Analysis Plan (SAP)*. This data report has been prepared to provide the evaluation of these sediments. Based upon results of previous comprehensive analysis conducted in Reach 10B of this same project, USACE believes that mercury will be the primary driver for evaluating suitability for reuse. After the mercury reuse guidelines for Reach 12 have been established, USACE anticipates analyzing and evaluating the soils for a wider array of constituents.

#### 1.1 Project Description

The Upper Guadalupe River Flood Control Project is located in the city of San Jose, Santa Clara County, California. The portion of Reach 12 to be reconstructed is located between Branham Lane and Blossom Hill Road and is approximately 1.05 miles in length (See Figure 1).

The Upper Guadalupe River project is a flood damage reduction project which will be utilizing a combination of bypass channels, floodwalls, and some channel widening to reduce flood risks in surrounding areas. To help mitigate project impacts on terrestrial and aquatic habitats, pre-existing channel modifications in Reach 12 are being reconfigured to restore more natural habitat conditions while maintaining the existing level of flood protection. This work is expected to aid the long-term recovery of riparian forest habitat and salmonid migration in the project area.

Native habitat restoration activities for Reach 12 consist of:

- Restoring up to 1.05 miles of channel and riparian habitat between Branham Lane and Blossom Hill Road;
- Modifying the existing low-flow and bankfull channels to give them a more natural size and shape by excavating and redistributing soil;
- Stabilizing the new inner channels and create habitat diversity for the listed steelhead trout by using rootwad structures in the channel; and
- Planting native trees, shrubs, and grasses.

The former New Almaden mines, located approximately 4.5 miles upstream of Reach 12 were in operation from 1847 to 1976. Cinnabar ore was mined and processed at New Almaden to obtain mercury for use in the gold mining industry, where it was used to extract gold from crushed ore. As a result of cinnabar ore mining and processing at New Almaden, mercury-impacted sediment has been found along the Guadalupe River including Reach 12.

The area surrounding Reach 12 is primarily residential. However, agricultural, commercial and light industrial activities historically have taken place around and upstream of Reach 12 and commercial land uses continue today.

Brahham Ln Guadalupe Project Area Almaden Blossom Hill Rd Contra Costa Coleman Ave Santa Cruz

Figure 1-1 Location Map: Upper Guadalupe River Reach 12, San Jose, CA

#### 1.2 Purpose of the Sampling Effort

The purpose of this sampling and analysis effort is twofold:

- First to characterize the existing conditions to evaluate the suitability of material for reuse within Reach 12; and
- Secondly to determine if there are any concerns with the new surface that will be exposed after the future excavations take place.

The habitat restoration work within Reach 12 requires the movement of existing soils to provide a more natural environment while maintaining flow capacities..

#### 1.3 Organization of this Document

Sample collection and handling procedures are discussed in Sections 2 and 3. Analytical/Testing methods are described in Section 4. Chemical analyses results are provided in Section 5. A Quality Control (QC) summary is provided in Section 6. Section 7 presents the conclusions regarding possible impacted material within Reach 12. Deviations from the SAP are discussed in Section 8, while references are provided in Section 9. Appendix A contains supporting documentation for this study.

#### 2 FIELD SEDIMENT SAMPLE COLLECTION

#### 2.1 Collection of Upper Guadalupe Reach 12 Sediment Samples

This sampling event was conducted by USACE. Sediment sampling was performed between October 9<sup>th</sup> -11<sup>th</sup>, 2012 by USACE personnel Mr. Justin Kosta with the SPN Operations Section providing field support.

Sampling occurred within Reach 12 between Stations 961+00 and 1018+00 and was divided into three sampling areas. Sampling Area 1 was from Station 961+00 to Station 980+00, Sampling Area 2 was from Station 980+00 to Station 998+00, and Sampling Area 3 was from Station 998+00 to 1018+00.

All samples boreholes were advanced with an excavator do to the nature of the soil conditions within the reach and the depths to which boreholes were advanced. Material was collected at each two foot interval down to maximum depth. All samples were collected from the bucket of the excavator using a hand scoop. All samples were placed in polyethylene bags labeled with the sample names immediately after collection and placed in a cooler with ice. Once sediment sampling was completed for the day, sediment samples were observed from within the polyethylene bags and their physical and olfactory characteristics were noted. After all material had been collected from a borehole, the borehole was backfilled. The material from the borehole from surface down to the beginning of the z-layer depth was homogenized and placed in a sample jar. The material from z-layer depth was homogenized and placed in a separate sampling jar; resulting in two samples from each bore hole, one which represented surface material down to the beginning of the z-layer depth, and material which represented the z-layer depth itself.

Each sediment sample was assigned a unique alphanumeric identifier as described in the SAP. During sediment sample collection activities and during transportation to the Columbia Analytical Services, Inc., samples were stored on ice within insulated coolers.

What follows is the rationale for the sediment sample locations and their respective depths:

Area 1, sediment samples 1-1 to 1-6: Six excavations are planned within Area 1. Excavated volumes will range from 60 to 730 cubic yards (cy). Maximum excavated depths will range from 1.39 to 5.80 feet below ground surface (ft. bgs.). Material was collected at two foot depth intervals from each sampling location within all six excavations, and homogenized to form one sample for each sampling location. Some material from each location was combined and homogenized to create a six-point composite sample for Area 1. Material was also collected from a six inch layer immediately below the maximum depth in each excavation. This material was homogenized to produce one, six point composited Z-layer sample for Area 1.

**Area 2, sediment samples 2-1 to 2-6:** Four excavations are planned within Area 2. Excavated volumes will range from 1,150 to 4,160 cy. Maximum excavated depths will range from 5.79 to 8.65 ft. bgs. Material was collected at two foot depth intervals from each sampling location within all four excavations and homogenized to form one sample for each sampling location.

Some material from each location was combined and homogenized to create a six-point composite sample for Area 2. Material was also collected from a six inch layer immediately below the maximum depth in each excavation. This material was homogenized to produce one, six point composited Z-layer sample for Area 2. Even though only four sections are being excavated in Area 2, six sampling locations were advanced due to the larger variation in the volumes at each section to be excavated.

Area 3, sediment samples 3-1 to 3-4: Three excavations are planned within Area 3. Excavated volumes will range from 1,240 to 6,660 cy. Maximum excavated depths will range from 6.64 to 10.17 ft. bgs. Material was collected at two foot depth intervals from each sampling location within all three excavations and homogenized to form one sample for each sampling location. Some material from each location was combined and homogenized to create a four-point composite sample for Area 3. Material was also collected from a six inch layer immediately below maximum depth in each excavation. This material was homogenized to produce one, four point composited Z-layer sample for Area 3. Due to the larger variation in the volumes at each section to be excavated, four sampling locations were appropriate within the aforementioned three excavations.

Each sampling area consisted of four to six sampling locations; resulting in sixteen physical sampling locations as is shown in Figure 2-1. Material was collected at two foot depth intervals from within each excavation area; there were 13 excavation areas to characterize within Reach 12. Sixteen homogenized discrete samples were collected according to the sampling scheme outlined in Table 2-2. From those sixteen discrete samples some material was used to generate two, six-point composite samples and one, four-point composite sample, one composite sample representing each sampling area. Furthermore, from those sixteen discrete sample locations, three composite Z-layer samples were made. The Z-layer samples characterized the material which will become exposed after construction activities have ceased, and were collected from the top six inches of that material.

In summation, from the sixteen sampling locations six composite samples were produced, three made up of material homogenized over the entire depth of the excavations, and three from the Z-layer (i.e. top six inches below the excavation depth). Further, sixteen individual samples representing the material to be excavated were collected. All samples were analyzed for mercury only.

One duplicate composite sample from a location was chosen while in the field.

Final site positions were determined with a differential global positioning system (DGPS) and are accurate to  $\pm$  15 feet.

**Table 2-1 Upper Guadalupe River Reach 12 Sampling Areas** 

Stations	Sampling Area	Approximate Length (ft.)
961+00 to 980+00	Area 1	1,900
980+00 to 998+00	Area 2	1,800
998+00 to 1018+00	Area 3	2,000

Table 2-2: Upper Guadalupe River Reach 12 Sampling and Analysis Scheme

Sampling Area	Composite Samples	Sent to Lab	Composite Samples Laboratory Analysis	Individual Samples	Sample Depth (ft. bgs)	Individual Samples Laboratory Analysis	Sent to Lab			
				UGR-R12-2012-1-1	4.18					
	UGR-R12-2012-1			UGR-R12-2012-1-2	2.44					
Area 1		Х	Conventional, Hg	UGR-R12-2012-1-3	3.91	Conventional, Hg	X			
Aleal	UGR-R12-2012-1Z	^	Conventional, ng	UGR-R12-2012-1-4	5.80		^			
		iR-R12-2012-1Z		R12-2012-1Z	UGR-R12-2012-1-5	5.34				
							UGR-R12-2012-1-6	1.39		
				UGR-R12-2012-2-1	4.18					
	UGR-R12-2012-2			UGR-R12-2012-2-2	2.44					
Area 2		Х	Χ	Conventional, Hg	UGR-R12-2012-2-3	3.91	Conventional, Hg	x		
Area 2				UGR-R12-2012-2-4	5.80		^			
	UGR-R12-2012-2Z			UGR-R12-2012-2-5	5.34					
				UGR-R12-2012-2-6	1.39					
	UCD D12 2012 2			UGR-R12-2012-3-1	10.00					
A ** 0.0 2	UGR-R12-2012-3	X	Conventional Us	UGR-R12-2012-3-2	10.17	Conventional, Hg	Х			
Area 3	LICD D12 2012 27	Α	Conventional, Hg	UGR-R12-2012-3-3	10.17		<b>X</b>			
	UGR-R12-2012-3Z			UGR-R12-2012-3-4	6.64					

#### 2.2 Field Observations

The soil which underlays all of the sampling locations consisted of approximately 40-60 percent cobble. The cobble encountered did not resemble native cinnabar formations prevalent to the area. As such, manual drilling was not an option and an excavator was used to dig down to the required depths. The grain size and chemical analysis did not take into account the high percentage of cobbles on site. The analysis focused on the finer grained material that could be collected and sent to the lab in the specified jars. This affects the data in that the actual insitu grain size is much coarser than reported; and the concentrations of chemicals is likely biased high since the total mass present is not accounted for and organics would not be anticipated in the cobbles. Grain size analyses for all composite and individual samples are located in Appendix A.

During the sampling event temperatures within the Reach were between approximately 60-65° Fahrenheit.

#### 2.3 Field Equipment Decontamination Procedure

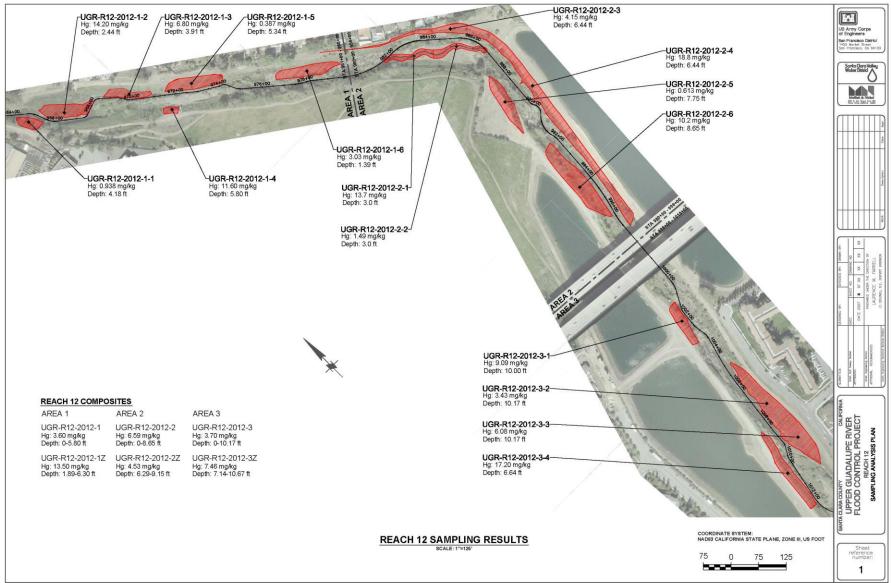
Sampling equipment used to collect the samples consisted of an excavator and a hand scoop. All equipment used for collecting, homogenizing and packaging the collected sediments, except the bucket of the excavator, were decontaminated between samples using the following procedures:

- Rinse with distilled water and wash with scrub brush until free of sediment;
- Wash with phosphate-free biodegradable soap solution; and
- Second rinse with distilled water

The bucket of the excavator was cleaned by hand as thoroughly as possible in between sample locations by scrapping off accumulated material. Regardless, all samples collected from the excavator bucket were collected from the center of the bucket, from soil which had not made any contact with the bucket itself, to prevent cross-contamination.

Any sampling equipment that could not be properly cleaned was not used for subsequent sampling activities.

Figure 2-1 Upper Guadalupe River Reach 12 Sampling Locations and Results



#### 3 SAMPLE PROCESSING

#### 3.1 Homogenization and Compositing of Sediments

Homogenization of sediment samples was performed onsite within Reach 12. Each composited sediment sample was homogenized in a stainless-steel bowl according to the composite sampling scheme identified in the SAP. In total, four, six-point composite; two, four-point composite, homogenized sediment samples; one duplicate composite; as well as sixteen individual samples were submitted to the analytical laboratory for physical and chemical analysis.

Sample labels were filled out with an indelible-ink pen and affixed to the sample containers. Each label contained the project name, sample identification number, preservation technique, requested analyses, date and time of collection and preparation, and initials of the person preparing the sample. To protect the information on the sample labels, clear tape was placed around the labeled sample containers. The sample containers were then placed into a cooler with ice and stored at  $\leq$ 4°C.

#### 3.2 Sample Shipping

Prior to shipping to the analytical laboratory, sample containers were securely packed inside a cooler with ice packs or crushed ice. A temperature blank was included in the cooler. The original signed chain-of-custody (COC) forms were placed in a sealed plastic bag and taped to the inside lid of the cooler.

Sediment samples were picked up by ADH Environmental personnel for shipment to the analytical laboratory on October 11<sup>th</sup>, 2012.

#### 3.3 Chain-of-Custody (COC) Protocol

COC procedures were followed for all samples throughout the collection, handling, and analyses activities. The Sampling and Analysis Project Manager, or a designee, was responsible for all sample tracking and COC procedures. This person was responsible for final sample inventory, maintenance of sample custody documentation, and completion of COC forms prior to transferring samples to the analytical laboratory. A COC form accompanied each cooler of samples to the respective analytical laboratories. Each custodian of the samples signed the COC form; copies of the COC forms are retained in the project file.

#### 4 ANALYTICAL AND TESTING METHODS

All analyses were conducted as per the SAP and in accordance with USACE guidelines.

#### 4.1 Sediment Analytical Chemistry Procedures

Sediment samples were collected and analyzed according to the sampling scheme outlined in the SAP and included in Table 2-2. The analytical methods and reporting limits (RL) for chemical analyses of bulk sediment are provided in Table 4-2. All sediment analytical results are presented on a dry weight basis (e.g., mg/kg, dry wt). Analyses of matrix spikes and sample duplicates were performed on the site samples. All samples were maintained according to the appropriate holding times and temperatures for each analysis as per the SAP.

Table 4-2: List of Standard Analytes, Methods, and Targeted Reporting Limits

Parameter	Analysis Method	Targeted Reporting Limit (RL) <sup>1</sup>				
Total Solids (%)	SM 2540B	+0.1				
Total Organic Carbon (%)	EPA 5310B mod or EPA 9060	+0.1				
Grain Size (%)	Plumb 1991 <sup>2</sup>	+0.1				
	Metals					
Mercury (mg/kg)	EPA 7471	0.05				
1 RLs are based on dry sample weight assuming no interferences; site-specific method modifications may be required to achieve these RLs in some cases.						
2 Plumb, RH, Jr 1981						

#### 4.2 Data Analysis

Data were analyzed and are presented clearly to determine sediment quality within Reach 12 of the Upper Guadalupe River. All analytical data were reviewed for accuracy. The chemical characteristics of sediment samples were screened against San Francisco Regional Water Quality Control Board Environmental Screening Levels (SFRWQCB ESLs) for residential and commercial/industrial use scenarios where the soil is found less than three meters below grade and where groundwater is *not* used for drinking (SFRWQCB, 2013).

#### 5 RESULTS OF LABORATORY ANALYSES

Physical and chemical analysis was performed on all composited and individual sediment samples. Sediment samples were chemically-analyzed for mercury only, and physically-analyzed for Total Solids (TS), Total Organic Carbon (TOC) and Grain Size (i.e. Conventionals) as specified in the SAP. No fine grained material was encounter in any sample analyzed for Reach 12.

The results of the chemical analyses for all analyzed samples were compared to SFRWQCB ESLs for Residential, and Commercial/Industrial use scenarios.

Initially only the composite samples were analyzed for mercury in October 2012. Results of the composite analysis showed that this portion of the project does have levels of mercury that exceed those found in reaches previously worked on. The data also did not show any clear trends. As a result, in January 2013, USACE requested that the laboratory analyze all sixteen individual samples in an effort to determine if there were in fact any trends to the mercury concentrations.

Individual mercury analysis indicated that individual samples, UGR-R12-2012-1-2, UGR-R12-2012-1-4, UGR-R12-2012-2-2, UGR-R12-2012-2-4, UGR-R12-2012-2-6, UGR-R12-2012-3-1, and UGR-R12-2012-3-4, exceeded the SFRWQCB ESLs.

Full analytical laboratory data reports for these sediments are provided in Table 5-1 below.

Table 5-1: Upper Guadalupe River Reach 12 Analytical Results

Upper Guadalupe Reach 12 Analytical Results									
		11-Oct-12							
Analyte	Analyte   UGR-R12-2012-1-1   UGR-R12-2012-1-2   UGR-R12-2012-1-3   UGR-R12-2012-1-4								
Carbon, Total Organic (%)	1.39	0.42	0.494	0.825					
Solids, Total (%)	91.6	95.7	89.9	89.9					
Grain Size (%)	Grain Size (%)								
Gravel	Gravel 28.95 22.2 43.3 27.15								
Sand	71.05	77.8	56.7	72.85					

U	Upper Guadalupe Reach 12 Analytical Results								
		11-Oct-12							
Analyte	Analyte   UGR-R12-2012-1-5   UGR-R12-2012-1-6   UGR-R12-2012-1   UGR-R12-2012-12								
Carbon, Total Organic (%)	bon, Total Organic (%) 0.158 0.774 0.863								
Solids, Total (%)	Solids, Total (%) 90.8 98.3 91.3 91.2								
Grain Size (%)	Grain Size (%)								
Gravel	Gravel 59.5 49.6 43.05								
Sand	40.5		50.4	56.95					

Upper Guadalupe Reach 12 Analytical Results									
	11-Oct-12								
Analyte	Analyte   UGR-R12-2012-2-1   UGR-R12-2012-2-2   UGR-R12-2012-2-3   UGR-R12-2012-2-4								
Carbon, Total Organic (%)	0.241	0.608	0.837	0.597					
Solids, Total (%) 97.5 97.8 92 90.9									
Grain Size (%)	Grain Size (%)								
Gravel 87.15 42.8 20.85 16.5									
Sand	12.85	57.2	79.15	83.5					

U	Upper Guadalupe Reach 12 Analytical Results								
		11-Oct-12							
Analyte   UGR-R12-2012-2-5   UGR-R12-2012-2-6   UGR-R12-2012-2   UGR-R12-2012-2Z									
Carbon, Total Organic (%)	Carbon, Total Organic (%) 0.704 0.423 0.731 0.885								
Solids, Total (%) 89 90.9 94 90									
Grain Size (%)	Grain Size (%)								
Gravel	Gravel 3.4 43.95 66.4 17.8								
Sand	96.6	56.05	33.6	82.2					

Upper Guadalupe Reach 12 Analytical Results									
	11-Oct-12								
Analyte	Analyte   UGR-R12-2012-3-1   UGR-R12-2012-3-2   UGR-R12-2012-3-3   UGR-R12-2012-3-4								
Carbon, Total Organic (%)	0.416	0.171	0.261	0.846					
Solids, Total (%)	93.5	87.3	88.5	93.2					
Grain Size (%)									
Gravel	46.95	51.3	57.95	13					
Sand	53.05	48.7	42.05	87					

Upper Guada							
	11-Oct-12						
Analyte	Analyte UGR-R12-2012-3 UGR-R12-2012-3Z						
Carbon, Total Organic (%)	Carbon, Total Organic (%) 0.395 0.541						
Solids, Total (%)	88.6	81.2					
Grain Size (%)							
Gravel	Gravel 50.55 44.65						
Sand	49.45	55.35					

	Upp	oer Guadalupe R	each 12 Anal	ytical Results			
Analyte	SFRWQCB ESLs (Residential)	SFRWQCB ESLs (Commercial/Industrial)	UGR-R12-2012-1-6	UGR-R12-2012-1	UGR-R12-2012-1Z	UGR-R12-2012-2-1	UGR-R12-2012-2-2
Mercury (mg/kg)	6.70	10.00	3.03	3.60	13.5	1.49	13.7
Exceeds SFRWQCB Residential ESLs							
Exceeds SFRWQCB Commercial/Industrial ESLs							
Above Detection Limits							
	Upp	per Guadalupe R		ytical Results			
A I. 4 -	SFRWQCB ESLs	SFRWQCB ESLs	11-Oct-12				
Analyte	(Residential)	(Commercial/Industrial)	UGR-R12-2012-2-3	UGR-R12-2012-2-4	UGR-R12-2012-2-5	UGR-R12-2012-2-6	UGR-R12-2012-2
Mercury (mg/kg)	6.70	10.00	4.15	18.8	0.613	10.2	6.59
Exceeds SFRWQCB Residential ESLs Exceeds SFRWQCB Commercial/Industrial ESLs							
Above Detection Limits							
	Upp	per Guadalupe R		ytical Results			
	SFRWQCB ESLs	SFRWQCB ESLs	11-Oct-12				
Analyte	(Residential)	(Commercial/Industrial)	UGR-R12-2012-2Z	UGR-R12-2012-3-1	UGR-R12-2012-3-2	UGR-R12-2012-3-3	UGR-R12-2012-3-4
Mercury (mg/kg)	6.70	10.00	4.53	9.09	3.43	6.08	17.2
Exceeds SFRWQCB Residential ESLs Exceeds SFRWQCB Commercial/Industrial ESLs Above Detection Limits							
Upper Gua	adalupe Reach	12 Analytical R	esults				
Analyte	SFRWQCB ESLs (Residential)	SFRWQCB ESLs (Commercial/Industrial)	UGR-R12-2012-3	UGR-R12-2012-3Z			
Mercury (mg/kg)	6.70	10.00	3.7	7.46			
Exceeds SFRWQCB Residential ESLs Exceeds SFRWQCB Commercial/Industrial ESLs Above Detection Limits							
			16				

## 6 LABORATORY QUALITY CONTROL/QUALITY ASSURANCE

Provided below is a narrative of the analytical effort, including any unique features or anomalies encountered as part of the analysis of the sediment samples.

All analyses were performed consistent with the quality assurance program of ALS Environmental.

#### 6.1 Composite Sample Analysis

**Sample Receipt-** Twenty three sediment samples were received for analysis at ALS Environmental on October 16, 2012. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at  $4^{\circ}$ C and frozen at  $-20^{\circ}$ C upon receipt at the laboratory.

General Comments- The DoD QSM 4.2 requires detections reported to the Method Detection Limit (MDL). Values greater than the MDL and less than the Limit of Quantitation (LOQ) were flagged as estimates (J). Values less than the MDL and Limit of Detection (LOD) were reported as non-detect (ND). The LOD for each analyte is verified quarterly by the laboratory using procedures defined in Grey Box D-13 of the DoD Quality Systems Manual Version 4.2.

The Limit of Quantitation (LOQ) is verified quarterly for each analyte using procedures defined in Grey Box D-14 of the DoD Quality Systems Manual Version 4.2.

General Chemistry Parameters-No anomalies associated with the analysis of these samples were observed.

**Matrix Spike Recovery Exceptions**- The control criteria for matrix spike and matrix spike duplicate recoveries of Mercury for sample UGR-R12-2012-1 were not applicable. The analyzed concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

No other anomalies associated with the analysis of these samples were observed.

#### 6.2 Individual Sample Analysis

All analyses were performed consistent with the quality assurance program of ALS Environmental.

**Sample Receipt-** On January 14, 2013 Christian Kocher with ADH Environmental, Inc. requested that sixteen frozen archived samples be tested for Mercury, TOC, Total Solids and Particle Size Distribution.

General Comments-The DoD QSM 4.2 requires detections reported to the Method Detection Limit (MDL). Values greater than the MDL and less than the Limit of Quantitation (LOQ) were flagged as estimates (J). Values less than the MDL and Limit of Detection (LOD) were reported as non-detect (ND). The LOD for each analyte is verified quarterly by the laboratory using procedures defined in Grey Box D-13 of the DoD Quality Systems Manual Version 4.2. The Limit of Quantitation (LOQ) is verified quarterly for each analyte using procedures defined in Grey Box D-14 of the DoD Quality Systems Manual Version 4.2. General Chemistry Parameters

Particle Size- Samples were previously frozen prior to analyses

**Total Organic Carbon by PSEP-** All samples were reissued past holding time. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

No other anomalies associated with the analysis of these samples were observed.

**Matrix Spike Recovery Exceptions-** The control criteria for matrix spike and matrix spike duplicate recoveries of Mercury for sample UGR-R12-2012-1-2 were not applicable. The analyzed concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

No other anomalies associated with the analysis of these samples were observed.

#### 7 SUMMARY

A summary of the laboratory physical and chemistry analytical results from the sampling effort is presented below. Appendix A provides the analytical results discussed below.

#### 7.1 Conventionals

Based on the grain size results, Area 2 samples had a higher percentage of gravel (51 percent) than Areas 1 and 3 (36 percent and 42 percent, respectively). Area 1 had the highest average percentage of sand (64 percent), while sand content in Areas 2 and 3 were 49 and 58 percent, respectively. Silt and clay-like soils were not encountered anywhere within Reach 12 during sampling.

With respect to total organic carbon, percentages across Areas 1, 2 and 3 ranged from 0.171-0.774.

With respect to total solids, percentages across all sampling areas ranged from 88.5-98.0

#### 7.2 Mercury

Concentrations of mercury were detected above the laboratory detection limits in all samples analyzed.

Concentrations of mercury, 6.8-18.8 mg/kg, exceeding SFRWQCB ESLs, were detected in samples UGR-R12-2012-1-2, UGR-R12-2012-1-3, UGR-R12-2012-1-4, UGR-R12-2012-1Z, UGR-R12-2012-2-2, UGR-R12-2012-2-4, UGR-R12-2012-2-6, UGR-R12-2012-3-1, UGR-R12-2012-3-4, and UGR-R12-2012-3Z.

#### 7.3 Conclusions

In general the samples from Reach 12 that were analyzed had higher mercury concentrations than those from other downstream reaches of this project. The cobbles encountered in Reach 12 did not appear to be directly from the cinnabar formation. For this reason the USACE believes that the source of mercury is further upstream where the historic mercury mines are located. Over time the mercury has migrated downstream from the historic mining areas.

The amount of cobble present affects the relationship of the sample concentrations to the true onsite concentrations of mercury on a mass basis. The sampling was focused on the smaller grain sized particles that would fit into the sample jars and did not account for the mass of cobbles within the matrix. The concentration of cobbles did not appear to be from the cinnabar formation and they were estimated to make up 40 to 60 % of the soil matrix. This leads to reported concentrations which are biased high from true on site mass comparisons.

Twelve of the 22 samples analyzed met the SFRWQCB Residential ESLs. Of the ten that did not meet this criterion only seven also did not meet the SFRWQCB Commercial/Industrial ESL. The project area is not being used for residential nor commercial/industrial activities; however this does provide some comparison to established values for these uses. If the cobbles mentioned above are taken into consideration, then all concentration likely meet the criterion for commercial/industrial use. The USACE believes that the exposure for recreational uses would be less than for commercial/industrial uses and therefore these values would also be protective of recreational users.

While there is variability in the results from the 22 analyzed samples; there were no real trends present. In some cases the material at depth had higher concentrations than the overlying material. In some cases, the highest concentrations were located adjacent to some of the lowest concentrations. The USACE believes that the sampling did not show any true source areas to be avoided, but rather showed results that are likely representative of the rocky heterogeneous nature of the project site.

USACE does believe that on site soils can be reused in a prudent manor to minimize future exposure of mercury to species that will inhabit the site. The sampling data indicates that a majority of the on-site soils contain mercury concentration below 10 mg/kg. The USACE believes that this range represents the cleaner soils present in this reach of the project. Only two of the 22 samples analyzed were greater than 15 mg/kg and the USACE believes that this represents the higher concentrations present in this reach of the project.

Prudent measures can be implemented that would lessen mercury exposures. First, use soils with lower concentrations, less than 10 mg/kg, for surface soils in areas of the low flow channel. Next use those soils with concentrations from 10 mg/kg to 15 mg/kg in areas that are more than 20 feet from the low flow channel or where there is at least 2 feet of cover by cleaner material. Then use soils with concentration greater than 15 mg/kg but less than 20 mg/kg only in areas above the 3 year flood level.

#### 8 DEVIATIONS FROM SAP

The following describes deviations from the approved SAP for Upper Guadalupe River Reach 12.

• Due to the locations of samples UGR-R12-2012-2-1 and 2-2, excavator access was not possible. Thus, both boreholes were advanced manually with a shovel and post-hole digger. Samples were still collected with a metal scoop. However, due to the need for manual drilling, both boreholes could only be advanced to 3 feet bgs rather than the required 5.79 feet bgs outlined in the SAP. Thus, Z-layers samples from these boreholes were not included in the composite Z-layer samples UGR-R12-2012-2 and only material down to 3 feet bgs from both boreholes was included in composite UGR-R12-2012-2.

#### 9 REFERENCES

SFRWQCB (2013) Screening Levels For Environmental Concerns at Sites with Contaminated Soil and. San Francisco Regional Water Quality Control Board, Oakland, CA, February 2013.

USACE (2012) Upper Guadalupe River Reach 12 Sampling and Analysis Plan, February 2012. U.S. Army Corps of Engineers San Francisco District, Engineering and Technical Services Division Planning Branch, Environmental Section A.

#### Appendix A

Laboratory Analytical Report



November 1, 2012

Analytical Report for Service Request No: K1210451

Christian Kocher ADH Environmental Inc. 3065 Porter St Suite 101 Soquel, CA 95073

**RE:** ACOE Upper Guad. River Reach 12

Dear Christian:

Enclosed are the results of the samples submitted to our laboratory on October 16, 2012. For your reference, these analyses have been assigned our service request number K1210451.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at <a href="https://www.caslab.com">www.caslab.com</a>. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3363. You may also contact me via Email at Lisa.Domenighini@alsglobal.com.

Respectfully submitted,

Columbia Analytical Services, Inc. dba ALS Environmental

Lisa Domenighini

Project Manager

LD/jw Page 1 of 60



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PHONE +1 360 577 7222 FAX +1 360 636 1068
Columbia Analytical Services, Inc.
Part of the ALS Group A Campbell Brothers Limited Company

#### TABLE OF CONTENTS

- 1. Acronyms
- 2. Data Qualifiers
- 3. State Certifications, Accreditations & Licenses
- 4. Case Narrative
- 5. Chain of Custody
- 6. Total Solids
- 7. General Chemistry
- 8. Metals

#### **Acronyms**

ASTM American Society for Testing and Materials

A2LA American Association for Laboratory Accreditation

CARB California Air Resources Board

CAS Number Chemical Abstract Service registry Number

CFC Chlorofluorocarbon
CFU Colony-Forming Unit

DEC Department of Environmental Conservation

DEQ Department of Environmental Quality

DHS Department of Health Services

DOE Department of Ecology
DOH Department of Health

EPA U. S. Environmental Protection Agency

ELAP Environmental Laboratory Accreditation Program

GC Gas Chromatography

GC/MS Gas Chromatography/Mass Spectrometry

LOD Limit of Detection
LOQ Limit of Quantitation

LUFT Leaking Underground Fuel Tank

M Modified

MCL Maximum Contaminant Level is the highest permissible concentration of a substance

allowed in drinking water as established by the USEPA.

MDL Method Detection Limit
MPN Most Probable Number
MRL Method Reporting Limit

NA Not Applicable
NC Not Calculated

NCASI National Council of the Paper Industry for Air and Stream Improvement

ND Not Detected

NIOSH National Institute for Occupational Safety and Health

PQL Practical Quantitation Limit

RCRA Resource Conservation and Recovery Act

SIM Selected Ion Monitoring

TPH Total Petroleum Hydrocarbons

tr Trace level is the concentration of an analyte that is less than the PQL but greater

than or equal to the MDL.

#### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition: Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

#### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. DOD-QSM 4.2 definition: Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition: Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- $\boldsymbol{Q}$   $\;\;$  See case narrative. One or more quality control criteria was outside the limits.

#### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

## Columbia Analytical Services, Inc. dba ALS Environmental (ALS) - Kelso State Certifications, Accreditations, and Licenses

Web Site	Number
http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
http://www.azdhs.gov/lab/license/env.htm	AZ0339
http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Not available	1
http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
-	C-WA-01
http://www.pjlabs.com/	L12-27
http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
	LA110003
Not available	WA0035
http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156,00.html	9949
http://www.health.state.mn.us/accreditation	053-999-368
http://www.dphhs.mt.gov/publichealth/	CERT0047
http://ndep.nv.gov/bsdw/labservice.htm	WA35
http://www.nj.gov/dep/oqa/	WA005
http://www.nmenv.state.nm.us/dwb/Index.htm	_
http://www.dwqlab.org/	605
http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
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http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	1704427-08-TX
http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
http://dnr.wi.gov/	998386840
http://www.epa.gov/region8/water/dwhome/wyomingdi.html	
www.caslab.com	NA
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Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

#### ALS ENVIRONMENTAL

Client: ADH Environmental Inc. Service Request No.: K1210451

Project: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Sample Matrix: Sediment

#### **CASE NARRATIVE**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier III deliverables including summary forms for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt

Twenty three sediment samples were received for analysis at ALS Environmental on 10/16/12. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at  $4^{\circ}$ C and frozen at  $-20^{\circ}$ C upon receipt at the laboratory.

#### **General Comments:**

The DoD QSM 4.2 requires detections reported to the Method Detection Limit (MDL). Values greater than the MDL and less than the Limit of Quantitation (LOQ) were flagged as estimates (J). Values less than the MDL and Limit of Detection (LOD) were reported as non-detect (ND). The LOD for each analyte is verified quarterly by the laboratory using procedures defined in Grey Box D-13 of the DoD Quality Systems Manual Version 4.2.

The Limit of Quantitation (LOQ) is verified quarterly for each analyte using procedures defined in Grey Box D-14 of the DoD Quality Systems Manual Version 4.2.

#### **General Chemistry Parameters**

No anomalies associated with the analysis of these samples were observed.

#### **Total Metals**

#### **Matrix Spike Recovery Exceptions:**

The control criteria for matrix spike and matrix spike duplicate recoveries of Mercury for sample UGR-R12-2012-1 were not applicable. The analyzed concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

No other anomalies associated with the analysis of these samples were observed.

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Cooler Receipt and Preservation Form

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PC	Texe	٤

Client / F	roject:	Ast						Ser	vice Re	quest <b>K</b>	(12/	04/5	5/		
Received	: 10/116/1	2(	Opened:_	10/11	12/12	-	Ву:	a	<u> </u>	Jnload	ed:	10/16/12	By:	<u> </u>	1
1. Samp	les were rece	eived via?	Mail	Fed Ex	Œ	IPS)	DE	IL .	PDX	Couri	er Ho	and Deliver	ed .	tought.	
2. Samp	les were rece	eived in: (cir	cle)	Cooler	) Be	0X	Enve	lope	Oth	ier	•			NA.	
3. Were	custody seal	s on coolers	?	NA	Υ (	N)	Ii	yes, h	ow many	y and w	here?				
If pre	sent, were cu	istody seals i	intact?	8	Y	N		If pre	esent, we	re they	signed a	nd dated?		Y	N
Raw Temp	Corr. Temp	Raw Blank	Corr. Blank	Corr. Factor		ermon ID	neter	Cool	er/COC II	) NA		Tracking	) Numbe	1. A	NA Filed
-0,2	-0.2	1.2	1.2	0.0		19				·	<u> </u>	98570	1 <u>3</u>	***************************************	
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7. Packi	ng material:	Inserts E	Baggies $<$	Bubble N	(rap)	Gel P	acks	Wet 1	ce Dry	Ice .	Sleeves				
8. Were	custody pap	ers properly	filled out	(ink, signe	ed, etc.	.)?						·	NA	(Y)	N
9. Did a	ll bottles arri	ve in good c	ondition (1	unbroken)	? Ind	licate i	in the t	able be	elow.				NA		N
10. Were	all sample l	abels comple	ete (i.e ana	alysis, pre	servati	on, etc	c.)?						NA		N
	Il sample lat			-				-	_	cies in i	the table	on page 2.	NA	$\sim$	(N)
	appropriate												ŅA	The country	N
	the pH-pres	•	,		-		-		ate pH?	Indicate	e in the to	able below	NA	. Y	N
	VOA vials		hout heads	space? Ind	dicate	in the	table t	elow.					(NA	. Y	N
15. Was	C12/Res neg	ative?	and and and and and	A = 108/JA/10 70 54	Quita Natio	Na santaka sa	Sala Galler	to crelitar Missler	434.387.1	andri Pilas <sup>a</sup>	1 2 48 Ta - 14 Ta	i ilgalija pistore lengti		Y	N
	Sample ID o	n Bottle			Samp	le ID o	n COC					Identified b	y:		
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4 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	Control to the Arms	Open Web 47,655 Orac Cotol egg	Bottle		Out of			(j. 1.1.)			Volume	Reagent			
	Sample ID		Bottle	Type	Temp	space	Broke	рН	Reag	gent	added	Numbe	r	Initials	Time
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**Cooler Receipt and Preservation Form** 

Client / Pr	roject: A	DH				cespe .				equest		104	151		
Received:	10118	slia	Opened:	10 (1	8/18	<u>2</u> )	Ву:	BT		Unloa	ded:10	118/12	By:	51	
. Sampl	es were rece	eived via?	Mail	Fed Ex	Ţ.	(PS)	DH	IL .	PDX	Cour	rier Ha	nd Delivered			
2. Sampl	es were rece	eived in: (c	ircle)	Cooler		ox	Enve	elope	0	ther				NA	
3. Were	custody seal	s on cooler	rs?	NA	Y	<b>(3)</b>	If	f yes, h	ow ma	ny and	where?			-a-va	
If pres	ent, were cu	stody seals	s intact?		Y	N		If pre	esent, v	ere the	y signed an	d dated?		Y	N
Raw Temp	Corr. Temp	Raw Blank	Corr. Blank	Corr. Factor		nermom ID	eter	Cool	er/COC	ID (NA)		Tracking N	umbei		NA File
0.9	0.6	4.3	4.0	-0.3	3	15					J229	988.	7_1	00	
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7. Packir	ng material:	Inserts	Baggies	Bubble V	Vrap	Gel P	acks	Wet 1	ce D	ry Ice	Sleeves				
B. Were	custody pap	ers properl	y filled out	(ink, signe	ed, etc	.)?						•	NA	E	) N
Did al	l bottles arri	ve in good	condition (	unbroken)	)? Inc	dicate i	n the t	able be	elow.				NA	Ŷ	N
0. Were	all sample l	abels comp	olete (i.e an	alysis, pre	servat	ion, etc	:.)?						NA	$\bigcirc$	N
1. Did a	ll sample lab	oels and tag	gs agree wit	h custody	paper	s? Indi	icate n	ıajor d	liscrepo	ıncies ir	the table o	on page 2.	NA	<b>(Y)</b>	N
2. Were	appropriate	bottles/cor	ntainers and	volumes	receiv	ed for	the tes	ts indic	cated?				NA	Y	N
3. Were	the pH-pres	erved bottl	es ( <i>see SMC</i>	GEN SOP	) rece	ived at	the ap	propri	ate pH?	Indica	te in the ta	ble below	MA	Y	N
14. Were	VOA vials	received w	ithout head	space? In	dicate	in the	table b	elow.					XA	Y	N
15. Was (	C12/Res neg	ative?											MA	Y	N
al de la contraction de la con	Sample ID o	n Bottle			Samp	ole ID or	n COC					Identified by:		2 (10 to 10	
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### ${\bf COLUMBIA\ ANALYTICAL\ SERVICES, INC.}$

Now part of the ALS Group

Analytical Results

Client: ADH Environmental Inc. Service Request: K1210451

**Project:** ACOE Upper Guad. River Reach 12

Sample Matrix: Sediment

**Total Solids** 

Prep Method:NONEUnits:PERCENTAnalysis Method:160.3MBasis:Wet

Test Notes:

Sample Name	Lab Code	Date Collected	Date Received	Date Analyzed	Result	Result Notes
Sample Name	Lab Code	Concettu	Received	Amaryzeu	Result	riotes
UGR-R12-2012-1	K1210451-001	10/11/2012	10/16/2012	10/26/2012	91.3	
UGR-R12-2012-1Z	K1210451-002	10/11/2012	10/16/2012	10/26/2012	91.2	
UGR-R12-2012-2	K1210451-003	10/11/2012	10/16/2012	10/26/2012	94.0	
UGR-R12-2012-2Z	K1210451-004	10/11/2012	10/16/2012	10/26/2012	90.0	
UGR-R12-2012-3	K1210451-005	10/11/2012	10/16/2012	10/26/2012	88.6	
UGR-R12-2012-3Z	K1210451-006	10/11/2012	10/16/2012	10/26/2012	81.2	
UGR-R12-2012-DUP-1	K1210451-007	10/11/2012	10/16/2012	10/26/2012	87.6	

Now part of the ALS Group

QA/QC Report

Client: ADH Environmental Inc.

**Project:** ACOE Upper Guad. River Reach 12

Sample Matrix: Sediment

**Service Request:** K1210451 **Date Collected:** 10/11/2012 **Date Received:** 10/16/2012

**Date Analyzed:** 10/26/2012

**Duplicate Sample Summary** 

**Total Solids** 

Prep Method: Analysis Method: NONE 160.3M Units: PERCENT

Basis: Wet

**Test Notes:** 

**Duplicate** Relative Sample Percent Sample Result Result Difference Lab Code Result Notes Sample Name Average 91.3 UGR-R12-2012-1 K1210451-001 91.3 91.3 <1

Printed: 10/29/2012 13:45
u:\Stealth\Crystal.rpt\Solids.rpt

13

SuperSet Reference: W1212810

### Analytical Report

Client:ADH Environmental Inc.Service Request:K1210451Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 10/26/2012

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-1 Lab Code: K1210451-001

Sand Fraction:Dry Weight (Grams)35.7117Sand Fraction:Weight Recovered (Grams)35.7614Sand Fraction:Percent Recovery100.14

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	19.9923	49.62
Very Coarse Sand	-1 to 0 Ø	3.8596	9.58
Coarse Sand	0 to 1 Ø	3.7045	9.19
Medium Sand	1 to 2 Ø	4.1058	10.19
Fine Sand	2 to 3 Ø	2.9052	7.21
Very Fine Sand	3 to 4 Ø	1.1143	2.77
62.5 μm	4 to 5 Ø	1.2100	3.00
31.3 µm	5 to 6 Ø	0.4500	1.12
15.6 µm	6 to 7 Ø	0.8000	1.99
7.8 µm	7 to 8 Ø	0.4550	1.13
3.9 µm	8 to 9 Ø	0.4900	1.22
1.95 μm	9 to 10 Ø	0.3550	0.88
0.98 µm	> 10 Ø	1.2800	3.18
		40.7217	101.07

### Analytical Report

Client:ADH Environmental Inc.Service Request:K1210451Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 10/26/2012

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-1Z Lab Code: K1210451-002

Sand Fraction:Dry Weight (Grams)30.7451Sand Fraction:Weight Recovered (Grams)30.7357Sand Fraction:Percent Recovery99.97

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	15.1696	43.04
Very Coarse Sand	-1 to 0 Ø	3.4098	9.67
Coarse Sand	0 to 1 Ø	3.3591	9.53
Medium Sand	1 to 2 Ø	4.9430	14.02
Fine Sand	2 to 3 Ø	2.7304	7.75
Very Fine Sand	3 to 4 Ø	1.0303	2.92
62.5 μm	4 to 5 Ø	1.1500	3.26
31.3 µm	5 to 6 Ø	0.6200	1.76
15.6 µm	6 to 7 Ø	0.5200	1.48
7.8 µm	7 to 8 Ø	0.5650	1.60
3.9 µm	8 to 9 Ø	0.3400	0.96
1.95 μm	9 to 10 Ø	0.3550	1.01
0.98 µm	> 10 Ø	1.0850	3.08
		35.2772	100.09

### Analytical Report

Client:ADH Environmental Inc.Service Request:K1210451Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 10/26/2012

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-2 Lab Code: K1210451-003

Sand Fraction:Dry Weight (Grams)33.3859Sand Fraction:Weight Recovered (Grams)33.4404Sand Fraction:Percent Recovery100.16

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	23.6658	66.37
Very Coarse Sand	-1 to 0 Ø	2.3507	6.59
Coarse Sand	0 to 1 Ø	2.1225	5.95
Medium Sand	1 to 2 Ø	2.1360	5.99
Fine Sand	2 to 3 Ø	1.9648	5.51
Very Fine Sand	3 to 4 Ø	1.0297	2.89
62.5 μm	4 to 5 Ø	0.9550	2.68
31.3 µm	5 to 6 Ø	0.5150	1.44
15.6 μm	6 to 7 Ø	0.2850	0.80
7.8 µm	7 to 8 Ø	0.2050	0.57
3.9 µm	8 to 9 Ø	0.2100	0.59
1.95 μm	9 to 10 Ø	0.1400	0.39
0.98 µm	> 10 Ø	0.6550	1.84
		36.2345	101.63

### Analytical Report

Client:ADH Environmental Inc.Service Request:K1210451Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012Date Analyzed:10/26/2012

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-2Z Lab Code: K1210451-004

Sand Fraction:Dry Weight (Grams)14.2783Sand Fraction:Weight Recovered (Grams)14.3974Sand Fraction:Percent Recovery100.83

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered	
Gravel	<-1 Ø	4.4354	17.83	
Very Coarse Sand	-1 to 0 Ø	1.6275	6.54	
Coarse Sand	0 to 1 Ø	1.6346	6.57	
Medium Sand	1 to 2 Ø	2.0216	8.13	
Fine Sand	2 to 3 Ø	2.5808	10.37	
Very Fine Sand	3 to 4 Ø	1.8972	7.63	
62.5 μm	4 to 5 Ø	2.6650	10.71	
31.3 µm	5 to 6 Ø	1.7650	7.09	
15.6 μm	6 to 7 Ø	1.7700	7.11	
7.8 µm	7 to 8 Ø	1.1400	4.58	
3.9 µm	8 to 9 Ø	0.9900	3.98	
1.95 μm	9 to 10 Ø	0.6250	2.51	
0.98 μm	> 10 Ø	1.5700	6.31	
		24.7221	99.36	

### Analytical Report

Client:ADH Environmental Inc.Service Request:K1210451Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Received:** 10/16/2012 **Date Analyzed:** 10/26/2012

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-3 Lab Code: K1210451-005

Sand Fraction:Dry Weight (Grams)32.8488Sand Fraction:Weight Recovered (Grams)32.9547Sand Fraction:Percent Recovery100.32

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	19.0207	50.53
Very Coarse Sand	-1 to 0 Ø	5.2358	13.91
Coarse Sand	0 to 1 Ø	3.4861	9.26
Medium Sand	1 to 2 Ø	2.7898	7.41
Fine Sand	2 to 3 Ø	1.6109	4.28
Very Fine Sand	3 to 4 Ø	0.6648	1.77
62.5 μm	4 to 5 Ø	1.0250	2.72
31.3 µm	5 to 6 Ø	0.5450	1.45
15.6 μm	6 to 7 Ø	0.7150	1.90
7.8 µm	7 to 8 Ø	0.5150	1.37
3.9 µm	8 to 9 Ø	0.4600	1.22
1.95 μm	9 to 10 Ø	0.5100	1.35
0.98 μm	> 10 Ø	1.6950	4.50
		38.2731	101.67

### Analytical Report

Client:ADH Environmental Inc.Service Request:K1210451Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 10/26/2012

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-3Z Lab Code: K1210451-006

Sand Fraction:Dry Weight (Grams)24.3020Sand Fraction:Weight Recovered (Grams)24.3701Sand Fraction:Percent Recovery100.28

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	13.7417	44.64
Very Coarse Sand	-1 to 0 Ø	3.5622	11.57
Coarse Sand	0 to 1 Ø	2.4751	8.04
Medium Sand	1 to 2 Ø	2.0980	6.82
Fine Sand	2 to 3 Ø	1.6114	5.24
Very Fine Sand	3 to 4 Ø	0.8435	2.74
62.5 μm	4 to 5 Ø	1.2500	4.06
31.3 µm	5 to 6 Ø	0.7250	2.36
15.6 μm	6 to 7 Ø	0.9500	3.09
7.8 µm	7 to 8 Ø	0.5850	1.90
3.9 µm	8 to 9 Ø	0.5850	1.90
1.95 μm	9 to 10 Ø	0.6050	1.97
0.98 µm	> 10 Ø	2.2550	7.33
		31.2869	101.64

### Analytical Report

Client:ADH Environmental Inc.Service Request:K1210451Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012Date Analyzed:10/26/2012

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-DUP-1

Lab Code: K1210451-007

Sand Fraction:Dry Weight (Grams)36.9878Sand Fraction:Weight Recovered (Grams)37.0715Sand Fraction:Percent Recovery100.23

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	23.7963	59.49
Very Coarse Sand	-1 to 0 Ø	5.1045	12.76
Coarse Sand	0 to 1 Ø	3.2293	8.07
Medium Sand	1 to 2 Ø	2.6549	6.64
Fine Sand	2 to 3 Ø	1.5261	3.82
Very Fine Sand	3 to 4 Ø	0.6307	1.58
62.5 μm	4 to 5 Ø	0.8350	2.09
31.3 µm	5 to 6 Ø	0.4300	1.07
15.6 μm	6 to 7 Ø	0.5650	1.41
7.8 µm	7 to 8 Ø	0.3950	0.99
3.9 µm	8 to 9 Ø	0.3600	0.90
1.95 μm	9 to 10 Ø	0.3850	0.96
0.98 µm	> 10 Ø	1.4800	3.70
		41.3918	103.48

### Analytical Report

Client:ADH Environmental Inc.Service Request:K1210451Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012Date Analyzed:10/26/2012

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-DUP-1 Lab Code: K1210451-007DUP

Sand Fraction:Dry Weight (Grams)38.7866Sand Fraction:Weight Recovered (Grams)38.8673Sand Fraction:Percent Recovery100.21

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	25.8256	60.95
Very Coarse Sand	-1 to 0 Ø	4.8299	11.40
Coarse Sand	0 to 1 Ø	3.0883	7.29
Medium Sand	1 to 2 Ø	2.7080	6.39
Fine Sand	2 to 3 Ø	1.6089	3.80
Very Fine Sand	3 to 4 Ø	0.6860	1.62
62.5 μm	4 to 5 Ø	0.8850	2.09
31.3 µm	5 to 6 Ø	0.4500	1.06
15.6 μm	6 to 7 Ø	0.5900	1.39
7.8 µm	7 to 8 Ø	0.3300	0.78
3.9 µm	8 to 9 Ø	0.4050	0.96
1.95 μm	9 to 10 Ø	0.4300	1.01
0.98 μm	> 10 Ø	1.4000	3.30
		43.2367	102.04

### Analytical Report

Client:ADH Environmental Inc.Service Request:K1210451Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012Date Analyzed:10/26/2012

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-DUP-1 Lab Code: K1210451-007TRP

Sand Fraction:Dry Weight (Grams)35.5220Sand Fraction:Weight Recovered (Grams)35.6633Sand Fraction:Percent Recovery100.40

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	21.2218	54.69
Very Coarse Sand	-1 to 0 Ø	5.3625	13.82
Coarse Sand	0 to 1 Ø	3.6566	9.42
Medium Sand	1 to 2 Ø	2.9185	7.52
Fine Sand	2 to 3 Ø	1.6061	4.14
Very Fine Sand	3 to 4 Ø	0.6711	1.73
62.5 μm	4 to 5 Ø	0.6600	1.70
31.3 µm	5 to 6 Ø	0.4450	1.15
15.6 µm	6 to 7 Ø	0.4300	1.11
7.8 µm	7 to 8 Ø	0.3950	1.02
3.9 µm	8 to 9 Ø	0.2400	0.62
1.95 μm	9 to 10 Ø	0.3650	0.94
0.98 µm	> 10 Ø	1.3800	3.56
		39.3516	101.42

Now part of the ALS Group

### Analytical Report

**Client:** ADH Environmental Inc.

**Project:** 

Service Request: K1210451 **Date Collected:** 10/11/12 ACOE Upper Guad. River Reach 12

**Date Received:** 10/16/12 **Sample Matrix:** Sediment

**Analysis Method:** ASTM D4129-05 Modified Units: Percent

**Prep Method:** CAS SOP Basis: Dry, per Method

### Carbon, Total Organic (TOC)

							Date	Date	
Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Analyzed	Extracted	Q
UGR-R12-2012-1	K1210451-001	0.774	0.050	0.020	0.020	1	10/26/12	10/19/12	
UGR-R12-2012-1Z	K1210451-002	0.863	0.050	0.020	0.020	1	10/26/12	10/19/12	
UGR-R12-2012-2	K1210451-003	0.731	0.050	0.020	0.020	1	10/26/12	10/19/12	
UGR-R12-2012-2Z	K1210451-004	0.885	0.050	0.020	0.020	1	10/26/12	10/19/12	
UGR-R12-2012-3	K1210451-005	0.395	0.050	0.020	0.020	1	10/26/12	10/19/12	
UGR-R12-2012-3Z	K1210451-006	0.541	0.050	0.020	0.020	1	10/26/12	10/19/12	
UGR-R12-2012-DUP-1	K1210451-007	0.325	0.050	0.020	0.020	1	10/26/12	10/19/12	
Method Blank	K1210451-MB	ND U	0.050	0.020	0.020	1	10/26/12		

Now part of the ALS Group

QA/QC Report

Client: ADH Environmental Inc. Service Request: K1210451 Project ACOE Upper Guad. River Reach 12 **Date Collected:** 10/11/12

Sample Matrix: Sediment **Date Received:** 10/16/12

**Date Analyzed:** 10/26/12

**Replicate Sample Summary General Chemistry Parameters** 

Sample Name: Units: Percent UGR-R12-2012-2Z

Lab Code: K1210451-004 Basis: Dry, per Method

> **Duplicate** Sample K1210451-

004DUP Sample

**RPD Analysis Method** Result Analyte Name LOQ LOD Result **RPD** Limit Average Carbon, Total Organic (TOC) ASTM D4129-05 Modified 0.050 0.885 0.855 0.870

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Now part of the ALS Group

QA/QC Report

Client: ADH Environmental Inc.

ACOE Upper Guad. River Reach 12

Sample Matrix: Sediment

**Project:** 

Lab Code:

Service Request:K1210451

**Date Collected:**10/11/12

**Date Received:** 10/16/12 **Date Analyzed:** 10/26/12

**Date Extracted:**10/19/12

Duplicate Matrix Spike Summary Carbon, Total Organic (TOC)

Sample Name: UGR-R12-2012-2Z

K1210451-004

Basis:Dry, per Method

Units:Percent

**Analysis Method:** ASTM D4129-05 Modified

**Prep Method:** CAS SOP

Matrix Spike K1210451-004MS **Duplicate Matrix Spike** 

K1210451-004DMS

	Sample		Spike			Spike		% Rec		RPD
Analyte Name	Result	Result	Amount	% Rec	Result	Amount	% Rec	Limits	RPD	Limit
Carbon, Total Organic (TOC)	0.885	4.29	3.54	96	4.55	3.73	98	70-122	2	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Now part of the ALS Group

QA/QC Report

Client: ADH Environmental Inc.

ACOE Upper Guad. River Reach 12 Date Analyzed: 10/26/12

Sample Matrix: Sediment

**Project:** 

**Lab Control Sample Summary Carbon, Total Organic (TOC)** 

Analysis Method: ASTM D4129-05 Modified Units:Percent

Basis: Dry, per Method

**Analysis Lot:**315743

Service Request:K1210451

			Spike		% Rec
Sample Name	Lab Code	Result	Amount	% Rec	Limits
Lab Control Sample	K1210451-LCS	0.248	0.280	88	72-122

Now part of the ALS Group

QA/QC Report

Client: ADH Environmental Inc. Service Request: K1210451

**Project:** ACOE Upper Guad. River Reach 12

### **Continuing Calibration Verification (CCV) Summary**

### Carbon, Total Organic (TOC)

Analysis Method: ASTM D4129-05 Modified Units: Percent

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
CCV1	315743	KQ1212674-01	10/26/12 09:20	20.0	19.5	98	90-110
CCV2	315743	KQ1212674-02	10/26/12 09:20	20.0	19.5	97	90-110
CCV3	315743	KQ1212674-03	10/26/12 09:20	20.0	19.7	99	90-110

Now part of the ALS Group

QA/QC Report

Client: ADH Environmental Inc. Service Request:K1210451

**Project:** ACOE Upper Guad. River Reach 12

## Continuing Calibration Blank (CCB) Summary Carbon, Total Organic (TOC)

Analysis Method: ASTM D4129-05 Modified Units:Percent

	Analysis		Date						
	Lot	Lab Code	Analyzed	LOQ	LOD	MDL	Result	Q	
CCB1	315743	KQ1212674-04	10/26/12 09:20	0.050	0.020	0.020	ND	U	
CCB2	315743	KQ1212674-05	10/26/12 09:20	0.050	0.020	0.020	ND	U	
CCB3	315743	KQ1212674-06	10/26/12 09:20	0.050	0.020	0.020	ND	U	

### - Cover Page -INORGANIC ANALYSIS DATA PACKAGE

**Client:** ADH Environmental Inc. Service Request: K1210451

**Project Name:** Project No.:

ACOE Upper Guad. River Reach 12

Sample Name:	Lab Code:
UGR-R12-2012-1	K1210451-001
UGR-R12-2012-1S	K1210451-001S
UGR-R12-2012-1SD	K1210451-001SD
UGR-R12-2012-1Z	K1210451-002
UGR-R12-2012-2	K1210451-003
UGR-R12-2012-2Z	K1210451-004
UGR-R12-2012-3	K1210451-005
UGR-R12-2012-3Z	K1210451-006
UGR-R12-2012-DUP-1	K1210451-007
Method Blank	K1210451-MB

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-1 Lab Code: K1210451-001

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	С	Q
Mercury	7471B	0.194	0.049	0.019	10.0	10/29/12	10/30/12	3.60		

% Solids: 91.3

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-1Z Lab Code: K1210451-002

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	0.380	0.095	0.038	20.0	10/29/12	10/30/12	13.5		

% Solids: 91.2

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-2 Lab Code: K1210451-003

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	0.194	0.049	0.019	10.0	10/29/12	10/30/12	6.59		

% Solids: 94.0

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-2Z Lab Code: K1210451-004

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	0.192	0.048	0.019	10.0	10/29/12	10/30/12	4.53		

% Solids: 90.0

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-3 Lab Code: K1210451-005

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	С	Q
Mercury	7471B	0.184	0.046	0.018	10.0	10/29/12	10/30/12	3.70		

% Solids: 88.6

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-3Z Lab Code: K1210451-006

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	С	Q
Mercury	7471B	0.190	0.047	0.019	10.0	10/29/12	10/30/12	7.46		

% Solids: 81.2

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-DUP-1 Lab Code: K1210451-007

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	С	Q
Mercury	7471B	0.193	0.048	0.019	10.0	10/29/12	10/30/12	4.35		

% Solids: 87.6

#### Metals -1-

### INORGANIC ANALYSIS DATA PACKAGE

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Date Collected:

Project Name: ACOE Upper Guad. River Reach 12 Date Received:

Matrix: SEDIMENT Units: ug/L

Basis: DRY

Sample Name: Method Blank Lab Code: K1210451-MB

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	С	Q
Mercury	7471B	0.020	0.005	0.002	1.0	10/29/12	10/30/12	0.005	U	

% Solids: 100.0

### Metals - 2a -

### INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

ICV Source: Inorganic Ventures CCV Source: CAS MIXED

	Initial	Calibration	on		Continuing Calibration						
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	Method		
Mercury	5.00	5.01	100	5.00	5.13	103	5.27	105	7471B		

### Metals - 2a -

### INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

ICV Source: Inorganic Ventures CCV Source: CAS MIXED

	Initial	Calibrati	on		Continuing Calibration						
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	Method		
Mercury				5.00	5.30	106	5.30	106	7471B		

### Metals - 2a -

### INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

ICV Source: Inorganic Ventures CCV Source: CAS MIXED

	Initial	Calibrati	on		Continuing Calibration						
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	Method		
Mercury				5.00	5.32	106	5.42	108	7471B		

### Metals - 2a -

### INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

ICV Source: Inorganic Ventures CCV Source: CAS MIXED

	Initial	Calibrati	on		Continuing Calibration						
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	Method		
Mercury				5.00	5.00   5.45   109   5.39   108						

### Metals - 2a -

### INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

ICV Source: Inorganic Ventures CCV Source: CAS MIXED

	Initial	Calibrati	.on		Continuing Calibration						
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	Method		
Mercury				5.00	5.38	108	5.39	108	7471B		

### Metals - 2a -

### INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

ICV Source: Inorganic Ventures CCV Source: CAS MIXED

	Initia	l Calibrat	ion		Continuing Calibration						
Analyte	True	Found	%R(1)	True Found %R(1) Found %R(1)					Method		
Mercury				5.00	5.33	107		1	7471B		

### Metals

### - 2b -

#### CRDL STANDARD FOR AA AND ICP

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

	CRDL Stand	lard for AA		CRDL Standard for ICP Initial Final					
Analyte	True	Found	%R	True	Found	%R	Found	%R	
Mercury	0.20	0.206	103				1		

Metals

- 3 -BLANKS

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analyte	Initial Calib. Blank			Continuing Calibration Blank (ug/L)							
Analyte	(ug/L)	С	1	C	2	C	3	C	Method		
Mercury	0.02	U	0.0	)2 U	0.0	)4 Ј	0.02	2 U	7471B		

Metals

- 3 -BLANKS

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

analyst a	Initial Calib. Blank			Continuing Calibration Blank (ug/L)							
Analyte	(ug/L)	C	1	C	2	C	3	C	Method		
Mercury			0.0	)2 U	0.0	)2 U	0.0	2 U	7471B		

Metals

- 3 -BLANKS

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

	Initial Calib. Blank			Continuing Calibration Blank (ug/L)								
Analyte	(ug/L)	C	1	C	2	C	3	C	Method			
Mercury			0.0	)2 U	0.0	02 J	0.0	2 U	7471B			

## COLUMBIA ANALYTICAL SERVICES, INC. Now part of the ALS Group

Metals

- 3 -BLANKS

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

	Initial Calib. Blank				nuing C lank (u	alibrati g/L)	ion		
Analyte	(ug/L)	C	1	C	2	С	3	С	Method
Mercury			0.0	)2 U	0.0	02 U			7471B

## Metals - 5A -SPIKE SAMPLE RECOVERY

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Units: MG/KG

Project Name: ACOE Upper Guad. River Reach 12 Basis: DRY

Matrix: SEDIMENT % Solids: 91.3

Sample Name: UGR-R12-2012-1S Lab Code: K1210451-001S

Analyte	Control Limit %R	Spike Result C	Sample Result C	Spike Added	%R Q	Method
Mercury		5.84	3.60	0.49	457.1	7471B

## Metals - 5A -SPIKE SAMPLE RECOVERY

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Units: MG/KG

Project Name: ACOE Upper Guad. River Reach 12 Basis: DRY

Matrix: SEDIMENT % Solids: 91.3

Sample Name: UGR-R12-2012-1SD Lab Code: K1210451-001SD

Analyte	Control Limit %R	Spike Result C	Sample Result C	Spike Added	%R	Method
Mercury		5.42	3.60	0.48	379.2	7471B

# COLUMBIA ANALYTICAL SERVICES, INC. Now part of the ALS Group

## Metals - 5B -

## POST SPIKE SAMPLE RECOVERY

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Units: UG/L

Project Name: ACOE Upper Guad. River Reach 12 Basis: DRY

Matrix: WATER

Sample Name: UGR-R12-2012-1A Lab Code: K1210451-001A

Analyte	Control Limit %R	Spike Result C	Sample Result C	Spike Added	%R	Q	Method
Mercury	75 - 125	8.75	3.71	5.00	101		7471B

Now part of the ALS Group

Metals

- 6 -

#### **DUPLICATES**

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Units: MG/KG

Project Name: ACOE Upper Guad. River Reach 12 Basis: DRY

Matrix: SEDIMENT % Solids: 91.3

Sample Name: UGR-R12-2012-1SD Lab Code: K1210451-001SD

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	С	RPD	Q	Method
Mercury	20	5.84		5.42		7.5		7471B

# COLUMBIA ANALYTICAL SERVICES, INC. Now part of the ALS Group

## Metals

- 7 -

## LABORATORY CONTROL SAMPLE

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

Aqueous LCS Source: CAS MIXED Solid LCS Source:

	Aqueous	(ug/L)			Soli	d (mg/	rg)	
Analyte	True	Found	%R	True	Found	С	Limits	%R
Mercury	5.00	5.65	113.0					

Now part of the ALS Group

#### Metals

- 10 -

#### **DETECTION LIMITS**

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

ICP/ICP-MS ID #: K-CVAA-02

GFAA ID #: AA ID #:

Analyte	Wave- length (nm)	Back- ground	LOQ ug/L	LOD ug/L	MDL ug/L	м
Mercury	253.7		0.20	0.05	0.02	CV

Comments:

# COLUMBIA ANALYTICAL SERVICES, INC. Now part of the ALS Group

## Metals -13-PREPARATION LOG

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

Method: CV

Sample ID	Preparation Date	Initial Weight (g)	Final Volume(mL)
K1210451-001	10/29/12	0.56	50.0
K1210451-001S	10/29/12	0.56	50.0
K1210451-001SD	10/29/12	0.57	50.0
K1210451-002	10/29/12	0.58	50.0
K1210451-003	10/29/12	0.55	50.0
K1210451-004	10/29/12	0.58	50.0
K1210451-005	10/29/12	0.62	50.0
K1210451-006	10/29/12	0.65	50.0
K1210451-007	10/29/12	0.59	50.0
K1210451-MB	10/29/12	0.50	50.0
LCSW	10/29/12	50.0	50.0

## **Metals** - 14 -

#### **ANALYSIS RUN LOG**

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Run Number: 103012B HG2

Project Name: ACOE Upper Guad. River Reach 12

Instrument ID Number: K-CVAA-02 Method: CV

	<u> </u>												Ana	.ly	tes	;										
Sample No.	D/F	Time	% R	A L	A S	B A	B E	C D	C A	C R	С О	C U		P B	M G		H G	N	K	S E	A G	N A	T L	V		C N
Calibration Blank	1.0	11:52															х		П					同	П	
Standard #1	1.0	11:54															Х									
Standard #2	1.0	11:55															Х									
Standard #3	1.0	11:57															Х									
Standard #4	1.0	12:03															Х									
Standard #5	1.0	12:04															Х									
ICV1	1.0	12:06															Х									
ICB1	1.0	12:08															Х									
CRA1	1.0	12:09															Х									
CCV1	1.0	12:11															Х									
CCB1	1.0	12:13															Х									
ZZZZZZ	1.0	12:14																						П		
ZZZZZZ	1.0	12:16																						П		
ZZZZZZ	1.0	12:17																						П		
ZZZZZZ	1.0	12:19																								
ZZZZZZ	1.0	12:21																						П		
ZZZZZZ	1.0	12:22																						П		
ZZZZZZ	1.0	12:27																						П		
ZZZZZZ	1.0	12:29																						П		
ZZZZZZ	1.0	12:30																						П		
ZZZZZZ	1.0	12:32																						П		
CCV2	1.0	12:39															х							П		
CCB2	1.0	12:40															х							П		
ZZZZZZ	1.0	12:42																						П		
ZZZZZZ	1.0	12:47																						П	П	
ZZZZZZ	1.0	12:49																	П						П	
ZZZZZZ	1.0	12:51																	П						П	
ZZZZZZ	1.0	12:52														j			П					П	П	
ZZZZZZ	1.0	12:54														j			П					П	П	
ZZZZZZ	1.0	12:55														j			П					П	П	
ZZZZZZ	1.0	12:57														j			П					П	П	
ZZZZZZ	1.0	12:59																							П	

<sup>\* -</sup> Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

## **Metals** - 14 -

#### **ANALYSIS RUN LOG**

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Run Number: 103012B HG2

Project Name: ACOE Upper Guad. River Reach 12

Instrument ID Number: K-CVAA-02 Method: CV

		<u> </u>										Ana	ly	tes	<u> </u>										
Sample No.	D/F	Time	% R	A L	A S	B A	B E	C D	C A	C R	D G			M G		H G	N I	K	S E	A G	N A	T L	v		C N
ZZZZZZ	1.0	13:00																					П	$\sqcap$	
CCV3	1.0	13:02														Х									
CCB3	1.0	13:04														Х									
ZZZZZZ	1.0	13:05																							
ZZZZZZ	1.0	13:07																							
ZZZZZZ	1.0	13:08																							
ZZZZZZ	1.0	13:10																							
ZZZZZZ	1.0	13:12																							
ZZZZZZ	1.0	13:13																							
ZZZZZZ	1.0	13:15																							
ZZZZZZ	1.0	13:16																							
ZZZZZZ	1.0	13:18																							
ZZZZZZ	1.0	13:20																							
ZZZZZZ	1.0	13:21																					П		
CCV4	1.0	13:27														Х									
CCB4	1.0	13:29														Х									
ZZZZZZ	1.0	13:31																							
ZZZZZZ	1.0	13:32																							
ZZZZZZ	1.0	13:34																							
ZZZZZZ	1.0	13:35																							
ZZZZZZ	1.0	13:37																					П		
ZZZZZZ	1.0	13:39																					П		
ZZZZZZ	1.0	13:40																					П		
ZZZZZZ	1.0	13:42																					П		
ZZZZZZ	1.0	13:44																					П		
ZZZZZZ	1.0	13:45																					П	П	
CCV5	1.0	13:47														х							П	П	
CCB5	1.0	13:48														х	-						П	П	
ZZZZZZ	1.0	13:50																					П	П	
ZZZZZZ	1.0	13:52																					П	П	
ZZZZZZ	1.0	13:53						Ī													Ī		П		
ZZZZZZ	1.0	13:55																					П	П	

<sup>\* -</sup> Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

#### **Metals** - 14 -

#### **ANALYSIS RUN LOG**

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Run Number: 103012B HG2

Project Name: ACOE Upper Guad. River Reach 12

Instrument ID Number: K-CVAA-02 Method: CV

	1											 Ana	lyt	es	3										
Sample No.	D/F	Time	% R	A L	s B	A S	B A	B E	C D	C R	C O	F E		M G	M N	H G	N I	K	S E	A G	N A	T L	v	Z N	C N
ZZZZZZ	1.0	13:58											ĺ											Π	
ZZZZZZ	1.0	13:59																							
ZZZZZZ	1.0	14:01																							
ZZZZZZ	1.0	14:03																							
ZZZZZZ	1.0	14:04																							
ZZZZZZ	1.0	14:06																							
CCV6	1.0	14:09														Х									
CCB6	1.0	14:11														Х									
ZZZZZZ	1.0	14:12																							
ZZZZZZ	1.0	14:17																							
ZZZZZZ	1.0	14:18																							
ZZZZZZ	1.0	14:23																							
K1210451-MB	1.0	14:24														х									
ZZZZZZ	5.0	14:26																							
LCSW	1.0	14:27														х									
ZZZZZZ	1.0	14:29																							
ZZZZZZ	1.0	14:32																							
ZZZZZZ	1.0	14:35																							
ZZZZZZ	1.0	14:39																							
CCV7	1.0	14:50														Х									
CCB7	1.0	14:52														Х									
ZZZZZZ	1.0	14:53																							
ZZZZZZ	1.0	14:57																							
ZZZZZZ	1.0	15:01																							
ZZZZZZ	1.0	15:05																							
ZZZZZZ	1.0	15:08																							
ZZZZZZ	1.0	15:12																							
ZZZZZZ	1.0	15:16																							
ZZZZZZ	1.0	15:19																							
CCV8	1.0	15:23				П							j			х			П					Г	Г
CCB8	1.0	15:24				П							j			х			П					Г	Г
ZZZZZZ	1.0	15:26				Г							İ						П	П	Г		П	Г	Γ

<sup>\* -</sup> Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

## Metals - 14 -

#### **ANALYSIS RUN LOG**

Client: ADH Environmental Inc. Service Request: K1210451

Project No.: NA Run Number: 103012B HG2

Project Name: ACOE Upper Guad. River Reach 12

Instrument ID Number: K-CVAA-02 Method: CV

														Ana	ly	tes	5										
Sample No.	D/F	Time	% R	A L	S B	A S	B A	B E	C D	C A	C R	С 0	C U		P B	M G	M N	H G	N I	K	S E	A G	N A	T L	v		C N
ZZZZZZ	5.0	15:28																									
ZZZZZZ	5.0	15:29																									
ZZZZZZ	5.0	15:31																									
ZZZZZZ	5.0	15:33																									
ZZZZZZ	2.0	15:34																									
ZZZZZZ	10.0	15:36																									
ZZZZZZ	10.0	15:37																									
ZZZZZZ	1.0	15:39																									
ZZZZZZ	5.0	15:48																									
CCV9	1.0	15:49																Х									
ССВ9	1.0	15:51																Х									
ZZZZZZ	2.0	15:52																									
ZZZZZZ	10.0	15:54																									
ZZZZZZ	100.0	15:56																									
ZZZZZZ	50.0	15:57																									
K1210451-001	10.0	15:59																Х									
K1210451-001A	10.0	16:01																Х									
ZZZZZZ	10.0	16:02																									
K1210451-001SD	10.0	16:04																Х									
K1210451-002	20.0	16:06																Х									
K1210451-003	10.0	16:07																Х									
ZZZZZZ	1.0	16:09																									
CCV10	1.0	16:14																Х									
CCB10	1.0	16:15																Х									
K1210451-004	10.0	16:17																х							П	П	
K1210451-005	10.0	16:19																х							П	П	
K1210451-006	10.0	16:20																х							П	П	
K1210451-007	10.0	16:22																х							П	П	
ZZZZZZ	10.0	16:23							Ī																П		
K1210451-001s	10.0	16:32							Ī									х							П	П	
ZZZZZZ	5.0	16:34																							П	П	
CCV11	1.0	16:35																х									

<sup>\* -</sup> Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals - 14 -

**ANALYSIS RUN LOG** 

ADH Environmental Inc. Client: Service Request: K1210451

Run Number: 103012B HG2

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

Instrument ID Number: K-CVAA-02 Method: CV

Sample			% R							_		ž	Ana	lyt	es	3						
Sample No.	D/F	Time	* R	A L	s B	A S	B A	B E	C D	C A	C 0			P B		M N	H G	K	A G		Z N	
CCB11	1.0	16:37															Х					



February 6, 2013

Analytical Report for Service Request No: K1300396

Christian Kocher ADH Environmental Inc. 3065 Porter St Suite 101 Soquel, CA 95073

**RE:** ACOE Upper Guad. River Reach 12

Dear Christian:

Enclosed are the results of the samples submitted to our laboratory on October 16, 2012. For your reference, these analyses have been assigned our service request number K1300396.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at <a href="https://www.caslab.com">www.caslab.com</a>. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3363. You may also contact me via Email at Lisa.Domenighini@alsglobal.com.

Respectfully submitted,

Columbia Analytical Services, Inc. dba ALS Environmental

Lisa Domenighini

Project Manager

LD/mj

Page 1 of \_\_\_\_\_



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PHONE +1 360 577 7222 FAX +1 360 636 1068
Columbia Analytical Services, Inc.
Part of the ALS Group A Campbell Brothers Limited Company

## TABLE OF CONTENTS

- 1. Acronyms
- 2. Data Qualifiers
- 3. State Certifications, Accreditations & Licenses
- 4. Case Narrative
- 5. Chain of Custody
- 6. Total Solids
- 7. General Chemistry
- 8. Particle Size
- 9. Metals

#### **Acronyms**

ASTM American Society for Testing and Materials

A2LA American Association for Laboratory Accreditation

CARB California Air Resources Board

CAS Number Chemical Abstract Service registry Number

CFC Chlorofluorocarbon
CFU Colony-Forming Unit

DEC Department of Environmental Conservation

DEQ Department of Environmental Quality

DHS Department of Health Services

DOE Department of Ecology
DOH Department of Health

EPA U. S. Environmental Protection Agency

ELAP Environmental Laboratory Accreditation Program

GC Gas Chromatography

GC/MS Gas Chromatography/Mass Spectrometry

LOD Limit of Detection
LOQ Limit of Quantitation

LUFT Leaking Underground Fuel Tank

M Modified

MCL Maximum Contaminant Level is the highest permissible concentration of a substance

allowed in drinking water as established by the USEPA.

MDL Method Detection Limit
MPN Most Probable Number
MRL Method Reporting Limit

NA Not Applicable
NC Not Calculated

NCASI National Council of the Paper Industry for Air and Stream Improvement

ND Not Detected

NIOSH National Institute for Occupational Safety and Health

PQL Practical Quantitation Limit

RCRA Resource Conservation and Recovery Act

SIM Selected Ion Monitoring

TPH Total Petroleum Hydrocarbons

tr Trace level is the concentration of an analyte that is less than the PQL but greater

than or equal to the MDL.

#### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- F. The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition: Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

#### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. DOD-QSM 4.2 definition: Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  DOD-QSM 4.2 definition: Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

# Columbia Analytical Services, Inc. dba ALS Environmental (ALS) - Kelso State Certifications, Accreditations, and Licenses

Web Site	Number
http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
http://www.azdhs.gov/lab/license/env.htm	AZ0339
http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Not available	1
http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
-	C-WA-01
http://www.pjlabs.com/	L12-27
http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Not available	LA110003
Not available	WA0035
http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156,00.html	9949
http://www.health.state.mn.us/accreditation	053-999-368
http://www.dphhs.mt.gov/publichealth/	CERT0047
http://ndep.nv.gov/bsdw/labservice.htm	WA35
http://www.nj.gov/dep/oqa/	WA005
http://www.nmenv.state.nm.us/dwb/Index.htm	-
http://www.dwqlab.org/	605
http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
http://www.scdhec.gov/environment/envserv/	61002
http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	1704427-08-TX
http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
http://dnr.wi.gov/	998386840
http://www.epa.gov/region8/water/dwhome/wyomingdi.html	
www.caslab.com	NA
	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx http://www.azdhs.gov/lab/license/env.htm http://www.adeq.state.ar.us/techsvs/labcert.htm http://www.adeq.state.ar.us/techsvs/labcert.htm http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm http://www.gaepd.org/Documents/techguide_pcb.html#cel Not available http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx http://www.nj.gov/isdh/24859.htm http://www.pjlabs.com/ http://www.pjlabs.com/ http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx Not available Not available http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156,00.html http://www.health.state.mn.us/accreditation http://www.health.state.mn.us/accreditation http://www.dphhs.mt.gov/publichealth/ http://www.nj.gov/dep/oqa/ http://www.nj.gov/dep/oqa/ http://www.nj.gov/dep/oqa/ http://www.nmenv.state.nm.us/dwb/Index.htm http://www.deq.state.ok.us/CSDnew/labcert.htm http://www.deq.state.ok.us/CSDnew/labcert.htm http://www.deq.state.ok.us/CSDnew/labcert.htm http://www.scdhec.gov/environment/envserv/ http://www.scdhec.gov/environment/envserv/ http://www.ceq.texas.gov/field/qa/env_lab_accreditation.html http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html http://www.epa.gov/region8/water/dwhome/wyomingdi.html

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

#### ALS ENVIRONMENTAL

Client: ADH Environmental, Inc. Service Request No.: K1300396

Project: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

**Sample Matrix:** Sediment

#### **Case Narrative**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier III deliverables including summary forms for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt

On January 14,2013 Christian Kocher with ADH Environmental, Inc. requested that sixteen frozen archived samples be tested for Mercury, TOC, Total Solids and Particle Size Distribution.

#### **General Comments:**

The DoD QSM 4.2 requires detections reported to the Method Detection Limit (MDL). Values greater than the MDL and less than the Limit of Quantitation (LOQ) were flagged as estimates (J). Values less than the MDL and Limit of Detection (LOD) were reported as non-detect (ND). The LOD for each analyte is verified quarterly by the laboratory using procedures defined in Grey Box D-13 of the DoD Quality Systems Manual Version 4.2.

The Limit of Quantitation (LOQ) is verified quarterly for each analyte using procedures defined in Grey Box D-14 of the DoD Quality Systems Manual Version 4.2.

#### **General Chemistry Parameters**

#### **Particle Size:**

Samples were previously frozen prior to analyses

## **Total Organic Carbon by PSEP:**

All samples were reissued past holding time. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

No other anomalies associated with the analysis of these samples were observed.

#### **Total Metals**

### **Matrix Spike Recovery Exceptions:**

The control criteria for matrix spike and matrix spike duplicate recoveries of Mercury for sample UGR-R12-2012-1-2 were not applicable. The analyzed concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

No other anomalies associated with the analysis of these samples were observed.

Approved by Approved by

E)		
AL DE		
THE YES		
(ALS)	Environmental	

## CHAIN OF CUSTODY

(ALS) Endironment		Sou	th 13th Av	o Koloo I	MA 0060	2 1 0	00 577	2000		000					20 mg				1			SH				-	
PROJECT NAME	1017		III TOUT AV	e., Kelso, \	VA 98620	5   3	0.577	.7222	800	.695.	7222	360.	636.1	068 (f	ax)	-	F	PAGE	1	-	OF	3		CO	C#_		
PROJECT NUMBER	ound.	R	liver	Reach	12		/	Semivolatile	/	1 DHP	1 0	/	1	/	10			/ /		/	10			Pher	C# 75-Part 52- X	100	
PROJECT MANAGER							_/	/	/	NA	BTEX	/	1250	/	8757	/	/	/4	- /	5 /	909	8	/	EF	6 /	2 / 5	/
COMPANY NAME ADH ENVITORN	apota	١					CONTAINED	8/	100	18/	Oil & Great Gesel Glow	0 8		0/	00/	0/	1	7 0	10	1	0/	8	1	Dell	= /vi	Solida	/
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Soyvel, (A	9507	3					1 1	/	827,58	/ 8	See	/I	000	Side 87	18	1880	10	12,50	0, 7	1/2	100		100	157	10 p	10/	28
E-MAIL ADDRESS	. 11	- 0.	VIFONMP	2461.00	W.	1	0 /	/	000	1000	ns l	ED	8/	Joseph	30	92/	I J	5.7	00	\ \vec{v}	18	00/	Ses	a. 1-	6	\ /	
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REPORT REQUIREM	ENTS		P.O. #	ICE INFO	MATION	1	Circle	which r	netals	are to	be ana	lyzed:															
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Blank, Surrogate, required	as		ADH!	Environn	nental		1,000							Œ													Zn Hg
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✓ V. EDD	сроп		Prov	vide FAX Re	sults		5)	SET	D	5.0	0 7	ZA	Du	to E	orm	at		1		33	IIII I <b>III</b> 749						
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(ALS)	Environmental	

## CHAIN OF CUSTODY

ALSEnvironmental				OFC								SR#				
1317 South 13th A	we., Kelso, WA 98620		77.7222	800.695.7	222   360	.636.1068	(fax)		PAGE	2	_ OF	_3	>	COC#		
PROJECT NUMBER  PROJECT NUMBER	vet Reach	12	77	1   0	9	1.1	101	1 1	1 /	TOX 9020 C 100, TOC,	10	Dissolved Gas	77	Dell .		
PROJECT MANAGER			1 /	SWIND	BIE	15	157	/ /	/ /4:	0	506	00	/	Z Ethe	?/ /	/
COMPANYNAME ADH ENVIRONMENTAL			ONTAINERS	V GCANS D SIM PAH	The last	5 / 5/		0/ /	000	12	CO3 1 1650D	5 /	Danie	1	/ /	/
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Kocher @ adhenviron		-/ 6	/ /	00 Jan 10	WATE OF THE PROPERTY OF THE PR	Terl 1	Solice Para	5 30 1	SS	1 18	10/	ans 300 300 1	letha /	Arehive	/ /	
SAMPLER'S SIGNATURE (831)	1477-0895	NUMBER	/ /olat	10/25   2/20   2	reas 4 HE	Pesticides/Herbicides	one to		18/3	0 2 / 2 / 2 / 2 / 2 / 2 / 2 / 2 / 2 / 2	Dioxins/Fur	86	0/ 3	7 /	/ /	
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DEDORE DECLIE	OICE INFORMATION	01	7													
P.O. #		1 20		metals are to b												
I. Routine Report: Method Bill To:	Christian Kocher			ls: Al As S												
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II. Report Dup., MS, MSD as TURNA	ROUND REQUIREME		NDICATI PECIAL I	E STATE HY NSTRUCTIO	DROCAR	BON PRO	CEDUR	E: AK	CA W	I NOF	THWE	ST OT	HER:_		(CIF	RCLE ONE)
required 24							1.									
III. CLP Like Summary5	day		Archive	at - 21	1° ( Jo.	SIX N	nonth	5	Cont	tainer s	Suppl	y Nun	nber			¥
✓ IV. Data Validation Report	andard (15 working days	s)							- 11							
V. EDD	ovide FAX Results								1.1		<b>   </b>   3749					
Requested Report Date  Sample Shipment contains USDA regulated soil samples (check box if applicable)																
RELINQUISHED BY:		RECEIVI						SHED BY		JON DOX	ii appi	iodbie)		CEIVED	) BV:	
10/11/12/1400	Clarga	Vache		/12 1400	C	larga Va				700			nec	) EIV ED	. 61:	
Signature Sin Date Inches	Signature Alaya V. Printed Name	autier	Date/Til		Sign	ature /	other	Date/Ti	me Enviro	20.	Sign	ature			Date/Tim	ie
Printed Name Yirm	Printed Name		Firm	V	Prin	ted Name		Firm	-11/16		Print	ted Nan	ne		Firm	

A)	
AT YES	
100 July	
(ALS)	Environmental

## CHAIN OF CUSTODY

1317 South 13th A	ve., Kelso, WA 9862	6   360.5	577.7222	800.695.722	2   360.63	6.1068 (fax)		PAGE	3	_ OF _	3	COC	C#		
PROJECT NAME JPPE GUAL RIVET PROJECT MANAGER	Reach 12		7/	Volatile Organics by GC/MS S24 III Organics Hydrocarbons (8021 III B)	8670			7 /	/~ /	7	TOTAL PROPERTY AND DESCRIPTION OF THE PERSON	lue Deut	,	77	7
COMPANY NAME			10/	SING G	186	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	/_/	10/3	100	100 DOS	§°/ /	C Eth	3/	/ /	
ADH ENVIORMENTAL		/	CONTAINERS	130 0	766, 166, 166, 166, 166, 166, 166, 166,	Congeners (2) 81410	100 P	om/	8/3/	7650[]	1 /2	than		/ /	
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PHONE/# A \ . EAV #	331) 477-080		/ /	827 827 827 827 827 827 827 827 827 827	ase lev	10871 Servol	otal of	182	5000		1828 1888 1888 1888 1888 1888 1888 1888	1	/	/	
SAMPLER'S SIGNATURE	7317 111-00	ABE!	Jovil		10s 18	Toop of	List t	E B B B	305	linity instruction	735/1	2		/	
SAMPLE I.D. DATE TIME	LAB I.D. MATRIX	NUMBER 51	Sen	Seattle Organics Hydrocarbons	PCBS HEND 1664 SG	608 Choices/Herbicides Tri horophenoics Tri cophenoics Tri ferrollics Tri ferrollics Tri ferrollics Tri ferrollics	(See List below) issolved	(Girale) PH Cond., Chrom. Chro	10/2/4	Dioxins/Furar	Dissolved Gases ACL. Methane	2///	/	REMAR	RKS
UGR- K12-2012-2-3 1011/12 1(000		1									V			one lboz	TAL
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UGR-RIZ-ZO12-Z-5 10/1/17/1615	sed	1	1 (1)								X			one 1602	
UGR- RIZ-2012-2-6 10/14/12-1620	sed	1	1								X			one 1602	- 8
UGR- 212-2012-3-1 10/11/12/1625	Sca	1									X			one 1602	4
UGR- RIZ-2012-3-2 10/11/12/1630	Sed	1									X			572 1607	
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REPORT REQUIREMENTS T	DICE INFORMATION	C	ircle which	metals are to be	analyzed:										
I. Routine Report: Method Bill To:	Christian Kocl	_	Total Meta	als: Al As Sb	Ba Be B	Ca Cd Co	Cr Cu	Fe Pb N	ng Mn N	10 Ni I	K Ag Na	Se Sr	TI	Sn V Zn	Ha
Blank, Surrogate, as ADH	Environmenta			tals: Al As Sb											
3065 Par	ter St Ste101 Sog	uel, CA *		E STATE HYD										(CIRCLE	
II. Report Dup., MS, MSD as required TURNA	ROUND REQUIREM	ENTS S	SPECIAL	INSTRUCTION	S/COMMEN	TS:								(OIIIOLL	Otte
III. CLP Like Summary			Arr	hive at wa	nor A	15 SV A	·n.H.c	Cor	toineré	N					
(no raw data)	lay andard (15 working day	۵ ا	1110	11 47	.U C T	W -2/X I	אטיוואס			nin min	/ Numbe	: F 			
V IV Data Validation Donort	ovide FAX Results	S)													
✓ V. EDD	The Frederic								3	3749					
	equested Report Date		Sampl	e Shipment co	ontains US	DA regulate	ed soil s	amples (ch	neck box	if applie	cable)				
MELINQUISHED BY:	50 11 11	RECEIV		1- 1	. 1	1/	UISHED				F	RECEIV	ED B	Y:	-
Date/Time_//	Signature Alaya V			2/12 /400 ime	Signatu	on last	Dat Dat	19/15/1a	1700	Signa	ature		Det	e/Time	
Printed Name Firm	Printed Name		Firm	ENVI PON.	Printed	Va Vaute Name	Y A Firm	DH ENVI	Onc	150	ed Name		Firm	50 Table 50	



Cooler Receipt and Preservation Form

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A A A	Cooler Receipt and	Preservation Forn	1		
Client / Project: HH	· · · · · · · · · · · · · · · · · · ·	Service Request I	K12 /04/5/		
Received: 10/16/12 Opened	d: <u>                                      </u>	Unload	led: 10/11/el12	By: <u> </u>	_
Samples were received via? Mail	Fed Ex (UPS) D	HL PDX Court	ier Hand Delivered	· · · · · · · · · · · · · · · · · · ·	
2. Samples were received in: (circle)		velope Other	**	NA	
3. Were custody seals on coolers?	The state of the s	If yes, how many and w	here?	to a second seco	
If present, were custody seals intact?	Y N	If present, were they		Y	N
Raw Corr. Raw Corr	Corr. Thermometer	Cooler/COC ID	Tracking Nu	mber	
Temp Blank Blank	c Factor ID	NA	701/12/21/10/2	NA	Filed
-0.2 -0.2 1.2 1.2	0.0 319		32279851093		
7. Packing material: Inserts Baggies	Bubble Wrap Gel Packs	Wet Ice Dry Ice	Sleeves		-
8. Were custody papers properly filled o	ut (ink, signed, etc.)?			NA (Y)	N
9. Did all bottles arrive in good conditio	n (unbroken)? Indicate in the	table below.		NA (Ý)	N
10. Were all sample labels complete (i.e	analysis, preservation, etc.)?			NA 🖄	N
11. Did all sample labels and tags agree	with custody papers? Indicate	major discrepancies in	the table on page 2.	NA Y	N
12. Were appropriate bottles/containers a	nd volumes received for the te	ests indicated?		NA (y	N
13. Were the pH-preserved bottles (see State 1)	MO GEN SOP) received at the a	ppropriate pH? Indicat	e in the table below	NA Y	N
14. Were VOA vials received without he	adspace? Indicate in the table	below.		NA Y	N
15. Was C12/Res negative?		* ***		NA Y	N
Sample ID on Bottle	Sample ID on CO		Identified by:	AND STREET	
		. In	d		
	tle Count Out of Head- ttle Type Temp space Brok	e pH Reagent	Volume Reagent Lot added Number	Initials Tin	ne
Notes, Discrepancies, & Resolutions:	Missing Cooky	WISAMPR	<u> </u>		
	J				
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Cooler Receipt and Preservation Form

Raw Corr. Raw Corr. Blank Blank Factor ID  O. Q. O. Q. U. 3.		Sample ID o	ative?	Bottle Bottl	Count	Sample Out of H Temp s	e ID on COC	рН	Reagent	Volume	Identified by:		Y	N N
Received: 10 18 10 Opened: 10 18 12 By: 6T Unloaded: 10 16 2 By 65  Samples were received via? Mail Fed Ex CFS DHL PDX Courier Hand Delivered  Samples were received in: (circle) Fooley Bax Envelope Other NA  Were custody seals on coolers? NA Y O If yes, how many and where?  If present, were custody seals intact? Y N If present, were they signed and dated? Y N  Raw Corr. Raw Corr. Raw Corr. Thermometer Cooler/COCID Tracking Number NA Filer  O. 9 O. Q 4.3 4.0 -0.3 31.5  Packing material: Inserts Baggies Public Wrap Cet Packs Wet Ice Dry Ice Sleeves  Were custody papers properly filled out (ink, signed, etc.)?  NA O N  Did all bottles arrive in good condition (unbrokeny)? Indicate in the table below.  NA O N  1. Did all sample labels complete (i.e analysis, preservation, etc.)?  NA O N  2. Were appropriate bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below  3. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below  4. Were VOA vials received without headspace? Indicate in the table below.  Sample ID on Bottle  Bottle Count Out of Head- Volume Reagent Lot  Volume Reagent Lot		C12/Res neg	ative?	Bottle	Count	Sample Out of H	e ID on COC			Volume	Identified by:		Y	N N
Received: 10 18 10 Opened: 10 18 12 By: 6T Unloaded: 10 16 2 By 65  Samples were received via? Mail Fed Ex CFS DHL PDX Courier Hand Delivered  Samples were received in: (circle) Fooley Bax Envelope Other NA  Were custody seals on coolers? NA Y O If yes, how many and where?  If present, were custody seals intact? Y N If present, were they signed and dated? Y N  Raw Corr. Raw Corr. Raw Corr. Thermometer Cooler/COCID Tracking Number NA Filer  O. 9 O. Q 4.3 4.0 -0.3 31.5  Packing material: Inserts Baggies Public Wrap Cet Packs Wet Ice Dry Ice Sleeves  Were custody papers properly filled out (ink, signed, etc.)?  NA O N  Did all bottles arrive in good condition (unbrokeny)? Indicate in the table below.  NA O N  1. Did all sample labels complete (i.e analysis, preservation, etc.)?  NA O N  2. Were appropriate bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below  3. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below  4. Were VOA vials received without headspace? Indicate in the table below.  Sample ID on Bottle  Bottle Count Out of Head- Volume Reagent Lot  Volume Reagent Lot		C12/Res neg	ative?	Bottle	Count	Sample Out of H	e ID on COC			Volume	Identified by:		Y	N N
Received: 10 18 10 Opened: 10 18 10 By: 15 Unloaded: 10 By: 15 Unloaded: 10 18 10 By: 15 Unloade		C12/Res neg	ative?	ithout head	space? In				pri. mata			XA)	Y	N
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Samples were received via? Mail Fed Ex	15. Was C			ithout head	space? In	dicate ir	n the table i	below.	pii. iimicu	·	ne below	XA)	Y	N
Samples were received via? Mail Fed Ex OPS DHL PDX Courier Hand Delivered  Samples were received via? Mail Fed Ex OPS DHL PDX Courier Hand Delivered  Samples were received in: (circle) Cooler Box Envelope Other NA  Were custody seals on coolers? NA Y N If yes, how many and where?  If present, were custody seals intact? Y N If present, were they signed and dated? Y N  Raw Corr. Raw Blank Blank Factor ID NA Tracking Number NA Filed  O. 9 O. Q 4.3 4.0 -0.3 315 J229 985 7 100  Packing material: Inserts Baggies Babble Wrap Cal Packs Wet Ice Dry Ice Sleeves  Were custody papers properly filled out (ink, signed, etc.)? NA N  Did all bottles arrive in good condition (unbroken)? Indicate in the table below. NA N  N Did all sample labels complete (i.e analysis, preservation, etc.)? NA N  N Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA N  N NA N  N NA N  N NA N  N N  N N	14. WEIE	VOA VIAIS I	ropoirrod III	ithaut hand	omnoo? In	diagta is	a the table	halow	pii. imicu		ne veiow			
Received: 10 1812 Opened: 10 1812 By: Vest Unloaded: 10 1812 By: Opened: 10 1812 By: Unloaded: 10 1812 By: Opened: 10 1812 By:				,	O GEN SOF	) receiv	ed at the ap	propriate	nH2 Indica	te in the tai	ble below	NPA)	V	3. Y
Received: 10   18   2 Opened: 10   18   2 By: VBT Unloaded: 10   18   2 By: BT Unloaded: 10   18   2 By	2. Were	appropriate	bottles/cor	ntainers and	l volumes	received	d for the tes	ts indicate	ed?				Constitution of the Consti	N
Received: 10   18   2 Opened: 10   18   2 By: 16T Unloaded: 10   18   2 By: 16   2 By: 16T Unloaded: 10   18   2 By: 16   2 B		*	-	,				najor disc	repancies in	the table o			_	
Received: 10 18 10 Opened: 10 18 10 By: 15T Unloaded: 10 11 By: 15T Unloaded:								table belo	w.			-	Y)	
Received: 10   18   2 Opened: 10   18   2 By: BT Unloaded: 10   18   2 By: BT  Samples were received via? Mail Fed Ex OPS DHL PDX Courier Hand Delivered  Samples were received in: (circle) Cooler Box Envelope Other NA  Were custody seals on coolers? NA Y O If yes, how many and where?  If present, were custody seals intact? Y N If present, were they signed and dated? Y N  Raw Corr. Raw Corr. Corr. Thermometer Temp Blank Bla				•		•							<b>(</b> )	
Received: 10   18   12   Opened: 10   18   12   By: 16T   Unloaded: 10   18   12   By: 15T    Samples were received via? Mail Fed Ex (VPS) DHL PDX Courier Hand Delivered  Samples were received in: (circle) Cooler Box Envelope Other NA  Were custody seals on coolers? NA Y O If yes, how many and where?  If present, were custody seals intact? Y N If present, were they signed and dated? Y N  Raw Corr. Raw Corr. Raw Corr. Corr. Thermometer ID Tracking Number NA File	7. Packin	g material:	Inserts	Baggies	Bubble V	Vrap (	Gel Packs	Wet Ice	Dry Ice	Sleeves				
Received: 10   18   10   18   10   18   10   18   10   18   10   10								ž						
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## ${\bf COLUMBIA\ ANALYTICAL\ SERVICES, INC.}$

Now part of the ALS Group

Analytical Results

Client: ADH Environmental Inc. Service Request: K1300396

**Project:** ACOE Upper Guad. River Reach 12

Sample Matrix: Sediment

**Total Solids** 

Prep Method:NONEUnits:PERCENTAnalysis Method:160.3MBasis:Wet

**Test Notes:** 

Sample Name	Lab Code	Date Collected	Date Received	Date Analyzed	Result	Result Notes
UGR-R12-2012-1-1	K1300396-001	10/11/2012	10/16/2012	01/15/2013	91.6	
UGR-R12-2012-1-2	K1300396-002	10/11/2012	10/16/2012	01/15/2013	95.7	
UGR-R12-2012-1-3	K1300396-003	10/11/2012	10/16/2012	01/15/2013	89.9	
UGR-R12-2012-1-4	K1300396-004	10/11/2012	10/16/2012	01/15/2013	89.9	
UGR-R12-2012-1-5	K1300396-005	10/11/2012	10/16/2012	01/15/2013	90.8	
UGR-R12-2012-1-6	K1300396-006	10/11/2012	10/16/2012	01/15/2013	98.3	
UGR-R12-2012-2-1	K1300396-007	10/11/2012	10/16/2012	01/15/2013	97.5	
UGR-R12-2012-2-2	K1300396-008	10/11/2012	10/16/2012	01/15/2013	97.8	
UGR-R12-2012-2-3	K1300396-009	10/11/2012	10/16/2012	01/15/2013	92.0	
UGR-R12-2012-2-4	K1300396-010	10/11/2012	10/16/2012	01/15/2013	90.9	
UGR-R12-2012-2-5	K1300396-011	10/11/2012	10/16/2012	01/15/2013	89.0	
UGR-R12-2012-2-6	K1300396-012	10/11/2012	10/16/2012	01/15/2013	90.9	
UGR-R12-2012-3-1	K1300396-013	10/11/2012	10/16/2012	01/15/2013	93.5	
UGR-R12-2012-3-2	K1300396-014	10/11/2012	10/16/2012	01/15/2013	87.3	
UGR-R12-2012-3-3	K1300396-015	10/11/2012	10/16/2012	01/15/2013	88.5	
UGR-R12-2012-3-4	K1300396-016	10/11/2012	10/16/2012	01/15/2013	93.2	

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 Page
 1 of 1
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12

## ${\bf COLUMBIA\ ANALYTICAL\ SERVICES, INC.}$

Now part of the ALS Group

QA/QC Report

Client: ADH Environmental Inc.

**Project:** ACOE Upper Guad. River Reach 12

Sample Matrix: Sediment

**Service Request:** K1300396 **Date Collected:** 10/11/2012 **Date Received:** 10/16/2012

**Date Analyzed:** 01/15/2013

**Duplicate Sample Summary** 

**Total Solids** 

Prep Method: Analysis Method: NONE 160.3M

Units: PERCENT

Basis: Wet

**Test Notes:** 

**Duplicate** Relative Sample Percent Sample Result Result Difference Lab Code Result Notes Sample Name Average K1300396-001 UGR-R12-2012-1-1 91.6 91.2 91.4 <1

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 SuperSet Reference:
 W1300467

Now part of the ALS Group

QA/QC Report

Client: ADH Environmental Inc.

**Project:** ACOE Upper Guad. River Reach 12

Sample Matrix: Sediment

**Service Request:** K1300396 **Date Collected:** 10/11/2012 **Date Received:** 10/16/2012

**Date Analyzed:** 01/15/2013

Duplicate Sample Summary Total Solids

Total St

**Analysis Method:** 

NONE 160.3M Units: PERCENT Basis: Wet

**Test Notes:** 

**Prep Method:** 

**Duplicate** Relative Sample Percent Result Sample Result Difference Lab Code Result Notes Sample Name Average K1300396-011 89.0 89.0 UGR-R12-2012-2-5 89.0 <1

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SuperSet Reference: W1300467

14

Now part of the ALS Group

## Analytical Report

**Client:** ADH Environmental Inc.

**Project:** 

Service Request: K1300396 **Date Collected:** 10/11/12 ACOE Upper Guad. River Reach 12

**Date Received:** 10/16/12 **Sample Matrix:** Sediment

**Analysis Method: PSEP TOC** Units: Percent

**Prep Method:** CAS SOP Basis: Dry, per Method

## Carbon, Total Organic (TOC)

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
	Lab Coue					DII.			
UGR-R12-2012-1-1	K1300396-001	1.39	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-1-2	K1300396-002	0.420	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-1-3	K1300396-003	0.494	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-1-4	K1300396-004	0.825	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-1-5	K1300396-005	0.158	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-2-1	K1300396-007	0.241	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-2-2	K1300396-008	0.608	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-2-3	K1300396-009	0.837	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-2-4	K1300396-010	0.597	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-2-5	K1300396-011	0.704	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-2-6	K1300396-012	0.423	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-3-1	K1300396-013	0.416	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-3-2	K1300396-014	0.171	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-3-3	K1300396-015	0.261	0.050	0.020	0.020	1	02/01/13	1/16/13	*
UGR-R12-2012-3-4	K1300396-016	0.846	0.050	0.020	0.020	1	02/01/13	1/16/13	*
Method Blank	K1300396-MB	ND U	0.050	0.020	0.020	1	02/01/13		

Now part of the ALS Group

QA/QC Report

Client: ADH Environmental Inc. Service Request: K1300396

Project ACOE Upper Guad. River Reach 12 Date Collected: 10/11/12

Sample Matrix: Sediment Date Received: 10/16/12
Date Analyzed: 02/01/13

Replicate Sample Summary General Chemistry Parameters

Sample Name: UGR-R12-2012-1-1 Units: Percent

Lab Code: K1300396-001 Basis: Dry, per Method

**Duplicate Sample** 

K1300396-

**RPD Analysis** Sample **001DUP** Method LOD Result Limit Analyte Name LOQ MDL Result **RPD** Average Carbon, Total Organic (TOC) PSEP TOC 0.050 0.020 0.020 1.39 1.35 1.37

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Printed 2/5/2013 10:07:46 AM Superset Reference:13-0000236069 rev 00

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QA/QC Report

Client: ADH Environmental Inc.

**Project:** ACOE Upper Guad. River Reach 12

Sample Matrix: Sediment

Service Request:K1300396

**Date Collected:** 10/11/12 **Date Received:** 10/16/12

**Date Analyzed:**02/1/13 **Date Extracted:**01/16/13

Duplicate Matrix Spike Summary Carbon, Total Organic (TOC)

**Sample Name:** UGR-R12-2012-1-1

**Lab Code:** K1300396-001

**Analysis Method:** PSEP TOC **Prep Method:** CAS SOP

Units:Percent

Basis:Dry, per Method

Matrix Spike K1300396-001MS **Duplicate Matrix Spike** 

K1300396-001DMS

	Sample		Spike			Spike		% Rec		RPD
Analyte Name	Result	Result	Amount	% Rec	Result	Amount	% Rec	Limits	RPD	Limit
Carbon, Total Organic (TOC)	1.39	6.67	5.59	94	6.24	5.39	90	69-123	4	27

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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Now part of the ALS Group

QA/QC Report

Client: ADH Environmental Inc.

Service Request:K1300396

Project:

ACOE Upper Guad. River Reach 12

Date Analyzed:02/01/13

**Sample Matrix:** 

Sediment

Lab Control Sample Summary Carbon, Total Organic (TOC)

Analysis Method:

PSEP TOC

Units:Percent

Basis: Dry, per Method

**Analysis Lot:**327806

			Spike		% Rec
Sample Name	Lab Code	Result	Amount	% Rec	Limits
Lab Control Sample	K1300396-LCS	0.297	0.280	106	74-118

Now part of the ALS Group

QA/QC Report

Client: ADH Environmental Inc. Service Request: K1300396

**Project:** ACOE Upper Guad. River Reach 12

## **Continuing Calibration Verification (CCV) Summary**

## Carbon, Total Organic (TOC)

Analysis Method:	PSEP TO	C	Units: Percent					
	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits	
CCV1	327806	KQ1301002-01	02/01/13 09:00	20.0	18.7	93	90-110	
CCV2	327806	KQ1301002-02	02/01/13 09:00	20.0	18.7	94	90-110	
CCV3	327806	KQ1301002-03	02/01/13 09:00	20.0	19.0	95	90-110	
CCV4	327806	KQ1301002-04	02/01/13 09:00	20.0	18.9	95	90-110	

Now part of the ALS Group

QA/QC Report

Client: ADH Environmental Inc. Service Request:K1300396

**Project:** ACOE Upper Guad. River Reach 12

# Continuing Calibration Blank (CCB) Summary Carbon, Total Organic (TOC)

Analysis Method: PSEP TOC Units:Percent

	Analysis		Date						
	Lot	Lab Code	Analyzed	LOQ	LOD	MDL	Result	Q	
CCB1	327806	KQ1301002-05	02/01/13 09:00	0.050	0.020	0.020	ND	U	
CCB2	327806	KQ1301002-06	02/01/13 09:00	0.050	0.020	0.020	ND	U	
CCB3	327806	KQ1301002-07	02/01/13 09:00	0.050	0.020	0.020	ND	U	
CCB4	327806	KQ1301002-08	02/01/13 09:00	0.050	0.020	0.020	ND	U	

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-1-1 Lab Code: K1300396-001

Sand Fraction:Dry Weight (Grams)24.1630Sand Fraction:Weight Recovered (Grams)24.1875Sand Fraction:Percent Recovery100.10

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	8.2743	28.95
Very Coarse Sand	-1 to 0 Ø	2.9248	10.23
Coarse Sand	0 to 1 Ø	2.7562	9.64
Medium Sand	1 to 2 Ø	3.5268	12.34
Fine Sand	2 to 3 Ø	3.8132	13.34
Very Fine Sand	3 to 4 Ø	2.3758	8.31
62.5 μm	4 to 5 Ø	0.9850	3.45
31.3 µm	5 to 6 Ø	1.0200	3.57
15.6 µm	6 to 7 Ø	0.7400	2.59
7.8 µm	7 to 8 Ø	0.4950	1.73
3.9 µm	8 to 9 Ø	0.3950	1.38
1.95 μm	9 to 10 Ø	0.3750	1.31
0.98 µm	> 10 Ø	0.9150	3.20
		28.5961	100.04

K1300396Wet.SC1.xls \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-1-2 Lab Code: K1300396-002

Sand Fraction:Dry Weight (Grams)30.8816Sand Fraction:Weight Recovered (Grams)30.9576Sand Fraction:Percent Recovery100.25

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	7.0666	22.18
Very Coarse Sand	-1 to 0 Ø	3.3381	10.48
Coarse Sand	0 to 1 Ø	5.2986	16.63
Medium Sand	1 to 2 Ø	7.6658	24.06
Fine Sand	2 to 3 Ø	5.9200	18.58
Very Fine Sand	3 to 4 Ø	1.5318	4.81
62.5 μm	4 to 5 Ø	0.3700	1.16
31.3 µm	5 to 6 Ø	0.1700	0.53
15.6 μm	6 to 7 Ø	0.1000	0.31
7.8 µm	7 to 8 Ø	0.0850	0.27
3.9 µm	8 to 9 Ø	0.0000	0.00
1.95 μm	9 to 10 Ø	0.0850	0.27
0.98 μm	> 10 Ø	0.1250	0.39
		31.7559	99.66

K1300396Wet.SC1.xls \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012Date Analyzed:1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-1-3 Lab Code: K1300396-003

Sand Fraction:Dry Weight (Grams)32.4528Sand Fraction:Weight Recovered (Grams)32.4637Sand Fraction:Percent Recovery100.03

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	15.2413	43.31
Very Coarse Sand	-1 to 0 Ø	5.0828	14.44
Coarse Sand	0 to 1 Ø	4.5060	12.81
Medium Sand	1 to 2 Ø	4.4181	12.56
Fine Sand	2 to 3 Ø	2.0983	5.96
Very Fine Sand	3 to 4 Ø	0.9225	2.62
62.5 μm	4 to 5 Ø	0.5450	1.55
31.3 µm	5 to 6 Ø	0.4350	1.24
15.6 µm	6 to 7 Ø	0.3400	0.97
7.8 µm	7 to 8 Ø	0.2850	0.81
3.9 µm	8 to 9 Ø	0.2250	0.64
1.95 μm	9 to 10 Ø	0.2750	0.78
0.98 µm	> 10 Ø	0.6800	1.93
		35.0540	99.62

K1300396Wet.SC2 \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012Date Analyzed:1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-1-4 Lab Code: K1300396-004

Sand Fraction:Dry Weight (Grams)27.6662Sand Fraction:Weight Recovered (Grams)27.6994Sand Fraction:Percent Recovery100.12

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	9.4161	27.14
Very Coarse Sand	-1 to 0 Ø	3.4384	9.91
Coarse Sand	0 to 1 Ø	3.5730	10.30
Medium Sand	1 to 2 Ø	4.4565	12.85
Fine Sand	2 to 3 Ø	3.9802	11.47
Very Fine Sand	3 to 4 Ø	2.3822	6.87
62.5 μm	4 to 5 Ø	1.5250	4.40
31.3 µm	5 to 6 Ø	1.5950	4.60
15.6 μm	6 to 7 Ø	1.0900	3.14
7.8 µm	7 to 8 Ø	0.8250	2.38
3.9 µm	8 to 9 Ø	0.6050	1.74
1.95 μm	9 to 10 Ø	0.6000	1.73
0.98 μm	> 10 Ø	1.3200	3.80
		34.8064	100.33

K1300396Wet.SC2 \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-1-5 Lab Code: K1300396-005

Sand Fraction:Dry Weight (Grams)34.4350Sand Fraction:Weight Recovered (Grams)34.5283Sand Fraction:Percent Recovery100.27

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	21.4683	59.43
Very Coarse Sand	-1 to 0 Ø	4.4258	12.25
Coarse Sand	0 to 1 Ø	4.4582	12.34
Medium Sand	1 to 2 Ø	3.1034	8.59
Fine Sand	2 to 3 Ø	0.7984	2.21
Very Fine Sand	3 to 4 Ø	0.2485	0.69
62.5 μm	4 to 5 Ø	0.1300	0.36
31.3 µm	5 to 6 Ø	0.1550	0.43
15.6 µm	6 to 7 Ø	0.1300	0.36
7.8 µm	7 to 8 Ø	0.0750	0.21
3.9 µm	8 to 9 Ø	0.0750	0.21
1.95 μm	9 to 10 Ø	0.2200	0.61
0.98 µm	> 10 Ø	1.4800	4.10
		36.7676	101.78

K1300396Wet.SC3 \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-2-1 Lab Code: K1300396-007

Sand Fraction:Dry Weight (Grams)52.8374Sand Fraction:Weight Recovered (Grams)52.9168Sand Fraction:Percent Recovery100.15

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	45.8487	87.15
Very Coarse Sand	-1 to 0 Ø	3.8419	7.30
Coarse Sand	0 to 1 Ø	2.4050	4.57
Medium Sand	1 to 2 Ø	0.6796	1.29
Fine Sand	2 to 3 Ø	0.0822	0.16
Very Fine Sand	3 to 4 Ø	0.0499	0.09
62.5 μm	4 to 5 Ø	0.0500	0.10
31.3 µm	5 to 6 Ø	0.0050	0.01
15.6 µm	6 to 7 Ø	0.0100	0.02
7.8 µm	7 to 8 Ø	0.0150	0.03
3.9 µm	8 to 9 Ø	0.0000	0.00
1.95 μm	9 to 10 Ø	0.0650	0.12
0.98 µm	> 10 Ø	0.0000	0.00
		53.0523	100.84

K1300396Wet.SC3 \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 10/16/2012 1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-2-2 Lab Code: K1300396-008

Sand Fraction:Dry Weight (Grams)35.0369Sand Fraction:Weight Recovered (Grams)35.1180Sand Fraction:Percent Recovery100.23

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	15.2950	42.78
Very Coarse Sand	-1 to 0 Ø	6.7262	18.81
Coarse Sand	0 to 1 Ø	6.3446	17.74
Medium Sand	1 to 2 Ø	3.7266	10.42
Fine Sand	2 to 3 Ø	2.0641	5.77
Very Fine Sand	3 to 4 Ø	0.8351	2.34
62.5 μm	4 to 5 Ø	0.2950	0.83
31.3 µm	5 to 6 Ø	0.1850	0.52
15.6 μm	6 to 7 Ø	0.1050	0.29
7.8 µm	7 to 8 Ø	0.0750	0.21
3.9 µm	8 to 9 Ø	0.0550	0.15
1.95 μm	9 to 10 Ø	0.0850	0.24
0.98 µm	> 10 Ø	0.1000	0.28
		35.8916	100.38

K1300396Wet.SC4 \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012Date Analyzed:1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-2-3 Lab Code: K1300396-009

Sand Fraction:Dry Weight (Grams)20.1542Sand Fraction:Weight Recovered (Grams)20.1789Sand Fraction:Percent Recovery100.12

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	4.8805	20.85
Very Coarse Sand	-1 to 0 Ø	2.2868	9.77
Coarse Sand	0 to 1 Ø	2.4233	10.35
Medium Sand	1 to 2 Ø	3.5656	15.23
Fine Sand	2 to 3 Ø	4.1096	17.56
Very Fine Sand	3 to 4 Ø	2.2995	9.83
62.5 μm	4 to 5 Ø	0.6200	2.65
31.3 µm	5 to 6 Ø	0.9450	4.04
15.6 μm	6 to 7 Ø	0.6250	2.67
7.8 µm	7 to 8 Ø	0.4250	1.82
3.9 µm	8 to 9 Ø	0.3550	1.52
1.95 μm	9 to 10 Ø	0.3050	1.30
0.98 µm	> 10 Ø	1.1100	4.74
		23.9503	102.33

K1300396Wet.SC5 \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-2-4 Lab Code: K1300396-010

Sand Fraction:Dry Weight (Grams)23.9443Sand Fraction:Weight Recovered (Grams)23.9052Sand Fraction:Percent Recovery99.84

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	4.7995	16.48
Very Coarse Sand	-1 to 0 Ø	2.5991	8.93
Coarse Sand	0 to 1 Ø	2.5114	8.63
Medium Sand	1 to 2 Ø	3.9577	13.59
Fine Sand	2 to 3 Ø	5.3409	18.34
Very Fine Sand	3 to 4 Ø	3.6633	12.58
62.5 μm	4 to 5 Ø	1.4700	5.05
31.3 µm	5 to 6 Ø	1.2550	4.31
15.6 μm	6 to 7 Ø	0.7450	2.56
7.8 µm	7 to 8 Ø	0.4550	1.56
3.9 µm	8 to 9 Ø	0.4000	1.37
1.95 μm	9 to 10 Ø	0.3450	1.18
0.98 µm	> 10 Ø	1.3400	4.60
		28.8819	99.19

K1300396Wet.SC5 \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012Date Analyzed:1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-2-5 Lab Code: K1300396-011

Sand Fraction:Dry Weight (Grams)19.3504Sand Fraction:Weight Recovered (Grams)19.2965Sand Fraction:Percent Recovery99.72

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	0.9567	3.38
Very Coarse Sand	-1 to 0 Ø	0.8940	3.15
Coarse Sand	0 to 1 Ø	1.5940	5.62
Medium Sand	1 to 2 Ø	3.0878	10.90
Fine Sand	2 to 3 Ø	5.5350	19.53
Very Fine Sand	3 to 4 Ø	4.9491	17.46
62.5 μm	4 to 5 Ø	1.9600	6.92
31.3 µm	5 to 6 Ø	2.4700	8.72
15.6 µm	6 to 7 Ø	1.1350	4.00
7.8 µm	7 to 8 Ø	0.5400	1.91
3.9 µm	8 to 9 Ø	1.2800	4.52
1.95 μm	9 to 10 Ø	0.6050	2.13
0.98 µm	> 10 Ø	1.7700	6.25
		26.7766	94.48

K1300396Wet.SC5 \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012Date Analyzed:1/21/2013

Puget Sound Estuary Program Protocol

Particle Size Determination

Sample Name: UGR-R12-2012-2-6 Lab Code: K1300396-012

Sand Fraction:Dry Weight (Grams)27.1416Sand Fraction:Weight Recovered (Grams)27.2305Sand Fraction:Percent Recovery100.33

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	13.1734	43.94
Very Coarse Sand	-1 to 0 Ø	2.5942	8.65
Coarse Sand	0 to 1 Ø	2.5038	8.35
Medium Sand	1 to 2 Ø	2.8827	9.62
Fine Sand	2 to 3 Ø	3.3419	11.15
Very Fine Sand	3 to 4 Ø	2.1336	7.12
62.5 μm	4 to 5 Ø	0.7050	2.35
31.3 µm	5 to 6 Ø	0.7050	2.35
15.6 μm	6 to 7 Ø	0.2400	0.80
7.8 µm	7 to 8 Ø	0.3000	1.00
3.9 µm	8 to 9 Ø	0.1900	0.63
1.95 μm	9 to 10 Ø	0.2850	0.95
0.98 μm	> 10 Ø	1.0750	3.59
		30.1296	100.51

K1300396Wet.SC6.xls \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 10/10/2012 1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-3-1 Lab Code: K1300396-013

Sand Fraction:Dry Weight (Grams)24.9952Sand Fraction:Weight Recovered (Grams)25.0793Sand Fraction:Percent Recovery100.34

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	13.2652	46.95
Very Coarse Sand	-1 to 0 Ø	2.8105	9.95
Coarse Sand	0 to 1 Ø	2.4651	8.73
Medium Sand	1 to 2 Ø	2.4724	8.75
Fine Sand	2 to 3 Ø	2.3756	8.41
Very Fine Sand	3 to 4 Ø	1.3628	4.82
62.5 μm	4 to 5 Ø	0.6300	2.23
31.3 µm	5 to 6 Ø	0.6900	2.44
15.6 µm	6 to 7 Ø	0.4300	1.52
7.8 µm	7 to 8 Ø	0.3350	1.19
3.9 µm	8 to 9 Ø	0.2500	0.88
1.95 μm	9 to 10 Ø	0.3050	1.08
0.98 µm	> 10 Ø	1.1900	4.21
		28.5816	101.17

K1300396Wet.SC6.xls \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-3-2 Lab Code: K1300396-014

Sand Fraction:Dry Weight (Grams)39.9543Sand Fraction:Weight Recovered (Grams)40.0559Sand Fraction:Percent Recovery100.25

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	21.8988	51.29
Very Coarse Sand	-1 to 0 Ø	6.0963	14.28
Coarse Sand	0 to 1 Ø	4.4811	10.49
Medium Sand	1 to 2 Ø	4.7335	11.09
Fine Sand	2 to 3 Ø	2.0808	4.87
Very Fine Sand	3 to 4 Ø	0.7095	1.66
62.5 μm	4 to 5 Ø	0.4050	0.95
31.3 µm	5 to 6 Ø	0.3650	0.85
15.6 µm	6 to 7 Ø	0.2450	0.57
7.8 µm	7 to 8 Ø	0.2100	0.49
3.9 μm	8 to 9 Ø	0.2050	0.48
1.95 μm	9 to 10 Ø	0.2800	0.66
0.98 µm	> 10 Ø	1.6350	3.83
		43.3450	101.51

K1300396Wet.SC6.xls \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012Date Analyzed:1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-3-3 Lab Code: K1300396-015

Sand Fraction:Dry Weight (Grams)41.9245Sand Fraction:Weight Recovered (Grams)42.0128Sand Fraction:Percent Recovery100.21

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	26.0076	57.97
Very Coarse Sand	-1 to 0 Ø	6.9523	15.50
Coarse Sand	0 to 1 Ø	4.7769	10.65
Medium Sand	1 to 2 Ø	2.7310	6.09
Fine Sand	2 to 3 Ø	1.1084	2.47
Very Fine Sand	3 to 4 Ø	0.3900	0.87
62.5 μm	4 to 5 Ø	0.2200	0.49
31.3 µm	5 to 6 Ø	0.2650	0.59
15.6 μm	6 to 7 Ø	0.2900	0.65
7.8 µm	7 to 8 Ø	0.2900	0.65
3.9 µm	8 to 9 Ø	0.2750	0.61
1.95 μm	9 to 10 Ø	0.3850	0.86
0.98 μm	> 10 Ø	1.6500	3.68
		45.3412	101.06

K1300396Wet.SC7.xls \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012Date Analyzed:1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-3-4 Lab Code: K1300396-016

Sand Fraction:Dry Weight (Grams)23.4221Sand Fraction:Weight Recovered (Grams)23.3749Sand Fraction:Percent Recovery99.80

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	3.8747	13.00
Very Coarse Sand	-1 to 0 Ø	2.1490	7.21
Coarse Sand	0 to 1 Ø	2.6440	8.87
Medium Sand	1 to 2 Ø	4.0741	13.67
Fine Sand	2 to 3 Ø	5.1812	17.38
Very Fine Sand	3 to 4 Ø	3.7995	12.75
62.5 µm	4 to 5 Ø	1.9250	6.46
31.3 µm	5 to 6 Ø	1.8800	6.31
15.6 µm	6 to 7 Ø	1.1850	3.98
7.8 µm	7 to 8 Ø	0.8350	2.80
3.9 µm	8 to 9 Ø	0.5350	1.79
1.95 µm	9 to 10 Ø	0.4550	1.53
0.98 µm	> 10 Ø	0.9500	3.19
		29.4875	98.91

K1300396Wet.SC7.xls \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012Date Analyzed:1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-2-2 Lab Code: K1300396-008 DUP

Sand Fraction:Dry Weight (Grams)29.6234Sand Fraction:Weight Recovered (Grams)29.7089Sand Fraction:Percent Recovery100.29

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	13.6779	45.44
Very Coarse Sand	-1 to 0 Ø	6.5952	21.91
Coarse Sand	0 to 1 Ø	5.1957	17.26
Medium Sand	1 to 2 Ø	2.5223	8.38
Fine Sand	2 to 3 Ø	1.1832	3.93
Very Fine Sand	3 to 4 Ø	0.4580	1.52
62.5 μm	4 to 5 Ø	0.1400	0.47
31.3 µm	5 to 6 Ø	0.1500	0.50
15.6 μm	6 to 7 Ø	0.0800	0.27
7.8 µm	7 to 8 Ø	0.0650	0.22
3.9 µm	8 to 9 Ø	0.0200	0.07
1.95 μm	9 to 10 Ø	0.0850	0.28
0.98 µm	> 10 Ø	0.0750	0.25
		30.2473	100.49

K1300396Wet.SC4 \1/29/2013 Page No.:

## Now Part of ALS Group Analytical Report

Client:ADH Environmental Inc.Service Request:K1300396Project:ACOE Upper Guad. River Reach 12Date Collected:10/11/2012Sample Matrix:SedimentDate Received:10/16/2012

**Date Analyzed:** 10/16/2012 1/21/2013

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: UGR-R12-2012-2-2 Lab Code: K1300396-008 TRP

Sand Fraction:Dry Weight (Grams)29.8355Sand Fraction:Weight Recovered (Grams)29.9239Sand Fraction:Percent Recovery100.30

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	14.8052	48.74
Very Coarse Sand	-1 to 0 Ø	5.5528	18.28
Coarse Sand	0 to 1 Ø	4.7716	15.71
Medium Sand	1 to 2 Ø	2.7663	9.11
Fine Sand	2 to 3 Ø	1.3880	4.57
Very Fine Sand	3 to 4 Ø	0.5597	1.84
62.5 μm	4 to 5 Ø	0.1850	0.61
31.3 µm	5 to 6 Ø	0.1550	0.51
15.6 μm	6 to 7 Ø	0.0900	0.30
7.8 µm	7 to 8 Ø	0.0450	0.15
3.9 µm	8 to 9 Ø	0.0300	0.10
1.95 μm	9 to 10 Ø	0.0800	0.26
0.98 µm	> 10 Ø	0.0900	0.30
		30.5186	100.46

K1300396Wet.SC4 \1/29/2013 Page No.:

#### - Cover Page -INORGANIC ANALYSIS DATA PACKAGE

**Client:** ADH Environmental Inc. Service Request: K1300396

**Project Name:** ACOE Upper Guad. River Reach 12 Project No.:

Sample Name:	Lab Code:
UGR-R12-2012-1-1	K1300396-001
UGR-R12-2012-1-2	K1300396-002
UGR-R12-2012-1-2S	K1300396-002S
UGR-R12-2012-1-2SD	K1300396-002SD
UGR-R12-2012-1-3	K1300396-003
UGR-R12-2012-1-4	K1300396-004
UGR-R12-2012-1-5	K1300396-005
UGR-R12-2012-1-6	K1300396-006
UGR-R12-2012-2-1	K1300396-007
UGR-R12-2012-2-2	K1300396-008
UGR-R12-2012-2-3	K1300396-009
UGR-R12-2012-2-4	K1300396-010
UGR-R12-2012-2-5	K1300396-011
UGR-R12-2012-2-6	K1300396-012
UGR-R12-2012-3-1	K1300396-013
UGR-R12-2012-3-2	K1300396-014
UGR-R12-2012-3-3	K1300396-015
UGR-R12-2012-3-4	K1300396-016
Method Blank	K1300396-MB

#### **Metals** - 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: ADH Environmental Inc. Service Request: K1300396

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-1-1 Lab Code: K1300396-001

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	0.021	0.005	0.002	1.0	01/16/13	01/16/13	0.938		

% Solids: 91.6

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-1-2 Lab Code: K1300396-002

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	С	Q
Mercury	7471B	0.991	0.248	0.099	50.0	01/16/13	01/16/13	14.2		

% Solids: 95.7

#### **Metals** - 1 -

#### INORGANIC ANALYSIS DATA PACKAGE

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-1-3 Lab Code: K1300396-003

Analyt	Analysis e Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	С	Q
Mercury	7471B	0.376	0.094	0.038	20.0	01/16/13	01/16/13	6.80		

% Solids: 89.9

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-1-4 Lab Code: K1300396-004

Ana	lyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Merc	cury	7471B	0.988	0.247	0.099	50.0	01/16/13	01/16/13	11.6		

% Solids: 89.9

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-1-5 Lab Code: K1300396-005

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	0.019	0.005	0.002	1.0	01/16/13	01/16/13	0.387		

% Solids: 90.8

Client: ADH Environmental Inc. Service Request: K1300396

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-1-6 Lab Code: K1300396-006

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	0.098	0.024	0.010	5.0	01/16/13	01/16/13	3.03		

% Solids: 98.3

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-2-1 Lab Code: K1300396-007

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	0.093	0.023	0.009	5.0	01/16/13	01/16/13	1.49		

% Solids: 97.5

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-2-2 Lab Code: K1300396-008

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	0.959	0.240	0.096	50.0	01/16/13	01/16/13	13.7		

% Solids: 97.8

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-2-3 Lab Code: K1300396-009

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	0.195	0.049	0.020	10.0	01/16/13	01/16/13	4.15		

% Solids: 92.0

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-2-4 Lab Code: K1300396-010

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	1.93	0.483	0.193	100.0	01/16/13	01/16/13	18.8		

% Solids: 90.9

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-2-5 Lab Code: K1300396-011

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	С	Q
Mercury	7471B	0.019	0.005	0.002	1.0	01/16/13	01/16/13	0.613		

% Solids: 89.0

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-2-6 Lab Code: K1300396-012

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	С	Q
Mercury	7471B	0.395	0.099	0.040	20.0	01/16/13	01/16/13	10.2		

% Solids: 90.9

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-3-1 Lab Code: K1300396-013

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	0.378	0.094	0.038	20.0	01/16/13	01/16/13	9.09		

% Solids: 93.5

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-3-2 Lab Code: K1300396-014

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	0.178	0.045	0.018	10.0	01/16/13	01/16/13	3.43		

% Solids: 87.3

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-3-3 Lab Code: K1300396-015

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	С	Q
Mercury	7471B	0.347	0.087	0.035	20.0	01/16/13	01/16/13	6.08		

% Solids: 88.5

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected: 10/11/12

Project Name: ACOE Upper Guad. River Reach 12 Date Received: 10/16/12

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: UGR-R12-2012-3-4 Lab Code: K1300396-016

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Mercury	7471B	1.87	0.467	0.187	100.0	01/16/13	01/16/13	17.2		

% Solids: 93.2

#### Metals

- 1 -

#### INORGANIC ANALYSIS DATA PACKAGE

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Date Collected:

Project Name: ACOE Upper Guad. River Reach 12 Date Received:

Matrix: SEDIMENT Units: mg/Kg

Basis: DRY

Sample Name: Method Blank Lab Code: K1300396-MB

Analyte	Analysis Method	LOQ	LOD	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	С	Q
Mercury	7471B	0.020	0.005	0.002	1.0	01/16/13	01/16/13	0.005	ט	

% Solids: 100.0

#### Metals - 2a -

#### INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

CCV Source: ICV Source: Inorganic Ventures CAS MIXED

	Initial	Calibratio	on						
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	Method
Mercury	5.00	5.02	100	5.00	5.19	104	4.99	100	7471B

#### Metals - 2a -

#### INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

CCV Source: ICV Source: Inorganic Ventures CAS MIXED

	Initia:	l Calibrati	ion		Continuing Calibration					
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	Method	
Mercury				5.00	5.06	101	5.06	101	7471B	

#### Metals - 2a -

#### INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

CCV Source: ICV Source: Inorganic Ventures CAS MIXED

	Initial	Calibrati	on		Continu	ing Calik	oration		
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	Method
Mercury				5.00	5.15	103	5.03	101	7471B

#### Metals

#### - 2b -

#### CRDL STANDARD FOR AA AND ICP

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

	CRDL Stand	dard for AA		CRDL Standard for ICP Initial Final				
Analyte	True	Found	%R	True	Found	%R	Found	%R
Mercury	0.20	0.196	98				1	

Metals

- 3 -BLANKS

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

	Initial Calib. Blank				nuing Ca Blank (ug		.on		
Analyte	(ug/L)	C	1	C	2	C	3	C	Method
Mercury	0.02	Ū	0.0	2 U	0.0	)2 U	0.02	U	7471B

Metals

- 3 -BLANKS

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

	Initial Calib. Blank				nuing C lank (u	alibrati g/L)	ion		
Analyte	(ug/L)	С	1	C	2	C	3	C	Method
Mercury			0.0	)2 U	0.	02 U	0.0	2 U	7471B

## Metals - 5A -SPIKE SAMPLE RECOVERY

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Units: MG/KG

Project Name: ACOE Upper Guad. River Reach 12 Basis: DRY

Matrix: SEDIMENT % Solids: 95.7

Sample Name: UGR-R12-2012-1-2S Lab Code: K1300396-002S

Analyte	Control Limit %R	Spike Result C	Sample Result C	Spike Added	%R	Q	Method
Mercury		8.53	14.2	0.49	-1157.1		7471B

## Metals - 5A -SPIKE SAMPLE RECOVERY

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Units: MG/KG

Project Name: ACOE Upper Guad. River Reach 12 Basis: DRY

Matrix: SEDIMENT % Solids: 95.7

Sample Name: UGR-R12-2012-1-2SD Lab Code: K1300396-002SD

Analyte	Control Limit %R	Spike Result C	Sample Result C	Spike Added	%R	Q	Method
Mercury		8.71	14.2	0.49	-1120.4		7471B

## Metals - 5B -

## POST SPIKE SAMPLE RECOVERY

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Units: UG/L

Project Name: ACOE Upper Guad. River Reach 12 Basis: DRY

Matrix: WATER

Sample Name: UGR-R12-2012-1-5A Lab Code: K1300396-005A

Analyte	Control Limit %R	Spike Result C	Sample Result C	Spike Added	%R	Q	Method
Mercury	75 - 125	9.07	4.06	5.00	100		7471B

## COLUMBIA ANALYTICAL SERVICES, INC.

Now part of the ALS Group

Metals

- 6 -

### **DUPLICATES**

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Units: MG/KG

Project Name: ACOE Upper Guad. River Reach 12 Basis: DRY

Matrix: SEDIMENT % Solids: 95.7

Sample Name: UGR-R12-2012-1-2SD Lab Code: K1300396-002SD

Analyte	Control Limit	Sample (S)	С	Duplicate (D)	С	RPD	Q	Method
Mercury	20	8.53		8.71		2.1		7471B

## Metals

- 7 -

## LABORATORY CONTROL SAMPLE

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

Aqueous LCS Source: CAS MIXED Solid LCS Source:

	Aqueous	ug/L)			Soli	d (mg/l	kg)	
Analyte	True	Found	%R	True	Found	С	Limits	%R
Mercury	5.00	5.05	101.0					

## COLUMBIA ANALYTICAL SERVICES, INC.

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## Metals

- 9 -

### **ICP SERIAL DILUTIONS**

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Units: UG/L

Project Name: ACOE Upper Guad. River Reach 12

Sample Name: UGR-R12-2012-1-1L Lab Code: K1300396-001L

Analyte	Initial Sample Result (I) C	Serial Dilution Result (S)	С	% - Differ- ence	Q	м
Mercury	8.90		9.20	3.4		CV

## COLUMBIA ANALYTICAL SERVICES, INC.

Now part of the ALS Group

#### Metals

- 10 -

#### **DETECTION LIMITS**

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

ICP/ICP-MS ID #: K-CVAA-02

GFAA ID #: AA ID #:

Analyte	Wave- length (nm)	Back- ground	LOQ ug/L	LOD ug/L	MDL ug/L	м
Mercury	253.7		0.20	0.05	0.02	CV

Comments:

## Metals -13-PREPARATION LOG

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA

Project Name: ACOE Upper Guad. River Reach 12

Method: CV

Sample ID	Preparation Date	Initial Weight (g)	Final Volume(mL)
K1300396-001	01/16/13	0.52	50.0
K1300396-002	01/16/13	0.53	50.0
K1300396-002S	01/16/13	0.53	50.0
K1300396-002SD	01/16/13	0.53	50.0
K1300396-003	01/16/13	0.59	50.0
K1300396-004	01/16/13	0.56	50.0
K1300396-005	01/16/13	0.58	50.0
K1300396-006	01/16/13	0.52	50.0
K1300396-007	01/16/13	0.55	50.0
K1300396-008	01/16/13	0.53	50.0
K1300396-009	01/16/13	0.56	50.0
K1300396-010	01/16/13	0.57	50.0
K1300396-011	01/16/13	0.59	50.0
K1300396-012	01/16/13	0.56	50.0
K1300396-013	01/16/13	0.57	50.0
K1300396-014	01/16/13	0.64	50.0
K1300396-015	01/16/13	0.65	50.0
K1300396-016	01/16/13	0.57	50.0
K1300396-MB	01/16/13	0.50	50.0
LCSW	01/16/13	50.0	50.0

## COLUMBIA ANALYTICAL SERV Now part of the ALS Group

#### Metals - 14 -

### **ANALYSIS RUN LOG**

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Run Number: 011613B HG2

Project Name: ACOE Upper Guad. River Reach 12

Instrument ID Number: K-CVAA-02 Method: CV

Start Date: 01/16/13 End Date: 01/16/13

	<u> </u>		]									Ana	ıly	es	5										
Sample No.	D/F	Time	% R	A L	s B	A S	B A	B E	C D	C R	C O		P B	M G		H G	N	K	S E	A G	N A	T L	v	Z N	C N
Calibration Blank	1.0	12:59														х								П	
Standard #1	1.0	13:00														Х									
Standard #2	1.0	13:02														Х									
Standard #3	1.0	13:03														Х									
Standard #4	1.0	13:05														Х									
Standard #5	1.0	13:07														Х									
ICV1	1.0	13:10														Х									
ICB1	1.0	13:11														Х									
CRA1	1.0	13:13														Х									
CCV1	1.0	13:14														Х									
CCB1	1.0	13:16														Х									
ZZZZZZ	1.0	13:18																							
ZZZZZZ	1.0	13:19																							
ZZZZZZ	1.0	13:21																							
ZZZZZZ	1.0	13:22																							
K1300396-MB	1.0	13:24														Х									
ZZZZZZ	5.0	13:26																							
LCSW	1.0	13:27														Х									
ZZZZZZ	1.0	13:29																							
ZZZZZZ	1.0	13:31																							
ZZZZZZ	1.0	13:32																							
CCV2	1.0	13:34														Х									
CCB2	1.0	13:35														Х									
ZZZZZZ	1.0	13:37																							
K1300396-001	1.0	13:39														Х									
ZZZZZZ	1.0	13:40																							
ZZZZZZ	1.0	13:45																							
ZZZZZZ	1.0	13:49																							
ZZZZZZ	1.0	13:54																							
ZZZZZZ	1.0	13:57																							
ZZZZZZ	1.0	14:02																							
K1300396-005	1.0	14:06														Х									

<sup>\* -</sup> Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

## COLUMBIA ANALYTICAL SERV Now part of the ALS Group

#### Metals - 14 -

### **ANALYSIS RUN LOG**

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Run Number: 011613B HG2

Project Name: ACOE Upper Guad. River Reach 12

Instrument ID Number: K-CVAA-02 Method: CV

Start Date: 01/16/13 End Date: 01/16/13

	<u> </u>												-	Ana	lyt	es	3									
Sample No.	D/F	Time	% R	A L	s B	A S	B A	B E	C D	C A	C R	C O	C D	F E	P B	M G		H G	N I	K	S E	A G	N A	v	Z N	C N
ZZZZZZ	1.0	14:07																								
CCV3	1.0	14:11																х							П	
CCB3	1.0	14:12																Х								
ZZZZZZ	1.0	14:14																								
ZZZZZZ	1.0	14:17																								
ZZZZZZ	1.0	14:21																								
ZZZZZZ	1.0	14:26																								
K1300396-011	1.0	14:31																Х								
ZZZZZZ	1.0	14:33																								
ZZZZZZ	1.0	14:38																								
ZZZZZZ	1.0	14:42																								
ZZZZZZ	1.0	14:46																								
ZZZZZZ	1.0	14:50																								
CCV4	1.0	14:55																Х								
CCB4	1.0	14:56																Х								
K1300396-001L	5.0	15:02																Х								
K1300396-002	50.0	15:04																Х								
K1300396-002S	50.0	15:05																Х								
K1300396-002SD	50.0	15:07																Х								
K1300396-003	20.0	15:09																Х								
K1300396-004	50.0	15:10																Х								
K1300396-005A	1.0	15:12																Х								
K1300396-006	5.0	15:14																Х								
K1300396-007	5.0	15:15																Х								
K1300396-008	50.0	15:17																Х								
CCV5	1.0	15:18																х							П	
CCB5	1.0	15:20																х							П	
K1300396-009	10.0	15:22																х							П	
K1300396-010	100.0	15:23																х							П	
K1300396-012	20.0	15:25																Х								
K1300396-013	20.0	15:26																Х								
K1300396-014	10.0	15:28																х							П	

<sup>\* -</sup> Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

## COLUMBIA ANALYTICAL SERV Now part of the ALS Group

Metals - 14 -

### **ANALYSIS RUN LOG**

Client: ADH Environmental Inc. Service Request: K1300396

Project No.: NA Run Number: 011613B HG2

Project Name: ACOE Upper Guad. River Reach 12

Instrument ID Number: K-CVAA-02 Method: CV

Start Date: 01/16/13 End Date: 01/16/13

Sample No.	D/F	Time	% R	Analytes																							
				A L	S B	A S	B A	_	C D	C A	C R	0	_	F E	P B	M G		H G	N I	K	S E	A G	N A	T L	V	Z N	_
K1300396-015	20.0	15:30																Х									
K1300396-016	100.0	15:31																Х									
CCV6	1.0	15:33																Х									
CCB6	1.0	15:35																Х									

 $<sup>\</sup>star$  - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14