2005 Full Monitoring at the Anderson/Ketron Islands PSDDA Disposal Site

Dioxin/Furan Analysis of Archived Sediments and Tissues Supplemental Data Report

September 15, 2006

Submitted to:

Washington State Department of Natural Resources
Aquatic Resources Division
Olympia, Washington 98504

Submitted by:

Science Applications International Corporation
Environmental Sciences Division
18912 North Creek Parkway, Suite 101
Bothell, Washington 98011

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List of Acronyms and Abbreviations

BCOC	bioaccumulative chemical of concern
C	Celsius
cy	cubic yard(s)
DMMP	Dredged Material Management Program
DNR	Department of Natural Resources
EPA	Environmental Protection Agency
GC/MS	gas chromatography/mass spectrophotometry
ID	identification
kg	kilogram(s)
ng	nanogram(s)
OSI	organism sediment index
PSDDA	Puget Sound Dredged Disposal Analysis
SAIC	Science Applications International Corporation
SRM	standard reference material
TOC	total organic carbon
TEF	toxic equivalent factor
TEQ	toxic equivalent quotient
TTL	target tissue level
QA1	quality assurance level 1
WHO	World Health Organization

1.0 INTRODUCTION

This report presents the results of the dioxin/furan analysis of archived sediments and tissues conducted in support of the 2005 full environmental monitoring of the Anderson/Ketron Islands non-dispersive dredged material disposal site, located near Steilacoom, WA. This report is a supplement to the 2005 Full Monitoring at Anderson/Ketron Islands Report (SAIC 2005), prepared by Science Applications International Corporation (SAIC) under contract to the Washington State Department of Natural Resources (DNR).

2.0 BACKGROUND

The Anderson/Ketron Island dredged material disposal site was established in 1989 by the Puget Sound Dredged Disposal Analysis (PSDDA) program during the Phase II studies for northern and southern Puget Sound (PSDDA, 1989a,b). To date, the disposal site has received little use, with a total of 32,826 cubic yards (cy) of dredged material placed at the site since 1989. The full monitoring program conducted in July 2005 was the first monitoring event conducted at the Anderson/Ketron site since completion of the baseline studies.

The results from the 2005 full monitoring survey generally showed that adverse impacts had not occurred at the site due to dredged material disposal (SAIC 2005). Dredged material disposed at the site remained within site boundaries, PSDDA Site Condition II chemical criteria were not exceeded (PSDDA 1988), offsite tissue chemistry showed that all bioaccumulative chemicals of concern (BCOCs) tested were below target tissue levels (TTL) and within the 1989 derived guideline values, and a relatively healthy benthic community was observed down current of the disposal site. Although a significant decrease in crustacean arthropod abundance was observed between the 1989 and 2005 surveys, significant increases in molluscs and annelids, presence of long-lived Stage III benthic succession, and high Organism Sediment Index (OSI) values observed throughout the site suggest that the differences may be related to regional changes in site conditions (SAIC and Caenum 2006).

3.0 STUDY OBJECTIVES

Although dioxins/furans are included on the primary list of BCOC compounds (List 1), the Dredged Material Management Program (DMMP) agencies did not include dioxins/furans for analysis during the 2005 Anderson/Ketron full monitoring program based on the lack of known contaminant sources near the site, and the general character of dredged material proposed for disposal at the Anderson/Ketron site. However, following completion of the 2005 full monitoring program, the DMMP agencies were presented with information suggesting that dioxins/furans may be present in sediments that are being evaluated for disposal at the Anderson/Ketron disposal site.

The DMMP agencies are currently working to establish defensible threshold concentrations for dioxins/furans at the Anderson/Ketron site. Therefore, dioxin/furan concentrations in sediments and tissues must be characterized at high resolution at the disposal site and surrounding areas (i.e., transect and benchmark stations). The data will be used as a baseline to ensure non-degradation of sediment quality at the Anderson/Ketron disposal site.

4.0 DIOXIN/FURAN ANALYSIS OF SEDIMENTS AND TISSUES

Sediment samples collected and archived during the 2005 full monitoring survey at the Anderson/Ketron site were analyzed for dioxins/furans. Frozen (-18 degrees Celsius) archived sediment samples were analyzed for one onsite, four perimeter, and two benchmark stations (Table 1 and Figure 1). A refrigerated (4 degrees Celsius) sediment sample (archived for grain size) was analyzed for one transect station. The DMMP agencies targeted colocated sediment and tissue data for this study. DMMP sample storage protocols recommend archiving dioxin/furan samples at -18 degrees Celsius with a holding time of one year.[1] However, since dioxins/furans are thought to be highly resistant to degradation and the analytical method allows a holding time of one year at 4 degrees Celsius, the DMMP decided to analyze the refrigerated transect sample.

Compsomyax subdiaphana clams, the target tissue species for chemical analysis, were generally low in abundance at the transect and benchmark stations, and only two stations (AKT01 and AKB03) showed sufficient clam densities to collect triplicate tissue samples. During the survey, all clams collected at the transect and benchmark stations were retained and archived at -18 degrees Celsius. In addition to *Compsomyax subdiaphana* clams, *Yoldia* sp. and *Macoma nasuta* clams were found at high enough abundances at some stations and retained for possible future analysis. A total of three *Compsomyax*, one *Yoldia*, and one *Macoma* samples were collected at colocated sediment sample locations and were analyzed for dioxins/furans (Table 1).

Dioxins/furans were analyzed using U.S. Environmental Protection Agency (EPA) Method 1613B, tetra- through octa-chlorinated dioxins and furans by isotope dilution high resolution gas chromatography/mass spectrophotometry (GC/MS). The analyses were conducted by Alta Analytical Laboratory, Inc., of El Dorado Hills, CA. The sediment analysis included a standard reference material (SRM 1944) and a duplicate analysis. The tissue analysis included a duplicate analysis.

Table 1. Summary of Anderson/Ketron Samples Analyzed for Dioxins/Furans

Sample ID	Sample Type	Date Collected	Archived	Date Analyzed
AKZ01	Sediment	July 6, 2005	-18 deg C	April 22, 2006
AKP01*	Sediment	July 6, 2005	-18 deg C	April 22, 2006
AKP02*	Sediment	July 7, 2005	-18 deg C	April 22, 2006
AKP03*	Sediment	July 8, 2005	-18 deg C	April 22, 2006
AKP04*	Sediment	July 7, 2005	-18 deg C	April 22, 2006
AKT01	Sediment	July 6, 2005	4 deg C	April 22, 2006
AKB02*	Sediment	July 7, 2005	-18 deg C	April 22, 2006
AKB03*	Sediment	July 8, 2005	-18 deg C	April 22, 2006
AKT01-Comp*	*Compsomyax* tissue	July 11, 2005	-18 deg C	April 22, 2006
AKT01-Yold	*Yoldia* tissue	July 11, 2005	-18 deg C	April 22, 2006
AKB02-Comp	*Compsomyax* tissue	July 7, 2005	-18 deg C	April 22, 2006
AKB03-Comp*	*Compsomyax* tissue	July 8, 2005	-18 deg C	April 22, 2006
AKB03-Mac	*Macoma* tissue	July 11, 2005	-18 deg C	April 22, 2006

* Triplicate archived samples were homogenized into one sample for dioxin/furan analysis.

[1] EPA Method 1613B specified a one-year holding time at 4 degrees Celsius in the dark.

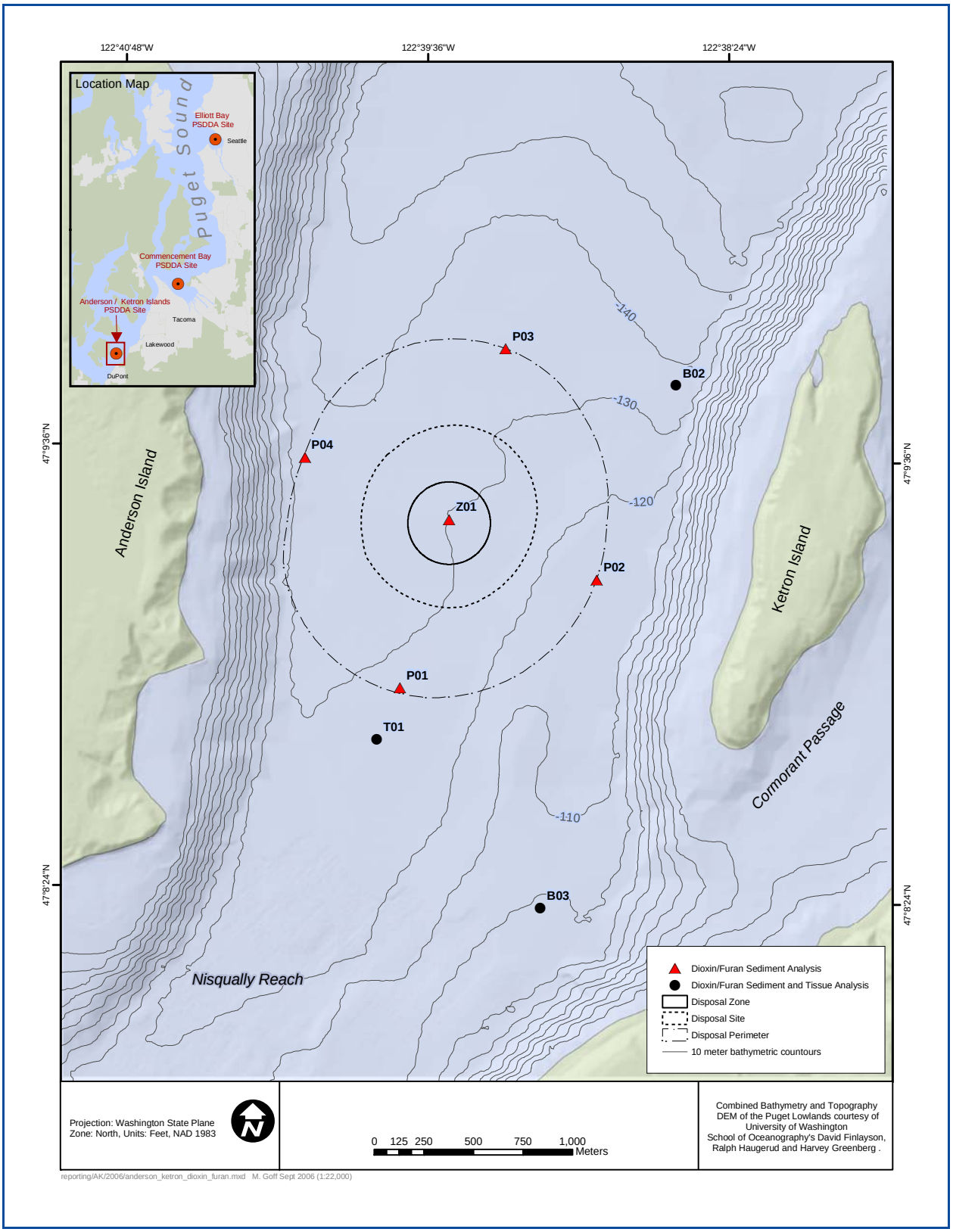

Figure 1. Anderson/Ketron Sediment and Tissue Samples Analyzed for Dioxins/Furans.

5.0 RESULTS

Dioxins/furans analyses were conducted on a total of eight sediment and five tissue samples collected at the Anderson/Ketron disposal site. Full laboratory data results and the associated quality assurance level 1 (QA1) documentation are provided in Appendix A. Toxic equivalent quotient (TEQ) data using World Health Organization (WHO) toxic equivalent factors (TEFs) for dioxins/furans (Van den Berg et al., 1998) are provided in Table 2. The table presents TEQ values using 0.5 of the quantitation limits of undetected compounds, and TEQ values omitting undetected concentrations.

The concentrations of dioxin and furan compounds are normalized to the toxicity of 2,3,7,8-TCDD using TEFs. The TEQ of a mixture is equal to the sum of the concentrations of individual congeners multiplied by their TEF (potency relative to 2,3,7,8-TCDD). The WHO TEFs are provided in Table 3. TEQ calculations using WHO TEFs are presented in Appendix B.

Table 2. TEQ Values for Anderson/Ketron Tissues and Sediments

Sample ID	Adjusted TEQ, ng/kg (0.5 x QL)	Adjusted TEQ, ng/kg (0 for ND)	Total Solids (%)[a]	TOC (%)[a]
Anderson/Ketron Sediments (ng/kg DW)				
AKZ01	3.34	3.14	51.8	1.12
AKP01	7.28	7.28	39.4*	1.47*
AKP02	2.60	2.42	51.0*	0.94*
AKP03	4.81	4.73	36.7*	1.96*
AKP04	4.94	4.70	43.7*	2.44*
AKT01	3.21	2.97	--	1.29
AKB02	1.81	1.64	55.1*	0.71*
AKB03	2.83	2.70	52.0*	1.12*
AKB03 (dupl.)	2.39	2.24	--	--

Sample ID	Adjusted TEQ, ng/kg (0.5 x QL)	Adjusted TEQ, ng/kg (0 for ND)	Solids (%)	Lipid (%)
Anderson/Ketron Tissues (ng/kg WW)				
AKT01-*Compsomyax*	0.050	0.010	7.00	0.077
AKT01-*Compsomyax* (dupl.)	0.064	0.007	7.00	0.08
AKT01-*Yoldia*	0.595	0.558	20.1	1.32
AKB02-*Compsomyax*	0.137	0.030	11.3	0.594
AKB03-*Compsomyax*	0.064	0.007	5.53	0.094
AKB03-*Macoma*	0.142	0.074	14.7	0.238

-- Not analyzed.
a Sediment total solids and total organic carbon (TOC) analyzed by Columbia Analytical Services, Kelso, WA.
* Mean of triplicate analysis results (SAIC 2005).

Table 3. Summary of WHO TEFs for Dioxins/Furans

Chemical	WHO TEFs (Van den Berg et al., 1998)
2,3,7,8-TCDD	1
1,2,3,7,8-PeCDD	1
1,2,3,4,7,8-HxCDD	0.1
1,2,3,6,7,8-HxCDD	0.1
1,2,3,7,8,9-HxCDD	0.1
1,2,3,4,6,7,8-HpCDD	0.01
OCDD	0.0001
2,3,7,8-TCDF	0.1
1,2,3,7,8-PeCDF	0.05
2,3,4,7,8-PeCDF	0.5
1,2,3,4,7,8-HxCDF	0.1
1,2,3,6,7,8-HxCDF	0.1
1,2,3,7,8,9-HxCDF	0.1
2,3,4,6,7,8-HxCDF	0.1
1,2,3,4,6,7,8-HpCDF	0.01
1,2,3,4,7,8,9-HpCDF	0.01
OCDF	0.0001

6.0 REFERENCES

Puget Sound Dredged Disposal Analysis (PSDDA). 1988. Final Environmental Impact Statement – Unconfined open-water disposal sites for dredged material, Phase I (Central Puget Sound). Puget Sound Dredged Disposal Analysis Reports Series. Cooperatively published by (in alphabetical order) U.S. Army Corps of Engineers, Seattle District; U.S. Environmental Protection Agency, Region 10; Washington State Department of Ecology; and Washington State Department of Natural Resources.

PSDDA. 1989a. Management Plan Report – Unconfined open-water disposal of dredged material, Phase II (North and South Puget Sound). Puget Sound Dredged Disposal Analysis reports series. Cooperatively published by (in alphabetical order) U.S. Army Corps of Engineers, Seattle District; U.S. Environmental Protection Agency, Region 10; Washington State Department of Ecology; and Washington State Department of Natural Resources.

PSDDA. 1989b. Final Environmental Impact Statement – Unconfined open-water disposal for dredged material, Phase II (North and South Puget Sound). Puget Sound Dredged Disposal Analysis reports series. Cooperatively published by (in alphabetical order) U.S. Army Corps of Engineers, Seattle District; U.S. Environmental Protection Agency, Region 10; Washington State Department of Ecology; and Washington State Department of Natural Resources.

SAIC. 2005. Full monitoring at the Anderson/Ketron Islands PSDDA disposal site. December 23, 2005. Submitted to the Washington State Department of Natural Resources, Olympia, WA. Submitted by Science Applications International Corporation, Bothell, WA.

SAIC and Caenum. 2006. Analysis of archived benthic samples. Supplemental data report. 2005 full monitoring at the Anderson/Ketron Islands PSDDA disposal site. August 28, 2006. Submitted to the Washington State Department of Natural Resources, Olympia, WA. Submitted by Science Applications International Corporation, Bothell, WA, and Caenum Environmental Associates, Seattle, WA.

Van den Berg, M., L. Birnbaum, A. Bosveld, B. Brunström, P. Cook, M. Feeley, J. Giesy, A. Hanberg, R. Hasegawa, S. Kennedy, T. Kubiak, J. Larsen, F. Rolaf van Leeuwen, A.K. Djien Liem, C. Nolt, R. Peterson, L. Poellinger, S. Safe, D. Schrenk, D. Tillitt, M. Tysklind, M. Younes, F. Wærn, and T. Zacharewski. 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. *Environmental Health Perspectives*. 106(12), pp. 775-792.

APPENDIX A

LABORATORY DATA REPORT AND QA1 CHECKLISTS

DIOXIN/FURAN LABORATORY DATA REPORT

May 18, 2006

Alta Project I.D.: 27543

Mr. John Nakayama
SAIC
18912 North Creek Parkway
Suite 101
Bothell, WA 98011

Dear Mr. Nakayama,

Enclosed are the amended results for the 20 sediment samples received at Alta Analytical Laboratory on April 5 and April 11, 2006 under your Project Name "Anderson/Ketron Monitoring". These samples were composited as directed in Table 3 of the Statement of Work and extracted and analyzed using EPA Method 1613 for tetra-through-octa chlorinated dioxins and furans. A standard turnaround time was provided for this work.

The 1,2,3,4,7,8-HxCDD was misidentified in nine samples in the original report.

A duplicate analysis was performed on sample "AKB03". In addition, an aliquot of SRM 1944 was extracted and analyzed; the results are included.

The following report consists of a Sample Inventory (Section I), Analytical Results (Section II) and the Appendix, which contains the chain-of-custody, a list of data qualifiers and abbreviations, Alta's current certifications, and copies of the raw data (if requested).

Alta Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-933-1640 or by email at mmaier@altalab.com. Thank you for choosing Alta as part of your analytical support team.

Sincerely,

Martha M. Maier
Director of HRMS Services

ACCREDITED IN ACCORDANCE WITH nelac

Alta Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAC for those applicable test methods. This report should not be reproduced except in full without the written approval of AALA.

nelap

Section I: Sample Inventory Report

Date Received: **4/5/2006**

Alta Lab. ID	Client Sample ID
27543-001	AKZ01
27543-002	AKT01
27543-003	AKP01-A
27543-004	AKP01-B
27543-005	AKP01-C
27543-006	AKP04-A
27543-007	AKP04-B
27543-008	AKP04-C
27543-009	AKP02-A
27543-010	AKP02-B
27543-011	AKP02-C
27543-012	AKB02-B
27543-013	AKB02-A
27543-014	AKB02-C

Section I: Sample Inventory Report

Date Received: **4/5/2006**

Alta Lab. ID	Client Sample ID
27543-015	AKB03-A
27543-016	AKB03-B
27543-017	AKB03-C
27543-018	AKP03-A
27543-019	AKP03-B
27543-020	AKP03-C
27543-021	SRM-1944
27543-022	AKP01
27543-023	AKP02
27543-024	AKP03
27543-025	AKP04
27543-026	AKB02
27543-027	AKB03

SECTION II

Method Blank **EPA Method 1613**

Matrix:	Sediment	QC Batch No.:	7954	Lab Sample:	0-MB001
Sample Size:	10.0 g	Date Extracted:	20-Apr-06	Date Analyzed DB-5:	22-Apr-06
				Date Analyzed DB-225:	NA

Analyte	Conc. (pg/g)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	ND	0.118		
1,2,3,7,8-PeCDD	ND	0.113		
1,2,3,4,7,8-HxCDD	ND	0.213		
1,2,3,6,7,8-HxCDD	ND	0.212		
1,2,3,7,8,9-HxCDD	ND	0.205		
1,2,3,4,6,7,8-HpCDD	ND	0.238		
OCDD	ND	0.409		
2,3,7,8-TCDF	ND	0.141		
1,2,3,7,8-PeCDF	ND	0.155		
2,3,4,7,8-PeCDF	ND	0.144		
1,2,3,4,7,8-HxCDF	ND	0.0987		
1,2,3,6,7,8-HxCDF	ND	0.0940		
2,3,4,6,7,8-HxCDF	ND	0.0998		
1,2,3,7,8,9-HxCDF	ND	0.149		
1,2,3,4,6,7,8-HpCDF	ND	0.117		
1,2,3,4,7,8,9-HpCDF	ND	0.144		
OCDF	ND	0.419		

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	88.4	25 - 164	
	13C-1,2,3,7,8-PeCDD	81.3	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	88.7	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	89.0	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	91.2	23 - 140	
	13C-OCDD	77.1	17 - 157	
	13C-2,3,7,8-TCDF	88.2	24 - 169	
	13C-1,2,3,7,8-PeCDF	81.9	24 - 185	
	13C-2,3,4,7,8-PeCDF	82.0	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	84.5	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	89.1	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	87.3	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	83.4	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	84.8	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	83.1	26 - 138	
	13C-OCDF	77.6	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	87.4	35 - 197	

Totals

Total TCDD	ND	0.118
Total PeCDD	ND	0.113
Total HxCDD	ND	0.210
Total HpCDD	ND	0.238
Total TCDF	ND	0.141
Total PeCDF	ND	0.150
Total HxCDF	ND	0.108
Total HpCDF	ND	0.129

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 0

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: MAS

Approved By: William J. Luksemburg 26-Apr-2006 13:27

OPR Results

EPA Method 1613

Matrix:	Sediment	QC Batch No.:	7954	Lab Sample:	0-OPR001
Sample Size:	10.0 g	Date Extracted:	20-Apr-06	Date Analyzed DB-5:	22-Apr-06
				Date Analyzed DB-225:	NA

Analyte	Spike Conc.	Conc. (ng/mL)	OPR Limits
2,3,7,8-TCDD	10.0	10.5	6.7 - 15.8
1,2,3,7,8-PeCDD	50.0	50.0	35 - 71
1,2,3,4,7,8-HxCDD	50.0	50.8	35 - 82
1,2,3,6,7,8-HxCDD	50.0	48.6	38 - 67
1,2,3,7,8,9-HxCDD	50.0	50.6	32 - 81
1,2,3,4,6,7,8-HpCDD	50.0	51.9	35 - 70
OCDD	100	101	78 - 144
2,3,7,8-TCDF	10.0	10.1	7.5 - 15.8
1,2,3,7,8-PeCDF	50.0	51.4	40 - 67
2,3,4,7,8-PeCDF	50.0	50.9	34 - 80
1,2,3,4,7,8-HxCDF	50.0	50.3	36 - 67
1,2,3,6,7,8-HxCDF	50.0	50.2	42 - 65
2,3,4,6,7,8-HxCDF	50.0	49.0	35 - 78
1,2,3,7,8,9-HxCDF	50.0	49.5	39 - 65
1,2,3,4,6,7,8-HpCDF	50.0	49.9	41 - 61
1,2,3,4,7,8,9-HpCDF	50.0	50.5	39 - 69
OCDF	100	102	63 - 170

	Labeled Standard	%R	LCL-UCL
IS	13C-2,3,7,8-TCDD	88.0	25 - 164
	13C-1,2,3,7,8-PeCDD	86.6	25 - 181
	13C-1,2,3,4,7,8-HxCDD	86.9	32 - 141
	13C-1,2,3,6,7,8-HxCDD	89.3	28 - 130
	13C-1,2,3,4,6,7,8-HpCDD	85.9	23 - 140
	13C-OCDD	85.8	17 - 157
	13C-2,3,7,8-TCDF	86.5	24 - 169
	13C-1,2,3,7,8-PeCDF	81.9	24 - 185
	13C-2,3,4,7,8-PeCDF	85.6	21 - 178
	13C-1,2,3,4,7,8-HxCDF	83.3	26 - 152
	13C-1,2,3,6,7,8-HxCDF	91.0	26 - 123
	13C-2,3,4,6,7,8-HxCDF	88.7	28 - 136
	13C-1,2,3,7,8,9-HxCDF	87.2	29 - 147
	13C-1,2,3,4,6,7,8-HpCDF	82.4	28 - 143
	13C-1,2,3,4,7,8,9-HpCDF	83.5	26 - 138
	13C-OCDF	83.6	17 - 157
CRS	37Cl-2,3,7,8-TCDD	87.3	35 - 197

Analyst: MAS

Approved By: William J. Luksemburg 18-May-2006 14:39

Sample ID: **AKZ01** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Sediment	Lab Sample:	27543-001	Date Received:	5-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	23.5 g	QC Batch No.:	7954	Date Extracted:	20-Apr-06
Date Collected:	6-Jul-05	%Solids:	42.6	Date Analyzed DB-5:	22-Apr-06	Dates Analyzed DB-225:	24-Apr-06
Time Collected:	0936						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.265		
1,2,3,7,8-PeCDD	0.610			J
1,2,3,4,7,8-HxCDD	ND	1.40		
1,2,3,6,7,8-HxCDD	3.18			
1,2,3,7,8,9-HxCDD	1.74			J
1,2,3,4,6,7,8-HpCDD	46.9			
OCDD	339			
2,3,7,8-TCDF	1.44			
1,2,3,7,8-PeCDF	0.987			J
2,3,4,7,8-PeCDF	1.45			J
1,2,3,4,7,8-HxCDF	2.37			J
1,2,3,6,7,8-HxCDF	0.901			J
2,3,4,6,7,8-HxCDF	0.959			J
1,2,3,7,8,9-HxCDF	0.517			J
1,2,3,4,6,7,8-HpCDF	12.8			
1,2,3,4,7,8,9-HpCDF	1.00			J
OCDF	32.8			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	90.3	25 - 164	
	13C-1,2,3,7,8-PeCDD	87.4	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	92.0	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	92.2	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	90.6	23 - 140	
	13C-OCDD	82.9	17 - 157	
	13C-2,3,7,8-TCDF	91.8	24 - 169	
	13C-1,2,3,7,8-PeCDF	85.1	24 - 185	
	13C-2,3,4,7,8-PeCDF	85.6	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	84.4	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	90.8	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	90.6	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	92.0	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	89.3	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	89.8	26 - 138	
	13C-OCDF	83.2	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	94.6	35 - 197	

Totals	
Total TCDD	14.6
Total PeCDD	16.4
Total HxCDD	38.4
Total HpCDD	116
Total TCDF	13.9
Total PeCDF	14.2
Total HxCDF	21.4
Total HpCDF	41.8

14.5

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **3.17**

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: MAS

Approved By: William J. Luksemburg 18-May-2006 14:39

Sample ID: **AKT01** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Sediment	Lab Sample:	27543-002	Date Received:	5-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	19.2 g	QC Batch No.:	7954	Date Extracted:	20-Apr-06
Date Collected:	6-Jul-05	%Solids:	51.7	Date Analyzed DB-5:	22-Apr-06	Dates Analyzed DB-225:	24-Apr-06
Time Collected:	1436						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.356		
1,2,3,7,8-PeCDD	0.592			J
1,2,3,4,7,8-HxCDD	ND	1.13		
1,2,3,6,7,8-HxCDD	3.25			
1,2,3,7,8,9-HxCDD	1.69			J
1,2,3,4,6,7,8-HpCDD	47.4			
OCDD	304			
2,3,7,8-TCDF	1.67			
1,2,3,7,8-PeCDF	0.887			J
2,3,4,7,8-PeCDF	1.41			J
1,2,3,4,7,8-HxCDF	1.88			J
1,2,3,6,7,8-HxCDF	0.742			J
2,3,4,6,7,8-HxCDF	0.689			J
1,2,3,7,8,9-HxCDF	0.393			J
1,2,3,4,6,7,8-HpCDF	8.40			
1,2,3,4,7,8,9-HpCDF	0.864			J
OCDF	22.2			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	80.9	25 - 164	
	13C-1,2,3,7,8-PeCDD	83.0	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	87.9	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	86.2	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	93.3	23 - 140	
	13C-OCDD	87.5	17 - 157	
	13C-2,3,7,8-TCDF	83.7	24 - 169	
	13C-1,2,3,7,8-PeCDF	80.3	24 - 185	
	13C-2,3,4,7,8-PeCDF	80.6	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	84.9	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	92.3	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	88.9	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	85.0	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	85.4	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	87.5	26 - 138	
	13C-OCDF	87.6	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	81.0	35 - 197	

Totals		
Total TCDD	8.01	
Total PeCDD	10.6	11.1
Total HxCDD	42.6	
Total HpCDD	125	
Total TCDF	17.5	17.8
Total PeCDF	14.2	
Total HxCDF	17.6	
Total HpCDF	29.2	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **2.97**

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: MAS

Approved By: William J. Luksemburg 18-May-2006 14:39

Sample ID: **SRM-1944** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Sediment	Lab Sample:	27543-021	Date Received:	4-Mar-05
Project:	Anderson/Ketron Monitoring	Sample Size:	0.970 g	QC Batch No.:	7954	Date Extracted:	20-Apr-06
Date Collected:	NA	%Solids:	100	Date Analyzed DB-5:	22-Apr-06	Dates Analyzed DB-225:	24-Apr-06
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	122			
1,2,3,7,8-PeCDD	16.2			J
1,2,3,4,7,8-HxCDD	26.5			
1,2,3,6,7,8-HxCDD	53.5			
1,2,3,7,8,9-HxCDD	42.6			
1,2,3,4,6,7,8-HpCDD	739			
OCDD	5050			
2,3,7,8-TCDF	34.5			
1,2,3,7,8-PeCDF	47.6			
2,3,4,7,8-PeCDF	61.9			
1,2,3,4,7,8-HxCDF	195			
1,2,3,6,7,8-HxCDF	85.6			
2,3,4,6,7,8-HxCDF	58.7			
1,2,3,7,8,9-HxCDF	13.0			J
1,2,3,4,6,7,8-HpCDF	917			
1,2,3,4,7,8,9-HpCDF	39.4			
OCDF	1070			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	86.7	25 - 164	
	13C-1,2,3,7,8-PeCDD	87.6	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	89.6	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	92.4	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	98.2	23 - 140	
	13C-OCDD	89.2	17 - 157	
	13C-2,3,7,8-TCDF	85.4	24 - 169	
	13C-1,2,3,7,8-PeCDF	82.5	24 - 185	
	13C-2,3,4,7,8-PeCDF	82.4	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	87.8	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	91.4	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	88.8	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	89.4	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	90.6	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	95.4	26 - 138	
	13C-OCDF	89.0	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	89.3	35 - 197	

Totals

Total TCDD	254	257	
Total PeCDD	212		
Total HxCDD	616		
Total HpCDD	1620		
Total TCDF	880	882	
Total PeCDF	825		
Total HxCDF	957		
Total HpCDF	1320		

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **237**

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: MAS

Approved By: William J. Luksemburg 18-May-2006 14:39

Sample ID: **AKP01** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Sediment	Lab Sample:	27543-022	Date Received:	5-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	41.9 g	QC Batch No.:	7954	Date Extracted:	20-Apr-06
Date Collected:	6-Jul-05	%Solids:	24.0	Date Analyzed DB-5:	22-Apr-06	Dates Analyzed DB-225:	24-Apr-06
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	0.375			J
1,2,3,7,8-PeCDD	1.42			J
1,2,3,4,7,8-HxCDD	1.57			J
1,2,3,6,7,8-HxCDD	7.22			
1,2,3,7,8,9-HxCDD	4.11			
1,2,3,4,6,7,8-HpCDD	97.8			
OCDD	695			
2,3,7,8-TCDF	3.43			
1,2,3,7,8-PeCDF	2.11			J
2,3,4,7,8-PeCDF	3.00			
1,2,3,4,7,8-HxCDF	4.75			
1,2,3,6,7,8-HxCDF	1.76			J
2,3,4,6,7,8-HxCDF	1.83			J
1,2,3,7,8,9-HxCDF	0.983			J
1,2,3,4,6,7,8-HpCDF	24.5			
1,2,3,4,7,8,9-HpCDF	1.78			J
OCDF	69.6			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	87.2	25 - 164	
	13C-1,2,3,7,8-PeCDD	87.4	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	92.9	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	91.2	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	96.4	23 - 140	
	13C-OCDD	96.1	17 - 157	
	13C-2,3,7,8-TCDF	89.0	24 - 169	
	13C-1,2,3,7,8-PeCDF	87.0	24 - 185	
	13C-2,3,4,7,8-PeCDF	85.6	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	90.8	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	94.6	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	90.1	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	90.7	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	90.1	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	93.8	26 - 138	
	13C-OCDF	93.6	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	86.9	35 - 197	

Totals		
Total TCDD	19.0	19.3
Total PeCDD	23.9	
Total HxCDD	86.8	
Total HpCDD	223	
Total TCDF	33.2	33.7
Total PeCDF	31.3	
Total HxCDF	44.4	
Total HpCDF	80.4	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **7.26**

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: MAS

Approved By: William J. Luksemburg 26-Apr-2006 13:27

Sample ID: **AKP02** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Sediment	Lab Sample:	27543-023	Date Received:	5-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	20.4 g	QC Batch No.:	7954	Date Extracted:	20-Apr-06
Date Collected:	7-Jul-05	%Solids:	50.0	Date Analyzed DB-5:	22-Apr-06	Dates Analyzed DB-225:	24-Apr-06
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.211		
1,2,3,7,8-PeCDD	0.449			J
1,2,3,4,7,8-HxCDD	ND	0.987		
1,2,3,6,7,8-HxCDD	3.04			
1,2,3,7,8,9-HxCDD	1.62			J
1,2,3,4,6,7,8-HpCDD	44.0			
OCDD	287			
2,3,7,8-TCDF	1.21			
1,2,3,7,8-PeCDF	0.646			J
2,3,4,7,8-PeCDF	1.02			J
1,2,3,4,7,8-HxCDF	1.46			J
1,2,3,6,7,8-HxCDF	0.571			J
2,3,4,6,7,8-HxCDF	0.666			J
1,2,3,7,8,9-HxCDF	ND	0.427		
1,2,3,4,6,7,8-HpCDF	9.52			
1,2,3,4,7,8,9-HpCDF	0.651			J
OCDF	23.2			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	84.7	25 - 164	
	13C-1,2,3,7,8-PeCDD	83.4	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	86.5	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	84.3	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	87.2	23 - 140	
	13C-OCDD	79.3	17 - 157	
	13C-2,3,7,8-TCDF	85.7	24 - 169	
	13C-1,2,3,7,8-PeCDF	82.2	24 - 185	
	13C-2,3,4,7,8-PeCDF	81.6	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	87.6	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	90.4	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	85.5	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	84.6	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	79.3	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	86.0	26 - 138	
	13C-OCDF	79.1	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	85.5	35 - 197	

Totals	
Total TCDD	5.39
Total PeCDD	8.71
Total HxCDD	37.4
Total HpCDD	114
Total TCDF	12.0
Total PeCDF	10.6
Total HxCDF	15.4
Total HpCDF	30.7

	EMPC[b]
Total TCDF	12.5
Total PeCDF	10.8

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 2.47

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: MAS

Approved By: William J. Luksemburg 18-May-2006 14:39

Sample ID: **AKP03** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Sediment	Lab Sample:	27543-024	Date Received:	5-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	26.2 g	QC Batch No.:	7954	Date Extracted:	20-Apr-06
Date Collected:	8-Jul-05	%Solids:	38.1	Date Analyzed DB-5:	22-Apr-06	Dates Analyzed DB-225:	24-Apr-06
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	0.286			J
1,2,3,7,8-PeCDD	0.959			J
1,2,3,4,7,8-HxCDD	ND	1.46		
1,2,3,6,7,8-HxCDD	4.30			
1,2,3,7,8,9-HxCDD	2.46			J
1,2,3,4,6,7,8-HpCDD	53.1			
OCDD	344			
2,3,7,8-TCDF	2.65			
1,2,3,7,8-PeCDF	1.63			J
2,3,4,7,8-PeCDF	2.28			J
1,2,3,4,7,8-HxCDF	3.15			
1,2,3,6,7,8-HxCDF	1.10			J
2,3,4,6,7,8-HxCDF	1.27			J
1,2,3,7,8,9-HxCDF	0.644			J
1,2,3,4,6,7,8-HpCDF	13.1			
1,2,3,4,7,8,9-HpCDF	1.05			J
OCDF	37.8			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	89.9	25 - 164	
	13C-1,2,3,7,8-PeCDD	91.0	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	92.8	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	92.2	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	95.4	23 - 140	
	13C-OCDD	86.3	17 - 157	
	13C-2,3,7,8-TCDF	90.3	24 - 169	
	13C-1,2,3,7,8-PeCDF	88.8	24 - 185	
	13C-2,3,4,7,8-PeCDF	88.4	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	93.4	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	94.6	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	91.3	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	90.5	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	88.4	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	91.6	26 - 138	
	13C-OCDF	86.8	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	90.2	35 - 197	

Totals		
Total TCDD	11.3	11.9
Total PeCDD	15.2	
Total HxCDD	55.8	
Total HpCDD	134	
Total TCDF	25.2	25.6
Total PeCDF	22.5	22.6
Total HxCDF	29.2	
Total HpCDF	49.8	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **4.60**

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: MAS

Approved By: William J. Luksemburg 18-May-2006 14:39

Sample ID: **AKP04** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Sediment	Lab Sample:	27543-025	Date Received:	5-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	25.4 g	QC Batch No.:	7954	Date Extracted:	20-Apr-06
Date Collected:	7-Jul-05	%Solids:	39.1	Date Analyzed DB-5:	22-Apr-06	Dates Analyzed DB-225:	25-Apr-06
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.325		
1,2,3,7,8-PeCDD	0.795			J
1,2,3,4,7,8-HxCDD	ND	1.55		
1,2,3,6,7,8-HxCDD	3.80			
1,2,3,7,8,9-HxCDD	2.14			J
1,2,3,4,6,7,8-HpCDD	52.3			
OCDD	390			
2,3,7,8-TCDF	1.99			
1,2,3,7,8-PeCDF	2.52			J
2,3,4,7,8-PeCDF	2.28			J
1,2,3,4,7,8-HxCDF	6.61			
1,2,3,6,7,8-HxCDF	2.32			J
2,3,4,6,7,8-HxCDF	1.28			J
1,2,3,7,8,9-HxCDF	0.997			J
1,2,3,4,6,7,8-HpCDF	14.3			
1,2,3,4,7,8,9-HpCDF	1.41			J
OCDF	33.7			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	90.6	25 - 164	
	13C-1,2,3,7,8-PeCDD	88.3	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	91.0	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	91.4	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	95.0	23 - 140	
	13C-OCDD	86.1	17 - 157	
	13C-2,3,7,8-TCDF	89.3	24 - 169	
	13C-1,2,3,7,8-PeCDF	86.7	24 - 185	
	13C-2,3,4,7,8-PeCDF	86.5	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	91.0	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	95.6	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	90.0	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	89.1	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	86.1	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	90.1	26 - 138	
	13C-OCDF	84.1	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	91.6	35 - 197	

Totals		
Total TCDD	9.14	9.68
Total PeCDD	12.9	13.2
Total HxCDD	47.2	
Total HpCDD	124	
Total TCDF	19.5	19.9
Total PeCDF	19.9	20.5
Total HxCDF	31.9	
Total HpCDF	43.9	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **4.68**

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: MAS

Approved By: William J. Luksemburg 18-May-2006 14:39

Sample ID: **AKB02** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Sediment	Lab Sample:	27543-026	Date Received:	5-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	18.8 g	QC Batch No.:	7954	Date Extracted:	20-Apr-06
Date Collected:	8-Jul-05	%Solids:	53.2	Date Analyzed DB-5:	22-Apr-06	Date Analyzed DB-225:	NA
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.207		
1,2,3,7,8-PeCDD	0.420			J
1,2,3,4,7,8-HxCDD	ND	0.835		
1,2,3,6,7,8-HxCDD	1.70			J
1,2,3,7,8,9-HxCDD	0.913			J
1,2,3,4,6,7,8-HpCDD	23.4			
OCDD	179			
2,3,7,8-TCDF	0.987			
1,2,3,7,8-PeCDF	ND		0.415	
2,3,4,7,8-PeCDF	0.723			J
1,2,3,4,7,8-HxCDF	0.979			J
1,2,3,6,7,8-HxCDF	0.335			J
2,3,4,6,7,8-HxCDF	0.544			J
1,2,3,7,8,9-HxCDF	ND	0.226		
1,2,3,4,6,7,8-HpCDF	5.58			
1,2,3,4,7,8,9-HpCDF	0.361			J
OCDF	13.3			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	88.9	25 - 164	
	13C-1,2,3,7,8-PeCDD	90.7	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	91.3	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	92.2	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	93.9	23 - 140	
	13C-OCDD	80.6	17 - 157	
	13C-2,3,7,8-TCDF	89.9	24 - 169	
	13C-1,2,3,7,8-PeCDF	89.3	24 - 185	
	13C-2,3,4,7,8-PeCDF	86.1	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	94.5	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	95.2	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	90.7	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	90.6	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	87.1	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	92.6	26 - 138	
	13C-OCDF	81.5	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	88.6	35 - 197	

Totals	
Total TCDD	4.95
Total PeCDD	5.78
Total HxCDD	21.2
Total HpCDD	57.3
Total TCDF	9.26
Total PeCDF	7.30
Total HxCDF	11.0
Total HpCDF	17.3

	5.91
	9.88
	7.93
	11.3

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 1.60

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: MAS

Approved By: William J. Luksemburg 18-May-2006 14:39

Sample ID: **AKB03** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Sediment	Lab Sample:	27543-027	Date Received:	5-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	21.2 g	QC Batch No.:	7954	Date Extracted:	20-Apr-06
Date Collected:	8-Jul-05	%Solids:	47.6	Date Analyzed DB-5:	22-Apr-06	Dates Analyzed DB-225:	25-Apr-06
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.154		
1,2,3,7,8-PeCDD	0.565			J
1,2,3,4,7,8-HxCDD	ND	1.17		
1,2,3,6,7,8-HxCDD	2.79			
1,2,3,7,8,9-HxCDD	1.58			J
1,2,3,4,6,7,8-HpCDD	41.3			
OCDD	318			
2,3,7,8-TCDF	1.14			
1,2,3,7,8-PeCDF	0.687			J
2,3,4,7,8-PeCDF	1.23			J
1,2,3,4,7,8-HxCDF	1.77			J
1,2,3,6,7,8-HxCDF	0.684			J
2,3,4,6,7,8-HxCDF	0.755			J
1,2,3,7,8,9-HxCDF	0.345			J
1,2,3,4,6,7,8-HpCDF	12.1			
1,2,3,4,7,8,9-HpCDF	0.773			J
OCDF	29.7			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	83.2	25 - 164	
	13C-1,2,3,7,8-PeCDD	78.0	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	80.0	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	77.5	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	79.9	23 - 140	
	13C-OCDD	66.1	17 - 157	
	13C-2,3,7,8-TCDF	84.7	24 - 169	
	13C-1,2,3,7,8-PeCDF	77.0	24 - 185	
	13C-2,3,4,7,8-PeCDF	77.5	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	75.8	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	77.4	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	75.6	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	81.5	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	71.0	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	76.8	26 - 138	
	13C-OCDF	68.0	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	84.7	35 - 197	

Totals		
Total TCDD	5.93	6.28
Total PeCDD	9.73	
Total HxCDD	34.6	
Total HpCDD	99.7	
Total TCDF	11.9	12.3
Total PeCDF	11.8	12.0
Total HxCDF	18.3	
Total HpCDF	39.6	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **2.73**

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: MAS

Approved By: William J. Luksemburg 18-May-2006 14:39

Sample ID: **AKB03** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Sediment	Lab Sample:	27543-027D	Date Received:	5-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	21.3 g	QC Batch No.:	7954	Date Extracted:	20-Apr-06
Date Collected:	8-Jul-05	%Solids:	47.6	Date Analyzed DB-5:	22-Apr-06	Dates Analyzed DB-225:	25-Apr-06
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.212		
1,2,3,7,8-PeCDD	0.572			J
1,2,3,4,7,8-HxCDD	ND	0.970		
1,2,3,6,7,8-HxCDD	2.27			J
1,2,3,7,8,9-HxCDD	1.24			J
1,2,3,4,6,7,8-HpCDD	28.6			
OCDD	203			
2,3,7,8-TCDF	1.04			
1,2,3,7,8-PeCDF	0.684			J
2,3,4,7,8-PeCDF	0.969			J
1,2,3,4,7,8-HxCDF	1.53			J
1,2,3,6,7,8-HxCDF	0.662			J
2,3,4,6,7,8-HxCDF	0.566			J
1,2,3,7,8,9-HxCDF	0.260			J
1,2,3,4,6,7,8-HpCDF	7.57			
1,2,3,4,7,8,9-HpCDF	0.522			J
OCDF	19.5			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	92.0	25 - 164	
	13C-1,2,3,7,8-PeCDD	92.7	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	91.7	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	90.0	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	93.9	23 - 140	
	13C-OCDD	81.6	17 - 157	
	13C-2,3,7,8-TCDF	91.4	24 - 169	
	13C-1,2,3,7,8-PeCDF	87.3	24 - 185	
	13C-2,3,4,7,8-PeCDF	87.8	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	88.4	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	93.5	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	92.6	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	92.9	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	86.1	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	88.5	26 - 138	
	13C-OCDF	81.7	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	92.1	35 - 197	

Totals		
Total TCDD	5.15	5.98
Total PeCDD	7.83	8.14
Total HxCDD	29.4	
Total HpCDD	69.6	
Total TCDF	10.6	11.4
Total PeCDF	10.4	
Total HxCDF	13.9	
Total HpCDF	25.6	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **2.15**

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: MAS

Approved By: William J. Luksemburg 18-May-2006 14:39

APPENDIX

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank.
D	The amount reported is the maximum possible concentration due to possible chlorinated diphenylether interference.
E	The reported value exceeds the calibration range of the instrument.
H	The signal-to-noise ratio is greater than 10:1.
I	Chemical interference
J	The amount detected is below the Lower Calibration Limit of the instrument.
*	See Cover Letter
Conc.	Concentration
DL	Sample-specific estimated Detection Limit
MDL	The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero in the matrix tested.
EMPC	Estimated Maximum Possible Concentration
NA	Not applicable
RL	Reporting Limit – concentrations that corresponds to low calibration point
ND	Not Detected
TEQ	Toxic Equivalency

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

CERTIFICATIONS

Accrediting Authority	Certificate Number
State of Alaska, DEC	CA413-02
State of Arizona	AZ0639
State of Arkansas, DEQ	05-013-0
State of Arkansas, DOH	Reciprocity through CA
State of California – NELAP Primary AA	02102CA
State of Colorado	
State of Connecticut	PH-0182
State of Florida, DEP	E87777
Commonwealth of Kentucky	90063
State of Louisiana, Health and Hospitals	LA050001
State of Louisiana, DEQ	01977
State of Maine	CA0413
State of Michigan	81178087
State of Mississippi	Reciprocity through CA
Naval Facilities Engineering Service Center	
State of Nevada	CA413
State of New Jersey	CA003
State of New Mexico	Reciprocity through CA
State of New York, DOH	11411
State of North Carolina	06700
State of North Dakota, DOH	R-078
State of Oklahoma	D9919
State of Oregon	CA200001-002
State of Pennsylvania	68-00490
State of South Carolina	87002001
State of Tennessee	02996
State of Texas	TX247-2005A
U.S. Army Corps of Engineers	
State of Utah	9169330940
Commonwealth of Virginia	00013
State of Washington	C1285
State of Wisconsin	998036160
State of Wyoming	8TMS-Q

Columbia Analytical Services, Inc.
1317 South 13th, Kelso, WA 98626
Phone: (360) 5677-7222 Fax: (360) 636-1068

SR# [redacted]
PAGE _____ OF _____

27543 2.5°C

Project Name/Number:
CAS Project Manager:

Sample I.D.	Date	Time	LAB ID	Matrix	Number of Containers	SEND OUT					REMARKS
						Analysis Requested					
AKB02-B	07/07/05	1623		Sediment	1	X					
AKB02-A	07/08/05	856		Sediment	1	X					
AKB02-C	07/08/05	945		Sediment	1	X					
AKB03-A	07/08/05	1058		Sediment	1	X					
AKB03-B	07/08/05	1229		Sediment	1	X					
AKB03-C	07/08/05	1315		Sediment	1	X					
AKP03-A	07/08/05	1359		Sediment	1	X					
AKP03-B	07/08/05	1429		Sediment	1	X					
AKP03-C	07/08/05	1500		Sediment	1	X					

TURNAROUND REQUIREMENTS

_____ 24 hr _____ 48 hr _____ 5 day
_____ Standard (21 days)
_____ Provide FAX Preliminary Results

Requested Report Date:_____

REPORT REQUIREMENTS

_____ I. Routine Report: Results, Method Blank, Surrogate, as required
_____ II. Report Dup., MS, MSD as required
_____ III. Data Validation Report (includes raw data)
V. EDD

Comments/Special Instructions:

[redacted]

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Amanda Juell	Signature: Bettina J. Benedict	Signature:	Signature:
Printed Name: Amanda Juell	Printed Name: B. Benedict	Printed Name:	Printed Name:
Firm: CAS/KELSO	Firm: Alta	Firm:	Firm:
Date/Time: 4/4/06 0900	Date/Time: 4/5/06 1210	Date/Time:	Date/Time:

Columbia Analytical Services, Inc.
1317 South 13th, Kelso, WA 98626
Phone: (360) 5677-7222 Fax: (360) 636-1068

SR# [redacted]
PAGE _____ OF _____

27543 2.5°C

Project Name/Number:
CAS Project Manager:

Sample I.D.	Date	Time	LAB ID	Matrix	Number of Containers	Send out					REMARKS
AKZ01	07/06/05	936		Sediment	1	X					
AKT01	07/06/05	1436		Sediment	1	X					
AKP01-A	07/06/05	1520		Sediment	1	X					
AKP01-B	07/06/05	1601		Sediment	1	X					
AKP01-C	07/06/05	1631		Sediment	1	X					
AKP04-A	07/07/05	909		Sediment	1	X					
AKP04-B	07/07/05	950		Sediment	1	X					
AKP04-C	07/07/05	1032		Sediment	1	X					
AKP02-A	07/07/05	1438		Sediment	1	X					
AKP02-B	07/07/05	1511		Sediment	1	X					
AKP02-C	07/07/05	1542		Sediment	1	X					

Analysis Requested

TURNAROUND REQUIREMENTS

_____ 24 hr _____ 48 hr _____ 5 day
_____ Standard (21 days)
_____ Provide FAX Preliminary Results

Requested Report Date:_____

REPORT REQUIREMENTS

_____ I. Routine Report: Results, Method Blank, Surrogate, as required
_____ II. Report Dup., MS, MSD as required
_____ III. Data Validation Report (includes raw data)
V. EDD

Comments/Special Instructions:

SEDIMENT SAMPLES FORWARDED ON BEHALF OF SAIC,
PM John Nakayama, ALTA QUOTE 1192

[redacted]

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Amanda Juell	Signature: Bettina L. Benedict	Signature:	Signature:
Printed Name: Amanda Juell	Printed Name: B. Benedict	Printed Name:	Printed Name:
Firm: CAS/KELSO	Firm: Alta	Firm:	Firm:
Date/Time: 4/4/06 0900	Date/Time: 4/5/06 1210	Date/Time:	Date/Time:

18912 101 27543 ~~Acc'd~~ ~~DLB~~ 4/5/06

~~18706~~ North Creek Parkway, Suite ~~140~~
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.: 01-0236-00-9403 Project Mgr: John Nakayama
Project Name: Dioxin Analysis – Anderson/Ketron Monitoring
Project Location: Steilacoom, WA
Sample Collectors: AS, TH, JN, CE, CL
Client Name: WA DNR

Analyses / Tests: Dioxins/Furans (Method 1613)

Shipping Information: Number of Shipping Containers: ; Date Shipped: ; Carrier: ; Waybill No.:

Sample ID	Depth	Matrix	Date	Time	# of Containers	Dioxins/Furans (Method 1613)	Comments
AKPØ4-A	0-2cm	Marine Sediment	7/7/05	0909	Composite to one sample AKPØ4		Alta Quote 1192
AKPØ4-B				0950		X	
AKPØ4-C				1032			* Sediment samples are
AKBØ2-A			7/8/05	0856	Composite to one sample AKBØ2		being shipped from CAS
AKBØ2-B			7/7/05	1623		X	directly to Alta
AKBØ2-C			7/8/05	0945			
AKBØ3-A			7/8/05	1058	Composite to one sample AKBØ3		
AKBØ3-B				1229		X	
AKBØ3-C				1315			
SRM 1944						X	Provided by Alta for $50
Sediment Duplicate						X	A duplicate analysis requested of
							one of the sediment samples

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: Bettina L. Benedict	Signature:	Signature:
Date/Time: 4/3/06 1000	Date/Time: 4/4/06 0900	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: Alta	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples; • Canary: Lab Retains; • Pink: Lab Returns to Project Manager with Final Report; • Goldenrod: Retained by Sampler

* received samples on 4/5/06 under CAS's COC. ~~DLB~~ 4/5/06

2 of 3

18912 101

~~18706~~ North Creek Parkway, Suite ~~440~~
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.: 01-0236-00-9403 Project Mgr: John Nakayama
Project Name: Dioxin Analysis - Anderson/Ketron Monitoring
Project Location: Steilacoom, WA
Sample Collectors: AS, TH, JN, CE, CC
Client Name: WA DNR

Analyses / Tests: Dioxins & Furans (Method 1613)

Shipping Information:
Number of Shipping Containers:
Date Shipped:
Carrier:
Waybill No.:

Sample ID	Depth	Matrix	Date	Time	# of Containers	Dioxins & Furans (Method 1613)	Comments
AKZØ1	0-10cm	Marine Sediment	7/6/05	0936		X	Alta Quote 1192
AKTØ1	0-10cm		7/6/05	1436		X	
AKPØ1-A	0-2cm			1520	Homogenize to one sample AKPØ1		* Sediment samples are being shipped from CAS directly to Alta
AKPØ1-B				1601		X	
AKPØ1-C				1631			
AKPØ2-A			7/7/05	1438	Homogenize to one sample AKPØ2		
AKPØ2-B				1511		X	
AKPØ2-C				1542			
AKPØ3-A			7/8/05	1359	Homogenize to one sample AKPØ3		
AKPØ3-B				1429		X	
AKPØ3-C				1500			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: Bettina J. Benedict	Signature:	Signature:
Date/Time: 4/3/06 1600	Date/Time: 4/4/06 0900	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: Alta	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples; • Canary: Lab Retains; • Pink: Lab Returns to Project Manager with Final Report; • Goldenrod: Retained by Sampler

* received samples on 4/5/06 under CAS's COC. BLB 4/5/06

SAMPLE LOG-IN CHECKLIST

Alta Project #: 27543

Samples Arrival:	**Date/Time** 4/5/06 1210	**Initials:** CBB	**Location:** WR-2
Logged In:	**Date/Time** 4/5/06 1400	**Initials:** CBB	**Location:** WR-2

Delivered By:	FedEx	UPS	Cal	DHL	Hand Delivered	Other

Preservation:	Ice	Blue Ice	Dry Ice	None

Temp °C 2.5°C	**Time:** 1225	**Thermometer ID:** DT-20

	YES	NO	NA
Adequate Sample Volume Received?	✓		
Holding Time Acceptable?	✓		
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Shipping Documentation Present?	✓		
Airbill Trk # 1Z9736591348029462	✓		
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Chain of Custody / Sample Documentation Present?	✓		
COC Anomaly/Sample Acceptance Form completed?	✓		
If Chlorinated or Drinking Water Samples, Acceptable Preservation?		✓	

$Na_2S_2O_3$ Preservation Documented?			COC	Sample Container	None
Shipping Container	Alta	Client	Retain	Return	Dispose

Comments:

AKP04-A

AKB02-B

AKP02-C

AKP01-A

AKB03-C - Cracked lid 4.5.06 FEB

Samplers initials found on Sample labels

Columbia Analytical Services INC.
An Employee - Owned Company

CHAIN OF CUSTODY 27543

SR#: K0501860

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

PAGE 1 OF 1 COC #

PROJECT NAME

PROJECT NUMBER

PROJECT MANAGER Harvey, Jacky

COMPANY/ADDRESS Columbia Analytical Services 1317 S. 13th ave.

CITY/STATE/ZIP Kelso, WA 98626

E-MAIL ADDRESS

PHONE # 360-577-7222 FAX#

SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐	Volatile Organics 624☐ 8260☐	Hydrocarbons (*see below) Gas☐ 8021☐ BTEX☐ Diesel☐ Oil☐	Fuel Fingerprint (FIQ) NW-HCID Screen	Oil & Grease/TRPH 1664 SGT☐ 1664 HEM☐	PCB's Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081A☐ 8141A☐ 8151A☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	PAHS 8310☐ SIM☐	Metals, Total or Dissolved (See list below)	Cyanide☐ Hex-Chrom☐	pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020☐ AOX 1650☐ 506☐					REMARKS
AKP02-A	7/7/05	1438		Soil	1	X																			
AKB03-B	7/8/05	1229		Soil	1	X																			

sent out

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. Data Validation Report (includes all raw data)

___ IV. CLP Deliverable Report

___ V. EDD

INVOICE INFORMATION

P.O. # ___

Bill To: ___

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 Day

___ Standard (10-15 working days)

___ Provide FAX Results

___ Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:___ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Karla Smith	Signature: Francie Bishop	Signature	Signature
Date/Time: 4/10/06 1:45	Date/Time: 4.11.06 1050	Date/Time	Date/Time
Printed Name: Karla Smith	Printed Name: Francie Bishop	Printed Name	Printed Name
Firm: Columbia Analytical Services	Firm	Firm	Firm

RCOC #1 06/03

SAMPLE LOG-IN CHECKLIST

Alta Project #: 27543

Samples Arrival:	**Date/Time** 4.11.06 1050	**Initials:** FEB	**Location:** WR-2 **Shelf/Rack:**
Logged In:	**Date/Time** 4/12/06 1015	**Initials:** BJB	**Location:** WR-2 **Shelf/Rack:**

Delivered By:	FedEx	UPS	Cal	DHL	Hand Delivered	Other
Preservation:	Ice	Blue Ice	Dry Ice	None		
Temp °C 1.7	**Time:** FB ~~101~~ 1110 4.11.06	**Thermometer ID:** DT-20				

		YES	NO	NA
Adequate Sample Volume Received?		✓		
Holding Time Acceptable?		✓		
Shipping Container(s) Intact?		✓		
Shipping Custody Seals Intact?		✓		
Shipping Documentation Present?		✓		
Airbill	Trk # 1Z 973 659 13 4844 4462	✓		
Sample Container Intact?		✓		
Sample Custody Seals Intact?				✓
Chain of Custody / Sample Documentation Present?		✓		
COC Anomaly/Sample Acceptance Form completed?			✓	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?				✓

$Na_2S_2O_3$ Preservation Documented?			COC	Sample Container	None
Shipping Container	Alta	Client	Retain	Return	Dispose

Comments: Back up sample

AKP02-A

AKB03-B

Chain of Custody Anomaly/Sample Acceptance Form

Client: SAIC
Contact: John Nakayama
Fax Number: 425-4871491

Project Number 27543
Date Received: Apr 5 2006
Documented by/date: BLB 4/5/06

Please review the following information and complete the Client Authorization section. To comply with NELAC regulations, we must receive authorization before proceeding with sample analysis.
Thank You. (Fax # 916-673-0106)

The following information or item is needed to proceed with analysis:

- ☐ Complete Chain-of-Custody
- ☐ Test Method Requested
- ☐ Analyte List Requested
- ☐ Preservative
- ☐ Sample Identification
- ☐ Sample Collection Date / Time
- ☐ Collector's Name
- ☐ Sample Type
- ☐ Sample Location

The following anomalies were noted. Authorization is needed to proceed with the analysis.

Temperature outside ±2°C range Samples Affected: _____

Temperature outside _____ °C Ice present? Yes No

Sample ID Discrepancy Samples Affected _____

Sample holding time missed Samples Affected _____

Custody seals broken Samples Affected _____

Insufficient Sample Size Samples Affected _____

✓ Sample Container(s) Broken Samples Affected See below

Incorrect Container Type Samples Affected _____

Other Sample "AKT01", "AKP02-A", "AKB03-B" each container the jar is broken).

* See note below

Client Authorization

Proceed With Analysis: YES NO Signature and Date [signature] 4/10/06

Client Comments/Instructions: Proceed with AKT01. CAS will send additional sediment for AKP02-A and AKB03-B. Note: for composites, please take equal volumes from each subsample to make up the composite.

To arrive 4/11/06

ALTA Analytical Laboratory
El Dorado Hills, CA 96762

April 27, 2006

Alta Project I.D.: 27541

Mr. John Nakayama
SAIC
18912 North Creek Parkway
Suite 101
Bothell, WA 98011

Dear Mr. Nakayama,

Enclosed are the results for the nine tissue samples received at Alta Analytical Laboratory on April 04, 2006 under your Project Name "Anderson/Ketron Monitoring". These samples were composited as directed in Table 3 of the Statement of Work and extracted and analyzed using EPA Method 1613 for tetra-through-octa chlorinated dioxins and furans. A standard turnaround time was provided for this work.

A duplicate analysis was performed on sample "AKT01-COMP".

The following report consists of a Sample Inventory (Section I), Analytical Results (Section II) and the Appendix, which contains the chain-of-custody, a list of data qualifiers and abbreviations, Alta's current certifications, and copies of the raw data (if requested).

Alta Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-933-1640 or by email at mmaier@altalab.com. Thank you for choosing Alta as part of your analytical support team.

Sincerely,

Martha M. Maier
Director of HRMS Services

ACCREDITED IN ACCORDANCE WITH nelac

Alta Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAC for those applicable test methods. This report should not be reproduced except in full without the written approval of ALTA.

nelap

Section I: Sample Inventory Report

Date Received: **4/4/2006**

Alta Lab. ID	Client Sample ID
27541-001	AKT01-A
27541-002	AKT01-B
27541-003	AKT01-C
27541-004	AKB03-A
27541-005	AKB03-B
27541-006	AKB03-C
27541-007	AKT01-YOLD
27541-008	AKB02-COMP
27541-009	AKB03-MAC
27541-010	AKT01-COMP
27541-011	AKB03-COMP

SECTION II

Method Blank **EPA Method 1613**

Matrix:	Tissue	QC Batch No.:	7949	Lab Sample:	0-MB001
Sample Size:	50.0 g	Date Extracted:	19-Apr-06	Date Analyzed DB-5:	22-Apr-06
				Date Analyzed DB-225:	NA

Analyte	Conc. (pg/g)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	ND	0.0174		
1,2,3,7,8-PeCDD	ND	0.0233		
1,2,3,4,7,8-HxCDD	ND	0.0361		
1,2,3,6,7,8-HxCDD	ND	0.0369		
1,2,3,7,8,9-HxCDD	ND	0.0353		
1,2,3,4,6,7,8-HpCDD	0.0770			J
OCDD	1.44			
2,3,7,8-TCDF	ND	0.0166		
1,2,3,7,8-PeCDF	ND	0.0321		
2,3,4,7,8-PeCDF	ND	0.0313		
1,2,3,4,7,8-HxCDF	ND	0.0145		
1,2,3,6,7,8-HxCDF	ND	0.0141		
2,3,4,6,7,8-HxCDF	ND	0.0167		
1,2,3,7,8,9-HxCDF	ND	0.0260		
1,2,3,4,6,7,8-HpCDF	ND	0.0207		
1,2,3,4,7,8,9-HpCDF	ND	0.0232		
OCDF	ND	0.0839		

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	83.7	25 - 164	
	13C-1,2,3,7,8-PeCDD	73.2	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	84.4	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	88.7	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	79.6	23 - 140	
	13C-OCDD	49.3	17 - 157	
	13C-2,3,7,8-TCDF	83.2	24 - 169	
	13C-1,2,3,7,8-PeCDF	79.8	24 - 185	
	13C-2,3,4,7,8-PeCDF	81.1	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	95.1	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	95.8	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	89.8	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	80.7	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	80.3	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	81.0	26 - 138	
	13C-OCDF	57.6	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	96.7	35 - 197	

Totals

Total TCDD	ND	0.0174
Total PeCDD	ND	0.0233
Total HxCDD	ND	0.0361
Total HpCDD	0.149	
Total TCDF	ND	0.0166
Total PeCDF	ND	0.0317
Total HxCDF	ND	0.0172
Total HpCDF	ND	0.0218

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 0.00221

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: JMH

Approved By: William J. Luksemburg 27-Apr-2006 08:23

OPR Results

EPA Method 1613

Matrix:	Tissue	QC Batch No.:	7949	Lab Sample:	0-OPR001
Sample Size:	50.0 g	Date Extracted:	19-Apr-06	Date Analyzed DB-5:	22-Apr-06
				Date Analyzed DB-225:	NA

Analyte	Spike Conc.	Conc. (ng/mL)	OPR Limits
2,3,7,8-TCDD	10.0	10.1	6.7 - 15.8
1,2,3,7,8-PeCDD	50.0	56.8	35 - 71
1,2,3,4,7,8-HxCDD	50.0	52.4	35 - 82
1,2,3,6,7,8-HxCDD	50.0	54.0	38 - 67
1,2,3,7,8,9-HxCDD	50.0	52.7	32 - 81
1,2,3,4,6,7,8-HpCDD	50.0	53.4	35 - 70
OCDD	100	110	78 - 144
2,3,7,8-TCDF	10.0	10.2	7.5 - 15.8
1,2,3,7,8-PeCDF	50.0	51.5	40 - 67
2,3,4,7,8-PeCDF	50.0	52.0	34 - 80
1,2,3,4,7,8-HxCDF	50.0	53.3	36 - 67
1,2,3,6,7,8-HxCDF	50.0	52.6	42 - 65
2,3,4,6,7,8-HxCDF	50.0	52.6	35 - 78
1,2,3,7,8,9-HxCDF	50.0	51.9	39 - 65
1,2,3,4,6,7,8-HpCDF	50.0	51.1	41 - 61
1,2,3,4,7,8,9-HpCDF	50.0	51.8	39 - 69
OCDF	100	97.9	63 - 170

	Labeled Standard	%R	LCL-UCL
IS	13C-2,3,7,8-TCDD	88.1	25 - 164
	13C-1,2,3,7,8-PeCDD	75.7	25 - 181
	13C-1,2,3,4,7,8-HxCDD	86.2	32 - 141
	13C-1,2,3,6,7,8-HxCDD	90.3	28 - 130
	13C-1,2,3,4,6,7,8-HpCDD	83.2	23 - 140
	13C-OCDD	59.4	17 - 157
	13C-2,3,7,8-TCDF	87.9	24 - 169
	13C-1,2,3,7,8-PeCDF	84.8	24 - 185
	13C-2,3,4,7,8-PeCDF	84.2	21 - 178
	13C-1,2,3,4,7,8-HxCDF	94.2	26 - 152
	13C-1,2,3,6,7,8-HxCDF	97.7	26 - 123
	13C-2,3,4,6,7,8-HxCDF	90.9	28 - 136
	13C-1,2,3,7,8,9-HxCDF	83.4	29 - 147
	13C-1,2,3,4,6,7,8-HpCDF	84.2	28 - 143
	13C-1,2,3,4,7,8,9-HpCDF	84.1	26 - 138
	13C-OCDF	65.9	17 - 157
CRS	37Cl-2,3,7,8-TCDD	100	35 - 197

Analyst: JMH

Approved By: William J. Luksemburg 27-Apr-2006 08:23

Sample ID: **AKT01-YOLD** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Tissue	Lab Sample:	27541-007	Date Received:	4-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	50.3 g	QC Batch No.:	7949	Date Extracted:	19-Apr-06
Date Collected:	11-Jul-05	%Lipids:	1.32	Date Analyzed DB-5:	22-Apr-06	Dates Analyzed DB-225:	26-Apr-06
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.0308		
1,2,3,7,8-PeCDD	0.121			J
1,2,3,4,7,8-HxCDD	ND	0.332		
1,2,3,6,7,8-HxCDD	0.524			
1,2,3,7,8,9-HxCDD	0.215			J
1,2,3,4,6,7,8-HpCDD	4.67			B
OCDD	24.1			B
2,3,7,8-TCDF	0.496			
1,2,3,7,8-PeCDF	0.283			J
2,3,4,7,8-PeCDF	0.320			J
1,2,3,4,7,8-HxCDF	0.514			
1,2,3,6,7,8-HxCDF	0.141			J
2,3,4,6,7,8-HxCDF	0.114			J
1,2,3,7,8,9-HxCDF	ND	0.107		
1,2,3,4,6,7,8-HpCDF	1.24			
1,2,3,4,7,8,9-HpCDF	0.0731			J
OCDF	1.93			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	82.2	25 - 164	
	13C-1,2,3,7,8-PeCDD	67.5	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	80.8	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	82.6	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	80.9	23 - 140	
	13C-OCDD	53.6	17 - 157	
	13C-2,3,7,8-TCDF	83.1	24 - 169	
	13C-1,2,3,7,8-PeCDF	76.1	24 - 185	
	13C-2,3,4,7,8-PeCDF	75.4	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	86.1	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	89.0	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	83.4	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	79.5	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	79.5	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	82.4	26 - 138	
	13C-OCDF	60.6	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	87.9	35 - 197	

Totals			
Total TCDD	2.01		
Total PeCDD	1.82	1.90	
Total HxCDD	4.96		
Total HpCDD	11.2		B
Total TCDF	5.56	5.75	D
Total PeCDF	3.94		D
Total HxCDF	3.29		D
Total HpCDF	1.31	3.09	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **0.521**

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: DMS

Approved By: William J. Luksemburg 27-Apr-2006 08:23

Sample ID: **AKB02-COMP** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Tissue	Lab Sample:	27541-008	Date Received:	4-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	22.4 g	QC Batch No.:	7949	Date Extracted:	19-Apr-06
Date Collected:	7-Jul-05	%Lipids:	0.594	Date Analyzed DB-5:	22-Apr-06	Date Analyzed DB-225:	NA
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.0439		
1,2,3,7,8-PeCDD	ND	0.0766		
1,2,3,4,7,8-HxCDD	ND	0.0937		
1,2,3,6,7,8-HxCDD	ND	0.0918		
1,2,3,7,8,9-HxCDD	ND	0.0897		
1,2,3,4,6,7,8-HpCDD	0.960			J,B
OCDD	6.31			B
2,3,7,8-TCDF	0.119			J
1,2,3,7,8-PeCDF	ND	0.0920		
2,3,4,7,8-PeCDF	ND	0.0928		
1,2,3,4,7,8-HxCDF	0.0554			J
1,2,3,6,7,8-HxCDF	ND	0.0339		
2,3,4,6,7,8-HxCDF	ND	0.0408		
1,2,3,7,8,9-HxCDF	ND	0.0604		
1,2,3,4,6,7,8-HpCDF	0.246			J
1,2,3,4,7,8,9-HpCDF	ND	0.0563		
OCDF	0.403			J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	76.7	25 - 164	
	13C-1,2,3,7,8-PeCDD	67.3	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	75.4	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	78.9	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	73.7	23 - 140	
	13C-OCDD	52.5	17 - 157	
	13C-2,3,7,8-TCDF	78.6	24 - 169	
	13C-1,2,3,7,8-PeCDF	75.9	24 - 185	
	13C-2,3,4,7,8-PeCDF	75.0	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	82.2	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	82.0	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	79.0	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	73.2	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	74.8	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	74.3	26 - 138	
	13C-OCDF	58.0	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	86.5	35 - 197	

Totals			
Total TCDD	0.220		
Total PeCDD	0.132		
Total HxCDD	0.961		
Total HpCDD	2.30		B
Total TCDF	0.478		
Total PeCDF	0.312		
Total HxCDF	0.344	0.514	
Total HpCDF	0.246	0.468	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **0.0362**

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: DMS

Approved By: William J. Luksemburg 27-Apr-2006 08:23

Sample ID: **AKB03-MAC** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Tissue	Lab Sample:	27541-009	Date Received:	4-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	50.1 g	QC Batch No.:	7949	Date Extracted:	19-Apr-06
Date Collected:	11-Jul-05	%Lipids:	0.238	Date Analyzed DB-5:	22-Apr-06	Date Analyzed DB-225:	NA
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.0351		
1,2,3,7,8-PeCDD	ND	0.0582		
1,2,3,4,7,8-HxCDD	ND	0.0907		
1,2,3,6,7,8-HxCDD	0.166			J
1,2,3,7,8,9-HxCDD	0.0971			J
1,2,3,4,6,7,8-HpCDD	1.65			B
OCDD	11.9			B
2,3,7,8-TCDF	0.103			
1,2,3,7,8-PeCDF	0.0553			J
2,3,4,7,8-PeCDF	ND	0.0599		
1,2,3,4,7,8-HxCDF	0.0829			J
1,2,3,6,7,8-HxCDF	ND	0.0135		
2,3,4,6,7,8-HxCDF	0.0403			J
1,2,3,7,8,9-HxCDF	ND	0.0259		
1,2,3,4,6,7,8-HpCDF	0.470			J
1,2,3,4,7,8,9-HpCDF	ND	0.0359		
OCDF	0.942			J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	74.2	25 - 164	
	13C-1,2,3,7,8-PeCDD	65.0	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	75.2	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	78.6	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	74.3	23 - 140	
	13C-OCDD	47.4	17 - 157	
	13C-2,3,7,8-TCDF	75.6	24 - 169	
	13C-1,2,3,7,8-PeCDF	72.0	24 - 185	
	13C-2,3,4,7,8-PeCDF	71.3	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	82.6	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	81.2	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	78.6	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	71.0	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	73.1	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	73.7	26 - 138	
	13C-OCDF	54.6	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	86.8	35 - 197	

Totals			
Total TCDD	0.169	0.233	
Total PeCDD	0.335	0.368	
Total HxCDD	1.66		
Total HpCDD	3.99		B
Total TCDF	0.521	0.671	
Total PeCDF	0.593		
Total HxCDF	0.783		
Total HpCDF	1.33		

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **0.0857**

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: DMS

Approved By: William J. Luksemburg 27-Apr-2006 08:23

Sample ID: **AKT01-COMP** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Tissue	Lab Sample:	27541-010	Date Received:	4-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	49.6 g	QC Batch No.:	7949	Date Extracted:	19-Apr-06
Date Collected:	12-Jul-05	%Lipids:	0.0770	Date Analyzed DB-5:	22-Apr-06	Date Analyzed DB-225:	NA
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.0206		
1,2,3,7,8-PeCDD	ND	0.0303		
1,2,3,4,7,8-HxCDD	ND	0.0264		
1,2,3,6,7,8-HxCDD	ND	0.0270		
1,2,3,7,8,9-HxCDD	ND	0.0258		
1,2,3,4,6,7,8-HpCDD	0.282			J,B
OCDD	2.20			B
2,3,7,8-TCDF	0.0360			J
1,2,3,7,8-PeCDF	ND	0.0303		
2,3,4,7,8-PeCDF	ND	0.0303		
1,2,3,4,7,8-HxCDF	0.0212			J
1,2,3,6,7,8-HxCDF	ND	0.0123		
2,3,4,6,7,8-HxCDF	ND	0.0150		
1,2,3,7,8,9-HxCDF	ND	0.0226		
1,2,3,4,6,7,8-HpCDF	0.0800			J
1,2,3,4,7,8,9-HpCDF	ND	0.0211		
OCDF	0.136			J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	78.6	25 - 164	
	13C-1,2,3,7,8-PeCDD	65.3	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	76.8	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	82.2	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	75.3	23 - 140	
	13C-OCDD	57.4	17 - 157	
	13C-2,3,7,8-TCDF	79.0	24 - 169	
	13C-1,2,3,7,8-PeCDF	75.5	24 - 185	
	13C-2,3,4,7,8-PeCDF	75.3	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	86.3	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	86.6	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	81.7	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	75.1	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	76.7	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	75.5	26 - 138	
	13C-OCDF	62.0	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	100	35 - 197	

Totals				
Total TCDD	0.0809			
Total PeCDD	ND	0.0303		
Total HxCDD	0.285			
Total HpCDD	0.679			B
Total TCDF	0.103			
Total PeCDF	0.0733			
Total HxCDF	0.141		0.164	
Total HpCDF	0.0800		0.200	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **0.0117**

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: DMS

Approved By: William J. Luksemburg 27-Apr-2006 08:23

Sample ID: **AKT01-COMP** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Tissue	Lab Sample:	27541-010D	Date Received:	4-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	49.8 g	QC Batch No.:	7949	Date Extracted:	19-Apr-06
Date Collected:	12-Jul-05	%Lipids:	0.0840	Date Analyzed DB-5:	22-Apr-06	Date Analyzed DB-225:	NA
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.0286		
1,2,3,7,8-PeCDD	ND	0.0346		
1,2,3,4,7,8-HxCDD	ND	0.0514		
1,2,3,6,7,8-HxCDD	ND	0.0520		
1,2,3,7,8,9-HxCDD	ND	0.0500		
1,2,3,4,6,7,8-HpCDD	0.271			J,B
OCDD	2.07			B
2,3,7,8-TCDF	0.0296			J
1,2,3,7,8-PeCDF	ND	0.0492		
2,3,4,7,8-PeCDF	ND	0.0498		
1,2,3,4,7,8-HxCDF	ND	0.0164		
1,2,3,6,7,8-HxCDF	ND	0.0158		
2,3,4,6,7,8-HxCDF	ND	0.0182		
1,2,3,7,8,9-HxCDF	ND	0.0274		
1,2,3,4,6,7,8-HpCDF	0.0799			J
1,2,3,4,7,8,9-HpCDF	ND	0.0210		
OCDF	0.155			J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	71.5	25 - 164	
	13C-1,2,3,7,8-PeCDD	64.7	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	73.3	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	77.7	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	72.6	23 - 140	
	13C-OCDD	48.8	17 - 157	
	13C-2,3,7,8-TCDF	74.6	24 - 169	
	13C-1,2,3,7,8-PeCDF	72.2	24 - 185	
	13C-2,3,4,7,8-PeCDF	70.7	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	81.1	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	81.5	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	78.8	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	72.3	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	73.2	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	74.5	26 - 138	
	13C-OCDF	55.4	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	92.0	35 - 197	

Totals

Total TCDD	0.0778
Total PeCDD	0.0418
Total HxCDD	0.276
Total HpCDD	0.645
Total TCDF	0.0920
Total PeCDF	0.0515
Total HxCDF	0.102
Total HpCDF	0.177

B

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **0.00869**

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: DMS

Approved By: William J. Luksemburg 27-Apr-2006 08:23

Sample ID: **AKB03-COMP** **EPA Method 1613**

Client Data		Sample Data		Laboratory Data			
Name:	SAIC	Matrix:	Tissue	Lab Sample:	27541-011	Date Received:	4-Apr-06
Project:	Anderson/Ketron Monitoring	Sample Size:	50.2 g	QC Batch No.:	7949	Date Extracted:	19-Apr-06
Date Collected:	12-Jul-05	%Lipids:	0.0940	Date Analyzed DB-5:	22-Apr-06	Date Analyzed DB-225:	NA
Time Collected:	NA						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.0173		
1,2,3,7,8-PeCDD	ND	0.0484		
1,2,3,4,7,8-HxCDD	ND	0.0406		
1,2,3,6,7,8-HxCDD	ND	0.0409		
1,2,3,7,8,9-HxCDD	ND	0.0394		
1,2,3,4,6,7,8-HpCDD	0.275			J,B
OCDD	2.01			B
2,3,7,8-TCDF	0.0362			J
1,2,3,7,8-PeCDF	ND	0.0572		
2,3,4,7,8-PeCDF	ND	0.0541		
1,2,3,4,7,8-HxCDF	ND	0.0110		
1,2,3,6,7,8-HxCDF	ND	0.00999		
2,3,4,6,7,8-HxCDF	ND	0.0120		
1,2,3,7,8,9-HxCDF	ND	0.0195		
1,2,3,4,6,7,8-HpCDF	0.0809			J
1,2,3,4,7,8,9-HpCDF	ND	0.0151		
OCDF	0.134			J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	73.8	25 - 164	
	13C-1,2,3,7,8-PeCDD	66.1	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	75.4	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	80.1	28 - 130	
	13C-1,2,3,4,6,7,8-HpCDD	75.0	23 - 140	
	13C-OCDD	50.5	17 - 157	
	13C-2,3,7,8-TCDF	73.4	24 - 169	
	13C-1,2,3,7,8-PeCDF	69.4	24 - 185	
	13C-2,3,4,7,8-PeCDF	68.2	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	83.7	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	86.5	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	80.7	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	73.1	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	74.1	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	76.9	26 - 138	
	13C-OCDF	58.1	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	94.9	35 - 197	

Totals			
Total TCDD	0.0720		
Total PeCDD	0.0368		
Total HxCDD	0.244		
Total HpCDD	0.632		B
Total TCDF	0.129	0.169	D
Total PeCDF	0.103		
Total HxCDF	0.0607	0.124	
Total HpCDF	0.193		

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **0.00932**

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

Analyst: DMS

Approved By: William J. Luksemburg 27-Apr-2006 08:23

APPENDIX

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank.
D	The amount reported is the maximum possible concentration due to possible chlorinated diphenylether interference.
E	The reported value exceeds the calibration range of the instrument.
H	The signal-to-noise ratio is greater than 10:1.
I	Chemical interference
J	The amount detected is below the Lower Calibration Limit of the instrument.
*	See Cover Letter
Conc.	Concentration
DL	Sample-specific estimated Detection Limit
MDL	The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero in the matrix tested.
EMPC	Estimated Maximum Possible Concentration
NA	Not applicable
RL	Reporting Limit – concentrations that corresponds to low calibration point
ND	Not Detected
TEQ	Toxic Equivalency

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

CERTIFICATIONS

Accrediting Authority	Certificate Number
State of Alaska, DEC	CA413-02
State of Arizona	AZ0639
State of Arkansas, DEQ	05-013-0
State of Arkansas, DOH	Reciprocity through CA
State of California – NELAP Primary AA	02102CA
State of Colorado	
State of Connecticut	PH-0182
State of Florida, DEP	E87777
Commonwealth of Kentucky	90063
State of Louisiana, Health and Hospitals	LA050001
State of Louisiana, DEQ	01977
State of Maine	CA0413
State of Michigan	81178087
State of Mississippi	Reciprocity through CA
Naval Facilities Engineering Service Center	
State of Nevada	CA413
State of New Jersey	CA003
State of New Mexico	Reciprocity through CA
State of New York, DOH	11411
State of North Carolina	06700
State of North Dakota, DOH	R-078
State of Oklahoma	D9919
State of Oregon	CA200001-002
State of Pennsylvania	68-00490
State of South Carolina	87002001
State of Tennessee	02996
State of Texas	TX247-2005A
U.S. Army Corps of Engineers	
State of Utah	9169330940
Commonwealth of Virginia	00013
State of Washington	C1285
State of Wisconsin	998036160
State of Wyoming	8TMS-Q

18912 101 4/5/06 B2B 255 27541 1.6°C

~~18706~~ North Creek Parkway, Suite ~~110~~
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.: 01-0236-00-9403 Project Mgr: John Nakayama
Project Name: ~~Air~~ Dioxin Analysis - Anderson Ketron Monitoring
Project Location: Steilacoom, WA
Sample Collectors: AS, TH, JN, CE, CC
Client Name: WA DNR

Shipping Information
Number of Shipping Containers:
Date Shipped:
Carrier:
Waybill No.:

Sample ID	Depth	Matrix	Date	Time	# of Containers	Dioxins & Furans (1613 Low Level)	% lipids	% Moisture	Shell clams & homogenize						Comments
AKTØ1-A		Clam Tissue	7/11/05	0915	Composite to one sample AKTØ1-Comp										Alta Quote 1192
AKTØ1-B		↓	7/12/05	0845		X	X	X							
AKTØ1-C			7/12/05	0845											*AKTØ1-Comp & AKBØ3-Comp
AKBØ3-A			7/8/05	1058	Composite to one sample AKBØ3-Comp										samples are being shipped from
AKBØ3-B			7/11/05	1600		X	X	X							ARI directly to Alta
AKBØ3-C		↓	7/12/05	1900											
AKTØ1-Yold		Clam Tissue	7/11/05		2-8oz	X	X	X	X						
AKBØ2-Comp		↓	7/7/05		1-16oz	X	X	X	X						
AKBØ3-Maco		↓	7/11/05		1-1 liter	X	X	X	X						
Tissue Duplicate						X	X	X							*Duplicate analysis only if MDLs
															are not compromised.

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: Bethany J. Benedict	Signature:	Signature:
Date/Time: 4/3/06 1000	Date/Time: 4/4/06 0900	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: Alta Analytical	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples; • Canary: Lab Retains; • Pink: Lab Returns to Project Manager with Final Report; • Goldenrod: Retained by Sampler

3 of 3

SAMPLE LOG-IN CHECKLIST

Alta Project #: 27541

Samples Arrival:	**Date/Time** 4/4/06 0900	**Initials:** BSB	**Location:** WR-2
Logged In:	**Date/Time** 4/5/06 1238	**Initials:** BSB	**Location:** WF-2 ~~WR~~ BSB 4/5/06

Delivered By:	FedEx	UPS	Cal	DHL	Hand Delivered	Other

Preservation:	Ice	Blue Ice	Dry Ice	None

Temp °C 1.6°C	**Time:** 0940	**Thermometer ID:** DT-20

		YES	NO	NA
Adequate Sample Volume Received?		✓		
Holding Time Acceptable?		✓		
Shipping Container(s) Intact?		✓		
Shipping Custody Seals Intact?		✓		
Shipping Documentation Present?		✓		
Airbill	Trk # 7919 0440 4537	✓		
Sample Container Intact?		✓		
Sample Custody Seals Intact?				✓
Chain of Custody / Sample Documentation Present?		✓		
COC Anomaly/Sample Acceptance Form completed?			✓	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?				✓

$Na_2S_2O_3$ Preservation Documented?			COC	Sample Container	None
Shipping Container	Alta	Client	Retain	Return	Dispose

Comments:

AKTØ1 - Yold
AKBØ2 - Comp
AKTØ1 - Yold
AKBØ3 - Mac

Sample containers are clear jars

Chain of Custody Anomaly/Sample Acceptance Form

Client: SAIC
Contact: John Nakayama
Fax Number: 425-4871491

Project Number 27541
Date Received: Apr 4 2006
Documented by/date: BLB 4/5/06
BLB 4/6/06

Please review the following information and complete the Client Authorization section. To comply with NELAC regulations, we must receive authorization before proceeding with sample analysis.
Thank You. (Fax # 916-673-0106)

The following information or item is needed to proceed with analysis:

- ☐ Complete Chain-of-Custody
- ☐ Test Method Requested
- ☐ Analyte List Requested
- ☐ Preservative
- ☐ Sample Identification
- ☐ Sample Collection Date / Time
- ☐ Collector's Name
- ☐ Sample Type
- ☐ Sample Location

The following anomalies were noted. Authorization is needed to proceed with the analysis.

Temperature outside ±2°C range Samples Affected: _____

Temperature outside _____ °C Ice present? Yes No

✓ Sample ID Discrepancy	Samples Affected	see below
Sample holding time missed	Samples Affected	
Custody seals broken	Samples Affected	
Insufficient Sample Size	Samples Affected	
Sample Container(s) Broken	Samples Affected	
Incorrect Container Type	Samples Affected	

Other COC I.D AKBØ3-Maco
Label ID AKBØ3-Mac

Client Authorization

Proceed With Analysis: (YES) NO Signature and Date RMH 4/10/06

Client Comments/Instructions: Please use label ID to report AKB03-Mac

2.6°c ARI I G97 27541 ~~27542~~ 1.8°C 4/7/06

SAIC

18706 North Creek Parkway, Suite 110
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.: 01-0440-00-9403 Project Mgr: J. Nakayama
Project Name: Anderson/Ketron Fish Monitoring
Project Location: Steilacoom, WA
Sample Collectors: GC, JN, RM, CE, CC
Client Name: WA DNR

Shipping Information
Number of Shipping Containers:
Date Shipped:
Carrier: By Hand
Waybill No.:

Sample ID	Depth	Matrix	Date	Time	# of Containers	Metals (BCOCs)	SVOAs (BCOCs)	Pesticides (BCOCs)	Butyltins	PCBs	Chromium VI	% Lipids	Tissue Prep			Comments
AKTØ1-A	—	Clam tissue	7/11/05	0915	1	X	X	X	X	X	X	X	X			Note: Please see Sue
AKTØ1-B	—	↓	7/12/05	0845	1	X	X	X	X	X	X	X	X			Dunnihoo regarding
AKTØ1-C	—	↓	7/12/05	0845	1	X	X	X	X	X	X	X	X			tissue prep.
AKBØ3-A	—	Clams	7/8/05	1058	1	X	X	X	X	X	X	X	X			Frozen sample
AKBØ3-B	—	↓	7/11/05	1600	2	X	X	X	X	X	X	X	X			
AKBØ3-C	—	↓	7/12/05	1900	2	X	X	X	X	X	X	X	X			TISSUE SAMPLES
																FORWARDED ON
																BEHALF OF SAIC,
																PROJ. MGR JOHN
																Nakayama,
																ALTA QUOTE 1192

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [illegible]	Signature: [illegible]	Signature:	Signature: Bettina J. Benedict
Date/Time: 7/14/05 0755	Date/Time: 7/14/05 0755	Date/Time:	Date/Time: 4/4/06 0900
Affiliation: SAIC	Affiliation: ARI	Affiliation:	Affiliation: Alta Analytical

• White: Lab Returns to Originator Upon Receipt of Samples; • Canary: Lab Retains; • Pink: Lab Returns to Project Manager with Final Report; • Goldenrod: Retained by Sampler

000007

SAMPLE LOG-IN CHECKLIST

Alta Project #: ~~27542~~ 27541 BLB 4/7/06

Samples Arrival:	**Date/Time** 4/4/06 0900		**Initials:** BLB		**Location:** WF-2	
Logged In:	**Date/Time** 4/5/06 1300		**Initials:** BLB		**Location:** WF-2	
Delivered By:	FedEx	UPS	Cal	DHL	Hand Delivered	Other
Preservation:	Ice	Blue Ice	Dry Ice	None		
Temp °C 1.8°C	**Time:** 0925		**Thermometer ID:** DT-20			

		YES	NO	NA
Adequate Sample Volume Received?		✓		
Holding Time Acceptable?		✓		
Shipping Container(s) Intact?		✓		
Shipping Custody Seals Intact?		✓		
Shipping Documentation Present?		✓		
Airbill	Trk # 7914 3132 1710	✓		
Sample Container Intact?		✓		
Sample Custody Seals Intact?				✓
Chain of Custody / Sample Documentation Present?		✓		
COC Anomaly/Sample Acceptance Form completed?			✓	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?				✓

$Na_2S_2O_3$ Preservation Documented?			COC	Sample Container	None
Shipping Container	Alta	Client	Retain	Return	Dispose

Comments:

Samples received in clear jars double bagged in Ziploc bags

AKTØ1-C
AKBØ3-C
AKBØ3-B
AKBØ3-A
AKTØ1-B
AKTØ1-A

QA1 CHECKLISTS

CHECKLIST FOR DIOXIN AND FURAN COMPOUNDS IN SEDIMENT

Project Name Anderson/Ketron Island Full Monitoring

SAIC Project No. 01-0236-00-9403-800

Lab Alta Analytical Laboratory, Inc. Lab # 27543

Responsible Technician Martha Maier, Director of HRMS Services

Reviewed by John Nakayama Date checklist prepared September 13, 2006

Date: Sampled 7/6/2005

Received by lab 4/4/2006

Analysis began Extraction: 4/20/2006 Analysis: 4/22/2006

Problems noted (e.g., deviations from prescribed methods, analytical problems)

1,2,3,4,7,8-HxCDD was misidentified in nine samples in the original report. The error was corrected and a revised data report was submitted on May 18, 2006.

NOTE: A full data validation of the Anderson/Ketron dioxin/furan results has been conducted by D.M.D. Inc., and reported separately.

All required documents submitted?[a] (Y/N) Y

Analytical method 1613B

COMPLETENESS AND HOLDING CONDITIONS

	# Samples Submitted	# Samples Analyzed
Dioxins/Furans	20	9*

Note: * Triplicate samples were submitted and homogenized into single samples. Analyses also included one duplicate and SRM 1944.

Holding conditions acceptable? (Y/N) (EPA Method 1613B recommended holding time of 1 year at 4 degrees Celsius, stored in the dark; DMMP protocols specify storage at -18 degrees Celsius) Yes

If no, identify samples

Extract conditions acceptable? (Y/N) Yes

If no, identify samples

FORMAT

Standard data report sheet

Concentrations in proper units and significant figures Yes

Qualifiers defined (e.g., U = undetected)

ND = not detected; J = amount detected is below the Lower Calibration Limit of the instrument.

QA/QC SAMPLES

Method Blank

Total # 1

Frequency 1 per batch
(minimum 1 per extraction batch)[c]

Chemicals detected

None

Analytical Replicates

Total # 1

Frequency 1 per batch

(<20 samples - 1 per set of samples submitted to lab; ≥20 samples - 1 triplicate and additional duplicate for minimum of 5% total replication)[c]

Samples/chemicals with >35% RPD or CV

1,2,3,4,6,7,8-HpCDD = 36.3%, OCDD = 44.1%, 1,2,3,4,6,7,8, HpCDF = 46.1%,

1,2,3,4,7,8,9-HpCDF = 38.8%, OCDF = 41.5%

Matrix Spikes

Total # Matrix spike not run.

Frequency

(<20 samples - 1 per set of samples submitted to lab; ≥20 samples - 5% of total samples)[c]

Chemicals outside 70-130% recovery[b]

Detection Limits

Did any DL exceed SL? (Y/N) N/A

Internal Standards

Were internal standards added to all samples?[b] (Y/N) Y

Identify compounds outside 40-135 percent recovery[b] (also identify samples)

None

Method Blanks (Relative blank contamination)

For target compounds, were sample concentrations less than 5 times the

blank concentrations? (Y/N) N

If yes, identify compounds and samples

[a] Organic Compounds

The following documentation is needed for dioxin and furan compounds:

- Ion chromatograms for HRGC/HRMS analyses
- Raw data quantification report
- Calibration data summary reporting calibration range used
- Final dilution volumes, sample size, wet-to-dry ratios, and instrument detection limit
- Method blanks
- Recovery assessments and a replicate sample summary
- Data qualification codes and their definitions

[b] Laboratory control limits

[c] For batches of 5 samples or less, the minimum QA checks should be a blank and the analysis of a CRM (and matrix spikes for any analytes not certified in the CRM). In general, the priority of QA checks for batches of ≤5 samples should be as follows: CRM > analytical replicate > matrix spikes.

[d] PSEP control limit.

An Employee-Owned Company

CHECKLIST FOR DIOXIN AND FURAN COMPOUNDS IN TISSUES

Project Name Anderson/Ketron Island Full Monitoring

SAIC Project No. 01-0236-00-9403-800

Lab Alta Analytical Laboratory, Inc. Lab # 27541

Responsible Technician Martha Maier, Director of HRMS Services

Reviewed by John Nakayama Date checklist prepared September 13, 2006

Date: Sampled 7/7/2005 – 7/11/2005

Received by lab 4/4/2006

Analysis began Extraction: 4/19/2006 Analysis: 4/22/2006

Problems noted (e.g., deviations from prescribed methods, analytical problems)

No problems noted.

NOTE: A full data validation of the Anderson/Ketron dioxin/furan results has been conducted by D.M.D. Inc., and reported separately.

All required documents submitted?[a] (Y/N) Y

Analytical method 1613B

COMPLETENESS AND HOLDING CONDITIONS

	# Samples Submitted	# Samples Analyzed
Dioxins/Furans	9	6*

Note: * Triplicate samples were submitted and homogenized into single samples. Analyses also included one duplicate analysis.

Holding conditions acceptable? (Y/N) (EPA Method 1613B recommended holding time of 1 year at 4 degrees Celsius, stored in the dark; DMMP protocols specify storage at -18 degrees Celsius) Yes

If no, identify samples

Extract conditions acceptable? (Y/N) Yes

If no, identify samples

FORMAT

Standard data report sheet

Concentrations in proper units and significant figures Yes

Qualifiers defined (e.g., U = undetected)

ND = not detected; J = amount detected is below the Lower Calibration Limit of the instrument; B = compound detected in method blank

QA/QC SAMPLES

Method Blank

Total # 1

Frequency 1 per batch
(minimum 1 per extraction batch)[c]

Chemicals detected

1,2,3,4,6,7,8-HpCDD and OCDD

Analytical Replicates

Total # 1

Frequency 1 per batch

(<20 samples - 1 per set of samples submitted to lab; ≥20 samples - 1 triplicate and additional duplicate for minimum of 5% total replication)[c]

Samples/chemicals with >35% RPD or CV

None

Matrix Spikes

Total # Matrix spike not run.

Frequency

(<20 samples - 1 per set of samples submitted to lab; ≥20 samples - 5% of total samples)[c]

Chemicals outside 70-130% recovery[b]

Detection Limits

Did any DL exceed SL? (Y/N) N/A

Internal Standards

Were internal standards added to all samples?[b] (Y/N) Y

Identify compounds outside 40-135 percent recovery[b] (also identify samples)

None

Method Blanks (Relative blank contamination)

For target compounds, were sample concentrations less than 5 times the blank concentrations? (Y/N) Y

If yes, identify compounds and samples

OCDD for AKB02-COMP, AKT01-COMP, and AKB03-COMP. 1,2,3,4,6,7,8-HpCDD for AKT01-COMP and AKB03-COMP.

[a] Organic Compounds

The following documentation is needed for dioxin and furan compounds:

- Ion chromatograms for HRGC/HRMS analyses
- Raw data quantification report
- Calibration data summary reporting calibration range used
- Final dilution volumes, sample size, wet-to-dry ratios, and instrument detection limit
- Method blanks
- Recovery assessments and a replicate sample summary
- Data qualification codes and their definitions

[b] Laboratory control limits

[c] For batches of 5 samples or less, the minimum QA checks should be a blank and the analysis of a CRM (and matrix spikes for any analytes not certified in the CRM). In general, the priority of QA checks for batches of ≤5 samples should be as follows: CRM > analytical replicate > matrix spikes.

[d] PSEP control limit.

APPENDIX B

TEQ CALCULATIONS

AKZ01	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Sediment	2,3,7,8-TCDD	1	0.265	U	2.7E-01	1.3E-01	0.0E+00
	1,2,3,7,8-PeCDD	1	0.610	J	6.1E-01	6.1E-01	6.1E-01
	1,2,3,4,7,8-HxCDD	0.1	1.40	U	1.4E-01	7.0E-02	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	3.18		3.2E-01	3.2E-01	3.2E-01
	1,2,3,7,8,9-HxCDD	0.1	1.74	J	1.7E-01	1.7E-01	1.7E-01
	1,2,3,4,6,7,8-HpCDD	0.01	46.9		4.7E-01	4.7E-01	4.7E-01
	OCDD	0.0001	339		3.4E-02	3.4E-02	3.4E-02
	2,3,7,8-TCDF	0.1	1.44		1.4E-01	1.4E-01	1.4E-01
	1,2,3,7,8-PeCDF	0.05	0.987	J	4.9E-02	4.9E-02	4.9E-02
	2,3,4,7,8-PeCDF	0.5	1.45	J	7.3E-01	7.3E-01	7.3E-01
	1,2,3,4,7,8-HxCDF	0.1	2.37	J	2.4E-01	2.4E-01	2.4E-01
	1,2,3,6,7,8-HxCDF	0.1	0.901	J	9.0E-02	9.0E-02	9.0E-02
	1,2,3,7,8,9-HxCDF	0.1	0.959	J	9.6E-02	9.6E-02	9.6E-02
	2,3,4,6,7,8-HxCDF	0.1	0.517	J	5.2E-02	5.2E-02	5.2E-02
	1,2,3,4,6,7,8-HpCDF	0.01	12.8		1.3E-01	1.3E-01	1.3E-01
	1,2,3,4,7,8,9-HpCDF	0.01	1.00	J	1.0E-02	1.0E-02	1.0E-02
	OCDF	0.0001	32.8		3.3E-03	3.3E-03	3.3E-03
			Sum		3.54423	3.34173	3.13923

AKT01	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Sediment	2,3,7,8-TCDD	1	0.356	U	3.6E-01	1.8E-01	0.0E+00
	1,2,3,7,8-PeCDD	1	0.592	J	5.9E-01	5.9E-01	5.9E-01
	1,2,3,4,7,8-HxCDD	0.1	1.13	U	1.1E-01	5.7E-02	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	3.25		3.3E-01	3.3E-01	3.3E-01
	1,2,3,7,8,9-HxCDD	0.1	1.69	J	1.7E-01	1.7E-01	1.7E-01
	1,2,3,4,6,7,8-HpCDD	0.01	47.4		4.7E-01	4.7E-01	4.7E-01
	OCDD	0.0001	304		3.0E-02	3.0E-02	3.0E-02
	2,3,7,8-TCDF	0.1	1.67		1.7E-01	1.7E-01	1.7E-01
	1,2,3,7,8-PeCDF	0.05	0.887	J	4.4E-02	4.4E-02	4.4E-02
	2,3,4,7,8-PeCDF	0.5	1.41	J	7.1E-01	7.1E-01	7.1E-01
	1,2,3,4,7,8-HxCDF	0.1	1.88	J	1.9E-01	1.9E-01	1.9E-01
	1,2,3,6,7,8-HxCDF	0.1	0.742	J	7.4E-02	7.4E-02	7.4E-02
	1,2,3,7,8,9-HxCDF	0.1	0.689	J	6.9E-02	6.9E-02	6.9E-02
	2,3,4,6,7,8-HxCDF	0.1	0.393	J	3.9E-02	3.9E-02	3.9E-02
	1,2,3,4,6,7,8-HpCDF	0.01	8.40		8.4E-02	8.4E-02	8.4E-02
	1,2,3,4,7,8,9-HpCDF	0.01	0.864	J	8.6E-03	8.6E-03	8.6E-03
	OCDF	0.0001	22.2		2.2E-03	2.2E-03	2.2E-03
			Sum		3.44101	3.20651	2.97201

AKP01	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Sediment	2,3,7,8-TCDD	1	0.375	J	3.8E-01	3.8E-01	3.8E-01
	1,2,3,7,8-PeCDD	1	1.42	J	1.4E+00	1.4E+00	1.4E+00
	1,2,3,4,7,8-HxCDD	0.1	1.57	J	1.6E-01	1.6E-01	1.6E-01
	1,2,3,6,7,8-HxCDD	0.1	7.22		7.2E-01	7.2E-01	7.2E-01
	1,2,3,7,8,9-HxCDD	0.1	4.11		4.1E-01	4.1E-01	4.1E-01
	1,2,3,4,6,7,8-HpCDD	0.01	97.8		9.8E-01	9.8E-01	9.8E-01
	OCDD	0.0001	695		7.0E-02	7.0E-02	7.0E-02
	2,3,7,8-TCDF	0.1	3.43		3.4E-01	3.4E-01	3.4E-01
	1,2,3,7,8-PeCDF	0.05	2.11	J	1.1E-01	1.1E-01	1.1E-01
	2,3,4,7,8-PeCDF	0.5	3		1.5E+00	1.5E+00	1.5E+00
	1,2,3,4,7,8-HxCDF	0.1	4.75		4.8E-01	4.8E-01	4.8E-01
	1,2,3,6,7,8-HxCDF	0.1	1.76	J	1.8E-01	1.8E-01	1.8E-01
	1,2,3,7,8,9-HxCDF	0.1	1.83	J	1.8E-01	1.8E-01	1.8E-01
	2,3,4,6,7,8-HxCDF	0.1	0.983	J	9.8E-02	9.8E-02	9.8E-02
	1,2,3,4,6,7,8-HpCDF	0.01	24.5		2.5E-01	2.5E-01	2.5E-01
	1,2,3,4,7,8,9-HpCDF	0.01	1.78	J	1.8E-02	1.8E-02	1.8E-02
	OCDF	0.0001	69.6		7.0E-03	7.0E-03	7.0E-03
			Sum		7.28306	7.28306	7.28306

AKP02	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Sediment	2,3,7,8-TCDD	1	0.211	U	2.1E-01	1.1E-01	0.0E+00
	1,2,3,7,8-PeCDD	1	0.449	J	4.5E-01	4.5E-01	4.5E-01
	1,2,3,4,7,8-HxCDD	0.1	0.987	U	9.9E-02	4.9E-02	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	3.04		3.0E-01	3.0E-01	3.0E-01
	1,2,3,7,8,9-HxCDD	0.1	1.62	J	1.6E-01	1.6E-01	1.6E-01
	1,2,3,4,6,7,8-HpCDD	0.01	44.0		4.4E-01	4.4E-01	4.4E-01
	OCDD	0.0001	287		2.9E-02	2.9E-02	2.9E-02
	2,3,7,8-TCDF	0.1	1.21		1.2E-01	1.2E-01	1.2E-01
	1,2,3,7,8-PeCDF	0.05	0.646	J	3.2E-02	3.2E-02	3.2E-02
	2,3,4,7,8-PeCDF	0.5	1.02	J	5.1E-01	5.1E-01	5.1E-01
	1,2,3,4,7,8-HxCDF	0.1	1.46	J	1.5E-01	1.5E-01	1.5E-01
	1,2,3,6,7,8-HxCDF	0.1	0.571	J	5.7E-02	5.7E-02	5.7E-02
	1,2,3,7,8,9-HxCDF	0.1	0.666	J	6.7E-02	6.7E-02	6.7E-02
	2,3,4,6,7,8-HxCDF	0.1	0.427	U	4.3E-02	2.1E-02	0.0E+00
	1,2,3,4,6,7,8-HpCDF	0.01	9.52		9.5E-02	9.5E-02	9.5E-02
	1,2,3,4,7,8,9-HpCDF	0.01	0.651	J	6.5E-03	6.5E-03	6.5E-03
	OCDF	0.0001	23.2		2.3E-03	2.3E-03	2.3E-03
			Sum		2.77313	2.59693	2.42073

AKP03	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Sediment	2,3,7,8-TCDD	1	0.286	J	2.9E-01	2.9E-01	2.9E-01
	1,2,3,7,8-PeCDD	1	0.959	J	9.6E-01	9.6E-01	9.6E-01
	1,2,3,4,7,8-HxCDD	0.1	1.46	U	1.5E-01	7.3E-02	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	4.30		4.3E-01	4.3E-01	4.3E-01
	1,2,3,7,8,9-HxCDD	0.1	2.46	J	2.5E-01	2.5E-01	2.5E-01
	1,2,3,4,6,7,8-HpCDD	0.01	53.1		5.3E-01	5.3E-01	5.3E-01
	OCDD	0.0001	344		3.4E-02	3.4E-02	3.4E-02
	2,3,7,8-TCDF	0.1	2.65		2.7E-01	2.7E-01	2.7E-01
	1,2,3,7,8-PeCDF	0.05	1.63	J	8.2E-02	8.2E-02	8.2E-02
	2,3,4,7,8-PeCDF	0.5	2.28	J	1.1E+00	1.1E+00	1.1E+00
	1,2,3,4,7,8-HxCDF	0.1	3.15		3.2E-01	3.2E-01	3.2E-01
	1,2,3,6,7,8-HxCDF	0.1	1.10	J	1.1E-01	1.1E-01	1.1E-01
	1,2,3,7,8,9-HxCDF	0.1	1.27	J	1.3E-01	1.3E-01	1.3E-01
	2,3,4,6,7,8-HxCDF	0.1	0.644	J	6.4E-02	6.4E-02	6.4E-02
	1,2,3,4,6,7,8-HpCDF	0.01	13.1		1.3E-01	1.3E-01	1.3E-01
	1,2,3,4,7,8,9-HpCDF	0.01	1.05	J	1.1E-02	1.1E-02	1.1E-02
	OCDF	0.0001	37.8		3.8E-03	3.8E-03	3.8E-03
			Sum		4.88058	4.80758	4.73458

AKP04	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Sediment	2,3,7,8-TCDD	1	0.325	U	3.3E-01	1.6E-01	0.0E+00
	1,2,3,7,8-PeCDD	1	0.795	J	8.0E-01	8.0E-01	8.0E-01
	1,2,3,4,7,8-HxCDD	0.1	1.55	U	1.6E-01	7.8E-02	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	3.80		3.8E-01	3.8E-01	3.8E-01
	1,2,3,7,8,9-HxCDD	0.1	2.14	J	2.1E-01	2.1E-01	2.1E-01
	1,2,3,4,6,7,8-HpCDD	0.01	52.3		5.2E-01	5.2E-01	5.2E-01
	OCDD	0.0001	390		3.9E-02	3.9E-02	3.9E-02
	2,3,7,8-TCDF	0.1	1.99		2.0E-01	2.0E-01	2.0E-01
	1,2,3,7,8-PeCDF	0.05	2.52	J	1.3E-01	1.3E-01	1.3E-01
	2,3,4,7,8-PeCDF	0.5	2.28	J	1.1E+00	1.1E+00	1.1E+00
	1,2,3,4,7,8-HxCDF	0.1	6.61		6.6E-01	6.6E-01	6.6E-01
	1,2,3,6,7,8-HxCDF	0.1	2.32	J	2.3E-01	2.3E-01	2.3E-01
	1,2,3,7,8,9-HxCDF	0.1	1.28	J	1.3E-01	1.3E-01	1.3E-01
	2,3,4,6,7,8-HxCDF	0.1	0.997	J	1.0E-01	1.0E-01	1.0E-01
	1,2,3,4,6,7,8-HpCDF	0.01	14.3		1.4E-01	1.4E-01	1.4E-01
	1,2,3,4,7,8,9-HpCDF	0.01	1.41	J	1.4E-02	1.4E-02	1.4E-02
	OCDF	0.0001	33.7		3.4E-03	3.4E-03	3.4E-03
			Sum		5.17717	4.93717	4.69717

AKB02	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Sediment	2,3,7,8-TCDD	1	0.207	U	2.1E-01	1.0E-01	0.0E+00
	1,2,3,7,8-PeCDD	1	0.42	J	4.2E-01	4.2E-01	4.2E-01
	1,2,3,4,7,8-HxCDD	0.1	0.835	U	8.4E-02	4.2E-02	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	1.70	J	1.7E-01	1.7E-01	1.7E-01
	1,2,3,7,8,9-HxCDD	0.1	0.913	J	9.1E-02	9.1E-02	9.1E-02
	1,2,3,4,6,7,8-HpCDD	0.01	23.4		2.3E-01	2.3E-01	2.3E-01
	OCDD	0.0001	179		1.8E-02	1.8E-02	1.8E-02
	2,3,7,8-TCDF	0.1	0.987		9.9E-02	9.9E-02	9.9E-02
	1,2,3,7,8-PeCDF	0.05	0.415	U	2.1E-02	1.0E-02	0.0E+00
	2,3,4,7,8-PeCDF	0.5	0.723	J	3.6E-01	3.6E-01	3.6E-01
	1,2,3,4,7,8-HxCDF	0.1	0.979	J	9.8E-02	9.8E-02	9.8E-02
	1,2,3,6,7,8-HxCDF	0.1	0.335	J	3.4E-02	3.4E-02	3.4E-02
	1,2,3,7,8,9-HxCDF	0.1	0.544	J	5.4E-02	5.4E-02	5.4E-02
	2,3,4,6,7,8-HxCDF	0.1	0.226	U	2.3E-02	1.1E-02	0.0E+00
	1,2,3,4,6,7,8-HpCDF	0.01	5.58		5.6E-02	5.6E-02	5.6E-02
	1,2,3,4,7,8,9-HpCDF	0.01	0.361	J	3.6E-03	3.6E-03	3.6E-03
	OCDF	0.0001	13.3		1.3E-03	1.3E-03	1.3E-03
			Sum		1.97379	1.806865	1.63994

AKB03	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Sediment	2,3,7,8-TCDD	1	0.154	U	1.5E-01	7.7E-02	0.0E+00
	1,2,3,7,8-PeCDD	1	0.565	J	5.7E-01	5.7E-01	5.7E-01
	1,2,3,4,7,8-HxCDD	0.1	1.17	U	1.2E-01	5.9E-02	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	2.79		2.8E-01	2.8E-01	2.8E-01
	1,2,3,7,8,9-HxCDD	0.1	1.58	J	1.6E-01	1.6E-01	1.6E-01
	1,2,3,4,6,7,8-HpCDD	0.01	41.3		4.1E-01	4.1E-01	4.1E-01
	OCDD	0.0001	318		3.2E-02	3.2E-02	3.2E-02
	2,3,7,8-TCDF	0.1	1.14		1.1E-01	1.1E-01	1.1E-01
	1,2,3,7,8-PeCDF	0.05	0.687	J	3.4E-02	3.4E-02	3.4E-02
	2,3,4,7,8-PeCDF	0.5	1.23	J	6.2E-01	6.2E-01	6.2E-01
	1,2,3,4,7,8-HxCDF	0.1	1.77	J	1.8E-01	1.8E-01	1.8E-01
	1,2,3,6,7,8-HxCDF	0.1	0.684	J	6.8E-02	6.8E-02	6.8E-02
	1,2,3,7,8,9-HxCDF	0.1	0.755	J	7.6E-02	7.6E-02	7.6E-02
	2,3,4,6,7,8-HxCDF	0.1	0.345	J	3.5E-02	3.5E-02	3.5E-02
	1,2,3,4,6,7,8-HpCDF	0.01	12.1		1.2E-01	1.2E-01	1.2E-01
	1,2,3,4,7,8,9-HpCDF	0.01	0.773	J	7.7E-03	7.7E-03	7.7E-03
	OCDF	0.0001	29.7		3.0E-03	3.0E-03	3.0E-03
			Sum		2.96825	2.83275	2.69725

AKB03 (Dupl.)	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Sediment	2,3,7,8-TCDD	1	0.212	U	2.1E-01	1.1E-01	0.0E+00
	1,2,3,7,8-PeCDD	1	0.572	J	5.7E-01	5.7E-01	5.7E-01
	1,2,3,4,7,8-HxCDD	0.1	0.970	U	9.7E-02	4.9E-02	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	2.27	J	2.3E-01	2.3E-01	2.3E-01
	1,2,3,7,8,9-HxCDD	0.1	1.24	J	1.2E-01	1.2E-01	1.2E-01
	1,2,3,4,6,7,8-HpCDD	0.01	28.6		2.9E-01	2.9E-01	2.9E-01
	OCDD	0.0001	203		2.0E-02	2.0E-02	2.0E-02
	2,3,7,8-TCDF	0.1	1.04		1.0E-01	1.0E-01	1.0E-01
	1,2,3,7,8-PeCDF	0.05	0.684	J	3.4E-02	3.4E-02	3.4E-02
	2,3,4,7,8-PeCDF	0.5	0.969	J	4.8E-01	4.8E-01	4.8E-01
	1,2,3,4,7,8-HxCDF	0.1	1.53	J	1.5E-01	1.5E-01	1.5E-01
	1,2,3,6,7,8-HxCDF	0.1	0.662	J	6.6E-02	6.6E-02	6.6E-02
	1,2,3,7,8,9-HxCDF	0.1	0.566	J	5.7E-02	5.7E-02	5.7E-02
	2,3,4,6,7,8-HxCDF	0.1	0.26	J	2.6E-02	2.6E-02	2.6E-02
	1,2,3,4,6,7,8-HpCDF	0.01	7.57		7.6E-02	7.6E-02	7.6E-02
	1,2,3,4,7,8,9-HpCDF	0.01	0.522	J	5.2E-03	5.2E-03	5.2E-03
	OCDF	0.0001	19.5		2.0E-03	2.0E-03	2.0E-03
			Sum		2.54567	2.39117	2.23667

AKT01-YOLD	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Tissue	2,3,7,8-TCDD	1	0.0308	U	3.1E-02	1.5E-02	0.0E+00
	1,2,3,7,8-PeCDD	1	0.121	J	1.2E-01	1.2E-01	1.2E-01
	1,2,3,4,7,8-HxCDD	0.1	0.332	U	3.3E-02	1.7E-02	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	0.524		5.2E-02	5.2E-02	5.2E-02
	1,2,3,7,8,9-HxCDD	0.1	0.215	J	2.2E-02	2.2E-02	2.2E-02
	1,2,3,4,6,7,8-HpCDD	0.01	4.67	B	4.7E-02	4.7E-02	4.7E-02
	OCDD	0.0001	24.1	B	2.4E-03	2.4E-03	2.4E-03
	2,3,7,8-TCDF	0.1	0.496		5.0E-02	5.0E-02	5.0E-02
	1,2,3,7,8-PeCDF	0.05	0.283	J	1.4E-02	1.4E-02	1.4E-02
	2,3,4,7,8-PeCDF	0.5	0.320	J	1.6E-01	1.6E-01	1.6E-01
	1,2,3,4,7,8-HxCDF	0.1	0.514		5.1E-02	5.1E-02	5.1E-02
	1,2,3,6,7,8-HxCDF	0.1	0.141	J	1.4E-02	1.4E-02	1.4E-02
	1,2,3,7,8,9-HxCDF	0.1	0.114	J	1.1E-02	1.1E-02	1.1E-02
	2,3,4,6,7,8-HxCDF	0.1	0.107	U	1.1E-02	5.4E-03	0.0E+00
	1,2,3,4,6,7,8-HpCDF	0.01	1.24		1.2E-02	1.2E-02	1.2E-02
	1,2,3,4,7,8,9-HpCDF	0.01	0.0731	J	7.3E-04	7.3E-04	7.3E-04
	OCDF	0.0001	1.93		1.9E-04	1.9E-04	1.9E-04
			Sum		0.632684	0.595334	0.557984

AKB02-COMP	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Tissue	2,3,7,8-TCDD	1	0.0439	U	4.4E-02	2.2E-02	0.0E+00
	1,2,3,7,8-PeCDD	1	0.0766	U	7.7E-02	3.8E-02	0.0E+00
	1,2,3,4,7,8-HxCDD	0.1	0.0937	U	9.4E-03	4.7E-03	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	0.0918	U	9.2E-03	4.6E-03	0.0E+00
	1,2,3,7,8,9-HxCDD	0.1	0.0897	U	9.0E-03	4.5E-03	0.0E+00
	1,2,3,4,6,7,8-HpCDD	0.01	0.960	JB	9.6E-03	9.6E-03	9.6E-03
	OCDD	0.0001	6.31	B	6.3E-04	6.3E-04	6.3E-04
	2,3,7,8-TCDF	0.1	0.119	J	1.2E-02	1.2E-02	1.2E-02
	1,2,3,7,8-PeCDF	0.05	0.092	U	4.6E-03	2.3E-03	0.0E+00
	2,3,4,7,8-PeCDF	0.5	0.0928	U	4.6E-02	2.3E-02	0.0E+00
	1,2,3,4,7,8-HxCDF	0.1	0.0554	J	5.5E-03	5.5E-03	5.5E-03
	1,2,3,6,7,8-HxCDF	0.1	0.0339	U	3.4E-03	1.7E-03	0.0E+00
	1,2,3,7,8,9-HxCDF	0.1	0.0408	U	4.1E-03	2.0E-03	0.0E+00
	2,3,4,6,7,8-HxCDF	0.1	0.0604	U	6.0E-03	3.0E-03	0.0E+00
	1,2,3,4,6,7,8-HpCDF	0.01	0.246	J	2.5E-03	2.5E-03	2.5E-03
	1,2,3,4,7,8,9-HpCDF	0.01	0.0563	U	5.6E-04	2.8E-04	0.0E+00
	OCDF	0.0001	0.403	J	4.0E-05	4.0E-05	4.0E-05
			Sum		0.2432643	0.1367178	0.0301713

AKB03-MAC	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Tissue	2,3,7,8-TCDD	1	0.0351	U	3.5E-02	1.8E-02	0.0E+00
	1,2,3,7,8-PeCDD	1	0.0582	U	5.8E-02	2.9E-02	0.0E+00
	1,2,3,4,7,8-HxCDD	0.1	0.0907	U	9.1E-03	4.5E-03	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	0.166	J	1.7E-02	1.7E-02	1.7E-02
	1,2,3,7,8,9-HxCDD	0.1	0.0971	J	9.7E-03	9.7E-03	9.7E-03
	1,2,3,4,6,7,8-HpCDD	0.01	1.65	B	1.7E-02	1.7E-02	1.7E-02
	OCDD	0.0001	11.9	B	1.2E-03	1.2E-03	1.2E-03
	2,3,7,8-TCDF	0.1	0.103		1.0E-02	1.0E-02	1.0E-02
	1,2,3,7,8-PeCDF	0.05	0.0553	J	2.8E-03	2.8E-03	2.8E-03
	2,3,4,7,8-PeCDF	0.5	0.0599	U	3.0E-02	1.5E-02	0.0E+00
	1,2,3,4,7,8-HxCDF	0.1	0.0829	J	8.3E-03	8.3E-03	8.3E-03
	1,2,3,6,7,8-HxCDF	0.1	0.0135	U	1.4E-03	6.8E-04	0.0E+00
	1,2,3,7,8,9-HxCDF	0.1	0.0403	J	4.0E-03	4.0E-03	4.0E-03
	2,3,4,6,7,8-HxCDF	0.1	0.0259	U	2.6E-03	1.3E-03	0.0E+00
	1,2,3,4,6,7,8-HpCDF	0.01	0.470	J	4.7E-03	4.7E-03	4.7E-03
	1,2,3,4,7,8,9-HpCDF	0.01	0.0359	U	3.6E-04	1.8E-04	0.0E+00
	OCDF	0.0001	0.942	J	9.4E-05	9.4E-05	9.4E-05
			Sum		0.2107982	0.1424887	0.0741792

AKT01-COMP	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Tissue	2,3,7,8-TCDD	1	0.0206	U	2.1E-02	1.0E-02	0.0E+00
	1,2,3,7,8-PeCDD	1	0.0303	U	3.0E-02	1.5E-02	0.0E+00
	1,2,3,4,7,8-HxCDD	0.1	0.0264	U	2.6E-03	1.3E-03	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	0.027	U	2.7E-03	1.4E-03	0.0E+00
	1,2,3,7,8,9-HxCDD	0.1	0.0258	U	2.6E-03	1.3E-03	0.0E+00
	1,2,3,4,6,7,8-HpCDD	0.01	0.282	JB	2.8E-03	2.8E-03	2.8E-03
	OCDD	0.0001	2.20	B	2.2E-04	2.2E-04	2.2E-04
	2,3,7,8-TCDF	0.1	0.0360	J	3.6E-03	3.6E-03	3.6E-03
	1,2,3,7,8-PeCDF	0.05	0.0303	U	1.5E-03	7.6E-04	0.0E+00
	2,3,4,7,8-PeCDF	0.5	0.0303	U	1.5E-02	7.6E-03	0.0E+00
	1,2,3,4,7,8-HxCDF	0.1	0.0212	J	2.1E-03	2.1E-03	2.1E-03
	1,2,3,6,7,8-HxCDF	0.1	0.0123	U	1.2E-03	6.2E-04	0.0E+00
	1,2,3,7,8,9-HxCDF	0.1	0.015	U	1.5E-03	7.5E-04	0.0E+00
	2,3,4,6,7,8-HxCDF	0.1	0.0226	U	2.3E-03	1.1E-03	0.0E+00
	1,2,3,4,6,7,8-HpCDF	0.01	0.0800	J	8.0E-04	8.0E-04	8.0E-04
	1,2,3,4,7,8,9-HpCDF	0.01	0.0211	U	2.1E-04	1.1E-04	0.0E+00
	OCDF	0.0001	0.136	J	1.4E-05	1.4E-05	1.4E-05
			Sum		0.0902596	0.0499166	0.0095736

AKT01-COMP (dupl.)	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Tissue	2,3,7,8-TCDD	1	0.0286	U	2.9E-02	1.4E-02	0.0E+00
	1,2,3,7,8-PeCDD	1	0.0346	U	3.5E-02	1.7E-02	0.0E+00
	1,2,3,4,7,8-HxCDD	0.1	0.0514	U	5.1E-03	2.6E-03	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	0.0520	U	5.2E-03	2.6E-03	0.0E+00
	1,2,3,7,8,9-HxCDD	0.1	0.0500	U	5.0E-03	2.5E-03	0.0E+00
	1,2,3,4,6,7,8-HpCDD	0.01	0.271	JB	2.7E-03	2.7E-03	2.7E-03
	OCDD	0.0001	2.07	B	2.1E-04	2.1E-04	2.1E-04
	2,3,7,8-TCDF	0.1	0.0296	J	3.0E-03	3.0E-03	3.0E-03
	1,2,3,7,8-PeCDF	0.05	0.0492	U	2.5E-03	1.2E-03	0.0E+00
	2,3,4,7,8-PeCDF	0.5	0.0498	U	2.5E-02	1.2E-02	0.0E+00
	1,2,3,4,7,8-HxCDF	0.1	0.0164	U	1.6E-03	8.2E-04	0.0E+00
	1,2,3,6,7,8-HxCDF	0.1	0.0158	U	1.6E-03	7.9E-04	0.0E+00
	1,2,3,7,8,9-HxCDF	0.1	0.0182	U	1.8E-03	9.1E-04	0.0E+00
	2,3,4,6,7,8-HxCDF	0.1	0.0274	U	2.7E-03	1.4E-03	0.0E+00
	1,2,3,4,6,7,8-HpCDF	0.01	0.0799	J	8.0E-04	8.0E-04	8.0E-04
	1,2,3,4,7,8,9-HpCDF	0.01	0.0210	U	2.1E-04	1.1E-04	0.0E+00
	OCDF	0.0001	0.155	J	1.6E-05	1.6E-05	1.6E-05
			Sum		0.1205815	0.0636365	0.0066915

AKB03-COMP	CHEMICAL	TEF (Dioxins and Furans--WHO-van den Berg 1998)	Environmental Concentration, ng/kg	Qual	Toxicity Equivalents, ng/kg	Adjusted Toxicity Equivalents, ng/kg (0.5 x QL)	Adjusted Toxicity Equivalents, ng/kg (0 for ND)
Tissue	2,3,7,8-TCDD	1	0.0173	U	1.7E-02	8.7E-03	0.0E+00
	1,2,3,7,8-PeCDD	1	0.0484	U	4.8E-02	2.4E-02	0.0E+00
	1,2,3,4,7,8-HxCDD	0.1	0.0406	U	4.1E-03	2.0E-03	0.0E+00
	1,2,3,6,7,8-HxCDD	0.1	0.0409	U	4.1E-03	2.0E-03	0.0E+00
	1,2,3,7,8,9-HxCDD	0.1	0.0394	U	3.9E-03	2.0E-03	0.0E+00
	1,2,3,4,6,7,8-HpCDD	0.01	0.275	JB	2.8E-03	2.8E-03	2.8E-03
	OCDD	0.0001	2.01	B	2.0E-04	2.0E-04	2.0E-04
	2,3,7,8-TCDF	0.1	0.0362	J	3.6E-03	3.6E-03	3.6E-03
	1,2,3,7,8-PeCDF	0.05	0.0572	U	2.9E-03	1.4E-03	0.0E+00
	2,3,4,7,8-PeCDF	0.5	0.0541	U	2.7E-02	1.4E-02	0.0E+00
	1,2,3,4,7,8-HxCDF	0.1	0.0110	U	1.1E-03	5.5E-04	0.0E+00
	1,2,3,6,7,8-HxCDF	0.1	0.00999	U	1.0E-03	5.0E-04	0.0E+00
	1,2,3,7,8,9-HxCDF	0.1	0.0120	U	1.2E-03	6.0E-04	0.0E+00
	2,3,4,6,7,8-HxCDF	0.1	0.0195	U	2.0E-03	9.8E-04	0.0E+00
	1,2,3,4,6,7,8-HpCDF	0.01	0.0809	J	8.1E-04	8.1E-04	8.1E-04
	1,2,3,4,7,8,9-HpCDF	0.01	0.0151	U	1.5E-04	7.6E-05	0.0E+00
	OCDF	0.0001	0.134	J	1.3E-05	1.3E-05	1.3E-05
			Sum		0.1204934	0.0639434	0.0073934