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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION III
CENTRAL REGIONAL LABORATORY
201 DEFENSE HIGHWAY
SUITE 200
ANNAPOLIS, MARYLAND 21401

QUALITY
ASSURANCE
BRANCH

By

DATE : November 15, 1994

SUBJECT: Region III Data QA Review

FROM : Susanne M. Stevens, Acting
Region III ESAT RPO (3ES30)

TO : Lisa Marino
Regional Project Manager (3HW42)

Attached is the dioxin data validation report for the Koppers Co. Fac. Plant Site (DAS R3011) completed by the Region III Environmental Services Assistance Team (ESAT) contractor under the direction of Region III ESD.

If you have any questions regarding this review, please call me at (410) 573-6832.

Attachment

cc: Chris Burns, TetraTech

TID File: 03941102

Printed on Recycled Paper

Lockheed

Environmental Services Assistance Teams
Region 3
1419 Forest Drive, Suite 104
Annapolis, Maryland 21403

Phone: (410) 268-7705
Fax: (410) 268-8472

DATE: November 9, 1994

SUBJECT: Level M1 Data Validation for Dioxin/Furan, DAS R3011
Site: Koppers County Facility Plant

FROM: Edgar A. Latham EAL. — Senior Organic Data Reviewer
Mahboobeh Mecanic MM — Senior Oversight Chemist

TO: Susanne Stevens
ESAT Acting Regional Project Officer

THROUGH: Dale S. Boshart DSB
ESAT Team Manager

OVERVIEW

Four (4) soil samples were analyzed by Southwest Laboratories of Oklahoma, Inc. (SWOK). These samples were analyzed through the Contract Laboratory Program (CLP) as a Delivery of Analytical Services (DAS) for the following components:

Total tetra through octa chlorinated dibenzo-p-dioxins and dibenzo-furans (PCDD and PCDF).

The Toxicity Equivalents (TEQ) for all samples are based on the 1989 Interim Scheme. All results are equated to 2,3,7,8-TCDD toxicity on the basis of a single column determination and are shown on Form I PCDD-2. The laboratory reported 2,3,7,8-chlorine substituted TCDDs and TCDFs (Form I PCDD-1) and total dioxins/ furans (Form II PCDD). See these forms in Appendix B.

The samples were successfully analyzed for all analytes. Areas of concern with respect to data usability are listed under the QA/QC section.

Analytical Methodology Comments

- Samples were analyzed according to CLP Statement of Work (SOW) DFLM01.1 for analysis of PCDD and PCDF in water, soils, fly ash, and chemical waste. Cleanup options employed were acid column, alumina column, and carbon/silica column.

- Three (3) ions were monitored for the identification of each tetra through octa dioxin and furan. The appropriate diphenyl ether ion was also monitored for possible interference with the furan identifications.

- The laboratory used a total of five (5) internal standards for quantitation of native dioxins and furans. Two (2) recovery standards were used to determine method efficiencies (percent recoveries of internal standards).

QA/QC Comments

- No problems that affect data usability were encountered during the Level M1 Review of this case.

- The matrix spike and duplicate analyses of sample W8B were within QC limits. See Form III PCDD-1&2 in Appendix C.

Attachments

1) Appendix A - Glossary of Data Qualifier Codes (Dioxin/Furan)

2) Appendix B - Results as Reported by the Laboratory including Toxicity Equivalence Summary

3) Appendix C - Support Documentation

DCN: EL411A01.KOP

APPENDIX A

GLOSSARY OF DATA QUALIFIER CODES (DIOXIN/FURAN)

Codes Relating to Identification

IR = Ion Ratio outside window

S/N = Signal to noise ratio less than 2.5

CI = Confirmation ion absent or its S/N less than 2.5

SC = Ion maximums in each window not within three scans

Codes Relating to Quantitation

IP = Incorrect peak area used for calculation

IS = Internal standard ion ratio outside window

* = Estimated Maximum Possible Concentration

TE = Transcription error

CE = Calculation Error

J = Estimated concentration

I = Polychlorinated diphenyl ether interference present

NOTE: The above codes may appear throughout this report. Not all codes will appear in all reports.

APPENDIX B

Results as Reported by the Laboratory

Includes

2,3,7,8 Chlorine substituted TCDDs/TCDFs (Form I PCDD-1)

Total TCDDs/TCDFs (Form II PCDD)

TCDD/TCDF Toxicity Equivalent Summary (Form I PCDD-2)

GL182D
GL182F

1DFA
PCDD/PCDF SAMPLE DATA SUMMARY

M1 Level Review

Sample Location: 0110920 W5A

EPA SAMPLE NO.

WSA

Lab Name: SWL-TULSA Contract:_____

Lab Code: SWOK Case No.: TTECH-MD SAS No.: _____ SDG. NO.: 20048

Matrix: SOIL (Soil/Water/Waste/Ash) Lab Sample ID.: 20048.05

Sample wt/vol: 10 (g/ml) g Lab File ID: GL182D

Water Sample Prep_____ (Sepf/Cont) Date Received: 09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted: 09/23/94

Injection Volume: 2 (uL) % Solids: 86 Date Analyzed: 09/26/94

GC Column: ULTRA 2 ID: .32 (mm) Dilution Factor: 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	SELECTED IONS	PEAK RT	ION RATIO #	CONCENTRATION	Q	EMPC/EDL
2378-TCDD	320/322			ND	U	.34
2378-TCDF	304/306	23.11	.85	.08	J	
12378-PeCDF	340/342	25.21	1.35	.32	J	
12378-PeCDD	356/358	25.80	1.69	.34	J	
23478-PeCDF	340/342			ND	U	.08
123478-HxCDF	374/376			ND	U	.07
123678-HxCDF	374/376	27.30	1.12	.40	J	
123478-HXCDD	390/392			ND	U	.16
123678-HxCDD	390/392			ND	U	.94
123789-HxCDD	390/392			ND	U	.08
234678-HxCDF	374/376			ND	U	.31
123789-HxCDF	374/376			ND	U	.21
1234678-HpCDF	408/410			ND	U	1.44
1234678-HpCDD	424/426			ND	U	.67
1234789-HpCDF	408/410			ND	U	.42
OCDD	458/460	34.58	.95	1.44	J	
OCDF	442/444	34.78	.94	.78	J	

NOTE: Concentrations, EMPCs, and EDLs are calculated on wet weight basis.

INTERNAL STANDARD	SELECTED IONS	PEAK RT	ION RATIO #	ION RATIO LIMITS	% REC #	RECOVERY LIMITS
13C-2378-TCDF	316/318	23.10	.796	0.65-0.89	85	25-150
13C-2378-TCDD	332/334	23.44	.795	0.65-0.89	83	25-150
13C-123678-HxCDD	402/404	28.00	1.396	1.05-1.43	82	25-150
13C-1234678-HpCDF	420/422	29.89	1.072	0.88-1.20	71	25-150
13C-OCDD	470/472	34.56	.938	0.76-1.01	65	25-150
37Cl-2378-TCDD	328/NA	23.46	N/A	N/A	78	25-150

Column to be used to flag values outside QC limits.

FORM I PCDD-1

AR305110

GL182D 2DF
GL182F

PCDD/PCDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY

EPA SAMPLE NO.

W5A

Lab Name: SWL-TULSA Contract:_____

Lab Code: SWOK Case No.: TTECH-MD SAS No.: _____ SDG. NO.: 20048

Matrix: SOIL (Soil/Water/Waste/Ash) Lab Sample ID.: 20048.05

Sample wt/vol: 10 (g/ml) g Lab File ID: GL182D

Water Sample Prep.: _____ (Sepf/Cont) Date Received: 09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted: 09/23/94

Injection Volume: 2 (uL) % Solids: 86 Date Analyzed: 09/26/94

GC Column: ULTRA 2 ID: .32 (mm) Dilution Factor: 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

HOMOLOGUE	PEAKS	CONCENTRATION	Q	EMPC/EDL
DIOXINS				
Total TCDD		.00	U	.34
Total PeCDD	1	.34	J	
Total HxCDD		.00	U	.08
Total HpCDD		.00	U	.67
FURANS				
Total TCDF	1	.08	J	
Total PeCDF	1	.32	J	
Total HxCDF	1	.40	J	
Total HpCDF		.00	U	.42

NOTE: Concentrations, EMPCs, and EDLs are calculated on a wet weight basis.
The total congener concentrations do not affect the TEF calculations.

GL182D 1DFB EPA SAMPLE NO.

GL182F PCDD/PCDF TOXICITY EQUIVALENCE SUMMARY

W5A

Lab Name: SWL-TULSA Contract:_____

Lab Code:__SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:___20048.05

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL182D

Water Sample Prep.:_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 86 Date Analyzed:____09/26/94

GC Column: ___ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	CONCENTRATION		TEF		TEF-ADJUSTED CONCENTRATION
2378-TCDD	ND	x	1.0	=	.00
2378-TCDF	.08	x	0.1	=	.01
12378-PeCDF	.32	x	0.05	=	.02
12378-PeCDD	.34	x	0.5	=	.17
23478-PeCDF	ND	x	0.5	=	.00
123478-HxCDF	ND	x	0.1	=	.00
123678-HxCDF	.40	x	0.1	=	.04
123478-HXCDD	ND	x	0.1	=	.00
123678-HxCDD	ND	x	0.1	=	.00
123789-HxCDD	ND	x	0.1	=	.00
234678-HxCDF	ND	x	0.1	=	.00
123789-HxCDF	ND	x	0.1	=	.00
1234678-HpCDF	ND	x	0.01	=	.00
1234678-HpCDD	ND	x	0.01	=	.00
1234789-HpCDF	ND	x	0.01	=	.00
OCDD	1.44	x	0.001	=	.00
OCDF	.78	x	0.001	=	.00
			TOTAL	=	.24

NOTE: Do not include EMPC or edl values in the TEF-adjusted Concentration.

If the Total Toxic Equivalent Concentration of the sample is greater than 7 ng/L for an aqueous sample, grater than 0.7 ug/Kg for any solid matrix, or grater than 7 ug/kg for a chemical waste sample, then second column confirmation of the results may be required.

GL183D 1DFA EPA SAMPLE NO.

GL183F PCDD/PCDF SAMPLE DATA SUMMARY M1 Level Review

Sample Location: 0110920W5B

W5B

Lab Name: SWL-TULSA Contract:_____

Lab Code:__SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:___20048.06

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL183D

Water Sample Prep_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 88 Date Analyzed:____09/26/94

GC Column: ___ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	SELECTED IONS	PEAK RT	ION RATIO #	CONCENTRATION	Q	EMPC/EDL
2378-TCDD	320/322			ND	U	.19
2378-TCDF	304/306			ND	U	.15
12378-PeCDF	340/342			ND	U	.24
12378-PeCDD	356/358			ND	U	.26
23478-PeCDF	340/342			ND	U	.06
123478-HxCDF	374/376			ND	U	.35
123678-HxCDF	374/376			ND	U	.27
123478-HXCDD	390/392			ND	U	.52
123678-HxCDD	390/392			ND	U	.46
123789-HxCDD	390/392			ND	U	.48
234678-HxCDF	374/376			ND	U	.37
123789-HxCDF	374/376			ND	U	.43
1234678-HpCDF	408/410			ND	U	.41
1234678-HpCDD	424/426			ND	U	.21
1234789-HpCDF	408/410			ND	U	.32
OCDD	458/460			ND	U	.44
OCDF	442/444			ND	U	.46

NOTE: Concentrations, EMPCs, and EDLs are calculated on wet weight basis.

INTERNAL STANDARD	SELECTED IONS	PEAK RT	ION RATIO #	ION RATIO LIMITS	% REC #	RECOVERY LIMITS
13C-2378-TCDF	316/318	23.09	.792	0.65-0.89	87	25-150
13C-2378-TCDD	332/334	23.45	.784	0.65-0.89	90	25-150
13C-123678-HxCDD	402/404	28.01	1.235	1.05-1.43	84	25-150
13C-1234678-HpCDF	420/422	29.90	1.022	0.88-1.20	88	25-150
13C-OCDD	470/472	34.57	.893	0.76-1.01	83	25-150
37Cl-2378-TCDD	328/NA	23.45	N/A	N/A	79	25-150

Column to be used to flag values outside QC limits.

AR305113

GL183D 2DF EPA SAMPLE NO.

GL183F PCDD/PCDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY

W5B

Lab Name: SWL-TULSA Contract:_____

Lab Code:__SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:___20048.06

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL183D

Water Sample Prep.:_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 88 Date Analyzed:____09/26/94

GC Column: ____ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

HOMOLOGUE	PEAKS	CONCENTRATION	Q	EMPC/EDL
DIOXINS				
Total TCDD		.00	U	.19
Total PeCDD		.00	U	.26
Total HxCDD		.00	U	.46
Total HpCDD		.00	U	.21
FURANS				
Total TCDF		.00	U	.15
Total PeCDF		.00	U	.06
Total HxCDF		.00	U	.27
Total HpCDF		.00	U	.32

NOTE: Concentrations, EMPCs, and EDLs are calculated on a wet weight basis.
The total congener concentrations do not affect the TEF calculations.

GL183D 1DFB EPA SAMPLE NO.

GL183F PCDD/PCDF TOXICITY EQUIVALENCE SUMMARY

W5B

Lab Name: SWL-TULSA Contract:_____

Lab Code:__SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:____20048.06

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL183D

Water Sample Prep.:_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:____09/23/94

Injection Volume: 2 (uL) % Solids: 88 Date Analyzed:____09/26/94

GC Column: ____ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	CONCENTRATION		TEF		TEF-ADJUSTED CONCENTRATION
2378-TCDD	ND	x	1.0	=	.00
2378-TCDF	ND	x	0.1	=	.00
12378-PeCDF	ND	x	0.05	=	.00
12378-PeCDD	ND	x	0.5	=	.00
23478-PeCDF	ND	x	0.5	=	.00
123478-HxCDF	ND	x	0.1	=	.00
123678-HxCDF	ND	x	0.1	=	.00
123478-HXCDD	ND	x	0.1	=	.00
123678-HxCDD	ND	x	0.1	=	.00
123789-HxCDD	ND	x	0.1	=	.00
234678-HxCDF	ND	x	0.1	=	.00
123789-HxCDF	ND	x	0.1	=	.00
1234678-HpCDF	ND	x	0.01	=	.00
1234678-HpCDD	ND	x	0.01	=	.00
1234789-HpCDF	ND	x	0.01	=	.00
OCDD	ND	x	0.001	=	.00
OCDF	ND	x	0.001	=	.00
			TOTAL	=	.00

NOTE: Do not include EMPC or edl values in the TEF-adjusted Concentration.

If the Total Toxic Equivalent Concentration of the sample is greater than 7 ng/L for an aqueous sample, grater than 0.7 ug/Kg for any solid matrix, or grater than 7 ug/kg for a chemical waste sample, then second column confirmation of the results may be required.

GL178D 1DFA EPA SAMPLE NO.

GL178F PCDD/PCDF SAMPLE DATA SUMMARY

MI Level Review

Sample Location: 01109/5W8A

W8A

Lab Name: SWL-TULSA Contract:_____

Lab Code:___SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:____20048.01

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL178D

Water Sample Prep_____ (Sepf/Cont) Date Received:_____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:____09/23/94

Injection Volume: 2 (uL) % Solids: 80 Date Analyzed:_____09/26/94

GC Column: ____ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	SELECTED IONS	PEAK RT	ION RATIO #	CONCENTRATION	Q	EMPC/EDL
2378-TCDD	320/322			ND	U	.16
2378-TCDF	304/306			ND	U	.04
12378-PeCDF	340/342			ND	U	.08
12378-PeCDD	356/358			ND	U	.10
23478-PeCDF	340/342			ND	U	.04
123478-HxCDF	374/376			ND	U	.27
123678-HxCDF	374/376			ND	U	.36
123478-HXCDD	390/392			ND	U	.39
123678-HxCDD	390/392			ND	U	.39
123789-HxCDD	390/392			ND	U	.29
234678-HxCDF	374/376			ND	U	.43
123789-HxCDF	374/376			ND	U	.57
1234678-HpCDF	408/410			ND	U	.24
1234678-HpCDD	424/426			ND	U	.18
1234789-HpCDF	408/410			ND	U	.32
OCDD	458/460			ND	U	.74
OCDF	442/444			ND	U	.39

NOTE: Concentrations, EMPCs, and EDLs are calculated on wet weight basis.

INTERNAL STANDARD	SELECTED IONS	PEAK RT	ION RATIO #	ION RATIO LIMITS	% REC #	RECOVERY LIMITS
13C-2378-TCDF	316/318	23.10	.795	0.65-0.89	89	25-150
13C-2378-TCDD	332/334	23.45	.786	0.65-0.89	96	25-150
13C-123678-HxCDD	402/404	28.01	1.253	1.05-1.43	85	25-150
13C-1234678-HpCDF	420/422	29.90	1.040	0.88-1.20	93	25-150
13C-OCDD	470/472	34.59	.886	0.76-1.01	91	25-150
37Cl-2378-TCDD	328/NA	23.46	N/A	N/A	80	25-150

Column to be used to flag values outside QC limits.

GL178D 2DF EPA SAMPLE NO.
GL178F

PCDD/PCDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY

W8A

Lab Name: SWL-TULSA Contract:_____

Lab Code:__SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:___20048.01

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL178D

Water Sample Prep.:_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 80 Date Analyzed:____09/26/94

GC Column: ___ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

HOMOLOGUE	PEAKS	CONCENTRATION	Q	EMPC/EDL
DIOXINS				
Total TCDD		.00	U	.16
Total PeCDD		.00	U	.10
Total HxCDD		.00	U	.29
Total HpCDD		.00	U	.18
FURANS				
Total TCDF		.00	U	.04
Total PeCDF		.00	U	.04
Total HxCDF		.00	U	.27
Total HpCDF		.00	U	.24

NOTE: Concentrations, EMPCs, and EDLs are calculated on a wet weight basis.
The total congener concentrations do not affect the TEF calculations.

AR305117

GL178D 1DFB EPA SAMPLE NO.
GL178F

PCDD/PCDF TOXICITY EQUIVALENCE SUMMARY

W8A

Lab Name: SWL-TULSA Contract:_____

Lab Code:___SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:___20048.01

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL178D

Water Sample Prep.:_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 80 Date Analyzed:____09/26/94

GC Column: ____ULTRA 2 ID:__.32 (mm) Dilution Factor:___ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	CONCENTRATION		TEF		TEF-ADJUSTED CONCENTRATION
2378-TCDD	ND	x	1.0	=	.00
2378-TCDF	ND	x	0.1	=	.00
12378-PeCDF	ND	x	0.05	=	.00
12378-PeCDD	ND	x	0.5	=	.00
23478-PeCDF	ND	x	0.5	=	.00
123478-HxCDF	ND	x	0.1	=	.00
123678-HxCDF	ND	x	0.1	=	.00
123478-HXCDD	ND	x	0.1	=	.00
123678-HxCDD	ND	x	0.1	=	.00
123789-HxCDD	ND	x	0.1	=	.00
234678-HxCDF	ND	x	0.1	=	.00
123789-HxCDF	ND	x	0.1	=	.00
1234678-HpCDF	ND	x	0.01	=	.00
1234678-HpCDD	ND	x	0.01	=	.00
1234789-HpCDF	ND	x	0.01	=	.00
OCDD	ND	x	0.001	=	.00
OCDF	ND	x	0.001	=	.00
			TOTAL	=	.00

NOTE: Do not include EMPC or edl values in the TEF-adjusted Concentration.

If the Total Toxic Equivalent Concentration of the sample is greater than 7 ng/L for an aqueous sample, grater than 0.7 ug/Kg for any solid matrix, or grater than 7 ug/kg for a chemical waste sample, then second column confirmation of the results may be required.

GL179D 1DFA EPA SAMPLE NO.

GL179F PCDD/PCDF SAMPLE DATA SUMMARY M1 Level Review

Sample Location: 0110915W8B

W88

Lab Name: SWL-TULSA Contract:_____

Lab Code:__SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL__ (Soil/Water/Waste/Ash) Lab Sample ID.:___20048.02

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL179D

Water Sample Prep_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 80 Date Analyzed:____09/26/94

GC Column: ___ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	SELECTED IONS	PEAK RT	ION RATIO #	CONCENTRATION	Q	EMPC/EDL
2378-TCDD	320/322			ND	U	.07
2378-TCDF	304/306			ND	U	.07
12378-PeCDF	340/342			ND	U	.06
12378-PeCDD	356/358			ND	U	.13
23478-PeCDF	340/342			ND	U	.09
123478-HxCDF	374/376			ND	U	.22
123678-HxCDF	374/376			ND	U	.23
123478-HXCDD	390/392			ND	U	.23
123678-HxCDD	390/392			ND	U	.23
123789-HxCDD	390/392			ND	U	.43
234678-HxCDF	374/376			ND	U	.09
123789-HxCDF	374/376			ND	U	.19
1234678-HpCDF	408/410			ND	U	.09
1234678-HpCDD	424/426			ND	U	.17
1234789-HpCDF	408/410			ND	U	.16
OCDD	458/460			ND	U	1.03
OCDF	442/444			ND	U	.12

NOTE: Concentrations, EMPCs, and EDLs are calculated on wet weight basis.

INTERNAL STANDARD	SELECTED IONS	PEAK RT	ION RATIO #	ION RATIO LIMITS	% REC #	RECOVERY LIMITS
13C-2378-TCDF	316/318	23.10	.788	0.65-0.89	88	25-150
13C-2378-TCDD	332/334	23.44	.787	0.65-0.89	90	25-150
13C-123678-HxCDD	402/404	28.02	1.219	1.05-1.43	87	25-150
13C-1234678-HpCDF	420/422	29.89	1.066	0.88-1.20	94	25-150
13C-OCDD	470/472	34.58	.897	0.76-1.01	87	25-150
37Cl-2378-TCDD	328/NA	23.46	N/A	N/A	76	25-150

Column to be used to flag values outside QC limits.

FORM I PCDD-1

AR305119

GL179D 2DF EPA SAMPLE NO.

GL179F PCDD/PCDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY

W8B

Lab Name: SWL-TULSA Contract:_____

Lab Code:__SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:___20048.02

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL179D

Water Sample Prep.:_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 80 Date Analyzed:____09/26/94

GC Column: ____ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

HOMOLOGUE	PEAKS	CONCENTRATION	Q	EMPC/EDL
DIOXINS				
Total TCDD		.00	U	.07
Total PeCDD		.00	U	.13
Total HxCDD		.00	U	.23
Total HpCDD		.00	U	.17
FURANS				
Total TCDF		.00	U	.07
Total PeCDF		.00	U	.06
Total HxCDF		.00	U	.09
Total HpCDF		.00	U	.09

NOTE: Concentrations, EMPCs, and EDLs are calculated on a wet weight basis.
The total congener concentrations do not affect the TEF calculations.

AR305120

GL179D 1DFB EPA SAMPLE NO.
GL179F PCDD/PCDF TOXICITY EQUIVALENCE SUMMARY

W8B

Lab Name: SWL-TULSA Contract:_____

Lab Code:___SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:___20048.02

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL179D

Water Sample Prep.:_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 80 Date Analyzed:____09/26/94

GC Column: ___ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	CONCENTRATION		TEF		TEF-ADJUSTED CONCENTRATION
2378-TCDD	ND	x	1.0	=	.00
2378-TCDF	ND	x	0.1	=	.00
12378-PeCDF	ND	x	0.05	=	.00
12378-PeCDD	ND	x	0.5	=	.00
23478-PeCDF	ND	x	0.5	=	.00
123478-HxCDF	ND	x	0.1	=	.00
123678-HxCDF	ND	x	0.1	=	.00
123478-HXCDD	ND	x	0.1	=	.00
123678-HxCDD	ND	x	0.1	=	.00
123789-HxCDD	ND	x	0.1	=	.00
234678-HxCDF	ND	x	0.1	=	.00
123789-HxCDF	ND	x	0.1	=	.00
1234678-HpCDF	ND	x	0.01	=	.00
1234678-HpCDD	ND	x	0.01	=	.00
1234789-HpCDF	ND	x	0.01	=	.00
OCDD	ND	x	0.001	=	.00
OCDF	ND	x	0.001	=	.00
			TOTAL	=	.00

NOTE: Do not include EMPC or edl values in the TEF-adjusted Concentration.

If the Total Toxic Equivalent Concentration of the sample is greater than 7 ng/L for an aqueous sample, grater than 0.7 ug/Kg for any solid matrix, or grater than 7 ug/kg for a chemical waste sample, then second column confirmation of the results may be required.

APPENDIX C

Support Documentation

x615

TETRA TECH, INC.
56 WEST MAIN STREET
CHRISTIANA, DE 19702-1501
TELEPHONE (302) 738-7551

August 29, 1994
TCN 4232-12

Ms. Angie Frye
Southwest Labs of Oklahoma
12712 Norwood Road
Raleigh, NC 27613-6844

Dear Angie:

SUBJECT: DIOXIN DAS PROPOSAL, ARCS CONTRACT #68-W8-0092,
WORK ASSIGNMENT #92-32-3P3C

Thank you for your response to Tetra Tech's request for a proposal for dioxin/dibenzofuran analyses. The selection and awarding of a subcontractor laboratory has been protracted because this procurement procedure is new to the USEPA; the prior Special Analytical Services (SAS) Program has been replaced by the new Delivery of Analytical Services (DAS) Program, with a new and evolving procurement process. We thank you for your interest and patience.

Enclosed is some additional information regarding the dioxin analyses which Tetra Tech is required to send to potential lab subcontractors under the DAS Program. It includes three items: the DAS request submitted to the USEPA specifying sample numbers, concentrations, and matrices, as well as a DAS Dioxin Information Sheet and the packet entitled Region III DAS Statement of Work for Procurement Through ARCS Contractors.

Please review the enclosed information and contact me at your earliest convenience regarding whether the enclosed information affects your ability to perform the requested analyses or affects the unit sample price you previously provided to Tetra Tech. I believe that the enclosed information generally specifies adherence to CLP protocols.

Should you have any questions, please give me a call.

Sincerely,

Elizabeth W. Rogers

Elizabeth W. Rogers
Work Assignment Manager

Enclosures
jp

cc: Jim McKenzie, USEPA
Al Pinero, USEPA
Lisa Marino, USEPA
Steve Pollak, Tt

f:\arcs\4232\corres\labdas.ltr

MOD 0183

DAS Number: R3011

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
DELIVERY OF ANALYTICAL SERVICES MASTER FORM

Site:		Data Validation Level: M1	
Latitude: 39°42'30"N	Longitude: 75°37'30"W	Altitude: 3.5	
Address:			
EPA Program: Superfund		Type of Activity: RI/FS Oversight	
EPA Account Number: 4TGB03NP3C		PRP Lab: Enseco CA (ECAL)	
Prepared by: Elizabeth W. Rogers		Phone Number: 302-738-7551	Fax No: 302-454-5988
EPA RPM: Lisa Marino		Phone Number: 215-597-0985	Fax No: 215-597-9890
Site Leader: Elizabeth W. Rogers		Phone Number: 302-738-7551	Fax No: 302-454-5988
EPA CO contact: Al Pinera		Phone Number: 215-597-7697	Fax No: 215-597-5029
Contract Type: ARCS	Prime: Tetra Tech, Inc.	Sub: None	

Concentration level:	Number of Samples:	Method Number:	Parameter:	Matrix:
LC	29	EPA CLP SOW DFLM01.1	PCDD/PCDF	S
LC	7	EPA CLP SOW DFLM01.1	PCDD/PCDF	AQ

Additional comments: The sample count does not include the required laboratory QC samples. Two sample shipments are anticipated during the stated sampling period. this is however subject to change. The data package must include all elements required by the EPA CLP SOW DFLM01.1 and the EPA Region 3 Statement of Work.

Required TAT: A complete data package is due 35 days after laboratory receipt of last sample in a Sample Delivery Group (SDG).			Carrier: FEDERAL EXPRESS		
Date Cancelled/Extended: NA		Reason: NA			
Sampling Dates	From: 8/15/94	To: 10/15/94	Shipping Dates	From: 8/15/94	To: 10/15/94

Date forwarded to CRL: 7/19/94	*CRL Response:*	*CRL Initials:*
Date Entered in RSCC database:	*Date Revision Entered:*	*Record Control No:*
Number of Screens:	*Validator:*	*DAS Reviewer:*
Send additional data validation report to: Elizabeth W. Rogers, Tetra Tech, Inc., 56 W. Main St., Christiana, DE 19702		
DAS Contact:	*Method of request:*	*Date RSCC sent to RPOC:*
Date RPOC received from RSCC:	*Date sent to CO:*	*Date received by CO:*
Purchase Order No:	*Date of Solicitation:*	*Date Closed:*
DAS Lab I:	*Cost:*	*Date Awarded:*
DAS Lab II:	*Cost:*	*Date Awarded:*
Total Billable samples:		
Lab assignment forwarded to:		*Date forwarded:*

AR305124

Special/additional technical instructions: (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.)

The laboratory must adhere to the following correction and modification to the CLP SOW DFLM01.0.

1) Page D-41, 10.4.2: Replace $^{13}C_{12}$-OCDD with $^{13}C_{12}$-1234-TCDD and $^{13}C_{12}$-123789 HxCDD.

2) Page D-42, 11.1.2: Replace 0.05 RRT units with 0.005 RRT units.

3) Page D-59, Table 5; The cleanup standard should be $^{37}Cl_4$-2378-TCDD.

4) Page D-60, Table 6; Change the tetra internal standard from $^{13}C_{12}$-1234-TCDD to $^{13}C_{12}$-2378-TCDD. The control limits for the penta theoretical ion abundance ratios are to have a 15% window and not a 20% window. Therefor change 1.24-1.86 to 1.32-1.78.

5) Form VI PCDD-2 and Form VII PCDD-1; Change the QC Limits for PeCDDs and PeCDFs to 1.32-1.78.

6) The RRF, Ion Ratio, RRT and RT must be calculated and reported for the instrument sensitivity check standard (CCI). The laboratory must complete the attached Form VIII PCDD-1 and Form VIII PCDD-2 for the CCI standard run at the end of each 12 hour shift to verify instrument sensitivity. Follow the instructions provided in SECTION III, Form Instruction Guide of EXHIBIT B, page B-28 for PCDD/PCDF Continuing Calibration Data Summary (Form VII PCDD-1 and PCDD-2).

2. QC requirements: (specify method specific criteria for matrix spikes, duplicates,calibration, dilutions, performance evaluation material, laboratory control samples, detection or quantitation limits, method blanks, surrogates, interna standards, etc.) Any additional QC not stipulated in the method requirements are considered to be billable items.

QC TYPE	FREQUENCY	ACCEPTANCE LIMITS
As per EPA CLP SOW DFLMO1.1 DFLMO1.1	As per EPA CLP SOW DFLMO1.1	As per EPA CLP SOW

A Performance Evaluation sample must be analyzed with each Sample Delivery Group when supplied by the Region.

None of the reagents or calibration solutions will be supplied by Environmental Monitoring Systems Laboratory-Las Veg (EMSL-LV).

Request reviewer:	Victor Yastrop (Name)	Lockheed, ESAT (Affiliation)	08/01 (Date)

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AR305125

7

DAS Number: RSCC DATE:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
DELIVERY OF ANALYTICAL SERVICES

P[illegible] is a request for delivery of analytical services (DAS) under Region III's DAS program. The awarded laboratory is responsible for meeting all requirements in this solicitation form. The awarded laboratory is required to follow the Region III DAS Statement of Work report format including use of CLP forms or modified CLP forms when applicable. If these stipulations are not met, the Region may reduce payment.

DIOXIN

EPA CO Contact:			Phone No:	Fax No:
Conc. level:	Number of Samples:	Matrix:	Parameter:	Method Number:
		Water, Soil, Sediment, Fly Ash, Chemical Waste	Dibenzo-p-dioxins (PCDDs) and Dibenzofurans (PCDFs)	CLP SOW 12/90 DFLM01.0
Additional Comments: Note the corrections and modifications made to the DFLM01.0 SOW in Special/Additional Technical Instructions				
Required TAT: For each Sample Delivery Group (SDG) the data package is due 35 DAYS after laboratory receipt of last sample in the SDG.			Carrier:	
Sampling Dates	From:	To:	Shipping Dates From:	To:

T[illegible] data package must contain all deliverables as stated in all of the [illegible]chments of Region III DAS Statement of Work, and the laboratory must [illegible]plete the "Laboratory Self Assessment" checklist.

1. Special/additional technical instructions:

The laboratory must adhere to the following correction and modification to the CLP SOW DFLM01.0.

1) Page D-41, 10.4.2; Replace $^{13}C_{12}$-OCDD with $^{13}C_{12}$-1234-TCDD and $^{13}C_{12}$-123789 HxCDD.

2) Page D-42, 11.1.2; Replace 0.05 RRT units with 0.005 RRT units.

3) Page D-59, Table 5; The cleanup standard should be $^{37}Cl_4$-2378-TCDD.

4) Page D-60, Table 6; Change the tetra internal standard from $^{13}C_{12}$-1234-TCDD to $^{13}C_{12}$-2378-TCDD. The control limits for the penta theoretical ion abundance ratios are to have a 15% window and not a 20% window. Therefor change 1.24-1.86 to 1.32-1.78.

5) Form VI PCDD-2 and Form VII PCDD-1; Change the QC Limits for PeCDDs and PeCDFs to 1.32-1.78.

[illegible] The RRF, Ion Ratio, RRT and RT must be calculated and reported for the instrument sensitivity check standard (CC1). The laboratory must complete the attached Form VIII PCDD-1 and Form VIII PCDD-2 for the CC1 standard run at the end of each 12 hour shift to verify instrument sensitivity. Follow

the instructions provided in SECTION III, Form Instruction Guide of EXHIBIT B, page B-28 for PCDD/PCDF Continuing Calibration Data Summary (Form VII PCDD-1 and PCDD-2).

. Performance Evaluation sample must be analyzed with each Sample Delive Group when supplied by the Region.

RPT = (RT of analyte) / (RT of appropriate internal standard)

2. QC Requirements:

Audit Required	Frequency of Audits	Limit
As per CLP SOW DFLM01.0	As per CLP SOW DFLM01.0	As per CLP SOW DFLM01.0

Include any associated telephone logs with the data package. The case narrative must document all problems encountered and the subsequent resolutions.

THIS IS A U.S. EPA REGIONAL PROCUREMENT. ALL QUESTIONS MUST BE DIRECTED TO REGION III'S POINT OF CONTACT (RPOC) JAMES McKENZIE (215-597-3229).

Request preparer: (Name) (Affiliation) (Date)

Request reviewer: (Name) (Affiliation) (Date)

SOUTHWEST LABORATORY OF OKLAHOMA
1700 West Albany, Suite A / Broken Arrow, OK 74012
918-251-2858

OCT 31 1994
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SDG NARRATIVE

October 12, 1994

CLIENT: TTECH-MD

SDG NO.: 20048

Six soil samples were received on 9/23/94 for the analysis of polychlorinated dibenzodioxins and furans following USEPA Method DFLM01.1.

No major problems occurred during the analyses.

Trace levels of analytes were detected in Sample W5A, all below the CRQL. Sample W8B was analyzed as a matrix spike and a duplicate sample as per the method.

The analyses were performed using a Hewlett Packard 5988A GC/MS/DS (SWOK Instrument G). The chromatographic column used is an HP Ultra 2 60 m x 0.32mm x 0.33um film thickness. the GC operating parameters are listed in Table Three, following this narrative.

All reporting qualifiers are those specified in DFLM01.1. As per a correspondence from Betsy Rogers on 9/15/94, the data package is arranged according to DFLM01.1.

Examples of the concentration and EDL calculations are listed in Tables One and Two, respectively, following this narrative. The calculation of the analyte EDL's deviated from the method due to software limitations. We have seen negligible differences comparing height versus area calculations.

As per the DAS request:

- -Form VIII is submitted for the instrument sensitivity.
- -A Region III Laboratory Self Assessment Form has been completed.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. In addition, I certify that, to the best of my knowledge and belief, the data as reported are true and accurate. Release of the data contained in this data package has been authorized by the Laboratory Manager, or his designee, as verified by the following signature.

Paul Daniello
Assistant Organic Program Manager

TABLE ONE
EXAMPLE OF THE 12378-PCDD CALCULATION IN SAMPLE W5A

$$CONE = \frac{(A_{356} + A_{358})\ (Qis)}{(A_{332} + A_{334})\ (RRF)\ (wt)}$$

$$= \frac{(\ 33617 +\ 19838)\ (50ng)}{(403132 + 507132)\ (0.863)\ (10g)}$$

$$= \frac{(\ 53455)\ (50ng)}{(910238)\ (0.863)\ (10g)}$$

$$= 0.34\ ng/g$$

TABLE TWO
EXAMPLE OF THE EDL CALCULATION OF 2378-TCDD IN SAMPLE W5A

$$EDL = \frac{(A_{320} + A_{322})\ (Qis)\ (2.5)}{(A_{332} + A_{334})\ (RRF)\ (wt)}$$

$$= \frac{(\ 13171 +\ 11277)\ (50ng)\ (2.5)}{(403132 + 507132)\ (0.998)\ (10g)}$$

$$= \frac{(\ 24448)\ (50ng)\ (2.5)}{(910238)\ (0.998)\ (10g)}$$

$$= 0.34\ ng/g$$

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TABLE THREE
GAS CHROMATOGRAPH OPERATING CONDITIONS USED FOR ANALYSES

GC/DIP		LEVEL A	LEVEL B	POST RUN
Temp 1	170.0	300.0	0.0	0.0
Time 1	10.0	45.0	0.0	0.0
Rate	8.0	0.0	0.0	
Temp 2	300.0	0.0	0.0	
Time 2	45.0	0.0	0.0	

Oven Equilibration Time: 0.00 minutes

Run Time: 39.50
Scan Start Time: 21.50
Splitless Valve Time: .70

Attachment 1 (page 1 of 2)

Region III
LABORATORY SELF ASSESSMENT

SAS Number:	Method(s): DELMOI-1
SDG Number: 20048	Matrix(ces): Soil
Lab Code: SWOK	Number of Samples: 6
[redacted]	

1.	Was sufficient sample volume/weight received?	YES	NO	NA
2.	Was the specified sample preparation method(s) followed?	YES	NO	NA
3.	Was the specified sample analysis method(s) used?	YES	NO	NA
4.	Were samples extracted/prepared within the specified contract holding time?	YES	NO	NA
5.	Were all samples analyzed within the specified contract required holding time?	YES	NO	NA
6.	Were all surrogate recoveries within QC limits?	YES	NO	NA
7.	Were MS/MSD recoveries and RPDs within QC limits?	YES	NO	NA
8.	Were laboratory control standard QC limits met?	YES	NO	NA
9.	Were method blanks and/or other blanks prepared and analyzed at the required frequency?	YES	NO	NA
10.	Did all blanks meet criteria (i.e., no contamination)?	YES	NO	NA
11.	Were instrument performance checks analyzed at the required frequency?	YES	NO	NA
12.	Were all criteria met for the instrument performance check?	YES	NO	NA
13.	Was initial calibration performed according to the requirements?	YES	NO	NA
14.	Were all criteria met for the initial calibration?	YES	NO	NA
15.	Were calibration verifications/continuing calibrations performed at the frequency required?	YES	NO	NA
16.	Were all criteria met for continuing calibration/calibration verification?	YES	NO	NA
17.	Were all internal standard areas and retention times within the upper and lower limits?	YES	NO	NA

18.	Were contract required quantitation/detection limits (CRQL/CRDL) met for all analytes?	YES	NO	NA
19.	Were interference check samples run at beginning and end of each run, or twice per 8 hour period?	YES	NO	NA
20.	Were Inorganic spike sample recoveries within QC limits?	YES	NO	NA
22.	Were analytical spike analyses performed as necessary for every sample for GFAA?	YES	NO	NA
23.	Were Inorganic duplicate sample analysis RPDs within QC limits?	YES	NO	NA
24.	Were instrument detection limits (IDLs) determined within 3 months of sample analysis?	YES	NO	NA
26.	Was linear range determined within 3 months of sample analysis?	YES	NO	NA
27.	Were interelement correction factors determined within one one year of sample?	YES	NO	NA
28.	Were ICP serial dilution analyses performed for each matrix and concentration level?	YES	NO	NA
29.	Were criteria met for all ICP serial dilution analyses?	YES	NO	NA
30.	Are all raw data legibly labeled with necessary information (e.g., SAS number, EPA sample number, date and time of analysis, instrument identification, etc.)?	YES	NO	NA
31.	Are all data deliverables included in the data package being sent to EPA?	YES	NO	NA
32.	Is an SDG narrative discussing all problems or issues encountered during sample preparation/analysis included in the data package?	YES	NO	NA
33.	Were proper chain of custody procedures followed?	YES	NO	NA

If any question was answered no, please indicate the change, why it was necessary, and who authorized the change. Please incorporate this information in narrative and attach to this checklist.

I certify, that to the best of my knowledge and belief, the information provided on this self-inspection form is true and accurate.

Paul Daniello Paul Daniello Asst Organic Program Mgr 10/12/94
Signature Prepared by (print name) Title Date

Paul Daniello Paul Daniello 10/12/94
Signature Laboratory Manager (Print Name) Date

ENVIRONME' _ PROTECTION AGENCY
Office of Enforcement

REGIO
841 Ches. . St.
Philadelphia, Pennsylvania 19107

CHAIN OF CUSTODY RECORD

PROJ. NO.: T4232-05
PROJECT NAME: KOP
SAMPLERS: (Signature) Dwl E Rudolph

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Dioxin/dibenzofurans						REMARKS
W8 A	9/15/94	1410		X	0110915 W8A	1	X						Tag # 3-1154334
W8 B	9/15/94	1440		X	0110915 W8B	1	X						Tag # 3-1154335 MS/MSD
W5 A	9/20/94	0828		X	0110920 W5A	1	X						Tag # 3-1154336
W5 B	9/20/94	0832		X	0110920 W5B	1	X						Tag # 3-1154337

AR305133

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Dwl E Rudolph	9/22/94 1630				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[illegible]	9/23/94 1000	Fed Ex Airbill 197369904	

5°C

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

PAGE 1 OF 1 (1)

EPA SAMPLE SHIPPING LOG

ARC/TETRA

(REQUIRED FOR ALL SAMPLES SENT THROUGH THE CONTRACT LAB PROGRAM)

PROJECT SITE NAME: Koppers Facility ; EPA PROJ. OFFICER: Lisa Marino
RAS NO. ; SAS NO. R3011 ; TASK OR SET NO. 4232-05
PROJECT SITE LEADER: E. Rogers ; PHONE NO. (302) 738-7551
PROJECT SAMPLE COORDINATOR: " ; PHONE NO. (") "

SAS REQUEST (DETAILS REQUIRED) (10)

QC SAMPLE INFORMATION AND/OR COMMENTS	CONC. (LOW/ MED./ HIGH)	SAMPLE PHASE (AQ/ SOL.)	TYPE OF REQUEST (ORG. DIO. OR INOR.) SAS	EPA SAMPLE NO.	ORGANICS OR INORGANICS: LAB NAME	DATE SHIPPED	DATA RECEIVED (XX-OUT ITEMS NOT REQUESTED): VOA	BNA	PEST	TCDD	METALS	CN	SAS REQUEST LAB NAME	SAS REQUEST (ITEMIZE)	DATE SHIPPED	DATA REC'D.
(2)	(3)	(4)	(5)	(6)	(7)	(8)	←			(9)		→	(11)	(12)	(13)	
—	L	SOL	drum	0110915W8A	SWOK/AMS	9/22/94				✓						
MS/MSD	L	↓	↓	0110915W8B	↓					✓						
—	L			0110920W5A						✓						
—	L			0110920W5B						✓			Rec'd 10-31-94 PC			

AR305134

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FINAL SAMPLING: YES ☐ ; NO ☒ ; FINAL SHIPPING DATE: unknown (14)

REVISION 02/90

PCDD/PCDF SPIKED SAMPLE SUMMARY

W8B

Lab Name: Shell - Tulsa Contract: _____

Lab Code: SWOIK Case No.: TTSC14M SAS No.: _____ SDG No.: 20048

Matrix: Soil (Soil/Water/Waste/Ash)

CONCENTRATION UNITS: (ng/L or ug/Kg) ~~ug/kg~~ pg/kg

ANALYTE	SPIKE ADDED (PG)	SPIKED SAMPLE CONCENTRATION	SAMPLE CONCENTRATION	% REC #	QC LIMITS
2378-TCDD	25000	2.17	Ø	87	50-150
2378-TCDF	25000	2.24		90	50-150
12378-PeCDF	62500	5.40		86	50-150
12378-PeCDD	62500	4.54		73	50-150
123678-HxCDF	62500	8.37		134	50-150
123678-HxCDD	62500	7.55		121	50-150
1234678-HpCDF	62500	9.03		144	50-150
1234678-HpCDD	62500	8.00		128	50-150
OCDD	125000	16.4		131	50-150
OCDF	125000	12.1	Ø	97	50-150

If an analyte is not detected in the unspiked sample, enter 0 (zero) as t
"SAMPLE CONCENTRATION."

Column to be used to flag values outside QC limits.

QC limits are advisory.

3DF3

PCDD/PCDF DUPLICATE SAMPLE SUMMARY

EPA SAMPLE NO.

W8B

Lab Name: SWL-Tulsa Contract: _____

Lab Code: SWOK Case No.: _____ SAS No.: _____ SDG No.: 20098

Matrix: Soil (Soil/Water/Waste/Ash)

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/kg

ANALYTE	SAMPLE CONCENTRATION	DUPLICATE CONCENTRATION	RPD	#	QC LIMITS
2378-TCDD	Ø	Ø	Ø		50
2378-TCDF					50
12378-PeCDF					50
12378-PeCDD					50
23478-PeCDF					50
123478-HxCDF					50
123678-HxCDF					50
123478-HxCDD					50
123678-HxCDD					50
123789-HxCDD					50
234678-HxCDF					50
123789-HxCDF					50
1234678-HpCDF					50
1234678-HpCDD					50
1234789-HpCDF					50
OCDD					50
OCDF	Ø	Ø	Ø		50

If an analyte is not detected in either analysis, enter 0 (zero) as the concentration.

Column to be used to flag values outside QC limits.

QC limits are advisory

AR305136

GL181D 1DFA EPA SAMPLE NO.

GL181F PCDD/PCDF SAMPLE DATA SUMMARY

W88ms

Lab Name: SWL-TULSA Contract:_____

Lab Code:___SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:___20048.03

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL181D

Water Sample Prep_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 80 Date Analyzed:____09/26/94

GC Column: ____ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	SELECTED IONS	PEAK RT	ION RATIO #	CONCENTRATION	Q	EMPC/EDL
2378-TCDD	320/322	23.45	.77	2.17		
2378-TCDF	304/306	23.10	.77	2.24		
12378-PeCDF	340/342	25.20	1.46	5.40		
12378-PeCDD	356/358	25.81	1.60	4.54		
23478-PeCDF	340/342			ND	U	.17
123478-HxCDF	374/376			ND	U	.32
123678-HxCDF	374/376	27.49	1.25	8.37		
123478-HXCDD	390/392			ND	U	.22
123678-HxCDD	390/392	28.03	1.21	7.55		
123789-HxCDD	390/392			ND	U	.57
234678-HxCDF	374/376			ND	U	.07
123789-HxCDF	374/376			ND	U	.29
1234678-HpCDF	408/410	29.92	1.01	9.03		
1234678-HpCDD	424/426	30.89	1.04	8.00		
1234789-HpCDF	408/410			ND	U	.14
OCDD	458/460	34.59	.89	16.36		
OCDF	442/444	34.79	.94	12.12		

NOTE: Concentrations, EMPCs, and EDLs are calculated on wet weight basis.

INTERNAL STANDARD	SELECTED IONS	PEAK RT	ION RATIO #	ION RATIO LIMITS	% REC #	RECOVERY LIMITS
13C-2378-TCDF	316/318	23.09	.790	0.65-0.89	89	25-150
13C-2378-TCDD	332/334	23.45	.770	0.65-0.89	94	25-150
13C-123678-HxCDD	402/404	28.01	1.226	1.05-1.43	93	25-150
13C-1234678-HpCDF	420/422	29.90	1.042	0.88-1.20	101	25-150
13C-OCDD	470/472	34.57	.872	0.76-1.01	94	25-150
37Cl-2378-TCDD	328/NA	23.45	N/A	N/A	77	25-150

Column to be used to flag values outside QC limits.

FORM I PCDD-1

AR305137

GL181D 1DFB EPA SAMPLE NO.

GL181F PCDD/PCDF TOXICITY EQUIVALENCE SUMMARY

W8Bms

Lab Name: SWL-TULSA Contract:_____

Lab Code:___SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:____20048.03

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL181D

Water Sample Prep.:_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:____09/23/94

Injection Volume: 2 (uL) % Solids: 80 Date Analyzed:____09/26/94

GC Column: ____ULTRA 2 ID:__.32 (mm) Dilution Factor:___ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	CONCENTRATION		TEF		TEF-ADJUSTED CONCENTRATION
2378-TCDD	2.17	x	1.0	=	2.17
2378-TCDF	2.24	x	0.1	=	.22
12378-PeCDF	5.40	x	0.05	=	.27
12378-PeCDD	4.54	x	0.5	=	2.27
23478-PeCDF	ND	x	0.5	=	.00
123478-HxCDF	ND	x	0.1	=	.00
123678-HxCDF	8.37	x	0.1	=	.84
123478-HXCDD	ND	x	0.1	=	.00
123678-HxCDD	7.55	x	0.1	=	.75
123789-HxCDD	ND	x	0.1	=	.00
234678-HxCDF	ND	x	0.1	=	.00
123789-HxCDF	ND	x	0.1	=	.00
1234678-HpCDF	9.03	x	0.01	=	.09
1234678-HpCDD	8.00	x	0.01	=	.08
1234789-HpCDF	ND	x	0.01	=	.00
OCDD	16.36	x	0.001	=	.02
OCDF	12.12	x	0.001	=	.01
			TOTAL	=	6.73

NOTE: Do not include EMPC or edl values in the TEF-adjusted Concentration.

If the Total Toxic Equivalent Concentration of the sample is greater than 7 ng/L for an aqueous sample, grater than 0.7 ug/Kg for any solid matrix, or grater than 7 ug/kg for a chemical waste sample, then second column confirmation of the results may be required.

GL181D 2DF EPA SAMPLE NO.

GL181F PCDD/PCDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY

W8Bms

Lab Name: SWL-TULSA Contract:_____

Lab Code: SWOK Case No.: TTECH-MD SAS No.: _____ SDG. NO.: 20048

Matrix: SOIL (Soil/Water/Waste/Ash) Lab Sample ID.: 20048.03

Sample wt/vol: 10 (g/ml) g Lab File ID: GL181D

Water Sample Prep.: _____ (Sepf/Cont) Date Received: 09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted: 09/23/94

Injection Volume: 2 (uL) % Solids: 80 Date Analyzed: 09/26/94

GC Column: ULTRA 2 ID: .32 (mm) Dilution Factor: 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

HOMOLOGUE	PEAKS	CONCENTRATION	Q	EMPC/EDL
DIOXINS				
Total TCDD	/	2.17		
Total PeCDD	/	4.54		
Total HxCDD	/	7.55		
Total HpCDD	/	8.00		
FURANS				
Total TCDF	/	2.24		
Total PeCDF	/	5.40		
Total HxCDF	/	8.37		
Total HpCDF	/	9.03		

NOTE: Concentrations, EMPCs, and EDLs are calculated on a wet weight basis.
The total congener concentrations do not affect the TEF calculations.

AR305139

GL180D 1DFA EPA SAMPLE NO.
GL180F PCDD/PCDF SAMPLE DATA SUMMARY

W88dup

Lab Name: SWL-TULSA Contract:_____

Lab Code:__SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL__ (Soil/Water/Waste/Ash) Lab Sample ID.:___20048.04

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL180D

Water Sample Prep_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 80 Date Analyzed:____09/26/94

GC Column: ___ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	SELECTED IONS	PEAK RT	ION RATIO #	CONCENTRATION	Q	EMPC/EDL
2378-TCDD	320/322			ND	U	.19
2378-TCDF	304/306			ND	U	.07
12378-PeCDF	340/342			ND	U	.09
12378-PeCDD	356/358			ND	U	.16
23478-PeCDF	340/342			ND	U	.05
123478-HxCDF	374/376			ND	U	.29
123678-HxCDF	374/376			ND	U	.33
123478-HXCDD	390/392			ND	U	.27
123678-HxCDD	390/392			ND	U	.27
123789-HxCDD	390/392			ND	U	.28
234678-HxCDF	374/376			ND	U	.35
123789-HxCDF	374/376			ND	U	.50
1234678-HpCDF	408/410			ND	U	.20
1234678-HpCDD	424/426			ND	U	.24
1234789-HpCDF	408/410			ND	U	.27
OCDD	458/460			ND	U	.43
OCDF	442/444			ND	U	.37

NOTE: Concentrations, EMPCs, and EDLs are calculated on wet weight basis.

INTERNAL STANDARD	SELECTED IONS	PEAK RT	ION RATIO #	ION RATIO LIMITS	% REC #	RECOVERY LIMITS
13C-2378-TCDF	316/318	23.10	.814	0.65-0.89	87	25-150
13C-2378-TCDD	332/334	23.44	.806	0.65-0.89	89	25-150
13C-123678-HxCDD	402/404	28.00	1.282	1.05-1.43	90	25-150
13C-1234678-HpCDF	420/422	29.89	1.070	0.88-1.20	90	25-150
13C-OCDD	470/472	34.56	.910	0.76-1.01	79	25-150
37Cl-2378-TCDD	328/NA	23.46	N/A	N/A	77	25-150

Column to be used to flag values outside QC limits.

FORM I PCDD-1

GL180D 1DFB EPA SAMPLE NO.

GL180F PCDD/PCDF TOXICITY EQUIVALENCE SUMMARY

W88dup

Lab Name: SWL-TULSA Contract:_____

Lab Code:___SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL__ (Soil/Water/Waste/Ash) Lab Sample ID.:____20048.04

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL180D

Water Sample Prep.:_____ (Sepf/Cont) Date Received:_____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:____09/23/94

Injection Volume: 2 (uL) % Solids: 80 Date Analyzed:_____09/26/94

GC Column: ____ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	CONCENTRATION		TEF		TEF-ADJUSTED CONCENTRATION
2378-TCDD	ND	x	1.0	=	.00
2378-TCDF	ND	x	0.1	=	.00
12378-PeCDF	ND	x	0.05	=	.00
12378-PeCDD	ND	x	0.5	=	.00
23478-PeCDF	ND	x	0.5	=	.00
123478-HxCDF	ND	x	0.1	=	.00
123678-HxCDF	ND	x	0.1	=	.00
123478-HXCDD	ND	x	0.1	=	.00
123678-HxCDD	ND	x	0.1	=	.00
123789-HxCDD	ND	x	0.1	=	.00
234678-HxCDF	ND	x	0.1	=	.00
123789-HxCDF	ND	x	0.1	=	.00
1234678-HpCDF	ND	x	0.01	=	.00
1234678-HpCDD	ND	x	0.01	=	.00
1234789-HpCDF	ND	x	0.01	=	.00
OCDD	ND	x	0.001	=	.00
OCDF	ND	x	0.001	=	.00
			TOTAL	=	.00

NOTE: Do not include EMPC or edl values in the TEF-adjusted Concentration.

If the Total Toxic Equivalent Concentration of the sample is greater than 7 ng/L for an aqueous sample, grater than 0.7 ug/Kg for any solid matrix, or grater than 7 ug/kg for a chemical waste sample, then second column confirmation of the results may be required.

GL180D 2DF EPA SAMPLE NO.

GL180F PCDD/PCDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY

W8Bdup

Lab Name: SWL-TULSA Contract:_____

Lab Code:___SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:___20048.04

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL180D

Water Sample Prep.:_____ (Sepf/Cont) Date Received:____09/23/94

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 80 Date Analyzed:____09/26/94

GC Column: ____ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

HOMOLOGUE	PEAKS	CONCENTRATION	Q	EMPC/EDL
DIOXINS				
Total TCDD		.00	U	.19
Total PeCDD		.00	U	.16
Total HxCDD		.00	U	.27
Total HpCDD		.00	U	.24
FURANS				
Total TCDF		.00	U	.07
Total PeCDF		.00	U	.05
Total HxCDF		.00	U	.29
Total HpCDF		.00	U	.20

NOTE: Concentrations, EMPCs, and EDLs are calculated on a wet weight basis.
The total congener concentrations do not affect the TEF calculations.

GL176D 1DFA EPA SAMPLE NO.
GL176F

PCDD/PCDF SAMPLE DATA SUMMARY

DFBLK /

Lab Name: SWL-TULSA Contract:_____

Lab Code:___SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:___BLK092303

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL176D

Water Sample Prep_____ (Sepf/Cont) Date Received:____

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 100 Date Analyzed:____09/26/94

GC Column: ____ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	SELECTED IONS	PEAK RT	ION RATIO #	CONCENTRATION	Q	EMPC/EDL
2378-TCDD	320/322			ND	U	.08
2378-TCDF	304/306			ND	U	.10
12378-PeCDF	340/342			ND	U	.07
12378-PeCDD	356/358			ND	U	.25
23478-PeCDF	340/342			ND	U	.09
123478-HxCDF	374/376			ND	U	.40
123678-HxCDF	374/376			ND	U	.25
123478-HXCDD	390/392			ND	U	.23
123678-HxCDD	390/392			ND	U	.20
123789-HxCDD	390/392			ND	U	.22
234678-HxCDF	374/376			ND	U	.38
123789-HxCDF	374/376			ND	U	.59
1234678-HpCDF	408/410			ND	U	.25
1234678-HpCDD	424/426			ND	U	.22
1234789-HpCDF	408/410			ND	U	.13
OCDD	458/460			ND	U	.41
OCDF	442/444			ND	U	.31

NOTE: Concentrations, EMPCs, and EDLs are calculated on wet weight basis.

INTERNAL STANDARD	SELECTED IONS	PEAK RT	ION RATIO #	ION RATIO LIMITS	% REC #	RECOVERY LIMITS
13C-2378-TCDF	316/318	23.09	.807	0.65-0.89	96	25-150
13C-2378-TCDD	332/334	23.46	.792	0.65-0.89	98	25-150
13C-123678-HxCDD	402/404	28.02	1.276	1.05-1.43	99	25-150
13C-1234678-HpCDF	420/422	29.91	1.078	0.88-1.20	101	25-150
13C-OCDD	470/472	34.57	.929	0.76-1.01	92	25-150
37Cl-2378-TCDD	328/NA	23.46	N/A	N/A	88	25-150

Column to be used to flag values outside QC limits.

GL176D 2DF EPA SAMPLE NO.

GL176F PCDD/PCDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY

DFBLK 1

Lab Name: SWL-TULSA Contract:_____

Lab Code:__SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:___BLKD92303

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL176D

Water Sample Prep.:_____ (Sepf/Cont) Date Received:____

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 100 Date Analyzed:____09/26/94

GC Column: ___ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

HOMOLOGUE	PEAKS	CONCENTRATION	Q	EMPC/EDL
DIOXINS				
Total TCDD		.00	U	.08
Total PeCDD		.00	U	.25
Total HxCDD		.00	U	.20
Total HpCDD		.00	U	.22
FURANS				
Total TCDF		.00	U	.10
Total PeCDF		.00	U	.07
Total HxCDF		.00	U	.25
Total HpCDF		.00	U	.13

NOTE: Concentrations, EMPCs, and EDLs are calculated on a wet weight basis.
The total congener concentrations do not affect the TEF calculations.

GL176D 1DFB EPA SAMPLE NO.

GL176F PCDD/PCDF TOXICITY EQUIVALENCE SUMMARY

DFBLK 1

Lab Name: SWL-TULSA Contract:_____

Lab Code:__SWOK___ Case No.:_TTECH-MD SAS No.: _____ SDG. NO.:20048

Matrix:__SOIL___ (Soil/Water/Waste/Ash) Lab Sample ID.:___BLK092303

Sample wt/vol: 10 (g/ml) g Lab File ID:_____GL176D

Water Sample Prep.:_____ (Sepf/Cont) Date Received:____

Concentrated Extract Volume: 100 (uL) Date Extracted:___09/23/94

Injection Volume: 2 (uL) % Solids: 100 Date Analyzed:____09/26/94

GC Column: ____ULTRA 2 ID:__.32 (mm) Dilution Factor:__ 1

CONCENTRATION UNITS: (ng/L or ug/Kg) ug/Kg

ANALYTE	CONCENTRATION		TEF		TEF-ADJUSTED CONCENTRATION
2378-TCDD	ND	x	1.0	=	.00
2378-TCDF	ND	x	0.1	=	.00
12378-PeCDF	ND	x	0.05	=	.00
12378-PeCDD	ND	x	0.5	=	.00
23478-PeCDF	ND	x	0.5	=	.00
123478-HxCDF	ND	x	0.1	=	.00
123678-HxCDF	ND	x	0.1	=	.00
123478-HXCDD	ND	x	0.1	=	.00
123678-HxCDD	ND	x	0.1	=	.00
123789-HxCDD	ND	x	0.1	=	.00
234678-HxCDF	ND	x	0.1	=	.00
123789-HxCDF	ND	x	0.1	=	.00
1234678-HpCDF	ND	x	0.01	=	.00
1234678-HpCDD	ND	x	0.01	=	.00
1234789-HpCDF	ND	x	0.01	=	.00
OCDD	ND	x	0.001	=	.00
OCDF	ND	x	0.001	=	.00
			TOTAL	=	.00

NOTE: Do not include EMPC or edl values in the TEF-adjusted Concentration.

If the Total Toxic Equivalent Concentration of the sample is greater than 7 ng/L for an aqueous sample, grater than 0.7 ug/Kg for any solid matrix, or grater than 7 ug/kg for a chemical waste sample, then second column confirmation of the results may be required.

AR305145