FILE 4UD215
PACKAGE H

Official File Copy
File Code
Project
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DATE	PEER REVIEWER(S)
	Printed Name
	Signature
	Printed Name
Author initials RCM	PEER REVIEW NOT REQUIRED

D-8650
ENV-5.00

DEC 12 1996

Ohio Environmental Protection Agency
Attention: Richard Smith
Northeast District Office
2110 Aurora Road
Twinsburg OH 44087

Subject: Krejci Dump Site Data Transmittal, Dioxin Sampling

Dear Mr. Smith:

Please find enclosed the chemical analytical package for the samples collected to evaluate for dioxin/furan contamination. These samples were collected in accordance with Technical Memorandum No. 11, which was transmitted to you on September 27, 1996.

If you have any questions relative to this data package, please contact me at (303) 236-8299, ext. 440.

Sincerely,

Robert E. McCaig

Robert E. McCaig
Resource Manager
Krejci Dump Investigations

Enclosure

bc: D-8340 (Gemperline), D-8650 (McCaig)
w/o encl

WBR:Bmccaig:fs:68299x446:12/11/96
H:\...\wpo\letter\bmccaig\tr1296

PACKAGE 114
4UD26

United States Department of the Interior

BUREAU OF RECLAMATION
Reclamation Service Center
P.O. Box 25007
Building 67, Denver Federal Center
Denver, Colorado 80225-0007

IN REPLY REFER TO:

D-8240
RES-1.10

DEC 10 1996

MEMORANDUM

To: Resource Management Team
Attention: D-8650 (McCaig)

From: Mary Goldade
Technical Service Center
Environmental Research Chemistry Laboratory

Subject: Report of Chemical Analysis of Environmental Soil Samples - Krejci Dump Site Project; Brecksville, Ohio

Attached are Sample Log-In Summaries, Analytical Report Package and copies of the field Chain of Custody (COC) records and the Laboratory COC records for samples from the Krejci Project submitted to the laboratory on October 19, 1996, for chemical analysis of EPA Method 8290 Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) [dioxins and furans]. The samples were subcontracted to Quanterra Environmental Services in West Sacramento, California for analysis. The samples included in this report are listed below:

K-2794
K-2800 to K-2828

The samples were received from the field under COC in good condition and preserved. The temperature of the samples at the time of receipt was 0.1°C, which is outside the EPA recommended preservation temperature of 4°C $\pm$ 2°C. Since the samples are not aqueous, freezing is not a matter for concern; therefore the temperature upon receipt is acceptable. The samples were transported to the contract laboratory under COC and received there in good condition as well. Please note that the samples were extracted and analyzed within EPA recommended holding times.

The analytical results for all investigative samples submitted in a soil matrix are reported on a dry weight basis. Detection limits for dioxins and furans are reported on a sample specific basis and all results are recovery corrected per the isotope dilution technique.

The concentration of OCDD in investigative samples K-2804, K-2807, K-2808, K-2809, K-2814 and K-2818, and the concentration of 1,2,3,4,6,7,8-HpCDF and OCDF in investigative sample K-2812 and the concentration of 1,2,3,4,6,7,8-HpCDD and OCDD in investigative sample K-2813 exceed the method calibration range. The concentrations are within the linear response range of the detector; and therefore dilution analyses are not required by EPA Method 8290. Dilution analyses are required for 2,3,7,8-substituted PCDDs and PCDFs if the concentration of the final extract exceeds the upper method calibration range. Data are not qualified.

Elevated detection limits are reported for samples K-2813, K-2814, K-2817 and K-2818 due to chlorinated diphenyl ether interferences present at the expected retention times of some 2,3,7,8-substituted PCDFs. Data are not qualified.

Investigative sample K-2828 is identified as an equipment blank which is used to determine if the equipment was free from contamination prior to sampling. The following compounds were positively detected: TCDFs (total) at 6.0 pg/L, 2,3,7,8-TCDF at 5.4 pg/L and OCDD at 140 pg/L. The project requires that these three compounds be qualified with a "B" to indicate their presence in the equipment blank.

Investigative sample K-2827 is identified as a field blank. A field blank is used to help demonstrate whether the sample handling procedures remained free of contamination. The following compounds were positively detected: HpCDDs (total) at 50 pg/g, 1,2,3,4,6,7,8-HpCDD at 24 pg/g, and OCDD at 1300 pg/g. The project requires that these three compounds be qualified with a "B" to indicate their presence in the field blank.

Matrix spike and matrix spike duplicate analyses were performed on investigative sample K-2800 with acceptable results.

Internal standards were added to each investigative and quality control (QC) sample and were recovered within acceptance limits (40-135%) with two exceptions. The analyte $^{13}C_{12}$-OCDD for investigative sample K-2808 was recovered slightly above acceptance limits at 137%. The analyte $^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF in laboratory control sample (LCS) QC Lot # 13 SEP 96-A was also recovered above the upper acceptance limit at 141%. Data are acceptable without qualification.

A certified reference material (CRM) was submitted to the contract laboratory and analyzed in advance of the investigative samples. All analytes were recovered within certified tolerance limits.

Questions regarding the attached dioxins and furans data may be addressed to the Client Representative, Kevin Kelly at (303) 236-4290 extension 257; Group Manager, Margaret Lake at extension 256 or Laboratory QC Officer, Doug Craft at extension 255.

Attachments

Mary Goldade

cc: D-8240 (Kelly)
(w/att)

SAMPLE LOG-IN SUMMARY

USBOR ENVIRONMENTAL RESEARCH CHEMISTRY LAB
DENVER, CO

Name Initial: MG

Lab#	Login Date	COC#	EPATag	StationID	Matrix	Sampled Date	Sampled Time	Analyses Required	Comment
K-2794	09/26/96	none	N/A	Fortified Soil	soil	n/a		~~dioxane~~/furan dioxin	certified standard

SPECIALTY ANALYTICAL STANDARD — RADIAN CEIL, Inc.
POLY CDD/PCLF CDF
FORTIFIED SOIL
Cat.# EDF-2303
Amount: 10g
Lot #: [illegible]
Date Prep: 7/01

FOR LABORATORY USE ONLY

MG 12.5.96

C960926.XLS

SAMPLE `G-IN SUMMARY

USBOR ENVIRONMENTAL RESEARCH CHEMISTRY LAB

DENVER, CO

Name Initial:

Lab#	Client	Client Reps
K-2794	McCaig-Krejci special	Kelly

SAMPLE LOG-IN SUMMARY

USBOR ENVIRONMENTAL RESEARCH CHEMISTRY LAB
DENVER, CO

Name Initial: MG

Lab#	Login Date	COC#	StationID	Matrix	Sampled Date	Sampled Time	Analyses Required	Comment	Client
K-2800	10/21/96	1800	SS2-N2600-E200-0-0-0-0	soil	10/17/96	17:05	dioxin		Robert McCaig/Kevin Kelly
K-2801	10/21/96	1800	SS2-N2800-E400-0-0-0-0	soil	10/17/96	17:15	dioxin		Robert McCaig/Kevin Kelly
K-2802	10/21/96	1800	SS2-N2600-E400-0-0-0-0	soil	10/17/96	16:54	dioxin		Robert McCaig/Kevin Kelly
K-2803	10/21/96	1800	SS2-N2600-E400-0-0-1-0	soil	10/17/96	16:54	dioxin		Robert McCaig/Kevin Kelly
K-2804	10/21/96	1800	SS2-N2400-E400-0-0-0-0	soil	10/17/96	17:00	dioxin		Robert McCaig/Kevin Kelly
K-2805	10/21/96	1800	SS2-N2600-E600-0-0-0-0	soil	10/17/96	17:20	dioxin		Robert McCaig/Kevin Kelly
K-2806	10/21/96	1800	SS2-N2400-E600-0-0-0-0	soil	10/17/96	16:48	dioxin		Robert McCaig/Kevin Kelly
K-2807	10/21/96	1800	SS2-N2200-E600-0-0-0-0	soil	10/17/96	16:45	dioxin		Robert McCaig/Kevin Kelly
K-2808	10/21/96	1800	SS2-N4600-E1800-0-0-0-0	soil	10/17/96	16:11	dioxin		Robert McCaig/Kevin Kelly
K-2809	10/21/96	1800	SS2-N4400-E1800-0-0-0-0	soil	10/17/96	16:07	dioxin		Robert McCaig/Kevin Kelly
K-2810	10/21/96	1801	SS2-N4600-E2000-0-0-0-0	soil	10/17/96	10:28	dioxin	time on COC is 10:00	Robert McCaig/Kevin Kelly
K-2811	10/21/96	1801	SS2-N4400-E2000-0-0-0-0	soil	10/17/96	10:30	dioxin		Robert McCaig/Kevin Kelly
K-2812	10/21/96	1801	SS2-N4400-E2000-0-0-1-0	soil	10/17/96	10:30	dioxin		Robert McCaig/Kevin Kelly
K-2813	10/21/96	1801	SS2-N4200-E2000-0-0-0-0	soil	10/17/96	16:00	dioxin		Robert McCaig/Kevin Kelly
K-2814	10/21/96	1801	SS2-N4000-E2000-0-0-0-0	soil	10/17/96	09:28	dioxin		Robert McCaig/Kevin Kelly
K-2815	10/21/96	1801	SS2-N4600-E2200-0-0-0-0	soil	10/17/96	10:25	dioxin		Robert McCaig/Kevin Kelly
K-2816	10/21/96	1801	SS2-N4400-E2200-0-0-0-0	soil	10/17/96	10:12	dioxin		Robert McCaig/Kevin Kelly
K-2817	10/21/96	1801	SS2-N4200-E2200-0-0-0-0	soil	10/17/96	09:51	dioxin		Robert McCaig/Kevin Kelly
K-2818	10/21/96	1801	SS2-N4000-E2200-0-0-0-0	soil	10/17/96	09:35	dioxin		Robert McCaig/Kevin Kelly
K-2819	10/21/96	1801	SS2-N3800-E2200-0-0-0-0	soil	10/17/96	09:25	dioxin		Robert McCaig/Kevin Kelly
K-2820	10/21/96	1802	SS2-N4000-E2400-0-0-0-0	soil	10/17/96	09:39	dioxin		Robert McCaig/Kevin Kelly
K-2821	10/21/96	1802	SS2-N4200-E2400-0-0-0-0	soil	10/17/96	09:45	dioxin		Robert McCaig/Kevin Kelly
K-2822	10/21/96	1802	SS2-N4200-E2400-0-0-1-0	soil	10/17/96	09:45	dioxin		Robert McCaig/Kevin Kelly
K-2823	10/21/96	1802	SS2-N4400-E2400-0-0-0-0	soil	10/17/96	10:15	dioxin		Robert McCaig/Kevin Kelly
K-2824	10/21/96	1802	SS2-N4200-E2600-0-0-0-0	soil	10/17/96	10:00	dioxin		Robert McCaig/Kevin Kelly
K-2825	10/21/96	1802	SS2-N3400-E3100-0-0-0-0	soil	10/17/96	08:50	dioxin		Robert McCaig/Kevin Kelly
K-2826	10/21/96	1802	SS2-N3200-E3100-0-0-0-0	soil	10/17/96	08:44	dioxin		Robert McCaig/Kevin Kelly
K-2827	10/21/96	1802	SS2-8888-8888-0-0-0-0	soil	10/17/96	15:33	dioxin		Robert McCaig/Kevin Kelly
K-2828	10/21/96	none	none	water	none	none	dioxin		Robert McCaig/Kevin Kelly
	All samples to be contracted to Quanterra Incorporated, 880 Riverside Parkway, West Sacramento, CA 95605								

all samples received @ ERCL on 10.19.96

woodside 12.5.96

C961021.XLS

Quanterra
Environmental Services

CASE NARRATIVE

QUANTERRA INCORPORATED PROJECT NUMBER 090169

Detection limits for dioxins and furans are reported on a sample specific basis and all results are recovery corrected per the isotope dilution technique.

The 13C-OCDD internal standard recovery in sample "K-2808" was above the method recommended goal of 135%. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated internal standard recoveries.

The concentration of OCDD in samples "K-2804", "K-2807", K-2808", "K-2809", "K-2814", "K-2818", and the concentration of 1,2,3,4,6,7,8-HpCDF and OCDF in sample "K-2812" and the concentration of 1,2,3,4,6,7,8-HpCDD and OCDD in sample "K-2813" exceeds the method calibration range, as noted on the appropriate data sheets. The concentration is within the linear response range of the detector and data quality should not be adversely affected.

Elevated detection limits were reported for samples "K-2813", "K-2814", "K-2817", "K-2818" due to chlorinated diphenyl ether interferences present at the expected retention times of some 2,3,7,8-substituted PCDFs.

Quanterra
Environmental Services

QUANTERRA INCORPORATED QUALITY CONTROL PROGRAM

Quanterra has implemented an extensive Quality Control (QC) program to ensure the production of scientifically sound, legally defensible data of known documentable quality. This QC program is based upon requirements in "Test Methods for Evaluating Solid Waste", USEPA SW-846, Third Edition. It applies whenever SW-846 analytical methods are used. It also applies in whole or in part whenever project requirements fail to specify some aspect of QC practices described here. It does not apply when other well defined QC programs (e.g. CLP or CLP-like) are specified. This is Quanterra's base QC program for environmental analysis.

Definitions:

Quality Control Batch. The quality control (QC) batch is a set of up to 20 field samples plus associated laboratory QC samples that are similar in composition (matrix) and that are processed within the same time period with the same reagent and standard lots.

Surrogate. A surrogate (or internal standard) is an organic compound similar in chemical behavior to the target analyte, but not normally found in environmental samples. Surrogates (or IS) are added to all samples in a batch to monitor the effects of both the matrix and the analytical process on accuracy.

Method Blank. A method blank (MB) is a control sample prepared using the same reagents used for the samples. As part of the QC batch, it accompanies the samples through all steps of the sample extraction and cleanup procedure. The method blank is used to monitor the level of contamination introduced to a batch of samples as a result of processing in the laboratory.

Laboratory Control Sample. A laboratory control sample (LCS) is prepared using a well characterized matrix (e.g., reagent water or Ottawa sand) that is spiked with known amounts of representative analytes. Alternate matrices (e.g., glass beads) may be used for soil analyses when Ottawa sand is not appropriate. As part of a QC batch, it accompanies the samples through all steps of the sample extraction and cleanup process. The LCS is used to monitor the accuracy of the analytical process independent of possible interference effects due to sample matrix.

Duplicate Control Sample. Duplicate laboratory control samples (DCS) consists of a pair of LCSs analyzed within the same QC batch to monitor precision and accuracy independent of sample matrix effects.

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
Bureau of Reclamation

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
090169-0001-MB	Method Blank	AQUEOUS			23 OCT 96
090169-0001-SA	K-2828	AQUEOUS	17 OCT 96		23 OCT 96
090169-0002-MB	Method Blank	SOLID			23 OCT 96
090169-0002-SA	K-2800	SOIL	17 OCT 96	17:05	23 OCT 96
090169-0002-MS	K-2800	SOIL	17 OCT 96	17:05	23 OCT 96
090169-0002-SD	K-2800	SOIL	17 OCT 96	17:05	23 OCT 96
090169-0003-SA	K-2801	SOIL	17 OCT 96	17:15	23 OCT 96
090169-0004-SA	K-2802	SOIL	17 OCT 96	16:54	23 OCT 96
090169-0005-SA	K-2803	SOIL	17 OCT 96	16:54	23 OCT 96
090169-0006-SA	K-2804	SOIL	17 OCT 96	17:00	23 OCT 96
090169-0007-SA	K-2805	SOIL	17 OCT 96	17:20	23 OCT 96
090169-0008-SA	K-2806	SOIL	17 OCT 96	16:48	23 OCT 96
090169-0009-SA	K-2807	SOIL	17 OCT 96	16:45	23 OCT 96
090169-0010-SA	K-2808	SOIL	17 OCT 96	16:11	23 OCT 96
090169-0011-SA	K-2809	SOIL	17 OCT 96	16:07	23 OCT 96
090169-0012-SA	K-2810	SOIL	17 OCT 96	10:28	23 OCT 96
090169-0013-SA	K-2811	SOIL	17 OCT 96	10:30	23 OCT 96
090169-0014-SA	K-2812	SOIL	17 OCT 96	10:30	23 OCT 96
090169-0015-SA	K-2813	SOIL	17 OCT 96	16:00	23 OCT 96
090169-0016-SA	K-2814	SOIL	17 OCT 96	09:28	23 OCT 96
090169-0017-SA	K-2815	SOIL	17 OCT 96	10:25	23 OCT 96
090169-0018-SA	K-2816	SOIL	17 OCT 96	10:12	23 OCT 96
090169-0019-SA	K-2817	SOIL	17 OCT 96	09:51	23 OCT 96
090169-0020-SA	K-2818	SOIL	17 OCT 96	09:35	23 OCT 96
090169-0021-SA	K-2819	SOIL	17 OCT 96	09:25	23 OCT 96
090169-0022-MB	Method Blank	SOLID			23 OCT 96
090169-0022-SA	K-2820	SOIL	17 OCT 96	09:39	23 OCT 96
090169-0023-SA	K-2821	SOIL	17 OCT 96	09:45	23 OCT 96
090169-0024-SA	K-2822	SOIL	17 OCT 96	09:45	23 OCT 96
090169-0025-SA	K-2823	SOIL	17 OCT 96	10:15	23 OCT 96
090169-0026-SA	K-2824	SOIL	17 OCT 96	10:00	23 OCT 96
090169-0027-SA	K-2825	SOIL	17 OCT 96	08:50	23 OCT 96
090169-0028-SA	K-2826	SOIL	17 OCT 96	08:44	23 OCT 96
090169-0029-SA	K-2827	SOIL	17 OCT 96	15:33	23 OCT 96

Percent Water

Method CLP %WATER

Client Name: Bureau of Reclamation
Matrix: SOIL
Units: %

Received: 23 OCT 96
Authorized: 23 OCT 96

Lab ID	Client ID	Result	Reporting Limit	Date Prepared	Date Analyzed
090169-0002-MS	K-2800	27.0	0.10	NA	01 NOV 96
090169-0002-SA	K-2800	27.0	0.10	NA	01 NOV 96
090169-0003-SA	K-2801	30.0	0.10	NA	01 NOV 96
090169-0004-SA	K-2802	28.4	0.10	NA	01 NOV 96
090169-0005-SA	K-2803	28.8	0.10	NA	01 NOV 96
090169-0006-SA	K-2804	22.3	0.10	NA	01 NOV 96
090169-0007-SA	K-2805	33.0	0.10	NA	01 NOV 96
090169-0008-SA	K-2806	22.6	0.10	NA	01 NOV 96
090169-0009-SA	K-2807	20.0	0.10	NA	01 NOV 96
090169-0010-SA	K-2808	21.2	0.10	NA	01 NOV 96
090169-0011-SA	K-2809	34.3	0.10	NA	01 NOV 96
090169-0012-SA	K-2810	10.7	0.10	NA	01 NOV 96
090169-0013-SA	K-2811	12.2	0.10	NA	01 NOV 96
090169-0014-SA	K-2812	12.2	0.10	NA	01 NOV 96
090169-0015-SA	K-2813	18.5	0.10	NA	01 NOV 96
090169-0016-SA	K-2814	14.5	0.10	NA	01 NOV 96
090169-0017-SA	K-2815	21.3	0.10	NA	01 NOV 96
090169-0018-SA	K-2816	20.9	0.10	NA	01 NOV 96
090169-0019-SA	K-2817	27.8	0.10	NA	01 NOV 96
090169-0020-SA	K-2818	24.7	0.10	NA	01 NOV 96
090169-0021-SA	K-2819	37.1	0.10	NA	01 NOV 96
090169-0022-SA	K-2820	21.7	0.10	NA	01 NOV 96
090169-0023-SA	K-2821	23.0	0.10	NA	01 NOV 96
090169-0024-SA	K-2822	26.0	0.10	NA	01 NOV 96
090169-0025-SA	K-2823	22.2	0.10	NA	01 NOV 96
090169-0026-SA	K-2824	26.4	0.10	NA	01 NOV 96
090169-0027-SA	K-2825	18.6	0.10	NA	01 NOV 96
090169-0028-SA	K-2826	23.3	0.10	NA	01 NOV 96
090169-0029-SA	K-2827	13.7	0.10	NA	01 NOV 96

ND = Not detected
NA = Not applicable

Reported By: Kelly Glauner

Approved By: Mike Flournoy

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2828
Lab ID: 090169-0001-SA
Matrix: AQUEOUS
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 29 OCT 96

Received: 23 OCT 96
Analyzed: 01 NOV 96

Sample Amount 0.95 L
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	6.0	pg/L	--	
2,3,7,8-TCDF	5.4	pg/L	--	@
PeCDFs (total)	ND	pg/L	130	
1,2,3,7,8-PeCDF	ND	pg/L	5.3	
2,3,4,7,8-PeCDF	ND	pg/L	4.6	
HxCDFs (total)	ND	pg/L	21	
1,2,3,4,7,8-HxCDF	ND	pg/L	8.2	
1,2,3,6,7,8-HxCDF	ND	pg/L	2.4	
2,3,4,6,7,8-HxCDF	ND	pg/L	12	
1,2,3,7,8,9-HxCDF	ND	pg/L	3.3	
HpCDFs (total)	ND	pg/L	11	
1,2,3,4,6,7,8-HpCDF	ND	pg/L	11	
1,2,3,4,7,8,9-HpCDF	ND	pg/L	3.6	
OCDF	ND	pg/L	17	
Dioxins				
TCDDs (total)	ND	pg/L	2.0	
2,3,7,8-TCDD	ND	pg/L	2.0	
PeCDDs (total)	ND	pg/L	6.4	
1,2,3,7,8-PeCDD	ND	pg/L	1.3	
HxCDDs (total)	ND	pg/L	6.1	
1,2,3,4,7,8-HxCDD	ND	pg/L	2.1	
1,2,3,6,7,8-HxCDD	ND	pg/L	2.0	
1,2,3,7,8,9-HxCDD	ND	pg/L	2.2	
HpCDDs (total)	ND	pg/L	14	
1,2,3,4,6,7,8-HpCDD	ND	pg/L	14	
OCDD	140	pg/L	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Teri Stone
Approved By: Mark Bechthold

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2828
Lab ID: 090169-0001-SA
Matrix: AQUEOUS Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 29 OCT 96 Analyzed: 01 NOV 96

Sample Amount 0.95 L
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	88
13C-2,3,7,8-TCDD	89
13C-1,2,3,7,8-PeCDF	84
13C-1,2,3,7,8-PeCDD	94
13C-1,2,3,4,7,8-HxCDF	85
13C-1,2,3,6,7,8-HxCDD	92
13C-1,2,3,4,6,7,8-HpCDF	67
13C-1,2,3,4,6,7,8-HpCDD	79
13C-OCDD	58

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone Approved By: Mark Bechthold

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2800
Lab ID: 090169-0002-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	13	pg/g	--	
2,3,7,8-TCDF	3.0	pg/g	--	g
PeCDFs (total)	ND	pg/g	5.7	
1,2,3,7,8-PeCDF	ND	pg/g	1.4	
2,3,4,7,8-PeCDF	ND	pg/g	1.9	
HxCDFs (total)	ND	pg/g	5.7	
1,2,3,4,7,8-HxCDF	ND	pg/g	2.4	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.5	
2,3,4,6,7,8-HxCDF	ND	pg/g	2.3	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.47	
HpCDFs (total)	ND	pg/g	5.6	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	5.6	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.89	
OCDF	ND	pg/g	11	
Dioxins				
TCDDs (total)	4.6	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.60	
PeCDDs (total)	ND	pg/g	3.7	
1,2,3,7,8-PeCDD	ND	pg/g	1.8	
HxCDDs (total)	7.7	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.5	
1,2,3,6,7,8-HxCDD	ND	pg/g	2.4	
1,2,3,7,8,9-HxCDD	ND	pg/g	4.1	
HpCDDs (total)	160	pg/g	--	
1,2,3,4,6,7,8-HpCDD	82	pg/g	--	
OCDD	9200	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Teri Stone Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2800
Lab ID: 090169-0002-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	98
13C-2,3,7,8-TCDD	97
13C-1,2,3,7,8-PeCDF	70
13C-1,2,3,7,8-PeCDD	91
13C-1,2,3,4,7,8-HxCDF	81
13C-1,2,3,6,7,8-HxCDD	94
13C-1,2,3,4,6,7,8-HpCDF	73
13C-1,2,3,4,6,7,8-HpCDD	95
13C-OCDD	112

Percent Moisture is 27%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2801
Lab ID: 090169-0003-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	19	pg/g	--	
2,3,7,8-TCDF	2.7	pg/g	--	g@
PeCDFs (total)	ND	pg/g	6.1	
1,2,3,7,8-PeCDF	ND	pg/g	1.1	
2,3,4,7,8-PeCDF	ND	pg/g	1.3	
HxCDFs (total)	ND	pg/g	5.8	
1,2,3,4,7,8-HxCDF	ND	pg/g	3.7	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.7	
2,3,4,6,7,8-HxCDF	ND	pg/g	1.6	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.46	
HpCDFs (total)	ND	pg/g	4.9	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	4.9	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.86	
OCDF	ND	pg/g	9.1	
Dioxins				
TCDDs (total)	4.7	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.49	
PeCDDs (total)	ND	pg/g	3.4	
1,2,3,7,8-PeCDD	ND	pg/g	1.5	
HxCDDs (total)	7.4	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.2	
1,2,3,6,7,8-HxCDD	ND	pg/g	2.0	
1,2,3,7,8,9-HxCDD	ND	pg/g	4.5	
HpCDDs (total)	91	pg/g	--	
1,2,3,4,6,7,8-HpCDD	45	pg/g	--	
OCDD	4100	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2801
Lab ID: 090169-0003-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	104
13C-2,3,7,8-TCDD	90
13C-1,2,3,7,8-PeCDF	70
13C-1,2,3,7,8-PeCDD	87
13C-1,2,3,4,7,8-HxCDF	86
13C-1,2,3,6,7,8-HxCDD	94
13C-1,2,3,4,6,7,8-HpCDF	77
13C-1,2,3,4,6,7,8-HpCDD	97
13C-OCDD	110

Percent Moisture is 30%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2802
Lab ID: 090169-0004-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	39	pg/g	--	
2,3,7,8-TCDF	4.1	pg/g	--	g
PeCDFs (total)	ND	pg/g	7.0	
1,2,3,7,8-PeCDF	ND	pg/g	1.4	
2,3,4,7,8-PeCDF	ND	pg/g	2.3	
HxCDFs (total)	8.0	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	5.0	
1,2,3,6,7,8-HxCDF	ND	pg/g	2.1	
2,3,4,6,7,8-HxCDF	ND	pg/g	2.5	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.18	
HpCDFs (total)	ND	pg/g	6.6	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	6.4	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.96	
OCDF	ND	pg/g	11	
Dioxins				
TCDDs (total)	8.8	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.56	
PeCDDs (total)	ND	pg/g	4.1	
1,2,3,7,8-PeCDD	ND	pg/g	1.0	
HxCDDs (total)	7.9	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.2	
1,2,3,6,7,8-HxCDD	ND	pg/g	2.0	
1,2,3,7,8,9-HxCDD	ND	pg/g	3.8	
HpCDDs (total)	54	pg/g	--	
1,2,3,4,6,7,8-HpCDD	26	pg/g	--	
OCDD	1600	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Andre Algazi Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2802
Lab ID: 090169-0004-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	100
13C-2,3,7,8-TCDD	89
13C-1,2,3,7,8-PeCDF	69
13C-1,2,3,7,8-PeCDD	87
13C-1,2,3,4,7,8-HxCDF	82
13C-1,2,3,6,7,8-HxCDD	91
13C-1,2,3,4,6,7,8-HpCDF	78
13C-1,2,3,4,6,7,8-HpCDD	99
13C-OCDD	114

Percent Moisture is 28%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

ND = Not detected
NA = Not applicable

Reported By: Andre Algazi Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2803
Lab ID: 090169-0005-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	47	pg/g	--	
2,3,7,8-TCDF	6.0	pg/g	--	g
PeCDFs (total)	9.2	pg/g	--	
1,2,3,7,8-PeCDF	ND	pg/g	1.6	
2,3,4,7,8-PeCDF	ND	pg/g	2.2	
HxCDFs (total)	8.3	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	5.7	
1,2,3,6,7,8-HxCDF	ND	pg/g	2.3	
2,3,4,6,7,8-HxCDF	ND	pg/g	2.8	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.18	
HpCDFs (total)	7.3	pg/g	--	
1,2,3,4,6,7,8-HpCDF	7.3	pg/g	--	@
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.94	
OCDF	16	pg/g	--	@
Dioxins				
TCDDs (total)	11	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.48	
PeCDDs (total)	ND	pg/g	4.8	
1,2,3,7,8-PeCDD	ND	pg/g	1.7	
HxCDDs (total)	10	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.6	
1,2,3,6,7,8-HxCDD	ND	pg/g	2.6	
1,2,3,7,8,9-HxCDD	ND	pg/g	4.8	
HpCDDs (total)	66	pg/g	--	
1,2,3,4,6,7,8-HpCDD	31	pg/g	--	
OCDD	1700	pg/g	--	

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ND = Not detected
NA = Not applicable

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Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2803
Lab ID: 090169-0005-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	106
13C-2,3,7,8-TCDD	94
13C-1,2,3,7,8-PeCDF	79
13C-1,2,3,7,8-PeCDD	93
13C-1,2,3,4,7,8-HxCDF	81
13C-1,2,3,6,7,8-HxCDD	84
13C-1,2,3,4,6,7,8-HpCDF	70
13C-1,2,3,4,6,7,8-HpCDD	92
13C-OCDD	104

Percent Moisture is 29%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Maricon Estrada Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2804
Lab ID: 090169-0006-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	45	pg/g	--	
2,3,7,8-TCDF	5.1	pg/g	--	g
PeCDFs (total)	6.9	pg/g	--	
1,2,3,7,8-PeCDF	ND	pg/g	1.6	
2,3,4,7,8-PeCDF	ND	pg/g	1.9	
HxCDFs (total)	7.7	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	2.8	
1,2,3,6,7,8-HxCDF	ND	pg/g	2.1	
2,3,4,6,7,8-HxCDF	ND	pg/g	2.2	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.68	
HpCDFs (total)	ND	pg/g	5.1	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	5.1	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.76	
OCDF	ND	pg/g	11	
Dioxins				
TCDDs (total)	12	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.71	
PeCDDs (total)	ND	pg/g	5.5	
1,2,3,7,8-PeCDD	ND	pg/g	1.2	
HxCDDs (total)	17	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.5	
1,2,3,6,7,8-HxCDD	ND	pg/g	2.5	
1,2,3,7,8,9-HxCDD	ND	pg/g	4.6	
HpCDDs (total)	390	pg/g	--	
1,2,3,4,6,7,8-HpCDD	210	pg/g	--	
OCDD	130000	pg/g	--	DE

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ND = Not detected
NA = Not applicable

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2804
Lab ID: 090169-0006-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	106
13C-2,3,7,8-TCDD	91
13C-1,2,3,7,8-PeCDF	78
13C-1,2,3,7,8-PeCDD	90
13C-1,2,3,4,7,8-HxCDF	85
13C-1,2,3,6,7,8-HxCDD	92
13C-1,2,3,4,6,7,8-HpCDF	77
13C-1,2,3,4,6,7,8-HpCDD	102
13C-OCDD	120

Percent Moisture is 22%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note D : Compound quantitated using a secondary dilution.

Note E : Concentration exceeds calibration range.

ND = Not detected
NA = Not applicable

Reported By: Maricon Estrada Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2805
Lab ID: 090169-0007-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	41	pg/g	--	
2,3,7,8-TCDF	5.1	pg/g	--	g
PeCDFs (total)	9.9	pg/g	--	
1,2,3,7,8-PeCDF	ND	pg/g	1.3	
2,3,4,7,8-PeCDF	ND	pg/g	2.3	
HxCDFs (total)	7.5	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	2.7	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.8	
2,3,4,6,7,8-HxCDF	ND	pg/g	2.4	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.18	
HpCDFs (total)	ND	pg/g	4.6	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	4.6	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.76	
OCDF	ND	pg/g	9.8	
Dioxins				
TCDDs (total)	7.9	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.64	
PeCDDs (total)	ND	pg/g	5.6	
1,2,3,7,8-PeCDD	ND	pg/g	1.2	
HxCDDs (total)	8.2	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.3	
1,2,3,6,7,8-HxCDD	ND	pg/g	2.0	
1,2,3,7,8,9-HxCDD	ND	pg/g	3.7	
HpCDDs (total)	53	pg/g	--	
1,2,3,4,6,7,8-HpCDD	26	pg/g	--	
OCDD	2600	pg/g	--	

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ND = Not detected
NA = Not applicable

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2805
Lab ID: 090169-0007-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	108
13C-2,3,7,8-TCDD	86
13C-1,2,3,7,8-PeCDF	71
13C-1,2,3,7,8-PeCDD	87
13C-1,2,3,4,7,8-HxCDF	76
13C-1,2,3,6,7,8-HxCDD	81
13C-1,2,3,4,6,7,8-HpCDF	70
13C-1,2,3,4,6,7,8-HpCDD	97
13C-OCDD	116

Percent Moisture is 33%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2806
Lab ID: 090169-0008-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	40	pg/g	--	
2,3,7,8-TCDF	4.5	pg/g	--	g
PeCDFs (total)	ND	pg/g	8.6	
1,2,3,7,8-PeCDF	ND	pg/g	1.6	
2,3,4,7,8-PeCDF	ND	pg/g	2.4	
HxCDFs (total)	8.1	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	3.0	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.9	
2,3,4,6,7,8-HxCDF	ND	pg/g	2.5	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.17	
HpCDFs (total)	6.6	pg/g	--	
1,2,3,4,6,7,8-HpCDF	6.6	pg/g	--	@
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.78	
OCDF	ND	pg/g	12	
Dioxins				
TCDDs (total)	15	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.59	
PeCDDs (total)	ND	pg/g	6.3	
1,2,3,7,8-PeCDD	ND	pg/g	1.4	
HxCDDs (total)	27	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.8	
1,2,3,6,7,8-HxCDD	ND	pg/g	3.1	
1,2,3,7,8,9-HxCDD	ND	pg/g	5.6	
HpCDDs (total)	120	pg/g	--	
1,2,3,4,6,7,8-HpCDD	55	pg/g	--	
OCDD	4600	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2806
Lab ID: 090169-0008-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	109
13C-2,3,7,8-TCDD	88
13C-1,2,3,7,8-PeCDF	72
13C-1,2,3,7,8-PeCDD	86
13C-1,2,3,4,7,8-HxCDF	82
13C-1,2,3,6,7,8-HxCDD	84
13C-1,2,3,4,6,7,8-HpCDF	77
13C-1,2,3,4,6,7,8-HpCDD	103
13C-OCDD	121

Percent Moisture is 23%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar

Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2807
Lab ID: 090169-0009-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	1.6	pg/g	--	
2,3,7,8-TCDF	ND	pg/g	0.79	g
PeCDFs (total)	ND	pg/g	1.8	
1,2,3,7,8-PeCDF	ND	pg/g	1.4	
2,3,4,7,8-PeCDF	ND	pg/g	1.2	
HxCDFs (total)	ND	pg/g	1.7	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.54	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.54	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.98	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.26	
HpCDFs (total)	ND	pg/g	1.6	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	1.6	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.20	
OCDF	ND	pg/g	3.2	
Dioxins				
TCDDs (total)	1.4	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.72	
PeCDDs (total)	ND	pg/g	3.4	
1,2,3,7,8-PeCDD	ND	pg/g	0.99	
HxCDDs (total)	14	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.3	
1,2,3,6,7,8-HxCDD	ND	pg/g	2.0	
1,2,3,7,8,9-HxCDD	ND	pg/g	5.0	
HpCDDs (total)	260	pg/g	--	
1,2,3,4,6,7,8-HpCDD	110	pg/g	--	
OCDD	33000	pg/g	--	E

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar
Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2807
Lab ID: 090169-0009-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 02 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	108
13C-2,3,7,8-TCDD	84
13C-1,2,3,7,8-PeCDF	65
13C-1,2,3,7,8-PeCDD	83
13C-1,2,3,4,7,8-HxCDF	78
13C-1,2,3,6,7,8-HxCDD	79
13C-1,2,3,4,6,7,8-HpCDF	71
13C-1,2,3,4,6,7,8-HpCDD	97
13C-OCDD	117

Percent Moisture is 20%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note E : Concentration exceeds calibration range.

ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar

Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2808
Lab ID: 090169-0010-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 03 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	150	pg/g	--	
2,3,7,8-TCDF	9.0	pg/g	--	g
PeCDFs (total)	31	pg/g	--	
1,2,3,7,8-PeCDF	ND	pg/g	4.1	
2,3,4,7,8-PeCDF	ND	pg/g	4.7	
HxCDFs (total)	25	pg/g	--	
1,2,3,4,7,8-HxCDF	13	pg/g	--	
1,2,3,6,7,8-HxCDF	ND	pg/g	4.1	
2,3,4,6,7,8-HxCDF	ND	pg/g	4.5	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.44	
HpCDFs (total)	11	pg/g	--	
1,2,3,4,6,7,8-HpCDF	11	pg/g	--	@
1,2,3,4,7,8,9-HpCDF	ND	pg/g	1.8	
OCDF	ND	pg/g	11	
Dioxins				
TCDDs (total)	60	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.95	
PeCDDs (total)	13	pg/g	--	
1,2,3,7,8-PeCDD	ND	pg/g	3.1	
HxCDDs (total)	38	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.6	
1,2,3,6,7,8-HxCDD	ND	pg/g	3.0	
1,2,3,7,8,9-HxCDD	7.0	pg/g	--	@
HpCDDs (total)	120	pg/g	--	
1,2,3,4,6,7,8-HpCDD	66	pg/g	--	
OCDD	14000	pg/g	--	E

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ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2808
Lab ID: 090169-0010-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 03 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery	
13C-2,3,7,8-TCDF	114	
13C-2,3,7,8-TCDD	94	
13C-1,2,3,7,8-PeCDF	71	
13C-1,2,3,7,8-PeCDD	83	
13C-1,2,3,4,7,8-HxCDF	81	
13C-1,2,3,6,7,8-HxCDD	83	
13C-1,2,3,4,6,7,8-HpCDF	81	
13C-1,2,3,4,6,7,8-HpCDD	114	
13C-OCDD	137	m

Percent Moisture is 21%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

Note E : Concentration exceeds calibration range.

Note m : Internal standard recovery is outside method recovery goal.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2809
Lab ID: 090169-0011-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 04 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	2700	pg/g	--	
2,3,7,8-TCDF	150	pg/g	--	g
PeCDFs (total)	2000	pg/g	--	
1,2,3,7,8-PeCDF	100	pg/g	--	
2,3,4,7,8-PeCDF	150	pg/g	--	
HxCDFs (total)	1700	pg/g	--	
1,2,3,4,7,8-HxCDF	290	pg/g	--	
1,2,3,6,7,8-HxCDF	160	pg/g	--	
2,3,4,6,7,8-HxCDF	180	pg/g	--	
1,2,3,7,8,9-HxCDF	7.8	pg/g	--	@
HpCDFs (total)	1200	pg/g	--	
1,2,3,4,6,7,8-HpCDF	690	pg/g	--	
1,2,3,4,7,8,9-HpCDF	77	pg/g	--	
OCDF	1300	pg/g	--	
Dioxins				
TCDDs (total)	520	pg/g	--	
2,3,7,8-TCDD	10	pg/g	--	
PeCDDs (total)	270	pg/g	--	
1,2,3,7,8-PeCDD	23	pg/g	--	
HxCDDs (total)	1100	pg/g	--	
1,2,3,4,7,8-HxCDD	31	pg/g	--	
1,2,3,6,7,8-HxCDD	82	pg/g	--	
1,2,3,7,8,9-HxCDD	71	pg/g	--	
HpCDDs (total)	2300	pg/g	--	
1,2,3,4,6,7,8-HpCDD	1100	pg/g	--	
OCDD	13000	pg/g	--	E

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ND = Not detected
NA = Not applicable

Reported By: Teri Stone Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2809
Lab ID: 090169-0011-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 04 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	89
13C-2,3,7,8-TCDD	96
13C-1,2,3,7,8-PeCDF	68
13C-1,2,3,7,8-PeCDD	99
13C-1,2,3,4,7,8-HxCDF	84
13C-1,2,3,6,7,8-HxCDD	94
13C-1,2,3,4,6,7,8-HpCDF	71
13C-1,2,3,4,6,7,8-HpCDD	92
13C-OCDD	91

Percent Moisture is 34%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

Note E : Concentration exceeds calibration range.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2810
Lab ID: 090169-0012-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 04 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	1500	pg/g	--	
2,3,7,8-TCDF	76	pg/g	--	g
PeCDFs (total)	920	pg/g	--	
1,2,3,7,8-PeCDF	52	pg/g	--	
2,3,4,7,8-PeCDF	85	pg/g	--	
HxCDFs (total)	830	pg/g	--	
1,2,3,4,7,8-HxCDF	140	pg/g	--	
1,2,3,6,7,8-HxCDF	81	pg/g	--	
2,3,4,6,7,8-HxCDF	90	pg/g	--	
1,2,3,7,8,9-HxCDF	ND	pg/g	5.1	
HpCDFs (total)	500	pg/g	--	
1,2,3,4,6,7,8-HpCDF	350	pg/g	--	
1,2,3,4,7,8,9-HpCDF	35	pg/g	--	
OCDF	380	pg/g	--	
Dioxins				
TCDDs (total)	360	pg/g	--	
2,3,7,8-TCDD	6.1	pg/g	--	
PeCDDs (total)	160	pg/g	--	
1,2,3,7,8-PeCDD	11	pg/g	--	@
HxCDDs (total)	460	pg/g	--	
1,2,3,4,7,8-HxCDD	17	pg/g	--	
1,2,3,6,7,8-HxCDD	27	pg/g	--	
1,2,3,7,8,9-HxCDD	54	pg/g	--	
HpCDDs (total)	570	pg/g	--	
1,2,3,4,6,7,8-HpCDD	200	pg/g	--	
OCDD	2800	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2810
Lab ID: 090169-0012-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 04 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	81
13C-2,3,7,8-TCDD	85
13C-1,2,3,7,8-PeCDF	56
13C-1,2,3,7,8-PeCDD	88
13C-1,2,3,4,7,8-HxCDF	72
13C-1,2,3,6,7,8-HxCDD	80
13C-1,2,3,4,6,7,8-HpCDF	57
13C-1,2,3,4,6,7,8-HpCDD	75
13C-OCDD	63

Percent Moisture is 11%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2811
Lab ID: 090169-0013-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 04 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	3500	pg/g	--	
2,3,7,8-TCDF	160	pg/g	--	g
PeCDFs (total)	2800	pg/g	--	
1,2,3,7,8-PeCDF	210	pg/g	--	
2,3,4,7,8-PeCDF	250	pg/g	--	
HxCDFs (total)	4600	pg/g	--	
1,2,3,4,7,8-HxCDF	780	pg/g	--	
1,2,3,6,7,8-HxCDF	450	pg/g	--	
2,3,4,6,7,8-HxCDF	460	pg/g	--	
1,2,3,7,8,9-HxCDF	31	pg/g	--	
HpCDFs (total)	4200	pg/g	--	
1,2,3,4,6,7,8-HpCDF	2800	pg/g	--	
1,2,3,4,7,8,9-HpCDF	360	pg/g	--	
OCDF	5800	pg/g	--	
Dioxins				
TCDDs (total)	950	pg/g	--	
2,3,7,8-TCDD	13	pg/g	--	
PeCDDs (total)	840	pg/g	--	
1,2,3,7,8-PeCDD	38	pg/g	--	
HxCDDs (total)	1900	pg/g	--	
1,2,3,4,7,8-HxCDD	92	pg/g	--	
1,2,3,6,7,8-HxCDD	140	pg/g	--	
1,2,3,7,8,9-HxCDD	130	pg/g	--	
HpCDDs (total)	2000	pg/g	--	
1,2,3,4,6,7,8-HpCDD	1000	pg/g	--	
OCDD	6200	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Teri Stone Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2811
Lab ID: 090169-0013-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 04 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	91
13C-2,3,7,8-TCDD	88
13C-1,2,3,7,8-PeCDF	63
13C-1,2,3,7,8-PeCDD	97
13C-1,2,3,4,7,8-HxCDF	84
13C-1,2,3,6,7,8-HxCDD	89
13C-1,2,3,4,6,7,8-HpCDF	69
13C-1,2,3,4,6,7,8-HpCDD	93
13C-OCDD	81

Percent Moisture is 12%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2812
Lab ID: 090169-0014-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 08 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	5800	pg/g	--	
2,3,7,8-TCDF	220	pg/g	--	g
PeCDFs (total)	6900	pg/g	--	
1,2,3,7,8-PeCDF	400	pg/g	--	
2,3,4,7,8-PeCDF	560	pg/g	--	
HxCDFs (total)	7300	pg/g	--	
1,2,3,4,7,8-HxCDF	2800	pg/g	--	
1,2,3,6,7,8-HxCDF	720	pg/g	--	
2,3,4,6,7,8-HxCDF	ND	pg/g	850	y
1,2,3,7,8,9-HxCDF	ND	pg/g	63	y
HpCDFs (total)	8500	pg/g	--	
1,2,3,4,6,7,8-HpCDF	5600	pg/g	--	E
1,2,3,4,7,8,9-HpCDF	800	pg/g	--	
OCDF	13000	pg/g	--	E
Dioxins				
TCDDs (total)	1000	pg/g	--	
2,3,7,8-TCDD	13	pg/g	--	
PeCDDs (total)	1300	pg/g	--	
1,2,3,7,8-PeCDD	73	pg/g	--	
HxCDDs (total)	2500	pg/g	--	
1,2,3,4,7,8-HxCDD	100	pg/g	--	
1,2,3,6,7,8-HxCDD	210	pg/g	--	
1,2,3,7,8,9-HxCDD	310	pg/g	--	
HpCDDs (total)	2900	pg/g	--	
1,2,3,4,6,7,8-HpCDD	1600	pg/g	--	
OCDD	6500	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Teri Stone Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2812
Lab ID: 090169-0014-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 08 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	100
13C-2,3,7,8-TCDD	99
13C-1,2,3,7,8-PeCDF	97
13C-1,2,3,7,8-PeCDD	111
13C-1,2,3,4,7,8-HxCDF	103
13C-1,2,3,6,7,8-HxCDD	99
13C-1,2,3,4,6,7,8-HpCDF	99
13C-1,2,3,4,6,7,8-HpCDD	101
13C-OCDD	95

Percent Moisture is 12%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note y : Elevated detection limit due to chemical interference.

Note E : Concentration exceeds calibration range.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2813
Lab ID: 090169-0015-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 08 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	6500	pg/g	--	
2,3,7,8-TCDF	280	pg/g	--	g
PeCDFs (total)	6000	pg/g	--	
1,2,3,7,8-PeCDF	190	pg/g	--	
2,3,4,7,8-PeCDF	350	pg/g	--	
HxCDFs (total)	3100	pg/g	--	
1,2,3,4,7,8-HxCDF	890	pg/g	--	
1,2,3,6,7,8-HxCDF	270	pg/g	--	
2,3,4,6,7,8-HxCDF	ND	pg/g	400	y
1,2,3,7,8,9-HxCDF	ND	pg/g	98	y
HpCDFs (total)	2100	pg/g	--	
1,2,3,4,6,7,8-HpCDF	1100	pg/g	--	
1,2,3,4,7,8,9-HpCDF	160	pg/g	--	
OCDF	860	pg/g	--	
Dioxins				
TCDDs (total)	1500	pg/g	--	
2,3,7,8-TCDD	36	pg/g	--	
PeCDDs (total)	2500	pg/g	--	
1,2,3,7,8-PeCDD	240	pg/g	--	
HxCDDs (total)	12000	pg/g	--	
1,2,3,4,7,8-HxCDD	160	pg/g	--	
1,2,3,6,7,8-HxCDD	1200	pg/g	--	
1,2,3,7,8,9-HxCDD	790	pg/g	--	
HpCDDs (total)	13000	pg/g	--	
1,2,3,4,6,7,8-HpCDD	7200	pg/g	--	E
OCDD	44000	pg/g	--	E

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2813
Lab ID: 090169-0015-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 08 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	88
13C-2,3,7,8-TCDD	87
13C-1,2,3,7,8-PeCDF	86
13C-1,2,3,7,8-PeCDD	98
13C-1,2,3,4,7,8-HxCDF	93
13C-1,2,3,6,7,8-HxCDD	88
13C-1,2,3,4,6,7,8-HpCDF	79
13C-1,2,3,4,6,7,8-HpCDD	84
13C-OCDD	81

Percent Moisture is 18%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note y : Elevated detection limit due to chemical interference.

Note E : Concentration exceeds calibration range.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2814
Lab ID: 090169-0016-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 08 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	4700	pg/g	--	
2,3,7,8-TCDF	250	pg/g	--	g
PeCDFs (total)	3600	pg/g	--	
1,2,3,7,8-PeCDF	190	pg/g	--	
2,3,4,7,8-PeCDF	320	pg/g	--	
HxCDFs (total)	2400	pg/g	--	
1,2,3,4,7,8-HxCDF	900	pg/g	--	
1,2,3,6,7,8-HxCDF	250	pg/g	--	
2,3,4,6,7,8-HxCDF	ND	pg/g	310	y
1,2,3,7,8,9-HxCDF	ND	pg/g	18	y
HpCDFs (total)	2000	pg/g	--	
1,2,3,4,6,7,8-HpCDF	1300	pg/g	--	
1,2,3,4,7,8,9-HpCDF	120	pg/g	--	
OCDF	1200	pg/g	--	
Dioxins				
TCDDs (total)	530	pg/g	--	
2,3,7,8-TCDD	15	pg/g	--	
PeCDDs (total)	430	pg/g	--	
1,2,3,7,8-PeCDD	45	pg/g	--	
HxCDDs (total)	1100	pg/g	--	
1,2,3,4,7,8-HxCDD	37	pg/g	--	
1,2,3,6,7,8-HxCDD	100	pg/g	--	
1,2,3,7,8,9-HxCDD	140	pg/g	--	
HpCDDs (total)	1900	pg/g	--	
1,2,3,4,6,7,8-HpCDD	990	pg/g	--	
OCDD	11000	pg/g	--	E

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ND = Not detected
NA = Not applicable

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2814
Lab ID: 090169-0016-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 08 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	102
13C-2,3,7,8-TCDD	97
13C-1,2,3,7,8-PeCDF	103
13C-1,2,3,7,8-PeCDD	112
13C-1,2,3,4,7,8-HxCDF	106
13C-1,2,3,6,7,8-HxCDD	103
13C-1,2,3,4,6,7,8-HpCDF	96
13C-1,2,3,4,6,7,8-HpCDD	96
13C-OCDD	94

Percent Moisture is 14%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note y : Elevated detection limit due to chemical interference.

Note E : Concentration exceeds calibration range.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2815
Lab ID: 090169-0017-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 08 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	350	pg/g	--	
2,3,7,8-TCDF	19	pg/g	--	g
PeCDFs (total)	230	pg/g	--	
1,2,3,7,8-PeCDF	14	pg/g	--	
2,3,4,7,8-PeCDF	19	pg/g	--	
HxCDFs (total)	170	pg/g	--	
1,2,3,4,7,8-HxCDF	47	pg/g	--	
1,2,3,6,7,8-HxCDF	16	pg/g	--	
2,3,4,6,7,8-HxCDF	18	pg/g	--	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.72	
HpCDFs (total)	240	pg/g	--	
1,2,3,4,6,7,8-HpCDF	100	pg/g	--	
1,2,3,4,7,8,9-HpCDF	7.8	pg/g	--	@
OCDF	250	pg/g	--	
Dioxins				
TCDDs (total)	53	pg/g	--	
2,3,7,8-TCDD	1.7	pg/g	--	@
PeCDDs (total)	8.6	pg/g	--	
1,2,3,7,8-PeCDD	ND	pg/g	3.9	
HxCDDs (total)	130	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	4.1	
1,2,3,6,7,8-HxCDD	10	pg/g	--	@
1,2,3,7,8,9-HxCDD	14	pg/g	--	
HpCDDs (total)	580	pg/g	--	
1,2,3,4,6,7,8-HpCDD	190	pg/g	--	
OCDD	2600	pg/g	--	

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ND = Not detected
NA = Not applicable

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2815
Lab ID: 090169-0017-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 08 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	101
13C-2,3,7,8-TCDD	95
13C-1,2,3,7,8-PeCDF	95
13C-1,2,3,7,8-PeCDD	107
13C-1,2,3,4,7,8-HxCDF	98
13C-1,2,3,6,7,8-HxCDD	95
13C-1,2,3,4,6,7,8-HpCDF	89
13C-1,2,3,4,6,7,8-HpCDD	92
13C-OCDD	83

Percent Moisture is 21%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2816
Lab ID: 090169-0018-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 08 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	5800	pg/g	--	
2,3,7,8-TCDF	240	pg/g	--	g
PeCDFs (total)	3800	pg/g	--	
1,2,3,7,8-PeCDF	200	pg/g	--	
2,3,4,7,8-PeCDF	340	pg/g	--	
HxCDFs (total)	2100	pg/g	--	
1,2,3,4,7,8-HxCDF	750	pg/g	--	
1,2,3,6,7,8-HxCDF	220	pg/g	--	
2,3,4,6,7,8-HxCDF	260	pg/g	--	
1,2,3,7,8,9-HxCDF	9.0	pg/g	--	@
HpCDFs (total)	1500	pg/g	--	
1,2,3,4,6,7,8-HpCDF	1000	pg/g	--	
1,2,3,4,7,8,9-HpCDF	73	pg/g	--	
OCDF	800	pg/g	--	
Dioxins				
TCDDs (total)	680	pg/g	--	
2,3,7,8-TCDD	20	pg/g	--	
PeCDDs (total)	480	pg/g	--	
1,2,3,7,8-PeCDD	55	pg/g	--	
HxCDDs (total)	1100	pg/g	--	
1,2,3,4,7,8-HxCDD	42	pg/g	--	
1,2,3,6,7,8-HxCDD	98	pg/g	--	
1,2,3,7,8,9-HxCDD	140	pg/g	--	
HpCDDs (total)	1900	pg/g	--	
1,2,3,4,6,7,8-HpCDD	880	pg/g	--	
OCDD	6700	pg/g	--	

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ND = Not detected
NA = Not applicable

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2816
Lab ID: 090169-0018-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 08 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	80
13C-2,3,7,8-TCDD	79
13C-1,2,3,7,8-PeCDF	79
13C-1,2,3,7,8-PeCDD	94
13C-1,2,3,4,7,8-HxCDF	94
13C-1,2,3,6,7,8-HxCDD	92
13C-1,2,3,4,6,7,8-HpCDF	82
13C-1,2,3,4,6,7,8-HpCDD	82
13C-OCDD	76

Percent Moisture is 21%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2817
Lab ID: 090169-0019-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 09 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	8600	pg/g	--	
2,3,7,8-TCDF	330	pg/g	--	g
PeCDFs (total)	6800	pg/g	--	
1,2,3,7,8-PeCDF	340	pg/g	--	
2,3,4,7,8-PeCDF	550	pg/g	--	
HxCDFs (total)	4400	pg/g	--	
1,2,3,4,7,8-HxCDF	1600	pg/g	--	
1,2,3,6,7,8-HxCDF	470	pg/g	--	
2,3,4,6,7,8-HxCDF	ND	pg/g	520	y
1,2,3,7,8,9-HxCDF	ND	pg/g	29	y
HpCDFs (total)	4000	pg/g	--	
1,2,3,4,6,7,8-HpCDF	2800	pg/g	--	
1,2,3,4,7,8,9-HpCDF	280	pg/g	--	
OCDF	2900	pg/g	--	
Dioxins				
TCDDs (total)	1600	pg/g	--	
2,3,7,8-TCDD	21	pg/g	--	
PeCDDs (total)	1100	pg/g	--	
1,2,3,7,8-PeCDD	76	pg/g	--	
HxCDDs (total)	2200	pg/g	--	
1,2,3,4,7,8-HxCDD	82	pg/g	--	
1,2,3,6,7,8-HxCDD	140	pg/g	--	
1,2,3,7,8,9-HxCDD	240	pg/g	--	
HpCDDs (total)	2300	pg/g	--	
1,2,3,4,6,7,8-HpCDD	1200	pg/g	--	
OCDD	6100	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2817
Lab ID: 090169-0019-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 09 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	99
13C-2,3,7,8-TCDD	94
13C-1,2,3,7,8-PeCDF	96
13C-1,2,3,7,8-PeCDD	108
13C-1,2,3,4,7,8-HxCDF	101
13C-1,2,3,6,7,8-HxCDD	95
13C-1,2,3,4,6,7,8-HpCDF	87
13C-1,2,3,4,6,7,8-HpCDD	86
13C-OCDD	78

Percent Moisture is 28%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note y : Elevated detection limit due to chemical interference.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2818
Lab ID: 090169-0020-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 09 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	7800	pg/g	--	
2,3,7,8-TCDF	370	pg/g	--	g
PeCDFs (total)	5700	pg/g	--	
1,2,3,7,8-PeCDF	290	pg/g	--	
2,3,4,7,8-PeCDF	480	pg/g	--	
HxCDFs (total)	3900	pg/g	--	
1,2,3,4,7,8-HxCDF	1300	pg/g	--	
1,2,3,6,7,8-HxCDF	390	pg/g	--	
2,3,4,6,7,8-HxCDF	ND	pg/g	470	y
1,2,3,7,8,9-HxCDF	ND	pg/g	23	y
HpCDFs (total)	4300	pg/g	--	
1,2,3,4,6,7,8-HpCDF	2100	pg/g	--	
1,2,3,4,7,8,9-HpCDF	170	pg/g	--	
OCDF	3700	pg/g	--	
Dioxins				
TCDDs (total)	890	pg/g	--	
2,3,7,8-TCDD	23	pg/g	--	
PeCDDs (total)	860	pg/g	--	
1,2,3,7,8-PeCDD	76	pg/g	--	
HxCDDs (total)	2800	pg/g	--	
1,2,3,4,7,8-HxCDD	62	pg/g	--	
1,2,3,6,7,8-HxCDD	220	pg/g	--	
1,2,3,7,8,9-HxCDD	250	pg/g	--	
HpCDDs (total)	4400	pg/g	--	
1,2,3,4,6,7,8-HpCDD	2600	pg/g	--	
OCDD	27000	pg/g	--	E

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ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2818
Lab ID: 090169-0020-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 09 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	100
13C-2,3,7,8-TCDD	97
13C-1,2,3,7,8-PeCDF	102
13C-1,2,3,7,8-PeCDD	109
13C-1,2,3,4,7,8-HxCDF	101
13C-1,2,3,6,7,8-HxCDD	98
13C-1,2,3,4,6,7,8-HpCDF	89
13C-1,2,3,4,6,7,8-HpCDD	89
13C-OCDD	87

Percent Moisture is 25%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note y : Elevated detection limit due to chemical interference.

Note E : Concentration exceeds calibration range.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2819
Lab ID: 090169-0021-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 09 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	320	pg/g	--	
2,3,7,8-TCDF	18	pg/g	--	g
PeCDFs (total)	180	pg/g	--	
1,2,3,7,8-PeCDF	9.7	pg/g	--	@
2,3,4,7,8-PeCDF	15	pg/g	--	@
HxCDFs (total)	130	pg/g	--	
1,2,3,4,7,8-HxCDF	37	pg/g	--	
1,2,3,6,7,8-HxCDF	12	pg/g	--	@
2,3,4,6,7,8-HxCDF	16	pg/g	--	@
1,2,3,7,8,9-HxCDF	ND	pg/g	1.1	
HpCDFs (total)	79	pg/g	--	
1,2,3,4,6,7,8-HpCDF	54	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	5.5	
OCDF	59	pg/g	--	
Dioxins				
TCDDs (total)	54	pg/g	--	
2,3,7,8-TCDD	2.1	pg/g	--	@
PeCDDs (total)	29	pg/g	--	
1,2,3,7,8-PeCDD	9.7	pg/g	--	@
HxCDDs (total)	170	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	4.7	
1,2,3,6,7,8-HxCDD	23	pg/g	--	
1,2,3,7,8,9-HxCDD	23	pg/g	--	
HpCDDs (total)	210	pg/g	--	
1,2,3,4,6,7,8-HpCDD	110	pg/g	--	
OCDD	3800	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2819
Lab ID: 090169-0021-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 09 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	101
13C-2,3,7,8-TCDD	103
13C-1,2,3,7,8-PeCDF	99
13C-1,2,3,7,8-PeCDD	113
13C-1,2,3,4,7,8-HxCDF	99
13C-1,2,3,6,7,8-HxCDD	107
13C-1,2,3,4,6,7,8-HpCDF	90
13C-1,2,3,4,6,7,8-HpCDD	90
13C-OCDD	81

Percent Moisture is 37%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2820
Lab ID: 090169-0022-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 05 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	4900	pg/g	--	
2,3,7,8-TCDF	390	pg/g	--	g
PeCDFs (total)	2700	pg/g	--	
1,2,3,7,8-PeCDF	170	pg/g	--	
2,3,4,7,8-PeCDF	220	pg/g	--	
HxCDFs (total)	1600	pg/g	--	
1,2,3,4,7,8-HxCDF	620	pg/g	--	
1,2,3,6,7,8-HxCDF	160	pg/g	--	
2,3,4,6,7,8-HxCDF	190	pg/g	--	
1,2,3,7,8,9-HxCDF	15	pg/g	--	
HpCDFs (total)	1100	pg/g	--	
1,2,3,4,6,7,8-HpCDF	700	pg/g	--	
1,2,3,4,7,8,9-HpCDF	90	pg/g	--	
OCDF	620	pg/g	--	
Dioxins				
TCDDs (total)	380	pg/g	--	
2,3,7,8-TCDD	12	pg/g	--	
PeCDDs (total)	340	pg/g	--	
1,2,3,7,8-PeCDD	34	pg/g	--	
HxCDDs (total)	820	pg/g	--	
1,2,3,4,7,8-HxCDD	24	pg/g	--	
1,2,3,6,7,8-HxCDD	65	pg/g	--	
1,2,3,7,8,9-HxCDD	110	pg/g	--	
HpCDDs (total)	1500	pg/g	--	
1,2,3,4,6,7,8-HpCDD	610	pg/g	--	
OCDD	7200	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Teri Stone Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2820
Lab ID: 090169-0022-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 05 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	97
13C-2,3,7,8-TCDD	103
13C-1,2,3,7,8-PeCDF	93
13C-1,2,3,7,8-PeCDD	98
13C-1,2,3,4,7,8-HxCDF	88
13C-1,2,3,6,7,8-HxCDD	93
13C-1,2,3,4,6,7,8-HpCDF	87
13C-1,2,3,4,6,7,8-HpCDD	105
13C-OCDD	115

Percent Moisture is 22%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2821
Lab ID: 090169-0023-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 05 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	5300	pg/g	--	
2,3,7,8-TCDF	290	pg/g	--	g
PeCDFs (total)	3300	pg/g	--	
1,2,3,7,8-PeCDF	200	pg/g	--	
2,3,4,7,8-PeCDF	260	pg/g	--	
HxCDFs (total)	2200	pg/g	--	
1,2,3,4,7,8-HxCDF	770	pg/g	--	
1,2,3,6,7,8-HxCDF	180	pg/g	--	
2,3,4,6,7,8-HxCDF	230	pg/g	--	
1,2,3,7,8,9-HxCDF	22	pg/g	--	
HpCDFs (total)	1700	pg/g	--	
1,2,3,4,6,7,8-HpCDF	960	pg/g	--	
1,2,3,4,7,8,9-HpCDF	110	pg/g	--	
OCDF	1300	pg/g	--	
Dioxins				
TCDDs (total)	490	pg/g	--	
2,3,7,8-TCDD	16	pg/g	--	
PeCDDs (total)	330	pg/g	--	
1,2,3,7,8-PeCDD	39	pg/g	--	
HxCDDs (total)	870	pg/g	--	
1,2,3,4,7,8-HxCDD	38	pg/g	--	
1,2,3,6,7,8-HxCDD	68	pg/g	--	
1,2,3,7,8,9-HxCDD	130	pg/g	--	
HpCDDs (total)	1400	pg/g	--	
1,2,3,4,6,7,8-HpCDD	720	pg/g	--	
OCDD	6000	pg/g	--	

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ND = Not detected
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Reported By: Teri Stone

Approved By: Maricon Estrada

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2821
Lab ID: 090169-0023-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 05 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	101
13C-2,3,7,8-TCDD	107
13C-1,2,3,7,8-PeCDF	94
13C-1,2,3,7,8-PeCDD	100
13C-1,2,3,4,7,8-HxCDF	97
13C-1,2,3,6,7,8-HxCDD	87
13C-1,2,3,4,6,7,8-HpCDF	90
13C-1,2,3,4,6,7,8-HpCDD	109
13C-OCDD	127

Percent Moisture is 23%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Maricon Estrada

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2822
Lab ID: 090169-0024-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 05 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	6100	pg/g	--	
2,3,7,8-TCDF	330	pg/g	--	g
PeCDFs (total)	4100	pg/g	--	
1,2,3,7,8-PeCDF	240	pg/g	--	
2,3,4,7,8-PeCDF	360	pg/g	--	
HxCDFs (total)	2900	pg/g	--	
1,2,3,4,7,8-HxCDF	980	pg/g	--	
1,2,3,6,7,8-HxCDF	230	pg/g	--	
2,3,4,6,7,8-HxCDF	310	pg/g	--	
1,2,3,7,8,9-HxCDF	27	pg/g	--	
HpCDFs (total)	2200	pg/g	--	
1,2,3,4,6,7,8-HpCDF	1200	pg/g	--	
1,2,3,4,7,8,9-HpCDF	140	pg/g	--	
OCDF	1600	pg/g	--	
Dioxins				
TCDDs (total)	710	pg/g	--	
2,3,7,8-TCDD	21	pg/g	--	
PeCDDs (total)	560	pg/g	--	
1,2,3,7,8-PeCDD	57	pg/g	--	
HxCDDs (total)	1100	pg/g	--	
1,2,3,4,7,8-HxCDD	47	pg/g	--	
1,2,3,6,7,8-HxCDD	87	pg/g	--	
1,2,3,7,8,9-HxCDD	170	pg/g	--	
HpCDDs (total)	1700	pg/g	--	
1,2,3,4,6,7,8-HpCDD	930	pg/g	--	
OCDD	7700	pg/g	--	

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ND = Not detected
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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2822
Lab ID: 090169-0024-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 05 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	104
13C-2,3,7,8-TCDD	109
13C-1,2,3,7,8-PeCDF	94
13C-1,2,3,7,8-PeCDD	105
13C-1,2,3,4,7,8-HxCDF	92
13C-1,2,3,6,7,8-HxCDD	91
13C-1,2,3,4,6,7,8-HpCDF	88
13C-1,2,3,4,6,7,8-HpCDD	104
13C-OCDD	119

Percent Moisture is 26%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone Approved By: Maricon Estrada

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2823
Lab ID: 090169-0025-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 06 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	140	pg/g	--	
2,3,7,8-TCDF	8.2	pg/g	--	g
PeCDFs (total)	33	pg/g	--	
1,2,3,7,8-PeCDF	ND	pg/g	3.9	
2,3,4,7,8-PeCDF	ND	pg/g	4.4	
HxCDFs (total)	21	pg/g	--	
1,2,3,4,7,8-HxCDF	10	pg/g	--	@
1,2,3,6,7,8-HxCDF	ND	pg/g	2.9	
2,3,4,6,7,8-HxCDF	ND	pg/g	4.5	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.77	
HpCDFs (total)	12	pg/g	--	
1,2,3,4,6,7,8-HpCDF	12	pg/g	--	@
1,2,3,4,7,8,9-HpCDF	ND	pg/g	1.7	
OCDF	15	pg/g	--	@
Dioxins				
TCDDs (total)	19	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.75	
PeCDDs (total)	ND	pg/g	8.9	
1,2,3,7,8-PeCDD	ND	pg/g	1.5	
HxCDDs (total)	17	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.5	
1,2,3,6,7,8-HxCDD	ND	pg/g	2.4	
1,2,3,7,8,9-HxCDD	ND	pg/g	4.5	
HpCDDs (total)	43	pg/g	--	
1,2,3,4,6,7,8-HpCDD	23	pg/g	--	
OCDD	680	pg/g	--	

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ND = Not detected
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Reported By: Clark Pickell

Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2823
Lab ID: 090169-0025-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 06 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	103
13C-2,3,7,8-TCDD	116
13C-1,2,3,7,8-PeCDF	91
13C-1,2,3,7,8-PeCDD	97
13C-1,2,3,4,7,8-HxCDF	83
13C-1,2,3,6,7,8-HxCDD	84
13C-1,2,3,4,6,7,8-HpCDF	90
13C-1,2,3,4,6,7,8-HpCDD	106
13C-OCDD	118

Percent Moisture is 22%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2824
Lab ID: 090169-0026-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 06 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	390	pg/g	--	
2,3,7,8-TCDF	26	pg/g	--	g
PeCDFs (total)	240	pg/g	--	
1,2,3,7,8-PeCDF	15	pg/g	--	
2,3,4,7,8-PeCDF	19	pg/g	--	
HxCDFs (total)	170	pg/g	--	
1,2,3,4,7,8-HxCDF	62	pg/g	--	
1,2,3,6,7,8-HxCDF	13	pg/g	--	@
2,3,4,6,7,8-HxCDF	20	pg/g	--	
1,2,3,7,8,9-HxCDF	ND	pg/g	1.1	
HpCDFs (total)	110	pg/g	--	
1,2,3,4,6,7,8-HpCDF	70	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	6.3	
OCDF	58	pg/g	--	
Dioxins				
TCDDs (total)	30	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	1.2	
PeCDDs (total)	7.6	pg/g	--	
1,2,3,7,8-PeCDD	ND	pg/g	3.3	
HxCDDs (total)	100	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	5.3	
1,2,3,6,7,8-HxCDD	7.8	pg/g	--	@
1,2,3,7,8,9-HxCDD	14	pg/g	--	
HpCDDs (total)	220	pg/g	--	
1,2,3,4,6,7,8-HpCDD	120	pg/g	--	
OCDD	3300	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Maricon Estrada

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2824
Lab ID: 090169-0026-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 06 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	99
13C-2,3,7,8-TCDD	110
13C-1,2,3,7,8-PeCDF	89
13C-1,2,3,7,8-PeCDD	95
13C-1,2,3,4,7,8-HxCDF	84
13C-1,2,3,6,7,8-HxCDD	81
13C-1,2,3,4,6,7,8-HpCDF	88
13C-1,2,3,4,6,7,8-HpCDD	100
13C-OCDD	111

Percent Moisture is 26%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell Approved By: Maricon Estrada

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2825
Lab ID: 090169-0027-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 06 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	11	pg/g	--	
2,3,7,8-TCDF	1.2	pg/g	--	g@
PeCDFs (total)	14	pg/g	--	
1,2,3,7,8-PeCDF	ND	pg/g	0.82	
2,3,4,7,8-PeCDF	ND	pg/g	1.3	
HxCDFs (total)	140	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	5.3	
1,2,3,6,7,8-HxCDF	ND	pg/g	2.2	
2,3,4,6,7,8-HxCDF	ND	pg/g	4.6	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.26	
HpCDFs (total)	340	pg/g	--	
1,2,3,4,6,7,8-HpCDF	79	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	4.6	
OCDF	110	pg/g	--	
Dioxins				
TCDDs (total)	1.3	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	1.1	
PeCDDs (total)	ND	pg/g	5.2	
1,2,3,7,8-PeCDD	ND	pg/g	3.0	
HxCDDs (total)	310	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	2.3	
1,2,3,6,7,8-HxCDD	46	pg/g	--	
1,2,3,7,8,9-HxCDD	27	pg/g	--	
HpCDDs (total)	370	pg/g	--	
1,2,3,4,6,7,8-HpCDD	200	pg/g	--	
OCDD	8600	pg/g	--	

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ND = Not detected
NA = Not applicable

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2825
Lab ID: 090169-0027-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 06 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	97
13C-2,3,7,8-TCDD	109
13C-1,2,3,7,8-PeCDF	91
13C-1,2,3,7,8-PeCDD	94
13C-1,2,3,4,7,8-HxCDF	87
13C-1,2,3,6,7,8-HxCDD	76
13C-1,2,3,4,6,7,8-HpCDF	81
13C-1,2,3,4,6,7,8-HpCDD	95
13C-OCDD	101

Percent Moisture is 19%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell Approved By: Maricon Estrada

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2826
Lab ID: 090169-0028-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 07 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	15	pg/g	--	
2,3,7,8-TCDF	1.3	pg/g	--	g@
PeCDFs (total)	27	pg/g	--	
1,2,3,7,8-PeCDF	ND	pg/g	0.93	
2,3,4,7,8-PeCDF	ND	pg/g	1.6	
HxCDFs (total)	110	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	5.7	
1,2,3,6,7,8-HxCDF	ND	pg/g	2.7	
2,3,4,6,7,8-HxCDF	ND	pg/g	4.9	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.52	
HpCDFs (total)	260	pg/g	--	
1,2,3,4,6,7,8-HpCDF	75	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	3.2	
OCDF	97	pg/g	--	
Dioxins				
TCDDs (total)	ND	pg/g	1.2	
2,3,7,8-TCDD	ND	pg/g	0.81	
PeCDDs (total)	ND	pg/g	6.0	
1,2,3,7,8-PeCDD	ND	pg/g	2.0	
HxCDDs (total)	100	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	2.1	
1,2,3,6,7,8-HxCDD	16	pg/g	--	
1,2,3,7,8,9-HxCDD	7.8	pg/g	--	@
HpCDDs (total)	200	pg/g	--	
1,2,3,4,6,7,8-HpCDD	110	pg/g	--	
OCDD	3900	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

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Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2826
Lab ID: 090169-0028-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 07 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	97
13C-2,3,7,8-TCDD	104
13C-1,2,3,7,8-PeCDF	91
13C-1,2,3,7,8-PeCDD	94
13C-1,2,3,4,7,8-HxCDF	85
13C-1,2,3,6,7,8-HxCDD	108
13C-1,2,3,4,6,7,8-HpCDF	95
13C-1,2,3,4,6,7,8-HpCDD	107
13C-OCDD	94

Percent Moisture is 23%. All results and limits are reported on a dry weight basis.

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2827
Lab ID: 090169-0029-SA
Matrix: SOIL
Authorized: 23 OCT 96

Sampled: 17 OCT 96
Prepared: 30 OCT 96

Received: 23 OCT 96
Analyzed: 08 NOV 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Dry Weight Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.50	
2,3,7,8-TCDF	ND	pg/g	0.50	
PeCDFs (total)	ND	pg/g	1.2	
1,2,3,7,8-PeCDF	ND	pg/g	0.15	
2,3,4,7,8-PeCDF	ND	pg/g	0.23	
HxCDFs (total)	ND	pg/g	1.3	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.38	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.25	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.90	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.20	
HpCDFs (total)	ND	pg/g	2.5	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	1.7	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.37	
OCDF	ND	pg/g	6.6	
Dioxins				
TCDDs (total)	ND	pg/g	0.32	
2,3,7,8-TCDD	ND	pg/g	0.25	
PeCDDs (total)	ND	pg/g	0.34	
1,2,3,7,8-PeCDD	ND	pg/g	0.23	
HxCDDs (total)	ND	pg/g	2.8	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.35	
1,2,3,6,7,8-HxCDD	ND	pg/g	1.0	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.74	
HpCDDs (total)	50	pg/g	--	
1,2,3,4,6,7,8-HpCDD	24	pg/g	--	
OCDD	1300	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Teri Stone

Approved By: Mark Bechthold

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2827
Lab ID: 090169-0029-SA
Matrix: SOIL Sampled: 17 OCT 96 Received: 23 OCT 96
Authorized: 23 OCT 96 Prepared: 30 OCT 96 Analyzed: 08 NOV 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	96
13C-2,3,7,8-TCDD	101
13C-1,2,3,7,8-PeCDF	93
13C-1,2,3,7,8-PeCDD	99
13C-1,2,3,4,7,8-HxCDF	88
13C-1,2,3,6,7,8-HxCDD	100
13C-1,2,3,4,6,7,8-HpCDF	92
13C-1,2,3,4,6,7,8-HpCDD	102
13C-OCDD	84

Percent Moisture is 14%. All results and limits are reported on a dry weight basis.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone Approved By: Mark Bechthold

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental
Services

CASE NARRATIVE

QUANTERRA INCORPORATED PROJECT NUMBER 089754

Detection limits for dioxins and furans are reported on a sample specific basis and all results are recovery corrected per the isotope dilution technique.

The 13C-1,2,3,4,6,7,8-HpCDF internal standard recovery in the associated Laboratory Control Sample was slightly above the method recommended goal of 135%. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated internal standard recoveries.

There were no anomalies associated with this report.

Quanterra
Environmental
Services

QUANTERRA INCORPORATED QUALITY CONTROL PROGRAM

Quanterra has implemented an extensive Quality Control (QC) program to ensure the production of scientifically sound, legally defensible data of known documentable quality. This QC program is based upon requirements in "Test Methods for Evaluating Solid Waste", USEPA SW-846, Third Edition. It applies whenever SW-846 analytical methods are used. It also applies in whole or in part whenever project requirements fail to specify some aspect of QC practices described here. It does not apply when other well defined QC programs (e.g. CLP or CLP-like) are specified. This is Quanterra's base QC program for environmental analysis.

Definitions:

Quality Control Batch. The quality control (QC) batch is a set of up to 20 field samples plus associated laboratory QC samples that are similar in composition (matrix) and that are processed within the same time period with the same reagent and standard lots.

Surrogate. A surrogate (or internal standard) is an organic compound similar in chemical behavior to the target analyte, but not normally found in environmental samples. Surrogates (or IS) are added to all samples in a batch to monitor the effects of both the matrix and the analytical process on accuracy.

Method Blank. A method blank (MB) is a control sample prepared using the same reagents used for the samples. As part of the QC batch, it accompanies the samples through all steps of the sample extraction and cleanup procedure. The method blank is used to monitor the level of contamination introduced to a batch of samples as a result of processing in the laboratory.

Laboratory Control Sample. A laboratory control sample (LCS) is prepared using a well characterized matrix (e.g., reagent water or Ottawa sand) that is spiked with known amounts of representative analytes. Alternate matrices (e.g., glass beads) may be used for soil analyses when Ottawa sand is not appropriate. As part of a QC batch, it accompanies the samples through all steps of the sample extraction and cleanup process. The LCS is used to monitor the accuracy of the analytical process independent of possible interference effects due to sample matrix.

Duplicate Control Sample. Duplicate laboratory control samples (DCS) consists of a pair of LCSs analyzed within the same QC batch to monitor precision and accuracy independent of sample matrix effects.

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
Bureau of Reclamation

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
089754-0001-MB	Method Blank	SOLID			01 OCT 96
089754-0001-SA	K-2794	SOLID	26 SEP 96	12:00	01 OCT 96

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2794
Lab ID: 089754-0001-SA
Matrix: SOLID
Authorized: 01 OCT 96

Sampled: 26 SEP 96
Prepared: 01 OCT 96

Received: 01 OCT 96
Analyzed: 05 OCT 96

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	490	pg/g	--	
2,3,7,8-TCDF	410	pg/g	--	g
PeCDFs (total)	1600	pg/g	--	
1,2,3,7,8-PeCDF	880	pg/g	--	
2,3,4,7,8-PeCDF	730	pg/g	--	
HxCDFs (total)	3600	pg/g	--	
1,2,3,4,7,8-HxCDF	960	pg/g	--	
1,2,3,6,7,8-HxCDF	850	pg/g	--	
2,3,4,6,7,8-HxCDF	790	pg/g	--	
1,2,3,7,8,9-HxCDF	980	pg/g	--	
HpCDFs (total)	2400	pg/g	--	
1,2,3,4,6,7,8-HpCDF	1100	pg/g	--	
1,2,3,4,7,8,9-HpCDF	1200	pg/g	--	
OCDF	2200	pg/g	--	
Dioxins				
TCDDs (total)	490	pg/g	--	
2,3,7,8-TCDD	490	pg/g	--	
PeCDDs (total)	850	pg/g	--	
1,2,3,7,8-PeCDD	850	pg/g	--	
HxCDDs (total)	2500	pg/g	--	
1,2,3,4,7,8-HxCDD	800	pg/g	--	
1,2,3,6,7,8-HxCDD	840	pg/g	--	
1,2,3,7,8,9-HxCDD	900	pg/g	--	
HpCDDs (total)	1100	pg/g	--	
1,2,3,4,6,7,8-HpCDD	1100	pg/g	--	
OCDD	3500	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Teri Stone
Approved By: Maricon Estrada

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Bureau of Reclamation
Client ID: K-2794
Lab ID: 089754-0001-SA
Matrix: SOLID Sampled: 26 SEP 96 Received: 01 OCT 96
Authorized: 01 OCT 96 Prepared: 01 OCT 96 Analyzed: 05 OCT 96

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	98
13C-2,3,7,8-TCDD	101
13C-1,2,3,7,8-PeCDF	104
13C-1,2,3,7,8-PeCDD	117
13C-1,2,3,4,7,8-HxCDF	83
13C-1,2,3,6,7,8-HxCDD	101
13C-1,2,3,4,6,7,8-HpCDF	70
13C-1,2,3,4,6,7,8-HpCDD	91
13C-OCDD	94

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

ND = Not detected
NA = Not applicable

Reported By: Teri Stone Approved By: Maricon Estrada

7-2518 (8-93)
Bureau of Reclamation

UNITED STATES
BUREAU OF RECLAMATION
DEPARTMENT OF THE INTERIOR

Chain of Custody Record

01800
1 of 3

Project Manager: Robert E. McCaig

Project name: Visqui Dump Site RI/FS

Batch identification:

Sampled by and title (signatures): Steven Huffman, Sampling team leader

Laboratory: TSC Earth Sciences and Research Lab

Field identification	Date collected	Time	Lab identification	Sample type	Number of containers	Dioxin	Remarks	Initials and date sample destroyed
SS2-N2600-E200-0-0-0-0	10/17/96	17:05	dioxin	Soil	1	X	Temp = 0.1 °C	
SS2-N2800-E400-0-0-0-0	10/17/96	17:15	dioxin	Soil	1	X	10-19-96 1200	
SS2-N2600-E400-0-0-0-0	10/17/96	16:54	dioxin	Soil	1	X		
SS2-N2601-E400-0-0-1-0	10/17/96	16:54	dioxin	Soil	1	X		
SS2-N2400-E400-0-0-0-0	10/17/96	17:00	dioxin	Soil	1	X		
SS2-N2600-E600-0-0-0-0	10/17/96	17:20	dioxin	Soil	1	X		
SS2-N2400-E600-0-0-0-0	10/17/96	16:48	dioxin	Soil	1	X		
SS2-N2200-E600-0-0-0-0	10/17/96	16:45	dioxin	Soil	1	X		
SS2-N4600-E1800-0-0-0-0	10/17/96	16:11	dioxin	Soil	1	X		
SS2N4400-E1800-0-0-0-0	10/17/96	16:07	dioxin	Soil	1	X		

Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time
Steven Huffman	10/18/96	10:00						
Received by (signature)	**Date**	**Time**	**Received by (signature)**	**Date**	**Time**	**Received by lab (signature)**	**Date**	**Time**
Kevin Kelly 10-19-96		0945				Kevin Kelly 10-19-96		1200

Point of contact: 1-800-659-3656 Kevin Kelly, then regnext 236-5525

Remarks:

Sample shipped via: ☐ Priority Mail ☐ Bus ☒ Other (Federal Express) ☐ Express Mail ☐ UPS

DISTRIBUTION: Original: Accompanies shipment. Pink copy: Field records. Yellow copy: Associate laboratory

Bureau of Reclamation

BUREAU OF RECLAMATION
DEPARTMENT OF THE INTERIOR

Chain of Custody Record

01801
2 of 3

Project Manager: Robert E. McCaig

Project name: Krejci Dump Site RI/FS

Batch identification:

Sampled by and title (signatures): Steven Hoffman, Sampling team leader

Laboratory: TSC Earth Sciences and Research Lab

Field identification	Date collected	Time	Lab identification	Sample type	Number of containers	dioxin	Remarks	Initials and date sample destroyed
⊗ SS2-N4600-E2000-0-0-0-0	10/17/96	10:00	dioxin	Soil	1	X		
⊗ SS2-N4400-E2000-0-0-0-0	10/17/96	10:30	dioxin	Soil	1	X	Temp = 0.1 °C	
⊗ SS2-N4400-E2000-0-0-1-0	10/17/96	10:30	dioxin	Soil	1	X	KK 10-19-96 1200	
⊗ SS2-N4200-E2000-0-0-0-0	10/17/96	16:00	dioxin	Soil	1	X		
⊗ SS2-N4000-E2000-0-0-0-0	10/17/96	9:28	dioxin	Soil	1	X	label on SS2-N4600-E2000-0-0-0-0 says TIME: 10:28	KK 10-19-96 12:2
⊗ SS2-N4600-E2200-0-0-0-0	10/17/96	10:25	dioxin	Soil	1	X		
⊗ SS2-N4400-E2200-0-0-0-0	10/17/96	10:12	dioxin	Soil	1	X		
⊗ SS2-N4200-E2200-0-0-0-0	10/17/96	9:51	dioxin	Soil	1	X		
⊗ SS2-N4000-E2200-0-0-0-0	10/17/96	9:35	dioxin	Soil	1	X		
⊗ SS2-N3800-E2200-0-0-0-0	10/17/96	9:25	dioxin	Soil	1	X		

Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time
Steven Hoffman	10/18/96	10:00						
Received by (signature)	**Date**	**Time**	**Received by (signature)**	**Date**	**Time**	**Received by lab (signature)**	**Date**	**Time**
Kevin Kelly	10-19-96	0945				Kevin Kelly	10-19-96	1200

Point of contact: Kevin Kelley; 1-800-659-3856, then request 236-5525

Remarks:

DISTRIBUTION: Original: Accompanies shipment. Pink copy: Field records. Yellow copy: Associate laboratory

Sample shipped via

☐ Priority Mail ☐ Bus ☒ Other
☐ Express Mail ☐ UPS

Federal Express

7-2518 (3-93)
Bureau of Reclamation

UNITED STATES
BUREAU OF RECLAMATION
DEPARTMENT OF THE INTERIOR

Chain of Custody Record

01802
3 of 3

Project Manager: Robert E. McCaig
Project name: Krejci Dump Site RI/FS
Batch identification:
Sampled by and title (signatures): Steven Hoffman, Sampling Team Leader
Laboratory: TSC Earth Sciences Lab

	Field identification	Date collected	Time	Lab identification	Sample type	Number of containers	Dioxin	Remarks	Initials and date sample destroyed
⊗	SS2-N4000-E2400-0-0-0-0	10/17/96	9:39	dioxin	Soil	1	X	Temperature = 0.1 °C	
⊗	SS2-N4200-E2400-0-0-0-0	10/17/96	9:45	dioxin	Soil	1	X	(NIST DIGITAL	
⊗	SS2-N4200-E2400-0-0-1-0	10/17/96	9:45	dioxin	Soil	1	X	Thermometer	
⊗	SS2-N4400-E2400-0-0-0-0	10/17/96	10:15	dioxin	Soil	1	X	Kevin Kelly	
⊗	SS2-N4200-E2600-0-0-0-0	10/17/96	10:00	dioxin	Soil	1	X	10-19-96	
⊗	SS2-N3400-E3100-0-0-0-0	10/17/96	8:50	dioxin	Soil	1	X	1200	
⊗	SS2-N3200-E3100-0-0-0-0	10/17/96	8:44	dioxin	Soil	1	X		
⊗	SS2-8888-8888-0-0-0-0	10/17/96	15:33	dioxin	Soil	1	X		

Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time
Steven Hoffman	10/18/96	10:00						
Received by (signature)	**Date**	**Time**	**Received by (signature)**	**Date**	**Time**	**Received by lab (signature)**	**Date**	**Time**
Kevin Kelly	10/18/96	0945				Kevin Kelly	10-19-96	1200

Point of contact: 1-800-659-3656, Kevin Kelly, then request 236-5525
Remarks:

Sample shipped via
☐ Priority Mail ☐ Bus ☒ Other (Federal Express)
☐ Express Mail ☐ UPS

DISTRIBUTION: Original: Accompanies shipment. Pink copy: Field records. Yellow copy: Associate laboratory

7-2518 (8-93)
Bureau of Reclamation

UNITED STATES
BUREAU OF RECLAMATION
DEPARTMENT OF THE INTERIOR

Chain of Custody Record

01624

Project Manager: Kevin Kelly

Project name: Krejci

Batch identification: None

Sampled by and title (signatures): Kevin Kelly, Bureau of Reclamation
DFC, Bldg 56
P.O. Box 25007, D-8240

Laboratory: Denver, CO 80225
(303) 236-4290 x257

Field identification	Date collected	Time	Lab identification	Sample type	Number of containers	EPA 8290	Remarks	Initials and date sample destroyed
K-2794	9/26/96	1200	—	soil	1	x	10 grams.	

Please fax results w/ hardcopies in mail. 14 days TAT and #975 per phone conversation w/ Kathy Gill. Please send complete Data Validation Package ($25 per Kathy Gill). No preservation required.

Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time
Kevin A. Kelly	9/26/96	1110						
Received by (signature)	**Date**	**Time**	**Received by (signature)**	**Date**	**Time**	**Received by lab (signature)**	**Date**	**Time**
Kevin A. Kelly	10/1/96	1010				Kevin A. Kelly	10/1/96	1010

Point of contact: Kevin Kelly 303-236-4290 x257

Remarks: ATTEN: KATHY GILL, QUANTERRA 916-373-5600

Sample shipped via
☐ Priority Mail ☐ Bus ☐ Other
☐ Express Mail ☐ UPS

DISTRIBUTION: Original: Accompanies shipment. Pink copy: Field records. Yellow copy: Associate laboratory

7-2518 (8-93)
Bureau of Reclamation

UNITED STATES
BUREAU OF RECLAMATION
DEPARTMENT OF THE INTERIOR

Chain of Custody Record

01642

Project Manager	Project name	Batch identification
Kevin Kelly	Krejci Dump Site	

Sampled by and title (signatures)

Laboratory U.S.Bureau of Reclamation Chemistry Laboratory, D-8240

Field identification	Date collected	Time	Lab identification	Sample type	Number of containers: 10 total	8290 (method)	Remarks	Initials and date sample destroyed
	10/17		K-2800	soil	1	x	sample(ing) date is 10/17/96	
	10/17		K-2801	soil	1	x		
	10/17		K-2802	soil	1	x		
	10/17		K-2803	soil	1	x		
	10/17		K-2804	soil	1	x		
	10/17		K-2805	soil	1	x		
	10/17		K-2806	soil ~~xxx~~	1	x		
	10/17		K-2807	soil	1	x	rec'd in good cond. as 10-23-96	
	10/17		K-2808	soil	1	x		
	10/17		K-2809	soil	1	x		

Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time
Marcia Jones	10/22/96	0800						
Received by (signature)	**Date**	**Time**	**Received by (signature)**	**Date**	**Time**	**Received by lab (signature)**	**Date**	**Time**
						Cheryl Hoxter	10/23/96	1330

Point of contact: Kevin Kelly (1-800-659-3656 then 236-5225) colorado area code is 303

Remarks:

Sample shipped via ☐ Priority Mail ☐ Bus ☐ Other ☐ Express Mail ☐ UPS

DISTRIBUTION: Original: Accompanies shipment. Pink copy: Field records. Yellow copy: Associate laboratory

7-2518 (8-93)
Bureau of Reclamation

UNITED STATES
BUREAU OF RECLAMATION
DEPARTMENT OF THE INTERIOR

Chain of Custody Record

01643

Project Manager	Project name	Batch identification
Kevin KElly	Krejci Dump Site	

Sampled by and title (signatures)

Laboratory U.S.Bureau of Reclamation CHemistry Laboratory, D-8240

Field identification	Date collected	Time	Lab identification	Sample type	Number of containers: 10 total	method 8290	Remarks	Initials and date sample destroyed
	10/17		K-2810	soil	1	x	sample(ing) date 10/17/96	
	10/17		K-2811	soil	1	x		
	10/17		K-2812	soil	1	x		
	10/17		K-2813	soil	1	x		
	10/17		K-2814	soil	1	x		
	10/17		K-2815	soil	1	x		
	10/17		K-2816	soil	1	x	rec'd in good cond. CH 10-23-96	
	10/17		K-2817	soil	1	x		
	10/17		K-2818	soil	1	x		
	10/17		K-2819	soil	1	x		

Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time
Marcia Jones	10/22/96	0800						
Received by (signature)	Date	Time	Received by (signature)	Date	Time	Received by lab (signature)	Date	Time
						Chad Horton	10/23/96	1330

Point of contact: Kelly at (1-800-659-3656 then 236-5225 Colorado area code is 303)

Remarks:

Sample shipped via
☐ Priority Mail ☐ Bus ☐ Other
☐ Express Mail ☐ UPS

DISTRIBUTION: Original: Accompanies shipment. Pink copy: Field records. Yellow copy: Associate laboratory

7-2518 (8-93)
Bureau of Reclamation

UNITED STATES
BUREAU OF RECLAMATION
DEPARTMENT OF THE INTERIOR

Chain of Custody Record

01644

Project Manager	Project name	Batch identification
Kevin Kelly	Krejci Dump Site	

Sampled by and title (signatures)

Laboratory: U.S.Bureau of Reclamation Chemistry Laboratory D-8240

Field identification	Date collected	Time	Lab identification	Sample type	Number of containers: 8 total	method 8290							Remarks	Initials and date sample destroyed
	10/17		K-2820	soil	1	x							sample(ing) date is 10/17/96	
	10/17		K-2821	soil	1	x								
	10/17		K-2822	soil	1	x								
	10/17		K-2823	soil	1	x							rec'd in good cond. cw 10-23-96	
	10/17		K-2824	soil	1	x								
	10/17		K-2825	soil	1	x								
	10/17		K-2826	soil	1	x								
	10/17		K-2827	soil	1	x							field blank	
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Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time
Maria Jones	10/22/96	0800						
Received by (signature)	**Date**	**Time**	**Received by (signature)**	**Date**	**Time**	**Received by lab (signature)**	**Date**	**Time**
						Cheryl Hylton	10/23/96	1330

Point of contact: Kelly at (1-800-659-3656 then 236-5225 Colorado area code is 303)

Remarks:

DISTRIBUTION: Original: Accompanies shipment. Pink copy: Field records. Yellow copy: Associate laboratory

Sample shipped via

☐ Priority Mail ☐ Bus ☐ Other
☐ Express Mail ☐ UPS

7-2518 (8-93)
Bureau of Reclamation

UNITED STATES
BUREAU OF RECLAMATION
DEPARTMENT OF THE INTERIOR

Chain of Custody Record

01646

Project Manager	Project name	Batch identification
Kevin Kelly	Krejci Dump Site	

Sampled by and title (signatures)

Laboratory: U.S.Bureau of Reclamation Chemistry Laboratory, D-8240

Field identification	Date collected	Time	Lab identification	Sample type	Number of containers: 1 total	method 8290							Remarks	Initials and date sample destroyed
	10/17/96		K-2828	water	1	x							there are 3 jugs rec'd in good cond. 10/23/96	

Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time
Maria Jones	10/22/96	0800						
Received by (signature)	Date	Time	Received by (signature)	Date	Time	Received by lab (signature)	Date	Time
						[signature]	10-24-96	1330

Point of contact: Kevin Kelly (1-800-659-3656 then 303-236-5225)

Remarks:

DISTRIBUTION: Original: Accompanies shipment. Pink copy: Field records. Yellow copy: Associate laboratory

Sample shipped via

☐ Priority Mail ☐ Bus ☐ Other
☐ Express Mail ☐ UPS