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BIOASSAY REPORT
ACUTE SCREENING BIOASSAYS
Conducted April 20 through 21, 2006

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Prepared for

ELR CONSULTING, INC.
WASHINGTON CLOSURE HANFORD
RICHLAND, WASHINGTON

Prepared by

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May 9, 2006
Lab I.D. Nos. BN1574-01 thru -05
SDG Number BN1574

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CONTENTS

Section	Page
INTRODUCTION	3
METHODS AND MATERIALS	3
TEST METHODS	3
TEST ORGANISMS	3
CONTROL SOIL	3
HYDRATION WATER	3
TEST CONCENTRATIONS	3
SAMPLE COLLECTION	3
SAMPLE CROSS-REFERENCE TABLE	4
SAMPLE PREPARATION	4
TEST INITIATION	5
TEST TERMINATION	5
TEST ACCEPTABILITY CRITERIA	5
MONITORING OF BIOASSAYS	5
DATA ANALYSIS	5
RESULTS AND DISCUSSION	6
ACUTE RESULTS	6
REFERENCE TOXICANT TEST	7
CERTIFICATION STATEMENT	7

APPENDIX A. RAW DATA SHEETS
APPENDIX B. REFERENCE TOXICANT RAW DATA SHEETS
APPENDIX C. CHAIN OF CUSTODY

INTRODUCTION

CH2M HILL conducted acute screening bioassay tests using the nematode (*Caenorhabditis elegans*) on soil samples provided by the ELR Consulting for the Washington Closure Hanford project, Richland, Washington. The tests were conducted from April 20 through 21, 2006.

METHODS AND MATERIALS

TEST METHODS

The chronic test methods were performed according to: *Standard Guide for Conducting Laboratory Soil Toxicity Tests with the Nematode Caenorhabditis elegans*, ASTM E 2172-01 (2001).

TEST ORGANISMS

The nematodes used were obtained from CH2M HILL's in-house cultures and were age synchronized as 4 day old organisms at test initiation. All organisms tested were fed and maintained during culturing, acclimation, and testing as prescribed by the ASTM protocol. The test organisms appeared vigorous and in good condition prior to testing.

CONTROL SOIL

The control soil used in the tests was 70 grade silica sand.

HYDRATION WATER

The water used to hydrate the control and test soils was Milli-Q equivalent de-ionized water.

TEST CONCENTRATIONS

The concentrations tested in the nematode test were 100 percent test sample with control soil alone for the control. For the nematode test, 30 organisms per concentration were used with three test chambers per concentration and 10 organisms per chamber.

SAMPLE COLLECTION

The soil samples were collected from April 5, 2006, through April 12, 2006. The samples were stored in the dark at 4°C until test solutions were prepared and tested. Chain of Custody for sample collection is provided in Appendix C.

SAMPLE CROSS-REFERENCE TABLE

Table 1 provides a cross-reference of the Client ID numbers, sampling dates, sampling locations, Nematode test sample identification (SDG) numbers, and Analytical Lab SDG numbers.

Table 1
Sample Cross-Reference

Client ID	Sample Date	Sample Location	Nematode test SDG	Analytical Lab SDG
J11JB4	04/05/2006	100-H RIPARIAN #1	BN1574-01	F1493
J11JB5	04/09/2006	100-D RIPARIAN #2	BN1574-02	F1508
J11JH6	04/10/2006	100-H RIPARIAN #9	BN1574-03	F1514
J11JJ0	04/11/2006	UPPER RIPARIAN #16	BN1574-04	F1518
J11JH9	04/12/2006	UPPER RIPARIAN #14	BN1574-05	F1522

SAMPLE PREPARATION

Test soils and control soil were dried and homogenized prior to use. For each replicate, 2.33 g dry weight of soil was added to each test chamber. The soils were then hydrated to 40 percent of the dry weight by addition of hydration water (0.93 ml) and test chambers were then covered. In addition, 23.3 g of soil was added to a surrogate chamber and hydrated to provide for pH measurements. All test chambers were allowed to equilibrate at test conditions for seven days prior to test initiation.

TEST INITIATION

Tests were initiated by the addition of 10 test organisms to each test chamber. Organisms were added to test chambers in random order.

TEST TERMINATION

Tests were terminated after 24 hours. The contents of the test chambers were added to a centrifuge tube, 10 ml of Ludox-AM silica solution added, and each tube was hand shaken to suspend the nematodes into the Ludox solution. The tubes were then centrifuged to concentrate the soil and the supernatant transferred to a 15 cm petri dish and allowed to sit for 15 minutes. The petri dish was then placed under a dissecting microscope and the nematodes were retrieved and inspected. The recovered test organisms were recorded as alive (responded with independent movement to tactile stimulation) or dead. Missing or un-recovered test organisms are scored as dead during data analysis.

TEST ACCEPTABILITY CRITERIA

The test must meet the following two test acceptability criteria to be considered valid:

- A minimum of 80 percent of test organisms must be recovered, both in the control and each test concentration tested.
- The controls must achieve a minimum 90 percent survival.

MONITORING OF BIOASSAYS

The soil pH was measured from surrogate test chambers at test initiation. Temperature was monitored in the test incubator at test initiation and termination.

DATA ANALYSIS

The endpoints measured during the nematode test included survival over the 24 hour exposure period. The statistical analyses performed were those outlined in *Standard Guide for Conducting Laboratory Soil Toxicity Tests with the Nematode Caenorhabditis elegans*, ASTM E 2172-01, using CETIS version 1.1.2. Equal Variance t Two-Sample Test was used to compare the survival data between the control and each test soil. When the assumptions of normality or homogeneity of variance necessary for Equal variance t Two-Sample Test could not be met, Unequal Variance t Two-Sample Test was used to analyze the data.

RESULTS AND DISCUSSION

ACUTE RESULTS

Table 2 summarizes the survival data for the nematode acute test initiated on April 20, 2006.

Table 2
***Caenorhabditis elegans* Results**
Test initiated on April 20, 2006

Client ID	Percent Survival	Percent Recovered
Control	93.3	100
J11JB4	46.7 [a]	90.0
J11JB5	83.3	100
J11JH6	76.7 [a]	96.7
J11JJ0	76.7 [a]	93.3
J11JH9	53.3 [a]	96.7

[a] Indicates a statistically significant reduction when compared to the control at the p equal to 0.05 level using Equal Variance t Two Sample Test.

The nematode results indicated no statistically significant reduction in survival in the J11JB5 sample and a statistically significant reduction in survival in the J11JB4, J11JH6, J11JJ0, and J11JH9 samples when compared to the control.

Test acceptability criteria was met with control survival of 90.0 percent and recovery of test organisms was greater than 80 percent in all test concentrations.

Test temperatures remained at 20±1°C. The tests proceeded without interruption or incidents that could have affected test results.

REFERENCE TOXICANT TEST

The results of the reference toxicant test conducted in April with cupric chloride indicate that the test organisms were within their respective sensitivity range based on EPA guidelines (EPA 1994). The LC_{50} value and control chart limits are listed in the table below.

Table 4
Chronic Reference Toxicant Tests (ug/L)

Species (test)	LC_{50}	Control Chart Limits
Caenorhabditis elegans (survival)	52.6	40.8 to 100.3

CERTIFICATION STATEMENT

I certify that this data package is in compliance with the Statement of Work, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature:

APPENDIX A
RAW DATA SHEETS

CH2M HILL *TOXICITY TEST ORGANISM AND WATER QUALITY DATA*

Client ELR Washington Closure Hanford — Test Initiation: Date 4-20-06 — Test Termination: Date 4-21-06

Contact — Technician Johnson, Oldham

Test Species/ID *Caenorhabditis elegans* / Nem 012 / / /

Sample ID Number	Field ID	Collected Date	Collected Time	Total Residual Chlorine (mg/l) As Received	Total Residual Chlorine (mg/l) As Dechlor.	Ammonia NH_3-N mg/l	Hardness mg/l as $CaCO_3$	Alkalinity mg/l as $CaCO_3$
BN1574-01	J115B4	4/5/06	–	–	–	–	–	–
-02	J115B5	4/9/06	–	–	–	–	–	–
-03	J115H6	4/10/06	–	–	–	–	–	–
-04	J115J0	4/11/06	–	–	–	–	–	–
-05	J115H9	4/12/06	–	–	–	–	–	–
				/				
				/				
				/				
				/				
				/				
				/				
				/				

Test Species Information	ID# Nem 012	ID#	ID#	ID#
	Acute			
Organism Age at Initiation	4 days			
	—			
Test Container Size	15 mm petri			
Test Volume	2.33 g dry wt.			
Feeding: Type	none			
Amount	—			
Aeration: Began	none			
Amount	—			
Dilution Water ID#	Milli-Q Equiv.			
Acclimation Period	4 days			
Test Location	#7			
Organism Source	Inhouse			
Size (mm)	–	–	–	–
Loading Rate	–	–	–	–

Dilution Water	ID#	Hardness mg/l as $CaCO_3$	Alkalinity mg/l as $CaCO_3$	Initial pH
Milli-Q equivalent Water	NA	0	0	NA

Comments: ☑ Indicates the following action was taken, (☐ Indicates action not taken):

Water Quality Meters Used/ID#

Dissolved Oxygen #2 pH #3 Conductivity #2

CH2M HILL TODE TOXICITY TEST SOIL QUALITY AND TEST CHAMBER ASSIGNMENT DATA

Client Washington Closure Hanford
Sample Description see below
Test Speci *Caenorhabditis elegans* ID#: Nem 012

Tech. 0 Hrs NJ 24 Hrs NJ/DO
Time 0 Hrs 0910 24 Hrs 1130

Beginning, Date 4-20-06 Time 0910
Ending, Date 4-21-06 Time 1130

Lab ID	Soil pH 0 hr	Soil pH 24 hr	Soil % Moisture 0 hr	Soil Temperature (°C) 0 hr	Soil Temperature (°C) 24 hr	Comments:
Lab Control	6.0	6.3 ~~5.3~~ NT		20.6	20.7	Each test chamber has 2.33 g dry wt. soil + 0.93 ml Milli-Q water (40% of dry wt.).
BN1574-01	6.2	6.1		20.6	20.7	Samples hydrated 7 days prior to test initiation.
BN1574-02	6.6	6.5		20.6	20.7	
BN1574-03	6.7	6.5		20.6	20.7	All test soils were dried during sampling process.
BN1574-04	6.6	6.6		20.6	20.7	
BN1574-05	6.8	6.7		20.6	20.7	

Lab ID	Field ID	Replicate	Chamber #	Lab ID	Field ID	Replicate	Chamber #	Lab ID	Field ID	Replicate	Chamber #
Lab Control	Artifieial Soil	A	13	BN1574-04	J11JJ0	A	7				
Lab Control	Artificial Soil	B	10	BN1574-04	J11JJ0	B	5				
Lab Control	Artificial Soil	C	11	BN1574-04	J11JJ0	C	14				
BN1574-01	J11JB4	A	17	BN1574-05	J11JH9	A	12				
BN1574-01	J11JB4	B	4	BN1574-05	J11JH9	B	15				
BN1574-01	J11JB4	C	8	BN1574-05	J11JH9	C	3				
BN1574-02	J11JB5	A	6								
BN1574-02	J11JB5	B	9								
BN1574-02	J11JB5	C	1								
BN1574-03	J11JH6	A	18								
BN1574-03	J11JH6	B	16								
BN1574-03	J11JH6	C	2								

CH2M HILL **NEMATODE TOXICITY TEST SURVIVAL DATA**

Client: Washington Closure Hanford
Sample Description: Lab ID#: B
Test Species: *Caenorhabditis elegans* ID#: Nem 012

Beginning, Date 4-20-06 Time 0910
Ending, Date 4-21-06 Time 1130

Test Initiation: Tech: Tech: NJ Time: 0916

Test Termination: Tech: Tech: NJ/DO Time: 1130

Chamber Number	Start Count 0	# alive found 24 hr	total # found 24 hr	Comments:
1	10	10	10	control nematodes
2	10	9	10	were very healthy
3	10	6	10	looking - lots of
4	10	6	10	movement and
5	10	9	9	solid in color.
6	10	9	10	#2 had one nematode
7	10	7	10	that was alive
8	10	3	8	but shorter than
9	10	6	10	the rest of the
10	10	9	10	worms.
11	10	10	10	
12	10	4	10	
13	10	9	10	
14	10	7	9	
15	10	6	9	

Chamber Number	Start Count 0	# alive found 24 hr	total # found 24 hr	Comments:
16	10	7	9	
17	10	5	9	
18	10	7	10	

CETIS Test Summary

Report Date: 27 Apr-06 2:37 PM
Test Link: 03-8088-1488/BN157401ce

Nematode 24 hour Acute test — **CH2M Hill**

Test No:	04-3488-9081	**Test Type:**	Nematode Survival	**Duration:**	35h
Start Date:	20 Apr-06	**Protocol:**	ASTM E2172-01 (2001)	**Species:**	Caenorhabditis elegans
Ending Date:	21 Apr-06 11:30 AM	**Dil Water:**		**Source:**	In-House Culture
Setup Date:	20 Apr-06 12:00 AM	**Brine:**			

Sample No:	16-5207-3918	**Code:**	BN1574-01	**Client:**	
Sample Date:	07 Apr-06	**Material:**	Sediment	**Project:**	
Receive Date:		**Source:**	Hanford		
Sample Age:	13d 0h	**Station:**			

Comments: J11JB4

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
08-9580-2332	% Survival	< 100	100	N/A	16.75%	Equal Variance t Two-Sample

% Survival Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Sedim	3	0.93333	0.90000	1.00000	0.03333	0.05774	6.19%
100		3	0.46667	0.30000	0.60000	0.08819	0.15275	32.73%

% Survival Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Sedim	0.90000	0.90000	1.00000
100		0.50000	0.60000	0.30000

CETIS Analysis Detail

Nematode 24 hour Acute test — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Comparison	03-8088-1488	03-8088-1488	27 Apr-06 2:37 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	16.75%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Dilution Sediment		100	5.25283	2.13185	0.0031	0.22443	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.4587094	0.458709	1	27.59	0.00629	Significant Effect
Error	0.0664984	0.016625	4			
Total	0.52520785	0.4753340	5			

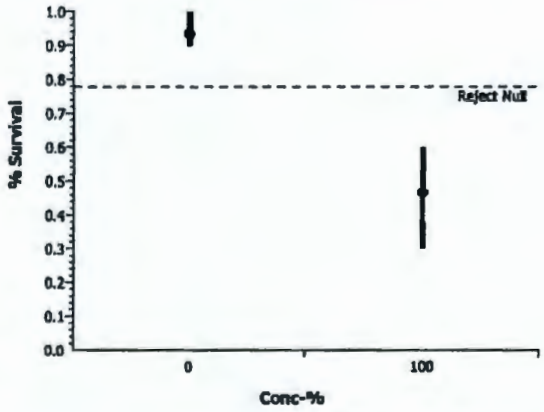
ANOVA Assumptions

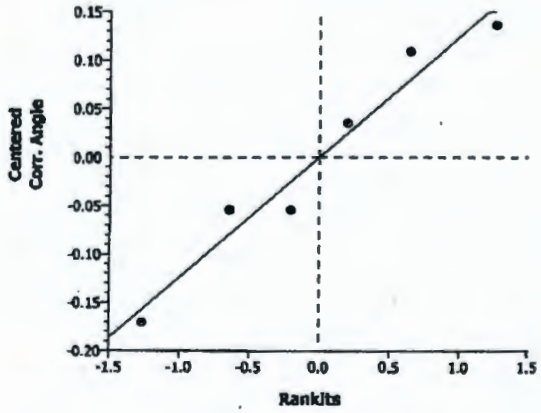
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.75565	199.00000	0.53253	Equal Variances
Distribution	Shapiro-Wilk W	0.94487		0.69861	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Sedim	3	0.93333	0.90000	1.00000	0.05773	1.30337	1.24905	1.41202	0.09409
100		3	0.46667	0.30000	0.60000	0.15275	0.75037	0.57964	0.88608	0.15619

Graphics





CETIS Test Summary

Report Date: 27 Apr-06 2:39 PM
Test Link: 01-3023-7423/BN157402ce

Nematode 24 hour Acute test — **CH2M Hill**

Test No:	15-2595-4109	**Test Type:**	Nematode Survival	**Duration:**	26h
Start Date:	20 Apr-06 09:10 AM	**Protocol:**	ASTM E2172-01 (2001)	**Species:**	Caenorhabditis elegans
Ending Date:	21 Apr-06 11:30 AM	**Dil Water:**		**Source:**	In-House Culture
Setup Date:	20 Apr-06 09:10 AM	**Brine:**			

Sample No:	04-4665-3490	**Code:**	BN1574-02	**Client:**	
Sample Date:	10 Apr-06	**Material:**	Sediment	**Project:**	
Receive Date:		**Source:**	Hanford		
Sample Age:	10d 9h	**Station:**			

Comments: J11JB5

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
19-2191-5951	% Survival	100	> 100	N/A	28.87%	Equal Variance t Two-Sample

% Survival Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Sedim	3	0.93333	0.90000	1.00000	0.03333	0.05774	6.19%
100		3	0.83333	0.60000	1.00000	0.12019	0.20817	24.98%

% Survival Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Sedim	0.90000	0.90000	1.00000
100		0.90000	0.60000	1.00000

CETIS Analysis Detail

Nematode 24 hour Acute test — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Comparison	01-3023-7423	01-3023-7423	27 Apr-06 2:38 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	28.87%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Dilution Sediment		100	0.73478	2.13185	0.2516	0.35103	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0219577	0.021958	1	0.54	0.50323	Non-Significant Effect
Error	0.1626787	0.04067	4			
Total	0.1846364	0.0626274	5			

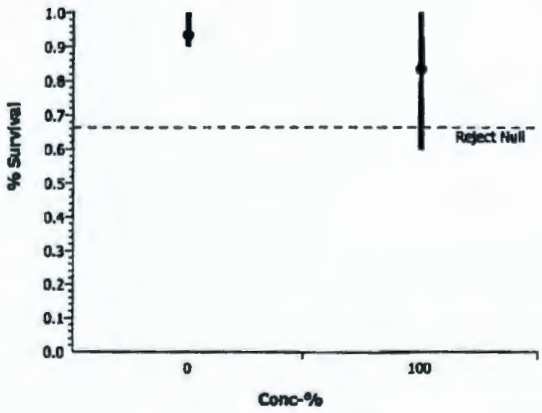
ANOVA Assumptions

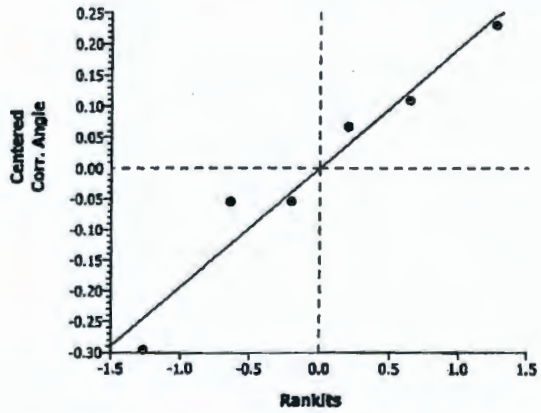
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	8.18766	199.00000	0.21768	Equal Variances
Distribution	Shapiro-Wilk W	0.95710		0.79717	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Sedim	3	0.93333	0.90000	1.00000	0.05773	1.30337	1.24905	1.41202	0.09409
100		3	0.83333	0.60000	1.00000	0.20817	1.18238	0.88608	1.41202	0.26923

Graphics





CETIS Test Summary

Report Date: 27 Apr-06 2:42 PM
Test Link: 12-7923-3756/BN157403ce

Nematode 24 hour Acute test — **CH2M Hill**

Test No:	10-5728-8163	**Test Type:**	Nematode Survival	**Duration:**	26h
Start Date:	20 Apr-06 09:10 AM	**Protocol:**	ASTM E2172-01 (2001)	**Species:**	Caenorhabditis elegans
Ending Date:	21 Apr-06 11:30 AM	**Dil Water:**		**Source:**	In-House Culture
Setup Date:	20 Apr-06 09:10 AM	**Brine:**			

Sample No:	07-1539-2463	**Code:**	BN1574-03	**Client:**	
Sample Date:	11 Apr-06	**Material:**	Sediment	**Project:**	
Receive Date:		**Source:**	Hanford		
Sample Age:	9d 9h	**Station:**			

Comments: J11JH6

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
04-8800-1791	% Survival	< 100	100	N/A	16.08%	Equal Variance t Two-Sample

% Survival Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Sedim	3	0.93333	0.90000	1.00000	0.03333	0.05774	6.19%
100		3	0.76667	0.70000	0.90000	0.06667	0.11547	15.06%

% Survival Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Sedim	0.90000	0.90000	1.00000
100		0.70000	0.70000	0.90000

CETIS Analysis Detail

Nematode 24 hour Acute test — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Comparison	12-7923-3756	12-7923-3756	27 Apr-06 2:42 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	16.08%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Dilution Sediment		100	2.22491	2.13185	0.0451	0.21679	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0767833	0.076783	1	4.95	0.09012	Non-Significant Effect
Error	0.0620441	0.015511	4			
Total	0.13882741	0.0922943	5			

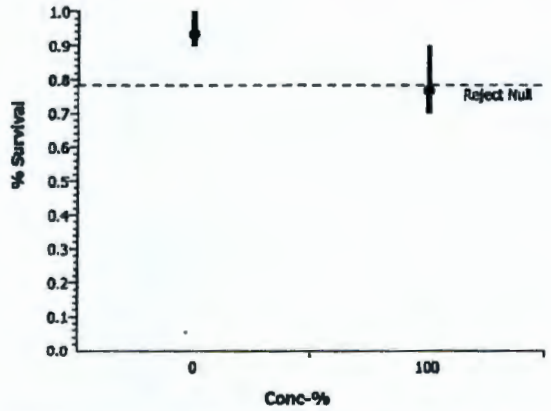
ANOVA Assumptions

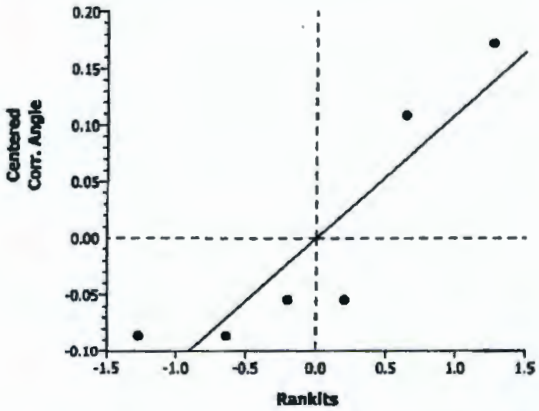
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.50409	199.00000	0.57076	Equal Variances
Distribution	Shapiro-Wilk W	0.78325		0.04132	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Sedim	3	0.93333	0.90000	1.00000	0.05773	1.30337	1.24905	1.41202	0.09409
100		3	0.76667	0.70000	0.90000	0.11547	1.07712	0.99116	1.24905	0.14889

Graphics





CETIS Test Summary

Report Date: 27 Apr-06 2:44 PM
Test Link: 04-2557-1266/BN157404ce

Nematode 24 hour Acute test — **CH2M Hill**

Test No:	04-6644-2868	**Test Type:**	Nematode Survival	**Duration:**	26h
Start Date:	20 Apr-06 09:10 AM	**Protocol:**	ASTM E2172-01 (2001)	**Species:**	Caenorhabditis elegans
Ending Date:	21 Apr-06 11:30 AM	**Dil Water:**		**Source:**	In-House Culture
Setup Date:	20 Apr-06 09:10 AM	**Brine:**			

Sample No:	07-9940-6935	**Code:**	BN1574-04	**Client:**	
Sample Date:	12 Apr-06	**Material:**	Sediment	**Project:**	
Receive Date:		**Source:**	Hanford		
Sample Age:	8d 9h	**Station:**			

Comments: J11JJ0

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
08-1899-8641	% Survival	< 100	100	N/A	16.08%	Equal Variance t Two-Sample

% Survival Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Sedim	3	0.93333	0.90000	1.00000	0.03333	0.05774	6.19%
100		3	0.76667	0.70000	0.90000	0.06667	0.11547	15.06%

% Survival Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Sedim	0.90000	0.90000	1.00000
100		0.70000	0.90000	0.70000

CETIS Analysis Detail

Nematode 24 hour Acute test — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Comparison	04-2557-1266	04-2557-1266	27 Apr-06 2:44 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	16.08%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Dilution Sediment		100	2.22491	2.13185	0.0451	0.21679	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0767833	0.076783	1	4.95	0.09012	Non-Significant Effect
Error	0.0620441	0.015511	4			
Total	0.13882741	0.0922943	5			

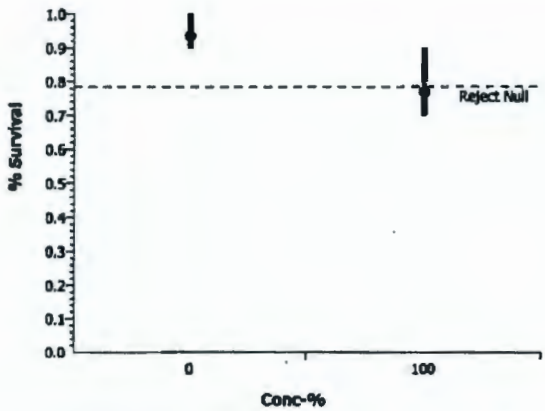
ANOVA Assumptions

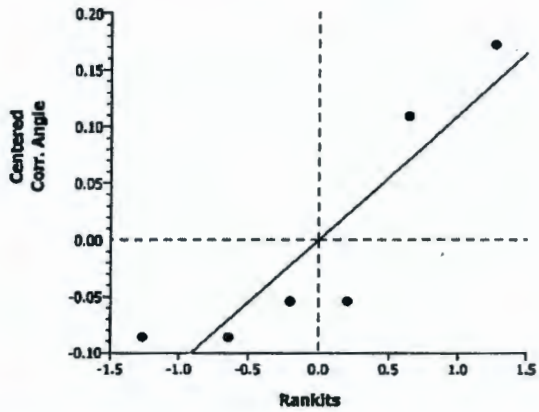
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.50409	199.00000	0.57076	Equal Variances
Distribution	Shapiro-Wilk W	0.78325		0.04132	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Sedim	3	0.93333	0.90000	1.00000	0.05773	1.30337	1.24905	1.41202	0.09409
100		3	0.76667	0.70000	0.90000	0.11547	1.07712	0.99116	1.24905	0.14889

Graphics





CETIS Test Summary

Report Date: 27 Apr-06 2:45 PM
Test Link: 06-5520-2340/BN157405ce

Nematode 24 hour Acute test — CH2M Hill

Test No:	02-2116-2399	**Test Type:**	Nematode Survival	**Duration:**	26h
Start Date:	20 Apr-06 09:10 AM	**Protocol:**	ASTM E2172-01 (2001)	**Species:**	Caenorhabditis elegans
Ending Date:	21 Apr-06 11:30 AM	**Dil Water:**		**Source:**	In-House Culture
Setup Date:	20 Apr-06 09:10 AM	**Brine:**			

Sample No:	06-5440-2928	**Code:**	BN1574-05	**Client:**	
Sample Date:	13 Apr-06	**Material:**	Sediment	**Project:**	
Receive Date:		**Source:**	Hanford		
Sample Age:	7d 9h	**Station:**			

Comments: J11JH9

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
04-9959-2325	% Survival	< 100	100	N/A	13.25%	Equal Variance t Two-Sample

% Survival Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Sedim	3	0.93333	0.90000	1.00000	0.03333	0.05774	6.19%
100		3	0.53333	0.40000	0.60000	0.06667	0.11547	21.65%

% Survival Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Sedim	0.90000	0.90000	1.00000
100		0.40000	0.60000	0.60000

CETIS Analysis Detail

Nematode 24 hour Acute test — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Comparison	06-5520-2340	06-5520-2340	27 Apr-06 2:45 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	13.25%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Dilution Sediment		100	5.60997	2.13185	0.0025	0.18408	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.3519816	0.351982	1	31.47	0.00496	Significant Effect
Error	0.0447362	0.011184	4			
Total	0.39671784	0.3631657	5			

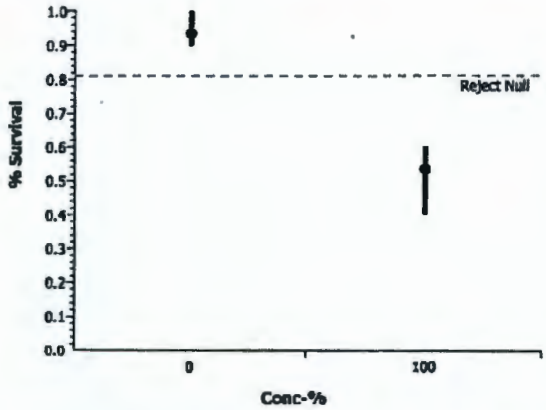
ANOVA Assumptions

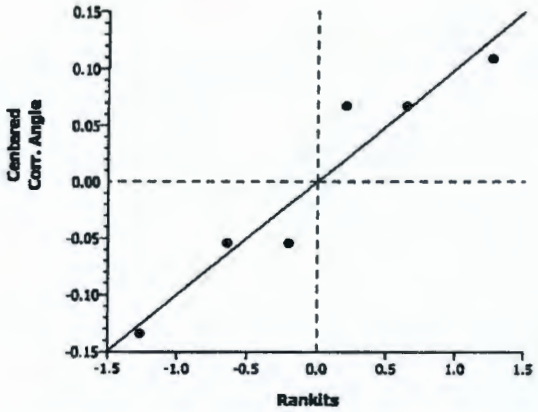
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.52658	199.00000	0.79158	Equal Variances
Distribution	Shapiro-Wilk W	0.90288		0.39125	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Sedim	3	0.93333	0.90000	1.00000	0.05773	1.30337	1.24905	1.41202	0.09409
100		3	0.53333	0.40000	0.60000	0.11547	0.81896	0.68472	0.88608	0.11625

Graphics





APPENDIX B
REFERENCE TOXICANT DATA SHEETS

CH2M HILL NEMATODE TOXICITY TEST SURVIVAL DATA

Client QA/QC

Sample Description Cu as $CuCl_2xH_2O$ Lab ID#: B053-06

Test Species: *Caenorhabditis elegans* ID#: Nem 009

Beginning, Date 4-3-06 Time 0930

Ending, Date 4-4-06 Time 0930

Test Initiation: Tech: Tech: NJ Time: 0930 Test Termination: Tech: Tech: NJ Time: 0830

Chamber Number	Start Count 0	# alive found 24 hr	total # found 24 hr
1	10	0	10
2	10	2	10
3	10	2	10
4	10	2	10
5	10	10	10
6	10	10	10
7	10	3	10
8	10	1	10
9	~~10~~ 11	11*	11*
10	10	8	10
11	10	6	10
12	10	~~9~~ 10	10
13	10	0	10
14	10	10	10
15	10	9	10

Comments:

* an extra nematode was added at test initiation but was still alive at test ending.

Endpoint	LC50	Cusum Chart Limits
Survival	52.6	40.9 to 100.3

Task Manager Natisha Johnson

Project Manager [signature]

QA Officer [signature]

CH2M HILL TODE TOXICITY TEST SOIL QUALITY AND TEST CHAMBER ASSIGNMENT DATA

Client: QA / QC
Sample Description: see below
Test Species: *Caenorhabditis elegans* ID#: Nem009

Tech. 0 Hrs: NJ 24 Hrs: NJ
Time 0 Hrs: 0930 24 Hrs: 0930

Beginning, Date: 4-3-06 Time: 0930
Ending, Date: 4-4-06 Time: 0830

Lab ID	K-Medium pH 0 hr	K-Medium pH 24 hr	% Moisture 0 hr	Temperature (°C) 0 hr	Temperature (°C) 24 hr	Comments:
Lab Control	5.8	~~6.2~~ 6.0 NJ	NA	21.7	21.7	
10 mg/L Cu	5.4	5.5	NA	21.9	21.7	
50 mg/L Cu	5.3	5.3	NA	21.9	21.7	
100 mg/L Cu	5.2	5.2	NA	21.9	21.7	
250 mg/L Cu	NJ ~~8.4~~ 9	9.8	NA	21.8	21.7	

Lab ID	Field ID	Replicate	Chamber #	Lab ID	Field ID	Replicate	Chamber #	Lab ID	Field ID	Replicate	Chamber #
Lab Control	K-medium	A	12	250 mg/L Cu		A	13				
Lab Control	K-medium	B	6	250 mg/L Cu		B	2				
Lab Control	K-medium	C	9	250 mg/L Cu		C	1				
10 mg/L Cu		A	15								
10 mg/L Cu		B	14								
10 mg/L Cu		C	5								
50 mg/L Cu		A	10								
50 mg/L Cu		B	11								
50 mg/L Cu		C	7								
100 mg/L Cu		A	3								
100 mg/L Cu		B	4								
100 mg/L Cu		C	8								

CETIS Test Summary

Report Date: 04 Apr-06 11:24 AM
Test Link: 01-8280-8779/rcea009

Nematode 24 hour Acute test — CH2M Hill

Test No:	07-1495-1310	Test Type:	Nematode Survival	Duration:	23h
Start Date:	03 Apr-06 09:30 AM	Protocol:	ASTM E2172-01 (2001)	Species:	Caenorhabditis elegans
Ending Date:	04 Apr-06 08:30 AM	Dil Water:		Source:	In-House Culture
Setup Date:	03 Apr-06 09:30 AM	Brine:			

Sample No:	09-6954-2135	Code:	1B033-06	Client:	
Sample Date:	16 Jan-06	Material:	Copper	Project:	
Receive Date:		Source:	Reference Toxicant		
Sample Age:	77d 9h	Station:			

Comments: 250 mg/L Cu in K medium

Point Estimate Summary

Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method
11-1509-7834	% Survival	50	52.63094	38.6932	68.37195	Linear Regression

% Survival Summary

Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
10		3	0.96667	0.90000	1.00000	0.03333	0.05774	5.97%
50		3	0.56667	0.30000	0.80000	0.14530	0.25166	44.41%
100		3	0.16667	0.10000	0.20000	0.03333	0.05774	34.64%
250		3	0.06667	0.00000	0.20000	0.06667	0.11547	173.21

% Survival Detail

Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1.00000	1.00000	1.00000
10		0.90000	1.00000	1.00000
50		0.80000	0.60000	0.30000
100		0.20000	0.20000	0.10000
250		0.00000	0.20000	0.00000

CETIS Analysis Detail

Nematode 24 hour Acute test — CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Linear Regression	01-8280-8779	01-8280-8779	04 Apr-06 11:24 AM	CETISv1.1.2

Linear Regression Options

Model Function	Threshold Option	Threshold	Threshold Opt	Reweighted	Pooled Groups	Het Corr
Log-Normal [NED=A+B*log(X)]	Control Threshold	0	Yes	Yes	No	No

Regression Summary

Iters	Log Likelihood	Mu	Sigma	G	Chi-Sq	Critical	P-Value	Decision(0.05)
4	-46.54554	0.24538	0.39332	0.09484	15.56585	18.30704	0.11275	Non-Significant Heterogeneity

Point Estimates

% Effect	Conc-µg/L	95% LCL	95% UCL
50	52.63094	38.6932	68.37195

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P-Value	Decision(0.05)
Slope	2.54243	0.3994823	1.759445	3.325415	6.364	0.00008	Significant
Intercept	0.6238645	0.7404562	-0.8274295	2.075159	0.843	0.41918	Not Significant

Residual Analysis

Attribute	Method	Statistic	Critical	P-Value	Decision(0.05)
Variances	Bartlett	2.977855	7.81473	0.39505	Equal Variances
Distribution	Shapiro-Wilk W	0.9184941		0.27369	Normal Distribution

Data Summary

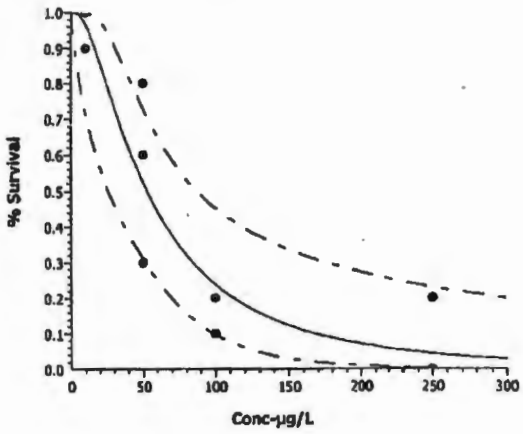
Conc-µg/L	Control Type	Count	Calculated Variate(A/B) Mean	Minimum	Maximum	SE	SD	A	B
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	31	31
10		3	0.96667	0.90000	1.00000	0.01179	0.05773	29	30
50		3	0.56667	0.30000	0.80000	0.05137	0.25166	17	30
100		3	0.16667	0.10000	0.20000	0.01179	0.05774	5	30
250		3	0.06667	0.00000	0.20000	0.02357	0.11547	2	30

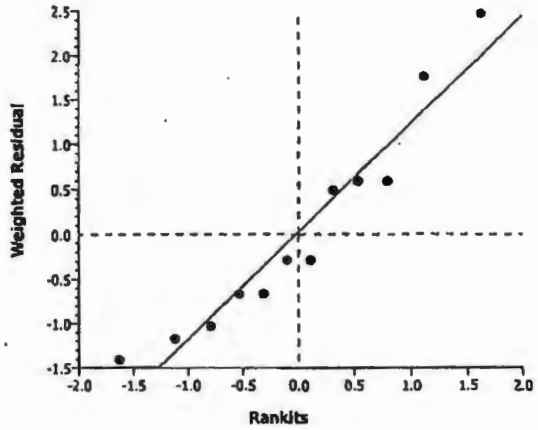
Data Detail

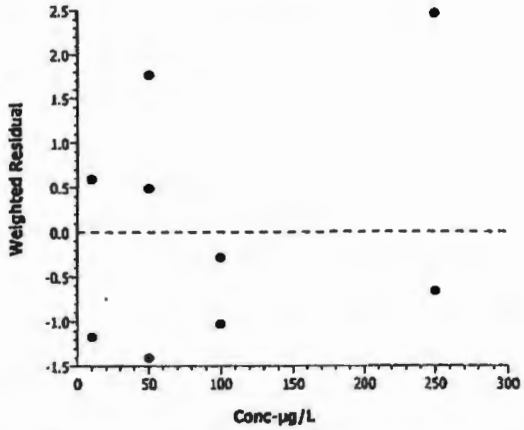
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1.00000	1.00000	1.00000							
10		0.90000	1.00000	1.00000							
50		0.80000	0.60000	0.30000							
100		0.20000	0.20000	0.10000							
250		0.00000	0.20000	0.00000							

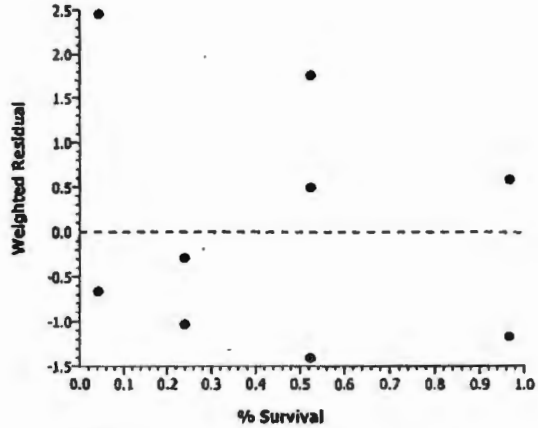
CETIS Analysis Detail

Graphics









APPENDIX C
CHAIN OF CUSTODY

F1493

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-65	Page 1 of 1

Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location 100-H RIPARIAN #1		SAF No. RC-051
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment GROUND TRANSPORT
Shipped To CH2MHILL	Offsite Property No. A060151		Bill of Lading/Air Bill No.

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.

Preservation	None	None										
Type of Container	G/P	P/G										
No. of Container(s)	1	1										
Volume	1000g	4000g										
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172										
Sample No.	Matrix *	Sample Date	Sample Time									
J11JB4	SOIL	4-5-06	13:00	1	1							-1

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
CH2MHill Elizabeth M. Tapia	10:30 4-6-06	Dayna Kaufmann	10:30 4-6-06

SPECIAL INSTRUCTIONS

These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr Analysis fraction.

These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids

F149301-5011

BN1574-01

Matrix *

S=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wi=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

3- ~~E 1503~~ should be F1503

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-66	Page 1 of 1

Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8L Air Quality ☐	Data Turnaround 45 Days
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location 100-D RIPARIAN #2		SAF No. RC-051		
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment GROUND TRANSPORT		
Shipped To CH2MHILL	Offsite Property No. A060151		Bill of Lading/Air Bill No.		

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.

Preservation	None	None									
Type of Container	G/P	P/G									
No. of Container(s)	1	1									
Volume	1000g	4000g									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172									
Sample No. / Matrix * / Sample Date / Sample Time											
J11JB5 / SOIL / 4-9-06 / 15:30	1	1									~1

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From CH2MHILL	Date/Time 10:30	Received By/Stored In	Date/Time
Elizabeth M Tepper 4-10-06		Kathy McKinley	4/10/06 1035
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

' These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

(1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids

This is a composite of all 5 samples from 1 Investigation Area F150801-5012 BN1574-02

Matrix *

SoSoil
SESediment
SOSolid
SlSludge
WaWater
OiOil
AiAir
DSDrum Solids
DLDrum Liquids
TsTissue
WiWipe
LiLiquid
VeVegetation
XtOther

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

F1514-01

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-97	Page 1 of 1

Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8L Air Quality ☐	Data Turnaround 45 Days
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location 100-H RIPARIAN #9		SAF No. RC-051		
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment GROUND TRANSPORT		
Shipped To CH2MHILL	Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.

Preservation	None	None									
Type of Container	G/P	P/G									
No. of Container(s)	1	1									
Volume	1000g	4000g									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172									

Sample No.	Matrix *	Sample Date	Sample Time										
J11JH6	SOIL	4-10-06	16:00	1	1								1

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
CH2MHILL Elizabeth M Tyring	4-11-06 10:30	Shawn Hubbard CH2M HILL	4/11/06 10:30

SPECIAL INSTRUCTIONS

' These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

(1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids

BN1574-03

Matrix *

S=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wi=Wipe
L=Liquid
Ve=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

F1518-01

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-101	Page 1 of 1

Collector STANKOVICH, M.	Company Contact JOAN KESSNER Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8L Data Turnaround 45 Days
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location UPPER RIPARIAN #16	SAF No. RC-051	Air Quality ☐
Ice Chest No.	Field Logbook No. EL-1596-1 COA BESRAS6520	Method of Shipment GROUND TRANSPORT	
Shipped To CH2MHILL	Offsite Property No. A060151	Bill of Lading/Air Bill No. SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.

Preservation	None	None										
Type of Container	G/P	P/G										
No. of Container(s)	1	1										
Volume	1000g	4000g										
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172										
Sample No.	Matrix *	Sample Date	Sample Time									
J11JJ0	SOIL	4-11-06	16:00	1	1							

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Elizabeth M Tepper		CH2M Hill	
Elizabeth M Tepper	4-12-06 10:30	Nancy D Hatchard CH2M HILL	4-12-06 11:30

SPECIAL INSTRUCTIONS

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids

BN1574-04

Matrix *

SeSoil
SDeSediment
SOeSoil
SlaSludge
W = Water
OeOil
AeAir
OSeDrum Solids
DLeDrum Liquids
TeTissue
WIeWipe
LeLiquid
VeVegetation
XeOther

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

F1522-01

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-100	Page 1 of 1

Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location UPPER RIPARIAN #14		SAF No. RC-051
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment GROUND TRANSPORT
Shipped To CH2MHILL	Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC

Price Code **8L**

Air Quality ☐

Data Turnaround **45 Days**

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.

Preservation	None	None									
Type of Container	G/P	P/G									
No. of Container(s)	1	1									
Volume	1000g	4000g									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172									
Sample No.	Matrix *	Sample Date	Sample Time								
J11JH9	SOIL	4-12-06	16:30	1	1						

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
CH2M Elizabeth M Tyler	10:30 4-13-06	Darrin D. Hubbard CH2M HILL	4-13-06 10:30

SPECIAL INSTRUCTIONS

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^-- These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

(1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids

BN 1574-05

Matrix *

S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

CH2M HILL
Applied Sciences Laboratory
2300 NW Walnut Blvd
Corvallis, OR
97330-3538
P.O. Box 428
Corvallis, OR
97339-0428
Tel 541.752.4271
Fax 541.752.0276

CH2MHILL
Applied Sciences Laboratory

RECEIVED
MAY 2006

May 19, 2006

ELR Consulting
2328 S. Garfield Street
Kennewick, WA 99337

RE: Laboratory Report for ELR Consulting
Applied Sciences Laboratory Reference No. F1522

Dear Emmett Richards:

On April 13, 2006, CH2M HILL Applied Sciences Laboratory received one sample with a request for analysis of selected parameters. All analyses were performed by CH2M HILL unless otherwise indicated below.

The analytical results and associated quality control data are enclosed. Any unusual difficulties encountered during the analysis of your samples are discussed in the case narrative. This data package meets standards requested by client and is not intended or implied to meet any other standard.

CH2M HILL Applied Sciences Laboratory appreciates your business and looks forward to serving your analytical needs again. If you should have any questions concerning the data, or if you need additional information, please call Mark Bos at (541) 758-0235, extension 3135.

Sincerely,

Mark Bos
Analytical Manager

Enclosures

CLIENT SAMPLE CROSS-REFERENCE

CH2M HILL Applied Sciences Laboratory Reference No. F1522

Sample ID	Client Sample ID	Date Collected	Time Collected
F152201	J11JH9	04/12/2006	16:30

Table of Contents
CH2M HILL Laboratory Reference No. F1522

Page

Ammonia Analysis by Method EPA350.3 5
Sample Data Summary 7
QC Summary 10

Anions Analysis by Method EPA300.0 20
Sample Data Summary 22
QC Summary 25

Moisture Analysis by Method ASTM D2216 37

Particle Size Analysis by Method D422 39

pH Analysis by Method SW9045C 41

Total Kjeldahl Nitrogen Analysis by Method EPA351.4 43
Sample Data Summary 45
QC Summary 48

Total Organic Carbon Analysis by Method ASTM E777 58
Sample Data Summary 60
QC Summary 63

Chain of Custody/Shipping Documents 73

Applied Sciences Laboratory

Organic CLP and CLP Like Data Qualifiers

U — The analyte was analyzed for, but not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

N — The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ — The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

P — The primary and confirmation analyte result recoveries do not match.

E — The analyte was positively identified; the associated numerical value exceeded the instrument calibration range.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Inorganic CLP and CLP Like Data Qualifiers

U — The analyte was analyzed for, but not detected above the reported sample quantitation limit.

B — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

E — The analyte was positively identified; the associated numerical value exceeded the instrument calibration range.

N — The matrix spike/matrix spike duplicate recovery for the analyte is outside of acceptance criteria—qualifier is applied to the native sample only.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

AMMONIA
METHOD EPA 350.3

CASE NARRATIVE
AMMONIA

Analytical Method: EPA 350.3 Batch No.: F1522

Lab Name: CH2M HILL Applied Sciences Lab Contract #.: 920842.OTC

Project Name: ELR Consulting Prime Contractor.:

I. Holding Times:
All acceptance criteria were met.

II. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Blanks:
All acceptance criteria were met.

C. Matrix Spike/Matrix Spike Duplicate(MS/MSD)
All analyses were performed in accordance with standard operating procedures.

D. Laboratory Control Spike(LCS)
All acceptance criteria were met.

E. Duplicate Sample(s):
All analyses were performed in accordance with standard operating procedures.

F. Analytical Exceptions:
None.

III. Sampling Equipment:
None.

IV. Documentation Exceptions:
None

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signature.

Reported by: Elizabeth M Eggers Date: 5-1-06

Reviewed by: Ginger Collins Date: 5/2/06

SAMPLE DATA
SUMMARY

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J11JH9

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Matrix: SOIL

Lab Sample ID: F152201

% Moisture: 2

Date Received: 04/13/06

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
7664-41-7	Ammonia-N	0.916	3.43	5.26		mg/kg	1	0.5945 G	E350.3	04/13/06

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-0413

SDG No.: F1522

Matrix: SOIL

% Moisture: 0

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-0413

Date Received: / /

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
7664-41-7	Ammonia-N	0.534	2.00	1.28	B	mg/kg	1	1 G	E350.3	04/13/06

QC DATA
SUMMARY

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Initial Calibration Date: 04/05/06 1500

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 040506NH3

Analyte	Std 1	Resp 1	Std 2	Resp 2	Std 3	Resp 3	Std 4	Resp 4	Std 5	Resp 5	Std 6	Resp 6	Std 7	Resp 7
Ammonia-N	0.10	160	1.0	103	10.0	51.0	100	-8.2						

Comments:

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Initial Calibration Date: 04/05/06 1500

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 040506NH3

Analyte	Curve Type	r	Q
Ammonia-N	LNR	0.9994	

Comments:

2B-WC

GENERAL CHEMISTRY SECOND SOURCE CALIBRATION VERIFICATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Second Source ID: ICV-0405

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 040506NH3

Analyte	Expected	Found	%D	Q
Ammonia-N	10	9.93	-0.7	

Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Analytical Lot ID: 041306NH3

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 040506NH3

CCV #1 ID: CV1-0413 CCV #2 ID: CV2-0413 CCV #3 ID: CV3-0413

Analyte	Expected	Found	%D	Q	Expected	Found	%D	Q	Expected	Found	%D	Q
Ammonia-N	1	1.12	11.7		10	10.1	1.0		1	0.942	-5.8	

Comments:

3-WC

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-0413

SDG No.: F1522

Analysis Method: E350.3

Initial Cal ID: 040506NH3

Matrix: (Soil/Water) SOIL

Instrument: NONE

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-0413

Date Analyzed: 04/13/06

Time Analyzed: 1244

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, AND MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED
10	BS1S0413	BS1S0413	04/13/06	1240
22	J11JH9	F152201	04/13/06	1407

COMMENTS: _____

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

LCS ID: BS1S0413

Initial Cal ID: 040506NH3

Date Analyzed: 04/13/06

Matrix: (Soil/Water) SOIL

Time Analyzed: 1240

Instrument: NONE

Concentration Units: mg/kg

Analyte	Expected	Found	%R	QC Limits %R	Q
Ammonia-N	200	196	98.1	75-125	

* Values outside of QC limits

Comments:

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Lab Code: CVO

Instrument: NONE

Analytical Lot ID: 040506NH3

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED
01	LEVEL 1	LEVEL 1	04/05/06	1544
01	LEVEL 2	LEVEL 2	04/05/06	1546
02	LEVEL 3	LEVEL 3	04/05/06	1548
03	LEVEL 4	LEVEL 4	04/05/06	1550
07	ICV-0405	ICV-0405	04/05/06	1559

COMMENTS: _____

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Lab Code: CVO

Instrument: NONE

Analytical Lot ID: 041306NH3

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED
08	CV1-0413	CV1-0413	04/13/06	1235
09	CV2-0413	CV2-0413	04/13/06	1235
11	BS1S0413	BS1S0413	04/13/06	1240
13	SB1-0413	SB1-0413	04/13/06	1244
23	J11JH9	F152201	04/13/06	1407
24	CV3-0413	CV3-0413	04/13/06	1409

COMMENTS: _____

CH2MHILL
Applied Sciences Laboratory

CH2M HILL
Applied Sciences Labortory (ASL)
2300 NW Walnut Blvd.
P.O. Box 428
Corvallis, OR 97330-0428
Telephone: 541-752-4271
Fax: 541-752-0276

05/01/06

MDL Study Report

Analytical Method: E350.3

Matrix: Soil

Instrument ID: NONE

Concentration Units: mg/kg

Analyte	Analysis Date	Amt. Spiked	Replicates 1	2	3	4	5	6	7	8	Std. Dev.	MDL
Ammonia	08/05/05	2	2.18	1.70	1.73	1.70	1.73	1.74	1.81		0.170	0.534

ET060501-16:22-F1522-W

ANIONS BY METHOD EPA300.0A

CASE NARRATIVE
ANIONS

Analytical Method: EPA300.0 Batch No.: F1522

Lab Name: CH2M HILL Applied Sciences Lab Contract #.: 920842.OTC

Base/Command: ELR Consulting Prime Contractor.: _____

I. Holding Times:
All acceptance criteria were met.

II. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Blanks:
All acceptance criteria were met.

C. Matrix Spike/Matrix Spike Duplicate Sample(s):
Samples were analyzed in accordance with SOP.

D. Laboratory Control Spike(LCS)
All acceptance criteria were met.

E. Analytical Exception:
None.

F. Other:
None.

III. Sampling Equipment:
None.

IV. Documentation Exceptions:
None

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signature.

Reported by: [signature] Date: 5/19/06

Reviewed by: [signature] Date: 5/19/06

SAMPLE DATA
SUMMARY

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J11JH9

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Matrix: SOIL

Lab Sample ID: F152201

% Moisture: 2

Date Received: 04/13/06

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
16887-00-6	Chloride	0.0587	0.483	1.77		mg/kg	1	5.28 G	E300.0A	04/21/06
16984-48-8	Fluoride	0.0524	0.483	0.483	U	mg/kg	1	5.28 G	E300.0A	04/21/06
14797-55-8	Nitrate-N	0.0454	0.483	3.69		mg/kg	1	5.28 G	E300.0A	04/21/06
14797-65-0	Nitrite-N	0.0434	0.483	0.664		mg/kg	1	5.28 G	E300.0A	04/21/06
14808-79-8	Sulfate	0.0779	0.483	5.96		mg/kg	1	5.28 G	E300.0A	04/21/06

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-0421

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Matrix: SOIL

Lab Sample ID: SB1-0421

% Moisture: 0

Date Received: / /

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
16887-00-6	Chloride	0.0607	0.500	0.0950	B	mg/kg	1	5 G	E300.0A	04/21/06
16984-48-8	Fluoride	0.0543	0.500	0.500	U	mg/kg	1	5 G	E300.0A	04/21/06
14797-55-8	Nitrate-N	0.0469	0.500	0.500	U	mg/kg	1	5 G	E300.0A	04/21/06
14797-65-0	Nitrite-N	0.0449	0.500	0.0550	B	mg/kg	1	5 G	E300.0A	04/21/06
14808-79-8	Sulfate	0.0806	0.500	0.165	B	mg/kg	1	5 G	E300.0A	04/21/06

QC DATA SUMMARY

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Initial Calibration Date: 01/30/06 18:27

Instrument Name: ICQ

Concentration Units: mg/L

Initial Calibration ID: 300A-013006

Analyte	Std 1	Resp 1	Std 2	Resp 2	Std 3	Resp 3	Std 4	Resp 4	Std 5	Resp 5	Std 6	Resp 6	Std 7	Resp 7
Chloride	0.020	0.0032	0.050	0.0041	0.10	0.023	0.50	0.050	1.0	0.11	5.0	0.67	10.0	1.5
Fluoride					0.10	0.0085	0.50	0.046	1.0	0.13	5.0	0.85	10.0	1.8
Nitrate-N	0.020	0.0059	0.050	0.012	0.10	0.067	0.50	0.14	1.0	0.32	5.0	1.8	10.0	4.1
Nitrite-N	0.020	0.0067	0.050	0.012	0.10	0.050	0.50	0.10	1.0	0.25	5.0	1.4	10.0	3.0
Sulfate	0.060	0.0065	0.15	0.014	0.30	0.059	1.5	0.13	3.0	0.27	15.0	1.5	30.0	3.2

Comments:

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Initial Calibration Date: 01/30/06 18:27

Instrument Name: ICQ

Concentration Units: mg/L

Initial Calibration ID: 300A-013006

Analyte	Curve Type	r	Q
Chloride	LNR	0.9985	
Fluoride	LNR	0.9988	
Nitrate-N	LNR	0.9983	
Nitrite-N	LNR	0.9988	
Sulfate	LNR	0.9991	

Comments:

2B-WC

GENERAL CHEMISTRY SECOND SOURCE CALIBRATION VERIFICATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Second Source ID: ICV-0130

Instrument Name: ICQ

Concentration Units: mg/L

Initial Calibration ID: 300A-013006

Analyte	Expected	Found	%D	Q
Chloride	5	5.06	1.2	
Fluoride	5	4.57	-8.6	
Nitrate-N	7.19	7.13	-0.8	
Nitrite-N	1.13	1.02	-9.4	
Sulfate	5	5.14	2.8	

Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Analytical Lot ID: 042106Q2

Instrument Name: ICQ

Concentration Units: mg/L

Initial Calibration ID: 300A-013006

CCV #1 ID: CV3-0421 CCV #2 ID: CV4-0421 CCV #3 ID:

Analyte	Expected	Found	%D	Q	Expected	Found	%D	Q	Expected	Found	%D	Q
Chloride	2.5	2.44	-2.5		5	5.28	5.7					
Fluoride	2.5	2.55	1.8		5	5.19	3.8					
Nitrate-N	2.5	2.63	5.3		5	5.52	10.3					
Nitrite-N	2.5	2.47	-1.2		5	5.52	10.4					
Sulfate	7.5	7.59	1.2		15	16.0	6.7					

Comments:

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-0421

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Lab Sample ID: SB1-0421

Initial Cal ID: 300A-013006

Date Analyzed: 04/21/06

Matrix: (Soil/Water) SOIL

Time Analyzed: 2207

Instrument: ICQ

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, AND MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED
41	BS1S0421	BS1S0421	04/21/06	2128
43	BS2S0421	BS2S0421	04/21/06	2148
44	BS3S0421	BS3S0421	04/21/06	2157
52	J11JH9	F152201	04/21/06	2325

COMMENTS: _____

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

LCS ID: BS1S0421

Initial Cal ID: 300A-013006

Date Analyzed: 04/21/06

Matrix: (Soil/Water) SOIL

Time Analyzed: 2128

Instrument: ICQ

Concentration Units: mg/kg

Analyte	Expected	Found	%R	QC Limits %R	Q
Chloride	25	27.0	108	90-110	
Fluoride	25	26.7	107	90-110	
Sulfate	25	27.1	108	90-110	

* Values outside of QC limits

Comments:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

LCS ID: BS2S0421

Initial Cal ID: 300A-013006

Date Analyzed: 04/21/06

Matrix: (Soil/Water) SOIL

Time Analyzed: 2148

Instrument: ICQ

Concentration Units: mg/kg

Analyte	Expected	Found	%R	QC Limits %R	Q
Nitrite-N	5.65	5.71	101	90-110	

* Values outside of QC limits

Comments:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

LCS ID: BS3S0421

Initial Cal ID: 300A-013006

Date Analyzed: 04/21/06

Matrix: (Soil/Water) SOIL

Time Analyzed: 2157

Instrument: ICQ

Concentration Units: mg/kg

Analyte	Expected	Found	%R	QC Limits %R	Q
Nitrate-N	35.95	38.7	108	90-110	

* Values outside of QC limits

Comments:

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Lab Code: CVO

Instrument: ICQ

Analytical Lot ID: 300A-013006

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED
02	LEVEL1	LEVEL1	01/30/06	1729
03	LEVEL2	LEVEL2	01/30/06	1739
04	LEVEL3	LEVEL3	01/30/06	1749
05	LEVEL4	LEVEL4	01/30/06	1758
06	LEVEL5	LEVEL5	01/30/06	1808
07	LEVEL6	LEVEL6	01/30/06	1818
08	LEVEL7	LEVEL7	01/30/06	1827
10	ICV-0130	ICV-0130	01/30/06	1846
11	ICV-0130	ICV-0130	01/30/06	1856
13	ICV-0130	ICV-0130	01/30/06	1916

COMMENTS: _____

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Lab Code: CVO

Instrument: ICQ

Analytical Lot ID: 042106Q2

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED
40	CV3-0421	CV3-0421	04/21/06	2119
41	BS1S0421	BS1S0421	04/21/06	2128
43	BS2S0421	BS2S0421	04/21/06	2148
44	BS3S0421	BS3S0421	04/21/06	2157
46	SB1-0421	SB1-0421	04/21/06	2207
52	J11JH9	F152201	04/21/06	2325
55	CV4-0421	CV4-0421	04/21/06	2354

COMMENTS: _____

CH2MHILL
Applied Sciences Laboratory

CH2M HILL
Applied Sciences Labortory (ASL)
2300 NW Walnut Blvd.
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Corvallis, OR 97330-0428
Telephone: 541-752-4271
Fax: 541-752-0276

05/19/06

MDL Study Report

Analytical Method: E300.0A

Instrument ID: ICQ

Matrix: Soil

Concentration Units: mg/kg

Analyte	Analysis Date	Amt. Spiked	Replicates 1	2	3	4	5	6	7	8	Std. Dev.	MDL
Nitrate	11/01/05	0.25	0.225	0.250	0.215	0.240	0.245	0.225	0.255		0.0149	0.0469
Nitrite-N	11/01/05	0.25	0.230	0.270	0.270	0.260	0.270	0.260	0.265		0.0143	0.0449
Sulfate	11/01/05	0.75	0.790	0.735	0.730	0.795	0.775	0.750	0.760		0.0256	0.0806
Chloride	11/01/05	0.25	0.315	0.315	0.340	0.340	0.290	0.300	0.330		0.0193	0.0607
Fluoride	11/02/05	0.5	0.505	0.480	0.500	0.470	0.490	0.485	0.455		0.0173	0.0543

PERCENT MOISTURE
ASTM D2216

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J11JH9

SDG No.: F1522

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: F152201

Date Received: 04/13/06

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
MOISTURE	Moisture	0.00	0.00	1.64		%	1	11.7632 G	ASTM D2216	04/17/06

PARTICLE SIZE
METHOD 422

Hanford

Particle Size

500.0 g sample used

Weight retained is the weight of material ON each sieve

ANALYST: KM 04/19/2006

Lab I.D.	Client I.D.	Sieve #	Sieve Size (um)	Sieve Size (mm)	Weight Retained (g)	Weight Retained (%)	Cumulative Coarser (%)	Cumulative Finer (%)
F152201	J11JH9	8	2362	2.362	0.20	0.04	0.04	99.96
		16	1180	1.180	30.30	6.08	6.12	93.88
		30	600	0.600	103.00	20.67	26.79	73.21
		50	500	0.500	205.90	41.31	68.10	31.90
		100	147	0.147	117.70	23.62	91.71	8.29
		200	75	0.075	24.80	4.98	96.69	3.31
		pan			16.50	3.31	100.00	0.00
		total			498.4			

CH2M HILL
Applied Sciences Group

2300 NW Walnut Blvd., Corvallis, OR 97330-3538
P.O. Box 428, Corvallis, OR 97339-0428
Tel 541.752.4271 Fax 541.752.0276

pH
METHOD SW9045C

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J11JH9

SDG No.: F1522

Matrix: SOIL

% Moisture: 2

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: F152201

Date Received: 04/13/06

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
pH	pH	0.00	0.00	7.28		pH	1	20 G	SW9045C	04/24/06

ST060427-19:22-F1522-W

FORM I GEN CHEM

TKN
METHOD EPA 351.4

CASE NARRATIVE
TKN

Analytical Method: EPA 351.4 Batch No.: F1522

Lab Name: CH2M HILL Applied Sciences Lab Contract #.: 920842.OTC

Project Name: ELR Consulting Prime Contractor.: _____

I. Holding Times:
All acceptance criteria were met.

II. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Blanks:
All acceptance criteria were met.

C. Matrix Spike/Matrix Spike Duplicate(MS/MSD)
All analyses were performed in accordance with standard operating procedures.

D. Laboratory Control Spike(LCS)
All acceptance criteria were met.

E. Duplicate Sample(s):
All analyses were performed in accordance with standard operating procedures.

F. Analytical Exceptions:
None.

III. Sampling Equipment:
None.

IV. Documentation Exceptions:
None

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signature.

Reported by: Elizabeth M Tepper Date: 5-1-06

Reviewed by: [illegible] Date: 5/1/06

SAMPLE DATA
SUMMARY

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J11JH9

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Matrix: SOIL

Lab Sample ID: F152201

% Moisture: 2

Date Received: 04/13/06

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
7727-37-9	Total Kjeldahl Nitrogen as N	40.9	150	1310		mg/kg	1	0.6799 G	E351.4	04/18/06

E7060502-16:41-F1522-W

FORM I GEN CHEM

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-0418

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Matrix: SOIL

Lab Sample ID: SB1-0418

% Moisture: 0

Date Received: / /

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
7727-37-9	Total Kjeldahl Nitrogen as N	27.3	100	100	U	mg/kg	1	1 G	E351.4	04/18/06

QC DATA
SUMMARY

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Initial Calibration Date: 04/18/06 1040

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 041806TKN

Analyte	Std 1	Resp 1	Std 2	Resp 2	Std 3	Resp 3	Std 4	Resp 4	Std 5	Resp 5	Std 6	Resp 6	Std 7	Resp 7
Total Kjeldahl Nitrogen	2.0	155	20.0	106	200	50.2	2000	-10						

Comments:

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Initial Calibration Date: 04/18/06 1040

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 041806TKN

Analyte	Curve Type	r	Q
Total Kjeldahl Nitrogen as N	LNR	0.9979	

Comments:

2B-WC

GENERAL CHEMISTRY SECOND SOURCE CALIBRATION VERIFICATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Second Source ID: ICV-0418

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 041806TKN

Analyte	Expected	Found	%D	Q
Total Kjeldahl Nitrogen as N	20	17.7	-11.5	

Comments:

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Analytical Lot ID: 041806TKN

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 041806TKN

CCV #1 ID: CV1-0418 CCV #2 ID: CV2-0418 CCV #3 ID: CV3-0414

Analyte	Expected	Found	%D	Q	Expected	Found	%D	Q	Expected	Found	%D	Q
Total Kjeldahl Nitrogen as N	20	17.5	-12.6		200	181	-9.6		20	18.4	-8.1	

Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Analytical Lot ID: 041806TKN

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 041806TKN

CCV #4 ID: CV4-0418 CCV #5 ID: CCV #6 ID:

Analyte	Expected	Found	%D	Q	Expected	Found	%D	Q	Expected	Found	%D	Q
Total Kjeldahl Nitrogen as N	200	178	-11.1									

Comments:

3-WC

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-0418

SDG No.: F1522

Analysis Method: E351.4

Initial Cal ID: 041806TKN

Matrix: (Soil/Water) SOIL

Instrument: NONE

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-0418

Date Analyzed: 04/18/06

Time Analyzed: 1053

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, AND MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED
09	BS1S0418	BS1S0418	04/18/06	1051
24	J11JH9	F152201	04/18/06	1125

COMMENTS: _____

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

LCS ID: BS1S0418

Initial Cal ID: 041806TKN

Date Analyzed: 04/18/06

Matrix: (Soil/Water) SOIL

Time Analyzed: 1051

Instrument: NONE

Concentration Units: mg/kg

Analyte	Expected	Found	%R	QC Limits %R	Q
Total Kjeldahl Nitrogen as N	680	807	119	75-125	

* Values outside of QC limits

Comments:

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Lab Code: CVO

Instrument: NONE

Analytical Lot ID: 041806TKN

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED
01	LEVEL 1	LEVEL 1	04/18/06	1040
02	LEVEL 2	LEVEL 2	04/18/06	1040
03	LEVEL 3	LEVEL 3	04/18/06	1040
04	LEVEL 4	LEVEL 4	04/18/06	1040
05	CV1-0418	CV1-0418	04/18/06	1042
06	CV2-0418	CV2-0418	04/18/06	1042
07	ICV-0418	ICV-0418	04/18/06	1045
09	BS1S0418	BS1S0418	04/18/06	1051
11	SB1-0418	SB1-0418	04/18/06	1053
22	CV3-0414	CV3-0414	04/18/06	1121
24	J11JH9	F152201	04/18/06	1125
26	CV4-0418	CV4-0418	04/18/06	1128

COMMENTS: _____

CH2MHILL
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Telephone: 541-752-4271
Fax: 541-752-0276

05/01/06

MDL Study Report

Analytical Method: E351.4

Matrix: Soil

Instrument ID: NONE

Concentration Units: mg/kg

Analyte	Analysis Date	Amt. Spiked	Replicates 1	2	3	4	5	6	7	8	Std. Dev.	MDL
Total Kjeldahl Nitrogen	03/13/06	100	168	154	161	147	152	161	171		8.67	27.3

ET060501-16:23-F1522-W

TOTAL ORGANIC CARBON
BY ASTM E777

CASE NARRATIVE
TOC SOILS

Analytical Method: ASTM E-777 Batch No.: F1522

Lab Name: CH2M HILL Applied Sciences Lab Contract #.: 920842.OTC

Project Name: ELR Consulting Prime Contractor.: _____

I. Holding Times:
All acceptance criteria were met.

II. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Blanks:
All acceptance criteria were met.

C. Matrix Spike/Matrix Spike Duplicate(MS/MSD)
All analyses were performed in accordance with standard operating procedures.

D. Laboratory Control Spike(LCS)
All acceptance criteria were met.

E. Duplicate Sample(s):
All analyses were performed in accordance with standard operating procedures.

F. Analytical Exceptions:
All acceptance criteria were met.

III. Sampling Equipment:
None.

IV. Documentation Exceptions:
None

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signature.

Reported by: [signature] Date: 4-25-06

Reviewed by: Ginger Collins Date: 4/26/06

SAMPLE DATA SUMMARY

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J11JH9

SDG No.: F1522

Matrix: SOIL

% Moisture: 0

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: F152201

Date Received: 04/13/06

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
TOC	Total Organic Carbon	109	313	14000		mg/kg	1	0.3197 G	ASTM E777	04/25/06

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-0425

SDG No.: F1522

Matrix: SOIL

% Moisture: 0

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-0425

Date Received: / /

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
TOC	Total Organic Carbon	35.0	100	100	U	mg/kg	1	1 G	ASTM E777	04/25/06

AD060425-15:47-F1522-M

FORM I GEN CHEM

QC SUMMARY

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

Initial Calibration Date: 10/14/05 11:48

Instrument Name: TOC Skalar

Concentration Units: mg/Kg

Initial Calibration ID: 101405S1

Analyte	Std 1	Resp 1	Std 2	Resp 2	Std 3	Resp 3	Std 4	Resp 4	Std 5	Resp 5	Std 6	Resp 6	Std 7	Resp 7
Total Organic Carbon	100	737000	200	1600000	1000	6840000	4000	2.48E+7	8000	4.79E+7				

Comments:

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

Initial Calibration Date: 10/14/05 11:48

Instrument Name: TOC Skalar

Concentration Units: mg/Kg

Initial Calibration ID: 101405S1

Analyte	Curve Type	r	Q
Total Organic Carbon	LNR	0.9997	

Comments:

2B-WC

GENERAL CHEMISTRY SECOND SOURCE CALIBRATION VERIFICATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

Second Source ID: ICV-1014

Instrument Name: TOC Skalar

Concentration Units: mg/kg

Initial Calibration ID: 101405S1

Analyte	Expected	Found	%D	Q
Total Organic Carbon	6430	6680	3.9	

Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

Analytical Lot ID: 042506TOCS

Instrument Name: TOC Skalar

Concentration Units: mg/kg

Initial Calibration ID: 101405S1

CCV #1 ID: CV1-0425 CCV #2 ID: CV2-0425 CCV #3 ID:

Analyte	Expected	Found	%D	Q	Expected	Found	%D	Q	Expected	Found	%D	Q
Total Organic Carbon	4000	3940	-1.5		4000	4090	2.2					

Comments:

3-WC

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-0425

SDG No.: F1522

Analysis Method: ASTM E777

Initial Cal ID: 101405S1

Matrix: (Soil/Water) SOIL

Instrument: TOC Skalar

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-0425

Date Analyzed: 04/25/06

Time Analyzed: 1121

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, AND MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED
02	BS1S0425	BS1S0425	04/25/06	1111
07	J11JH9	F152201	04/25/06	1331

COMMENTS:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F1522

Analysis Method: ASTM E777

Initial Cal ID: 101405S1

Matrix: (Soil/Water) SOIL

Instrument: TOC Skalar

Lab Name: CH2M HILL/LAB/CVO

LCS ID: BS1S0425

Date Analyzed: 04/25/06

Time Analyzed: 1111

Concentration Units: mg/kg

Analyte	Expected	Found	%R	QC Limits %R	Q
Total Organic Carbon	8840	9120	103	75-125	

* Values outside of QC limits

Comments:

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

Lab Code: CVO

Instrument: TOC SKALAR

Analytical Lot ID: 101405TOCS

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED
02	LEVEL1	LEVEL1	10/14/05	1148
03	LEVEL2	LEVEL2	10/14/05	1158
04	LEVEL3	LEVEL3	10/14/05	1208
05	LEVEL4	LEVEL4	10/14/05	1218
06	LEVEL5	LEVEL5	10/14/05	1228
07	ICV-1014	ICV-1014	10/14/05	1252

COMMENTS: _____

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F1522

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

Lab Code: CVO

Instrument: TOC Skalar

Analytical Lot ID: 042506TOCS

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED
01	CV1-0425	CV1-0425	04/25/06	1058
02	BS1S0425	BS1S0425	04/25/06	1111
03	SB1-0425	SB1-0425	04/25/06	1121
07	J11JH9	F152201	04/25/06	1331
14	CV2-0425	CV2-0425	04/25/06	1511

COMMENTS: _____

CH2M HILL
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P.O. Box 428
Corvallis, OR 97330-0428
Telephone: 541-752-4271
Fax: 541-752-0276

04/25/06

MDL Study Report

Analytical Method: ASTM E777

Instrument ID: TOC Skalar

Matrix: Soil

Concentration Units: mg/kg

Analyte	Analysis Date	Amt. Spiked	Replicates 1	2	3	4	5	6	7	8	Std. Dev.	MDL
Total Organic Carbon	08/17/05	140	31.0	14.4	8.89	29.4	32.4	27.1	6.37		11.1	35.0

CHAIN OF CUSTODY/SHIPPING DOCUMENTS

F1522-01

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-100	Page 1 of 1

Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location UPPER RIPARIAN #14		SAF No. RC-051
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment GROUND TRANSPORT
Shipped To CH2MHILL	Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.

Preservation	None	None										
Type of Container	G/P	P/G										
No. of Container(s)	1	1										
Volume	1000g	4000g										
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172										
Sample No.	Matrix *	Sample Date	Sample Time									
J11JH9	SOIL	4-12-06	16:30	1	1							

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Elizabeth M. Tipton CH2M	4-13-06 10:30	Darin Dillard CH2M HILL	4-13-06 10:30

SPECIAL INSTRUCTIONS

These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

(1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids

Matrix *

S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

CH2MHILL
Analytical Services

Sample Receipt Record

Batch Number: F1522 Date received: 4-13-06

Client/Project ELR Consulting

VERIFICATION OF SAMPLE CONDITIONS (verify all items) * HD = Client Hand delivered Samples

Observation	YES	NO
Radiological Screening for AFCEE		X
Were custody seals intact and on the outside of the cooler?		HD
If yes, Where? Front____ Rear____ Lt Side____ Rt Side____		
Type of packing material: Ice Blue Ice Bubble wrap		HD
Was the Chain of Custody inside the cooler?		HD
Was the Chain of Custody properly filled out?	X	
Were the sample containers in good condition?	X	
Containers supplied by ASL?	X	
Any sample with < 1/2 holding time remaining? If so contact LPM		X
Was there ice in the cooler? Enter temp. 23.4 C		X
All VOCs free of air bubbles ?		NA

VERIFICATION OF SAMPLE PRESERVATION

Sample No	Nutrients pH <2	Metals pH <2	Volatiles pH <2	Cyanides pH >12	TOC pH <2	TOX pH <2	Other (specify)	N/A (soils/unpres)
1								X
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

LOGIN AND pH VERIFICATIONS PERFORMED BY

[illegible] 4/13/06 10:30
Date/Time

Date/Time

Rev 11/05/2003-recptrcd.xls

VersionCo	LabName	SDG	FieldID	NativeID	QAQCTyp	LRType	Matrix	LabSampl	AnalysisM	ExtractionI	SampleDa	SampleTin	ReceiveDa	ExtractDat	ExtractTim	AnalysisDa	AnalysisTi	PercentSo	LabLotCtlN	CAS	ParamID	Analyte	Result
4.00EPAC	CHMC	F1522	J11JH9	J11JH9	N		SOIL	F152201	ASTM E77	NONE	4/12/2006	16:30	4/13/2006			4/25/2006	13:31	98.36		TOC	TOC	Total Orga	14000
4.00EPAC	CHMC	F1522	J11JH9	J11JH9	N		SOIL	F152201	E351.4	METHOD	4/12/2006	16:30	4/13/2006	4/18/2006	11:25	4/18/2006	11:25	98.36	SB1-0418	7727-37-9	KN	Total Kjeld	1310
4.00EPAC	CHMC	F1522	J11JH9	J11JH9	N		SOIL	F152201	E350.3	METHOD	4/12/2006	16:30	4/13/2006	4/13/2006	14:07	4/13/2006	14:07	98.36	SB1-0413	7664-41-7	NH3N	Ammonia-I	5.26
4.00EPAC	CHMC	F1522	J11JH9	J11JH9	N		SOIL	F152201	E300.0A	METHOD	4/12/2006	16:30	4/13/2006	4/21/2006	23:25	4/21/2006	23:25	98.36	SB1-0421	16887-00-(	CL	Chloride	1.77
4.00EPAC	CHMC	F1522	J11JH9	J11JH9	N		SOIL	F152201	E300.0A	METHOD	4/12/2006	16:30	4/13/2006	4/21/2006	23:25	4/21/2006	23:25	98.36	SB1-0421	16984-48-I	F	Fluoride	0.483
4.00EPAC	CHMC	F1522	J11JH9	J11JH9	N		SOIL	F152201	E300.0A	METHOD	4/12/2006	16:30	4/13/2006	4/21/2006	23:25	4/21/2006	23:25	98.36	SB1-0421	14797-55-I	NO3N	Nitrate-N	3.69
4.00EPAC	CHMC	F1522	J11JH9	J11JH9	N		SOIL	F152201	E300.0A	METHOD	4/12/2006	16:30	4/13/2006	4/21/2006	23:25	4/21/2006	23:25	98.36	SB1-0421	14797-65-(	NO2N	Nitrite-N	0.664
4.00EPAC	CHMC	F1522	J11JH9	J11JH9	N		SOIL	F152201	E300.0A	METHOD	4/12/2006	16:30	4/13/2006	4/21/2006	23:25	4/21/2006	23:25	98.36	SB1-0421	14808-79-I	SO4	Sulfate	5.96
4.00EPAC	CHMC	F1522	J11JH9	J11JH9	N		SOIL	F152201	ASTM D22	NONE	4/12/2006	16:30	4/13/2006			4/17/2006	16:52	98.36		MOISTURI	MOIST	Moisture	1.64
4.00EPAC	CHMC	F1522	J11JH9	J11JH9	N		SOIL	F152201	SW9045C	METHOD	4/12/2006	16:30	4/13/2006	4/24/2006	14:05	4/24/2006	14:05	98.36	SB1-0424	pH	PH	pH	7.28
4.00EPAC	CHMC	F1522	BS1S0413	BS1S0413	BS		SOIL	BS1S0413	E350.3	METHOD				4/13/2006	12:40	4/13/2006	12:40	100	SB1-0413	7664-41-7	NH3N	Ammonia-I	196
4.00EPAC	CHMC	F1522	BS1S0418	BS1S0418	BS		SOIL	BS1S0418	E351.4	METHOD				4/18/2006	10:51	4/18/2006	10:51	100	SB1-0418	7727-37-9	KN	Total Kjeld	807
4.00EPAC	CHMC	F1522	BS1S0421	BS1S0421	BS		SOIL	BS1S0421	E300.0A	METHOD				4/21/2006	21:28	4/21/2006	21:28	100	SB1-0421	16887-00-(	CL	Chloride	27
4.00EPAC	CHMC	F1522	BS1S0421	BS1S0421	BS		SOIL	BS1S0421	E300.0A	METHOD				4/21/2006	21:28	4/21/2006	21:28	100	SB1-0421	16984-48-I	F	Fluoride	26.7
4.00EPAC	CHMC	F1522	BS1S0421	BS1S0421	BS		SOIL	BS1S0421	E300.0A	METHOD				4/21/2006	21:28	4/21/2006	21:28	100	SB1-0421	14808-79-I	SO4	Sulfate	27.1
4.00EPAC	CHMC	F1522	BS1S0425	BS1S0425	BS		SOIL	BS1S0425	ASTM E77	NONE						4/25/2006	11:11	100		TOC	TOC	Total Orga	9120
4.00EPAC	CHMC	F1522	BS2S0421	BS2S0421	BS		SOIL	BS2S0421	E300.0A	METHOD				4/21/2006	21:48	4/21/2006	21:48	100	SB1-0421	14797-65-(	NO2N	Nitrite-N	5.71
4.00EPAC	CHMC	F1522	BS3S0421	BS3S0421	BS		SOIL	BS3S0421	E300.0A	METHOD				4/21/2006	21:57	4/21/2006	21:57	100	SB1-0421	14797-55-I	NO3N	Nitrate-N	38.7
4.00EPAC	CHMC	F1522	SB1-0413	SB1-0413	LB		SOIL	SB1-0413	E350.3	METHOD				4/13/2006	12:44	4/13/2006	12:44	100	SB1-0413	7664-41-7	NH3N	Ammonia-I	1.28
4.00EPAC	CHMC	F1522	SB1-0418	SB1-0418	LB		SOIL	SB1-0418	E351.4	METHOD				4/18/2006	10:53	4/18/2006	10:53	100	SB1-0418	7727-37-9	KN	Total Kjeld	100
4.00EPAC	CHMC	F1522	SB1-0421	SB1-0421	LB		SOIL	SB1-0421	E300.0A	METHOD				4/21/2006	22:07	4/21/2006	22:07	100	SB1-0421	16887-00-(	CL	Chloride	0.095
4.00EPAC	CHMC	F1522	SB1-0421	SB1-0421	LB		SOIL	SB1-0421	E300.0A	METHOD				4/21/2006	22:07	4/21/2006	22:07	100	SB1-0421	16984-48-I	F	Fluoride	0.5
4.00EPAC	CHMC	F1522	SB1-0421	SB1-0421	LB		SOIL	SB1-0421	E300.0A	METHOD				4/21/2006	22:07	4/21/2006	22:07	100	SB1-0421	14797-55-I	NO3N	Nitrate-N	0.5
4.00EPAC	CHMC	F1522	SB1-0421	SB1-0421	LB		SOIL	SB1-0421	E300.0A	METHOD				4/21/2006	22:07	4/21/2006	22:07	100	SB1-0421	14797-65-(	NO2N	Nitrite-N	0.055
4.00EPAC	CHMC	F1522	SB1-0421	SB1-0421	LB		SOIL	SB1-0421	E300.0A	METHOD				4/21/2006	22:07	4/21/2006	22:07	100	SB1-0421	14808-79-I	SO4	Sulfate	0.165
4.00EPAC	CHMC	F1522	SB1-0425	SB1-0425	LB		SOIL	SB1-0425	ASTM E77	NONE						4/25/2006	11:21	100		TOC	TOC	Total Orga	100

ExpectedV	Units	Dilution	MDL	RL	LabQualifi	Surrogate	Comments	ParValUnc	Recovery	LowerCont	UpperCont	Basis	ConcQual	MDLAdjus	RLAdjuste	SampleDe	LeachMeth	LeachDate	LeachTime	LeachLot	AnalysisLo	CalRefID
	MG/KG	1	109	313		N						D	=	109	313	J11JH9	NONE				SB1-0425	101405S1
	MG/KG	1	40.1	147		N						D	=	40.9	150	J11JH9	NONE				041806KN	041806TKN
	MG/KG	1	0.898	3.36		N						D	=	0.916	3.43	J11JH9	NONE				041306NH	040506NH3
	MG/KG	1	0.0575	0.473		N						D	=	0.0587	0.483	J11JH9	NONE				042106Q2	300A-013006
	MG/KG	1	0.0514	0.473	U	N						D	U	0.0524	0.483	J11JH9	NONE				042106Q2	300A-013006
	MG/KG	1	0.0445	0.473		N						D	=	0.0454	0.483	J11JH9	NONE				042106Q2	300A-013006
	MG/KG	1	0.0425	0.473		N						D	=	0.0434	0.483	J11JH9	NONE				042106Q2	300A-013006
	MG/KG	1	0.0764	0.473		N						D	=	0.0779	0.483	J11JH9	NONE				042106Q2	300A-013006
	PERCENT	1	0	0		N						D	=	0	0	J11JH9	NONE				041706MC	NONE
	PH UNITS	1	0	0		N						D	=	0	0	J11JH9	NONE				042406PH	NONE
200	MG/KG	1	0.534	2		N			98.1	75	125	D	=	0.534	2		NONE				041306NH	040506NH3
680	MG/KG	1	27.3	100		N			119	75	125	D	=	27.3	100		NONE				041806KN	041806TKN
25	MG/KG	1	0.0607	0.5		N			108	90	110	D	=	0.0607	0.5		NONE				042106Q2	300A-013006
25	MG/KG	1	0.0543	0.5		N			107	90	110	D	=	0.0543	0.5		NONE				042106Q2	300A-013006
25	MG/KG	1	0.0806	0.5		N			108	90	110	D	=	0.0806	0.5		NONE				042106Q2	300A-013006
8840	MG/KG	1	56.5	162		N			103	75	125	D	=	56.5	162		NONE				SB1-0425	101405S1
5.65	MG/KG	1	0.0449	0.5		N			101	90	110	D	=	0.0449	0.5		NONE				042106Q2	300A-013006
36	MG/KG	1	0.0469	0.5		N			108	90	110	D	=	0.0469	0.5		NONE				042106Q2	300A-013006
0	MG/KG	1	0.534	2	B	N						D	J	0.534	2		NONE				041306NH	040506NH3
0	MG/KG	1	27.3	100	U	N						D	U	27.3	100		NONE				041806KN	041806TKN
0	MG/KG	1	0.0607	0.5	B	N						D	J	0.0607	0.5		NONE				042106Q2	300A-013006
0	MG/KG	1	0.0543	0.5	U	N						D	U	0.0543	0.5		NONE				042106Q2	300A-013006
0	MG/KG	1	0.0469	0.5	U	N						D	U	0.0469	0.5		NONE				042106Q2	300A-013006
0	MG/KG	1	0.0449	0.5	B	N						D	J	0.0449	0.5		NONE				042106Q2	300A-013006
0	MG/KG	1	0.0806	0.5	B	N						D	J	0.0806	0.5		NONE				042106Q2	300A-013006
0	MG/KG	1	35	100	U	N						D	U	35	100		NONE				SB1-0425	101405S1