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

RECEIVED
JUN 2 2 2006
EDMC

Prepared for

ELR CONSULTING, INC.
WASHINGTON CLOSURE HANFORD
RICHLAND, WASHINGTON

Prepared by

CH2M HILL
2300 NW Walnut Boulevard
Corvallis, Oregon 97330

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

RC-051
F1518

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 Information | | | | | | | | Test Species Information | ID# Nem 012 | ID# | ID# | ID# |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID Number | Field ID | Collected Date | Collected Time | Total Residual Chlorine (mg/l) As Received / As Dechlor. | Ammonia $NH_3$-N mg/l | Hardness mg/l as $CaCO_3$ | Alkalinity mg/l as $CaCO_3$ | | Acute | | | |
| | | | | | | | | Organism Age at Initiation | 4 days | | | |
| BN1574-01 | J115B4 | 4/5/06 | -- | - / - | - | - | - | | — | | | |
| -02 | J115B5 | 4/9/06 | - | - / - | - | - | - | Test Container Size | 15 mm petri | | | |
| -03 | J115H6 | 4/10/06 | - | - / - | - | - | - | Test Volume | 2.33 g dry wt. | | | |
| -04 | J11550 | 4/11/06 | - | - / - | - | - | - | Feeding: Type | none | | | |
| -05 | J115H9 | 4/12/06 | - | - / - | - | - | - | Amount | — | | | |
| | | | | / | | | | Aeration: Began | none | | | |
| | | | | / | | | | Amount | — | | | |
| | | | | / | | | | Dilution Water ID# | Milli-Q Equiv. | | | |
| | | | | / | | | | Acclimation Period | 4 days | | | |
| | | | | / | | | | Test Location | #7 | | | |
| | | | | / | | | | Organism Source | In house | | | |
| | | | | / | | | | 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 | Tech. 0 Hrs NJ | 24 Hrs NJ/DO | Beginning, Date 4-20-06 | Time 0910

Sample Description see below | Time 0 Hrs 0910 | 24 Hrs 1130 | Ending, Date 4-21-06 | Time 1130

Test Speci *Caenorhabditis elegans* | ID#: Nem 012

| 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 | ~~5.3~~ 6.3 NJ | | 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: 0910

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 | |
| 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 | | | |

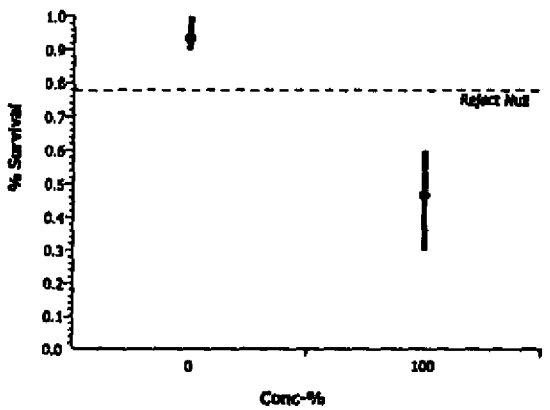
**ANOVA Assumptions**

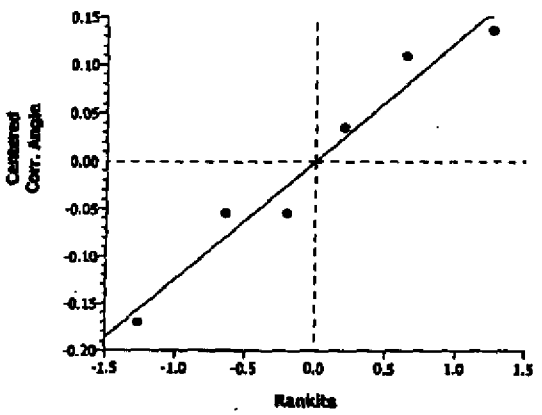
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.75565 | 199.00000 | 0.53253 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94467 | | 0.69861 | Normal Distribution |

**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 | | | |

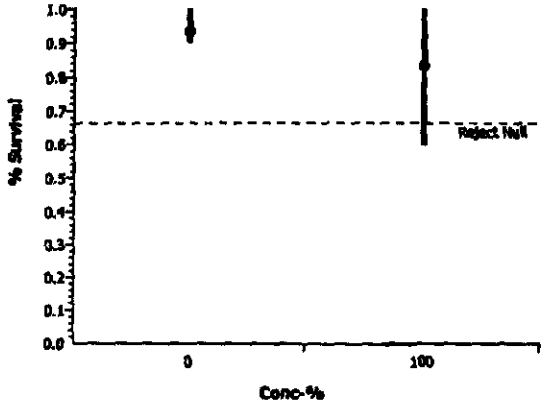
**ANOVA Assumptions**

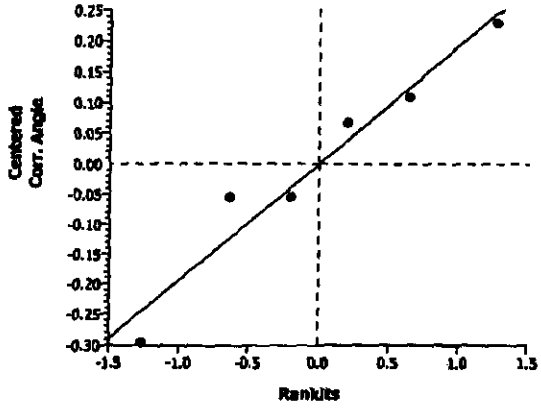
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 8.18766 | 199.00000 | 0.21768 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95710 | | 0.79717 | Normal Distribution |

**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 | 0.80000 | 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:** | 10-5728-8183 | **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 | | | |

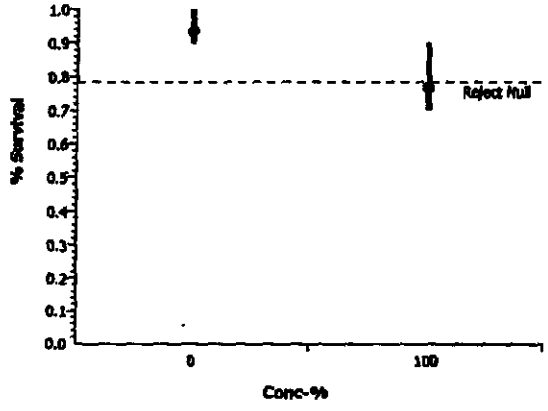
**ANOVA Assumptions**

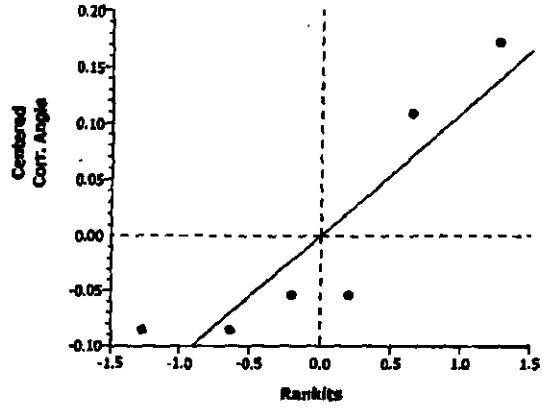
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.50409 | 199.00000 | 0.57076 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.78325 | | 0.04132 | Normal Distribution |

**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 | | | |

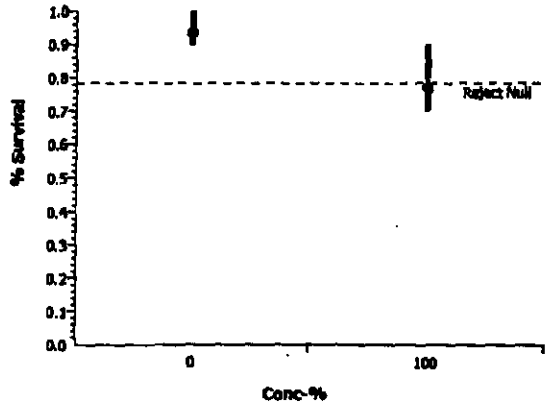
**ANOVA Assumptions**

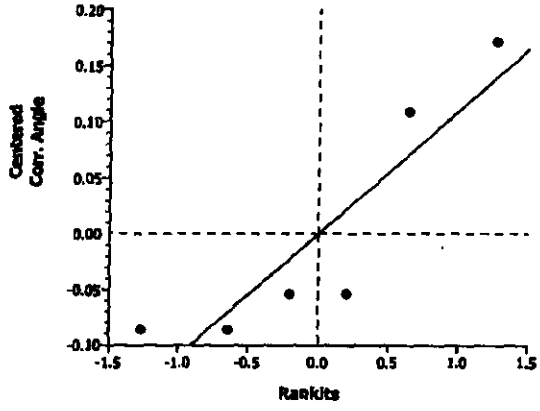
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.50409 | 199.00000 | 0.57076 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.78325 | | 0.04132 | Normal Distribution |

**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 | 0.18406 | 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 | | | |

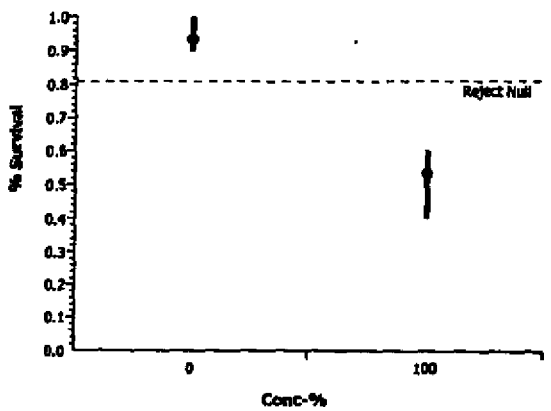
**ANOVA Assumptions**

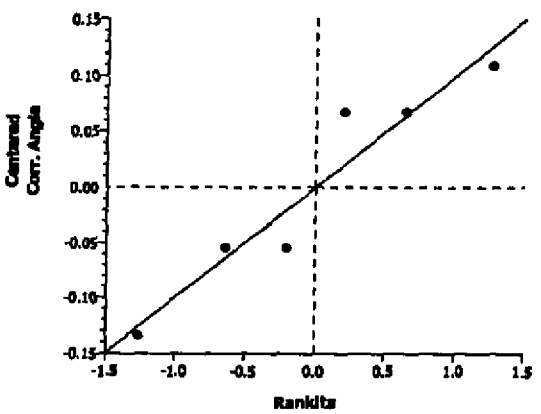
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.52658 | 199.00000 | 0.79158 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.90288 | | 0.39125 | Normal Distribution |

**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#: B033-06
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 | Comments: |
|---|---|---|---|---|
| 1 | 10 | 0 | 10 | * an extra nematode was added at test initiation but was still |
| 2 | 10 | 2 | 10 | alive at test ending. |
| 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 | NT ~~9~~ 10 | 10 | |
| 13 | 10 | 0 | 10 | |
| 14 | 10 | 10 | 10 | |
| 15 | 10 | 9 | 10 | |

| Endpoint | LC50 | Cusum Chart Limits |
|---|---|---|
| Survival | 52.6 | 49.9 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 | Tech. 0 Hrs NJ | 24 Hrs NJ | Beginning, Date 4-3-06 | Time 0930

Sample Description see below | Time 0 Hrs 0930 | 24 Hrs 0930 | Ending, Date 4-4-06 | Time 0830

Test Specie *Caenorhabditis elegans* | ID#: Nem009

| 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 NT | 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 | NT ~~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**

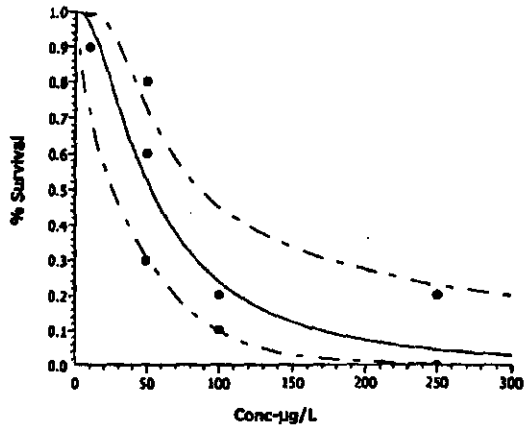
| Conc-µg/L | Control Type | Count | Calculated Variate(A/B) Mean | Minimum | Maximum | SE | SD | A | B |
|---|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 3 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 31 | 31 |
| 10 | | 3 | 0.96667 | 0.90000 | 1.00000 | 0.01179 | 0.05773 | 29 | 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 |

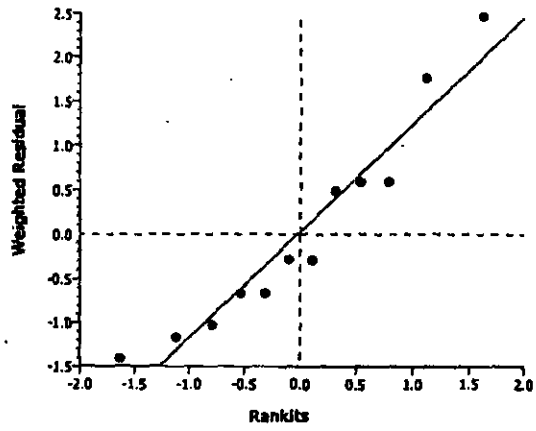
**Data Detail**

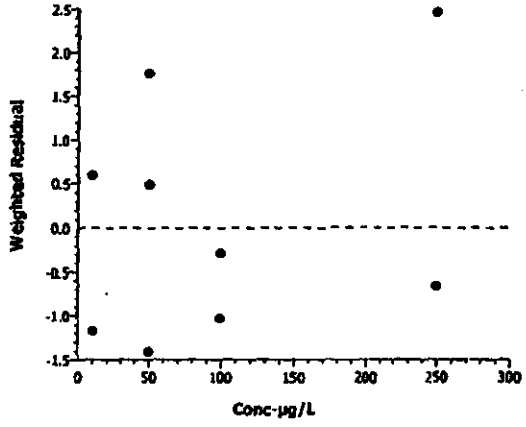
| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 1.00000 | 1.00000 | 1.00000 | | | | | | | |
| 10 | | 0.90000 | 1.00000 | 1.00000 | | | | | | | |
| 50 | | 0.80000 | 0.60000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

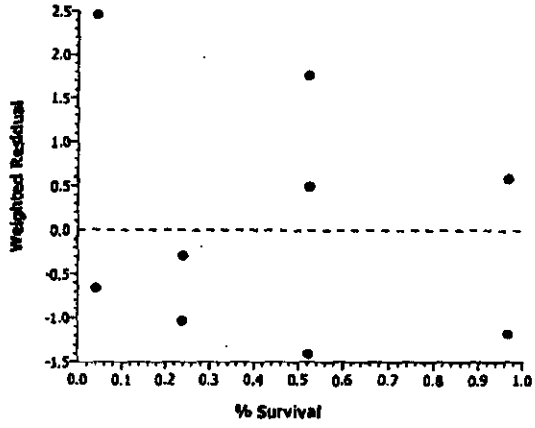
# CETIS Analysis Detail

Graphics



**APPENDIX C**
**CHAIN OF CUSTODY**

F1493

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | RC-051-65 | Page 1 of 1 |
|---|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L<br>Air Quality ☐ |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>100-H RIPARIAN #1 | | SAF No.<br>RC-051 | Data Turnaround<br>45 Days |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment<br>GROUND TRANSPORT | |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11JB4 | SOIL | 4-5-06 | 18:00 | 1 | 1 | | | | | | | | -1 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From CH2MHill<br>Elizabeth M Tyler | Date/Time 10:30<br>4-6-06 | Received By/Stored In<br>Dayna Kaumann | Date/Time 10:30<br>4-6-06 |
| 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

F149301-SOIL

BN 1574-01

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 ~~E1503~~ should be F1503

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | RC-051-66 | Page 1 of 1 |
|---|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L<br>Air Quality ☐ |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>100-D RIPARIAN #2 | | SAF No.<br>RC-051 | Data Turnaround<br>45 Days |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment<br>GROUND TRANSPORT | |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>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, analyses to be included with Strontium-89,90 -- Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to property 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-S012 BN1574-02

Matrix *
S=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
W=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)

F1514-01

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | RC-051-97 | Page 1 of 1 |
|---|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L<br>Air Quality ☐ |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>100-H RIPARIAN #9 | | SAF No.<br>RC-051 | Data Turnaround<br>45 Days |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment<br>GROUND TRANSPORT | |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No.<br>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 Liouville.*

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 CH2MHILL | Date/Time 10:30 | Received By/Stored In | Date/Time 4/11/06 |
| Elizabeth M Tyson | 4-11-06 | Nancy Hubbard CH2M HILL | 10:30 |
| 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

BN1574-03

Matrix *

S=Soil
SE=Sediment
SO=Solid
SI=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)

F1518-01

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | RC-051-101 | Page 1 of 1 |
|---|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L<br>Air Quality ☐ |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>UPPER RIPARIAN #16 | | SAF No.<br>RC-051 | Data Turnaround<br>45 Days |
| Ice Chest No. | Field Logbook No.<br>EL-1596-1 | COA<br>BESRAS6520 | Method of Shipment<br>GROUND TRANSPORT | |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No.<br>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 | |
| Relinquished By/Removed From | Date/Time 10:30 | Received By/Stored In | Date/Time 4-12-06 |
| Elizabeth M Tepper | 4-12-06 | Daisy D Hubbard CH2M HILL | 11:30 |
| 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

BN1574-04

Matrix *

S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
OS=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)

F1522-01

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | RC-051-100 | Page 1 of 1 |
|---|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L<br>Air Quality ☐ |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>UPPER RIPARIAN #14 | | SAF No.<br>RC-051 | Data Turnaround<br>45 Days |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment<br>GROUND TRANSPORT | |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No.<br>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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11JH9 | SOIL | 4-12-06 | 16:30 | 1 | 1 | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From CH2M | Date/Time 10:30 | Received By/Stored In | Date/Time 4-13-06 |
| [signature] | 4-13-06 | [signature] CH2M HILL | 10:30 |
| 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

BN 1574-05

Matrix *

S=Soil
SE=Sediment
SO=Solid
SI=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

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. F1518

Dear Emmett Richards:

On April 12, 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. F1518

| Sample ID | Client Sample ID | Date Collected | Time Collected |
|---|---|---|---|
| F151801 | J11JJ0 | 04/11/2006 | 16:00 |

**Table of Contents**
**CH2M HILL Laboratory Reference No. F1518**

**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 ..... 57
Sample Data Summary ..... 59
QC Summary ..... 62

Chain of Custody/Shipping Documents ..... 72

# 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.: F1518

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 aceeptance 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 Tapper | 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:

J11JJ0

SDG No.: F1518

Lab Name: CH2M HILL/LAB/CVO

Matrix: SOIL

Lab Sample ID: F151801

% Moisture: 1

Date Received: 04/12/06

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 7664-41-7 | Ammonia-N | 0.951 | 3.56 | 4.95 | | mg/kg | 1 | 0.567 G | E350.3 | 04/13/06 |

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-0413

SDG No.: F1518

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.: F1518

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.: F1518

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.: F1518

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.: F1518

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.: F1518

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 |
| 21 | J11JJ0 | F151801 | 04/13/06 | 1405 |

COMMENTS: _____

# GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F1518

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.: F1518

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: _____

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F1518

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 |
| 22 | J11JJ0 | F151801 | 04/13/06 | 1405 |
| 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 |



ET060501-16:18-F1518-W

## ANIONS BY METHOD EPA300.0A

**CASE NARRATIVE**
**ANIONS**

Analytical Method: EPA300.0 Batch No.: F1518

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: Date: 5/19/06

Reviewed by: Date: 5/19/06

AFCEE FORM I-1

# SAMPLE DATA SUMMARY

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J11JJ0

SDG No.: F1518

Lab Name: CH2M HILL/LAB/CVO

Matrix: SOIL

Lab Sample ID: F151801

% Moisture: 1

Date Received: 04/12/06

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 0.0587 | 0.484 | 1.55 | | mg/kg | 1 | 5.22 G | E300.0A | 04/21/06 |
| 16984-48-8 | Fluoride | 0.0525 | 0.484 | 0.484 | U | mg/kg | 1 | 5.22 G | E300.0A | 04/21/06 |
| 14797-55-8 | Nitrate-N | 0.0454 | 0.484 | 2.87 | | mg/kg | 1 | 5.22 G | E300.0A | 04/21/06 |
| 14797-65-0 | Nitrite-N | 0.0434 | 0.484 | 0.465 | B | mg/kg | 1 | 5.22 G | E300.0A | 04/21/06 |
| 14808-79-8 | Sulfate | 0.0780 | 0.484 | 8.70 | | mg/kg | 1 | 5.22 G | E300.0A | 04/21/06 |

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-0421

SDG No.: F1518

Matrix: SOIL

% Moisture: 0

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-0421

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

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F1518

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.: F1518

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 | 0.9980 | |
| Sulfate | LNR | 0.9991 | |

Comments:

2B-WC

GENERAL CHEMISTRY SECOND SOURCE CALIBRATION VERIFICATION DATA

SDG No.: F1518

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.: F1518

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:

3-WC

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-0421

SDG No.: F1518

Analysis Method: E300.0A

Initial Cal ID: 300A-013006

Matrix: (Soil/Water) SOIL

Instrument: ICQ

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-0421

Date Analyzed: 04/21/06

Time Analyzed: 2207

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 |
| 51 | J11JJ0 | F151801 | 04/21/06 | 2315 |

COMMENTS: _____

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F1518

Analysis Method: E300.0A

Initial Cal ID: 300A-013006

Matrix: (Soil/Water) SOIL

Instrument: ICQ

Lab Name: CH2M HILL/LAB/CVO

LCS ID: BS1S0421

Date Analyzed: 04/21/06

Time Analyzed: 2128

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.: F1518

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:

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F1518

Analysis Method: E300.0A

Initial Cal ID: 300A-013006

Matrix: (Soil/Water) SOIL

Instrument: ICQ

Lab Name: CH2M HILL/LAB/CVQ

LCS ID: BS3S0421

Date Analyzed: 04/21/06

Time Analyzed: 2157

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:

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F1518

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.: F1518

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Lab Code: CVO

Instrument: ICQ

Analytical Lot ID: 04210602

| | 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 |
| 50 | J11JJ0 | F151801 | 04/21/06 | 2315 |
| 55 | CV4-0421 | CV4-0421 | 04/21/06 | 2354 |

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

05/19/06

# MDL Study Report

Analytical Method: E300.0
Matrix: Soil

Instrument ID: ICQ
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 |
| 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 |
| 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 |

**PERCENT MOISTURE**
**ASTM D2216**

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J11JJ0

SDG No.: F1518

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: F151801

Date Received: 04/12/06

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| MOISTURE | Moisture | 0.00 | 0.00 | 1.05 | | % | 1 | 10.1849 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 (%) |
|---|---|---|---|---|---|---|---|---|
| F151801 | J11JJ0 | 8 | 2362 | 2.362 | 0.50 | 0.10 | 0.10 | 99.90 |
| | | 16 | 1180 | 1.180 | 69.80 | 13.99 | 14.09 | 85.91 |
| | | 30 | 600 | 0.600 | 95.90 | 19.22 | 33.31 | 66.69 |
| | | 50 | 500 | 0.500 | 93.50 | 18.74 | 52.05 | 47.95 |
| | | 100 | 147 | 0.147 | 139.10 | 27.88 | 79.94 | 20.06 |
| | | 200 | 75 | 0.075 | 73.20 | 14.67 | 94.61 | 5.39 |
| | | pan | | | 26.90 | 5.39 | 100.00 | 0.00 |
| | | total | | | 498.9 | | | |



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:

J11JJ0

SDG No.: F1518

Matrix: SOIL

% Moisture: 1

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: F151801

Date Received: 04/12/06

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| pH | pH | 0.00 | 0.00 | 7.19 | | pH | 1 | 20 G | SW9045C | 04/12/06 |

**TKN**
**METHOD EPA 351.4**

**CASE NARRATIVE**
**TKN**

Analytical Method: EPA 351.4 Batch No.: F1518

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 Tupper Date: 5-1-06

Reviewed by: [illegible] Date: 5/3/06

# SAMPLE DATA SUMMARY

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J11JJ0

SDG No.: F1518

Matrix: SOIL

% Moisture: 1

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: F151801

Date Received: 04/12/06

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 7727-37-9 | Total Kjeldahl Nitrogen as N | 52.3 | 192 | 443 | | mg/kg | 1 | 0.5262 G | E351.4 | 04/18/06 |

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-0418

SDG No.: F1518

Matrix: SOIL

% Moisture: 0

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-0418

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.: F1518

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.: F1518

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.: F1518

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.: F1518

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:

# SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-0418

SDG No.: F1518

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 |
| 19 | J11JJ0 | F151801 | 04/18/06 | 1114 |

COMMENTS:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F1518

Analysis Method: E351.4

Initial Cal ID: 041806TKN

Matrix: (Soil/Water) SOIL

Instrument: NONE

Lab Name: CH2M HILL/LAB/CVO

LCS ID: BS1S0418

Date Analyzed: 04/18/06

Time Analyzed: 1051

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.: F1518

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 |
| 19 | J11JJ0 | F151801 | 04/18/06 | 1114 |
| 22 | CV3-0414 | CV3-0414 | 04/18/06 | 1121 |

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: 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 |

**TOTAL ORGANIC CARBON**
**BY ASTM E777**

**CASE NARRATIVE**
**TOC SOILS**

Analytical Method: ASTM E-777 Batch No.: F1518

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 acceptance criteria were met.

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:

J11JJ0

SDG No.: F1518

Matrix: SOIL

% Moisture: 0

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: F151801

Date Received: 04/12/06

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| TOC | Total Organic Carbon | 140 | 400 | 12400 | | mg/kg | 1 | 0.2502 G | ASTM E777 | 04/25/06 |

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-0425

SDG No.: F1518

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 |

# QC SUMMARY

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F1518

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:

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F1518

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.: F1518

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.: F1518

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.: F1518

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 |
| 06 | J11JJ0 | F151801 | 04/25/06 | 1158 |

COMMENTS: _____

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F1518

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

LCS ID: BS1S0425

Initial Cal ID: 101405S1

Date Analyzed: 04/25/06

Matrix: (Soil/Water) SOIL

Time Analyzed: 1111

Instrument: TOC Skalar

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.: F1518

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.: F1518

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 |
| 06 | J11JJ0 | F151801 | 04/25/06 | 1158 |
| 14 | CV2-0425 | CV2-0425 | 04/25/06 | 1511 |

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

04/25/06

# MDL Study Report

Analytical Method: ASTM E777
Matrix: Soil

Instrument ID: TOC Skalar
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

F1518-01

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

| | | | |
|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>UPPER RIPARIAN #16 | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596-1 | COA<br>BES/RAS 6520 | Method of Shipment<br>GROUND TRANSPORT |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No.<br>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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11JJ0 | SOIL | 4-11-06 | 16:00 | 1 | 1 | | | | | | | | -01 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Elizabeth M Tepper | | CH2M Hill | |
| Relinquished By/Removed From | Date/Time 10:30 | Received By/Stored In | Date/Time 4-12-06 |
| Elizabeth M Tepper | 4-12-06 | Darin D. Hubbard CH2M HILL | 11:30 |
| 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

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: F1518-0 Date received: 4-12-00

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. 22.0 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**

Darrin D. Lindhard 4/12/00 11:30
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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.00 | EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | ASTM E77 | NONE | 4/11/2006 | 16:00 | 4/12/2006 | | | 4/25/2006 | 11:58 | 98.95 | | TOC | TOC | Total Orga | 12400 |
| 4.00 | EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E351.4 | METHOD | 4/11/2006 | 16:00 | 4/12/2006 | 4/18/2006 | 11:14 | 4/18/2006 | 11:14 | 98.95 | SB1-0418 | 7727-37-9 | KN | Total Kjeld | 443 |
| 4.00 | EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E350.3 | METHOD | 4/11/2006 | 16:00 | 4/12/2006 | 4/13/2006 | 14:05 | 4/13/2006 | 14:05 | 98.95 | SB1-0413 | 7664-41-7 | NH3N | Ammonia-I | 4.95 |
| 4.00 | EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E300.0A | METHOD | 4/11/2006 | 16:00 | 4/12/2006 | 4/21/2006 | 23:15 | 4/21/2006 | 23:15 | 98.95 | SB1-0421 | 16887-00-( | CL | Chloride | 1.55 |
| 4.00 | EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E300.0A | METHOD | 4/11/2006 | 16:00 | 4/12/2006 | 4/21/2006 | 23:15 | 4/21/2006 | 23:15 | 98.95 | SB1-0421 | 16984-48-( | F | Fluoride | 0.484 |
| 4.00 | EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E300.0A | METHOD | 4/11/2006 | 16:00 | 4/12/2006 | 4/21/2006 | 23:15 | 4/21/2006 | 23:15 | 98.95 | SB1-0421 | 14797-55-( | NO3N | Nitrate-N | 2.87 |
| 4.00 | EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E300.0A | METHOD | 4/11/2006 | 16:00 | 4/12/2006 | 4/21/2006 | 23:15 | 4/21/2006 | 23:15 | 98.95 | SB1-0421 | 14797-65-( | NO2N | Nitrite-N | 0.465 |
| 4.00 | EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E300.0A | METHOD | 4/11/2006 | 16:00 | 4/12/2006 | 4/21/2006 | 23:15 | 4/21/2006 | 23:15 | 98.95 | SB1-0421 | 14808-79-( | SO4 | Sulfate | 8.7 |
| 4.00 | EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | ASTM D22 | NONE | 4/11/2006 | 16:00 | 4/12/2006 | | | 4/17/2006 | 16:52 | 98.95 | | MOISTURI | MOIST | Moisture | 1.05 |
| 4.00 | EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | SW9045C | METHOD | 4/11/2006 | 16:00 | 4/12/2006 | 4/12/2006 | 15:37 | 4/12/2006 | 15:37 | 98.95 | SB1-0412 | pH | PH | pH | 7.19 |
| 4.00 | EPAC | CHMC | F1518 | 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 |
| 4.00 | EPAC | CHMC | F1518 | 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 |
| 4.00 | EPAC | CHMC | F1518 | 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 |
| 4.00 | EPAC | CHMC | F1518 | BS1S0421 | BS1S0421 | BS | | SOIL | BS1S0421 | E300.0A | METHOD | | | | 4/21/2006 | 21:28 | 4/21/2006 | 21:28 | 100 | SB1-0421 | 16984-48-( | F | Fluoride | 26.7 |
| 4.00 | EPAC | CHMC | F1518 | BS1S0421 | BS1S0421 | BS | | SOIL | BS1S0421 | E300.0A | METHOD | | | | 4/21/2006 | 21:28 | 4/21/2006 | 21:28 | 100 | SB1-0421 | 14808-79-( | SO4 | Sulfate | 27.1 |
| 4.00 | EPAC | CHMC | F1518 | BS1S0425 | BS1S0425 | BS | | SOIL | BS1S0425 | ASTM E77 | NONE | | | | | | 4/25/2006 | 11:11 | 100 | | TOC | TOC | Total Orga | 9120 |
| 4.00 | EPAC | CHMC | F1518 | 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 |
| 4.00 | EPAC | CHMC | F1518 | BS3S0421 | BS3S0421 | BS | | SOIL | BS3S0421 | E300.0A | METHOD | | | | 4/21/2006 | 21:57 | 4/21/2006 | 21:57 | 100 | SB1-0421 | 14797-55-( | NO3N | Nitrate-N | 38.7 |
| 4.00 | EPAC | CHMC | F1518 | 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 |
| 4.00 | EPAC | CHMC | F1518 | 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 |
| 4.00 | EPAC | CHMC | F1518 | 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 |
| 4.00 | EPAC | CHMC | F1518 | 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-( | F | Fluoride | 0.5 |
| 4.00 | EPAC | CHMC | F1518 | 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-( | NO3N | Nitrate-N | 0.5 |
| 4.00 | EPAC | CHMC | F1518 | 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 |
| 4.00 | EPAC | CHMC | F1518 | 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-( | SO4 | Sulfate | 0.165 |
| 4.00 | EPAC | CHMC | F1518 | 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 | MDLAdjust | RLAdjuste | SampleDe | LeachMeth | LeachDate | LeachTime | LeachLot | AnalysisLo | CalRefID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MG/KG | 1 | 140 | 400 | | N | | | | | | D | = | 140 | 400 | J11JJ0 | NONE | | | | SB1-0425 | 101405S1 |
| | MG/KG | 1 | 51.8 | 190 | | N | | | | | | D | = | 52.3 | 192 | J11JJ0 | NONE | | | | 041806KN | 041806TKN |
| | MG/KG | 1 | 0.942 | 3.53 | | N | | | | | | D | = | 0.951 | 3.56 | J11JJ0 | NONE | | | | 041306NH | 040506NH3 |
| | MG/KG | 1 | 0.0582 | 0.479 | | N | | | | | | D | = | 0.0587 | 0.484 | J11JJ0 | NONE | | | | 042106Q2 | 300A-013006 |
| | MG/KG | 1 | 0.052 | 0.479 | U | N | | | | | | D | U | 0.0525 | 0.484 | J11JJ0 | NONE | | | | 042106Q2 | 300A-013006 |
| | MG/KG | 1 | 0.045 | 0.479 | | N | | | | | | D | = | 0.0454 | 0.484 | J11JJ0 | NONE | | | | 042106Q2 | 300A-013006 |
| | MG/KG | 1 | 0.043 | 0.479 | B | N | | | | | | D | J | 0.0434 | 0.484 | J11JJ0 | NONE | | | | 042106Q2 | 300A-013006 |
| | MG/KG | 1 | 0.0772 | 0.479 | | N | | | | | | D | = | 0.078 | 0.484 | J11JJ0 | NONE | | | | 042106Q2 | 300A-013006 |
| | PERCENT | 1 | 0 | 0 | | N | | | | | | D | = | 0 | 0 | J11JJ0 | NONE | | | | 041706MC | NONE |
| | PH UNITS | 1 | 0 | 0 | | N | | | | | | D | = | 0 | 0 | J11JJ0 | NONE | | | | 041206PH | 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 |

3-WC

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-0425

SDG No.: F1518

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 |
| 06 | J11JJ0 | F151801 | 04/25/06 | 1158 |

COMMENTS:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F1518

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.: F1518

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.: F1518

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 |
| 06 | J11JJ0 | F151801 | 04/25/06 | 1158 |
| 14 | CV2-0425 | CV2-0425 | 04/25/06 | 1511 |

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

04/25/06

# MDL Study Report

Analytical Method: ASTM E777
Matrix: Soil

Instrument ID: TOC Skalar
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

F1518-01

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

| | | | |
|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>UPPER RIPARIAN #16 | | SAF No.<br>RC-651 |
| Ice Chest No. | Field Logbook No.<br>EL-1596-1 | COA<br>BES RAS 6520 | Method of Shipment<br>GROUND TRANSPORT |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No.<br>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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11JJ0 | SOIL | 4-11-06 | 16:00 | 1 | 1 | | | | | | | | -01 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Elizabeth M Tepper | | CH2M Hill | |
| Relinquished By/Removed From | Date/Time 10:30 | Received By/Stored In | Date/Time 4-12-06 |
| Elizabeth M Tepper | 4-12-06 | Nancy D Hubbard CH2M HILL | 11:30 |
| 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

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: F1518-0 Date received: 4-12-06

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. 22.0 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**

Daisy D. Hubbard 4/12/06 11:30
Date/Time

Date/Time



Rev 11/05/2003-recptrcd.xls

| VersionCo | LabName | SDG | FieldID | NativeID | QAQCTyp | LRType | Matrix | LabSampl | AnalysisM | Extraction | SampleDa | SampleTin | ReceiveD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.00EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | ASTM E77 | NONE | 4/11/2006 | 16:00 | 4/12/2006 |
| 4.00EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E351.4 | METHOD | 4/11/2006 | 16:00 | 4/12/2006 |
| 4.00EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E350.3 | METHOD | 4/11/2006 | 16:00 | 4/12/2006 |
| 4.00EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E300.0A | METHOD | 4/11/2006 | 16:00 | 4/12/2006 |
| 4.00EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E300.0A | METHOD | 4/11/2006 | 16:00 | 4/12/2006 |
| 4.00EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E300.0A | METHOD | 4/11/2006 | 16:00 | 4/12/2006 |
| 4.00EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E300.0A | METHOD | 4/11/2006 | 16:00 | 4/12/2006 |
| 4.00EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | E300.0A | METHOD | 4/11/2006 | 16:00 | 4/12/2006 |
| 4.00EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | ASTM D22 | NONE | 4/11/2006 | 16:00 | 4/12/2006 |
| 4.00EPAC | CHMC | F1518 | J11JJ0 | J11JJ0 | N | | SOIL | F151801 | SW9045C | METHOD | 4/11/2006 | 16:00 | 4/12/2006 |
| 4.00EPAC | CHMC | F1518 | BS1S0413 | BS1S0413 | BS | | SOIL | BS1S0413 | E350.3 | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | BS1S0418 | BS1S0418 | BS | | SOIL | BS1S0418 | E351.4 | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | BS1S0421 | BS1S0421 | BS | | SOIL | BS1S0421 | E300.0A | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | BS1S0421 | BS1S0421 | BS | | SOIL | BS1S0421 | E300.0A | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | BS1S0421 | BS1S0421 | BS | | SOIL | BS1S0421 | E300.0A | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | BS1S0425 | BS1S0425 | BS | | SOIL | BS1S0425 | ASTM E77 | NONE | | | |
| 4.00EPAC | CHMC | F1518 | BS2S0421 | BS2S0421 | BS | | SOIL | BS2S0421 | E300.0A | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | BS3S0421 | BS3S0421 | BS | | SOIL | BS3S0421 | E300.0A | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | SB1-0413 | SB1-0413 | LB | | SOIL | SB1-0413 | E350.3 | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | SB1-0418 | SB1-0418 | LB | | SOIL | SB1-0418 | E351.4 | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | SB1-0421 | SB1-0421 | LB | | SOIL | SB1-0421 | E300.0A | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | SB1-0421 | SB1-0421 | LB | | SOIL | SB1-0421 | E300.0A | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | SB1-0421 | SB1-0421 | LB | | SOIL | SB1-0421 | E300.0A | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | SB1-0421 | SB1-0421 | LB | | SOIL | SB1-0421 | E300.0A | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | SB1-0421 | SB1-0421 | LB | | SOIL | SB1-0421 | E300.0A | METHOD | | | |
| 4.00EPAC | CHMC | F1518 | SB1-0425 | SB1-0425 | LB | | SOIL | SB1-0425 | ASTM E77 | NONE | | | |

| ExpectedV | Units | Dilution | MDL | RL | LabQualifi | Surrogate | Comments | ParValUnc | Recovery | LowerCont | UpperCont | Basis | ConcQual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MG/KG | 1 | 140 | 400 | | N | | | | | | D | = |
| | MG/KG | 1 | 51.8 | 190 | | N | | | | | | D | = |
| | MG/KG | 1 | 0.942 | 3.53 | | N | | | | | | D | = |
| | MG/KG | 1 | 0.0582 | 0.479 | | N | | | | | | D | = |
| | MG/KG | 1 | 0.052 | 0.479 | U | N | | | | | | D | U |
| | MG/KG | 1 | 0.045 | 0.479 | | N | | | | | | D | = |
| | MG/KG | 1 | 0.043 | 0.479 | B | N | | | | | | D | J |
| | MG/KG | 1 | 0.0772 | 0.479 | | N | | | | | | D | = |
| | PERCENT | 1 | 0 | 0 | | N | | | | | | D | = |
| | PH UNITS | 1 | 0 | 0 | | N | | | | | | D | = |
| 200 | MG/KG | 1 | 0.534 | 2 | | N | | | 98.1 | 75 | 125 | D | = |
| 680 | MG/KG | 1 | 27.3 | 100 | | N | | | 119 | 75 | 125 | D | = |
| 25 | MG/KG | 1 | 0.0607 | 0.5 | | N | | | 108 | 90 | 110 | D | = |
| 25 | MG/KG | 1 | 0.0543 | 0.5 | | N | | | 107 | 90 | 110 | D | = |
| 25 | MG/KG | 1 | 0.0806 | 0.5 | | N | | | 108 | 90 | 110 | D | = |
| 8840 | MG/KG | 1 | 56.5 | 162 | | N | | | 103 | 75 | 125 | D | = |
| 5.65 | MG/KG | 1 | 0.0449 | 0.5 | | N | | | 101 | 90 | 110 | D | = |
| 36 | MG/KG | 1 | 0.0469 | 0.5 | | N | | | 108 | 90 | 110 | D | = |
| 0 | MG/KG | 1 | 0.534 | 2 | B | N | | | | | | D | J |
| 0 | MG/KG | 1 | 27.3 | 100 | U | N | | | | | | D | U |
| 0 | MG/KG | 1 | 0.0607 | 0.5 | B | N | | | | | | D | J |
| 0 | MG/KG | 1 | 0.0543 | 0.5 | U | N | | | | | | D | U |
| 0 | MG/KG | 1 | 0.0469 | 0.5 | U | N | | | | | | D | U |
| 0 | MG/KG | 1 | 0.0449 | 0.5 | B | N | | | | | | D | J |
| 0 | MG/KG | 1 | 0.0806 | 0.5 | B | N | | | | | | D | J |
| 0 | MG/KG | 1 | 35 | 100 | U | N | | | | | | D | U |